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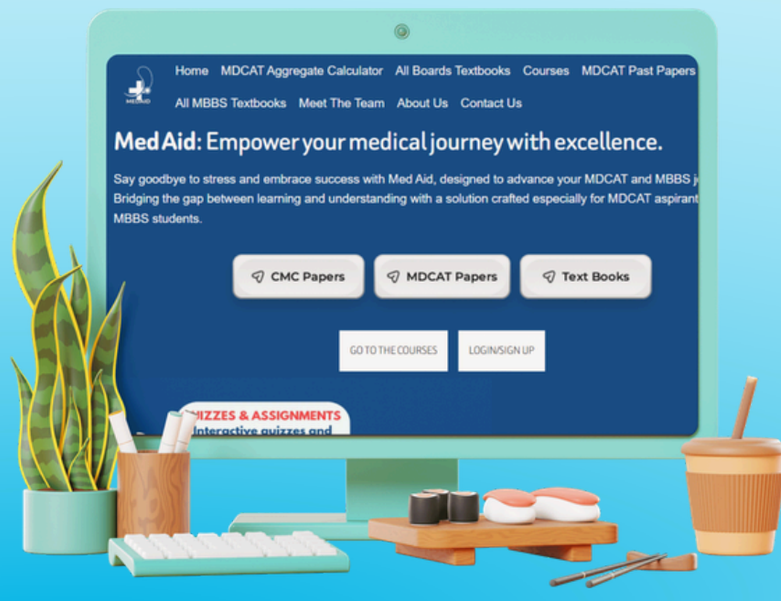
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CHEMISTRY NMDCAT
1040 MCQs
As Per PMC Syllabus 2022

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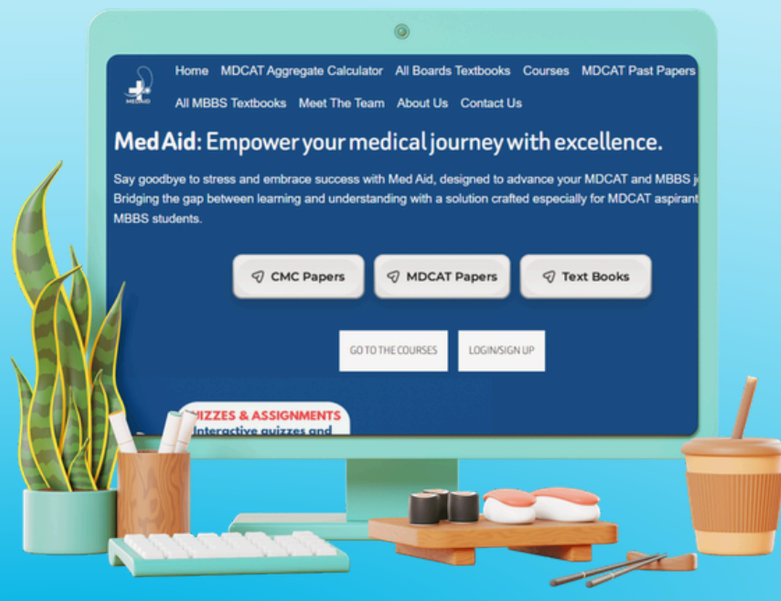
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Introduction to Fundamental Concepts Of Chemistry

Atomic mass

Q. 1 Which of the following is not macromolecule?
A. Haemoglobin
B. Lipoprotein
C. Maltose
D. Cellulose

Q. 2 Which set represents pure compounds only
A. Air, Alloy, Table salt.
B. Glucose, Sucrose, water gas
C. Milk, aspartame, serotenin
D. None

Q. 3 Haemoglobin molecule is _____ times then heavier H_2
A. 10, 000
B. 68, 000
C. 1000
D. 34,000

Q. 4 Which of the following elements has maximum number of isotopes?
A. Ca
B. Pd
C. Cd
D. Sn

Q. 5 Fractional atomic masses can be calculated from
A. Number of peaks
B. Relative abundance of isotopes
C. Number of isotopes
D. Average mass of isotopes

Q. 6 CN^{-1} is iso-electronic with
A. H_2O
B. CO
C. CO_2
D. NH_3

Q. 7 Which of the following statement is wrong about isotopes?
A. They possess different mass number
B. They possess same chemical properties
C. They possess different physical properties
D. They possess different position in the periodic table

Q. 8 Bromine has two isotopes having relative abundance as and the average atomic mass of bromine is about
A. 81
B. 79
C. 80
D. 80.5

Q. 9 Which one of the following has maximum number of isotopes?
A. Na
B. Cd
C. S
D. Ni

Q. 10 An atom of carbon is twelve times heavier than ___ atom
A. H
B. Ne
C. He
D. Li

Concept of mole

Q. 11 How many numbers of electrons are present in 4.2g of azide ion?
A. 2.1 N_A
B. 2.2 N_A
C. 21 N_A
D. 22 N_A

Q. 12 If we take same mass of following elements, largest number of atoms will be in
A. Fe (56)
B. Ca (40)
C. Ni (59)
D. Mn (55)

Q. 13 The number of moles of CH_4 which contains 3.0g of Carbon
A. 1.0
B. 0.75
C. 0.5
D. 0.25

Q. 14 4g H_2 reacts with 32.0g O_2 to produce water. Which of the following statements is correct?
A. H_2-limiting reactant
B. O_2-non-limiting reactant
C. 2.0 mole water is produced
D. 1 mole water is produced

Q. 15 2.8g of N_2 molecule contains number of chemical bonds
A. 6.02×10^{22}
B. 1.204×10^{23}
C. 1.8×10^{23}
D. 1.8×10^{22}

Q. 16 The number of moles of $KMnO_4$ that contain 1 mole of oxygen
A. 2 moles
B. 0.5 moles
C. 0.25 moles
D. 1.5 moles

Q. 17 1 mole of CH_3OH and C_2H_5OH have equal number
A. C-Atoms
B. H-atoms
C. O-Atoms
D. Electrons

Q. 18 The number of hydrogen atoms in 36 g of NH_4^{+1} is approximately

A. $2N_A$ B. $6N_A$

C. $4N_A$ D. $8N_A$

Q. 19 A sample of 100cm³ of dilute H_2SO_4 contains 0.1 moles of acid. What is hydrogen ion concentration in the solution per dm³?

A. 2 moles B. 0.50 moles

C. 0.25 moles D. 1 mole

Q. 20 The number of oxygen atoms contained in 1000 g of water is

A. 6.02×10^{23} B. 3.3410×10^{25}

C. 6.692×10^{25} D. 55.5

Avogadro's number and Vm

Q. 21 Eight grams of methane occupies volume at STP

A. 22.4 dm^3 B. 2.24 dm^3

C. 1.12 dm^3 D. 11.2 dm^3

Q. 22 The number of molecules in 89.6 dm^3 of a gas at 0°C and 1 atm pressure is?

A. 6.02×10^{23} B. 1.806×10^{24}

C. 1.204×10^{24} D. 2.408×10^{24}

Q. 23 15 gram of a gas occupies 11.2 dm^3 at S.T.P, the gas is

A. CO B. NO

C. CO_2 D. N_2O

Q. 24 Which one is incorrect relation at STP?

A. 6g of carbon = 3.01´1023 atoms B. 11.2 dm3 of CO2 = 3.01´1023 molecules

C. 49 g of H2SO4 = 4 moles of atoms D. 1 mole of sucrose = 45 moles of atoms

Q. 25 If a piece of copper weighs 0.635g how many atoms does it contain (Cu = 63.5 amu)

A. 6.023×10^{21} B. 6.02×10^{22}

C. 6.023×10^{23} D. 6.02×10^{24}

Q. 26 Avogadro's number is the number of molecules present in

A. 11.2 dm^3 at STP B. 22400 cm^3 at STP

C. 1000 cm^3 at STP D. 1 cm^3 at STP

Q. 27 What volume is occupied by a mixture of 0.5g H_2, 16g O_2 and 7.0g N_2

A. 2.24 dm^3 B. 22.4 dm^3

C. 0.224 dm^3 D. 11.2 dm^3

Q. 28 Which of the following will weigh more?

A. 10g Fe B. 1.6 g atom of N

C. 2×10^{23} atoms of C D. 11.2 dm^3 of O_2 at STP

Q. 29 2.24 dm^3 of CO_2 gas at S.T.P has mass

A. 28g B. 2.8g

C. 44g D. 4.4g

Q. 30 Block of metals Mg, Al, Fe, Zn of each mass 100g. The maximum number of atoms are present in a block of metal.

A. Mg B. Al

C. Zn D. Fe

Empirical and Molecular formulae

Q. 31 Which of the following term is not used for ionic compounds?

A. Formula unit B. Empirical formula

C. Molecular formula D. Formula Mass

Q. 32 A compound with empirical formula CHO_2 and molecular mass 90g / mole. The molecular formula of a compound is

A. $C_6H_{12}O_6$ B. $(COOH)_2$

C. $C_{12}H_{22}O_{11}$ D. HCOOH

Q. 33 An acid with molecular mass 104 contains 34.6%C, 3.85% H and rest is O the molecular formula of acid is

A. $C_3H_4O_4$ B. $C_2H_2O_4$

C. C_2H_2O D. C_2HO_2

Q. 34 Elemental analysis is performed to determine

A. Molar mass of the compound B. Structural formula of a compound

C. Empirical formula of a compound D. Mass of halogen present in a compound

Q. 35 CH_2O is the empirical formula of

A. $C1_2H_{22}O_{11}$ B. $CH_2(OH)CH_2(OH)$

C. CH_3. CH(OH). COOH D. CH_3CHO

Q. 36 An unknown compound has empirical formula CH3O. Its molar mass is 62g/mole. The compound may be (write formulas)

A. $CH_2(OH)CH(OH)CH_2(OH)$ B. CH_3COOH_3
C. $CH_2(OH)CH_2(OH)$ D. C_2H_5OH

Q. 37 While determine molecular formula, the simple multiple 'n' is not unity for

A. H_2O B. H_2O_2
C. $C_{12}H_{22}O_{11}$ D. CO_2

Q. 38 A compound contains 50% S and 50% O by mass. The empirical formula of compound is

A. SO_2 B. S_2O_3
C. SO_3 D. SO

Q. 39 A compound with empirical formula CHO_2 and molecular mass 90g / mole. The molecular formula of the compound is

A. $C_6H_{12}O_6$ B. $(COOH)_2$
C. $C_{12}H_{22}O_{11}$ D. HCOOH

Q. 40 An unknown compound has empirical formula CH3O. Its molar mass is 62g/mole. The compound may be

A. $CH_2(OH)CH(OH)CH_2(OH)$ B. CH_3COCH_3
C. $CH_2(OH)CH_2(OH)$ D. C_2H_5OH

Stoichiometry

Q. 41 Which one will produce largest number of negatively charged ions in case of 100% dissociation of 1 mole

A. $FeCl_3$ B. Na_2SO_4
C. NaOH D. $ZnCl_2$

Q. 42 Efficiency of a chemical reaction is

A. Actual yield B. Theoretical yield
C. Percentage yield D. All of these

Q. 43 0.36 moles of Aluminum and oxygen each react to produce alumina then which of the following is limiting reactant and non-limiting reactant respectively

A. Al, O_2 B. O_2, Al
C. Al, Al_2O_3 D. O_2, Al_2O_3

Q. 44 One of the following is not the limitation of balanced chemical equation

A. Conditions of reaction B. Rate of reaction
C. Physical states of reactants D. Moles of reactants and products

Q. 45 Which one act as a limiting reactant when 6g of carbon and 16 g of oxygen react to produce CO_2

A. Carbon B. Oxygen
C. Anyone of oxygen and carbon D. None of these

Q. 46 For stoichiometry calculations, we have to assume

A. Mass of reactants is less than the mass of products
B. All the reactants are converted into products
C. Side reaction occurs
D. Reaction is reversible

Q. 47 If a sample of ammonium phosphate, $(NH_4)_3PO_4$ contains 6 moles of hydrogen atoms. Then number of moles of oxygen atoms in the sample is

A. 1 B. 2
C. 4 D. 6

Q. 48 The law of conservation of mass and the law of definite proportions are obeyed while doing calculation of

A. Limiting reactant B. Theoretical yield
C. Stoichiometry D. All of these

Q. 49 $3N_A$, $2N_A$ and $1N_A$ molecules of N_2, O_2 and He are present in a container, the mole ratio of these gases is respectively

A. 2: 1: 3 B. 3: 1: 2
C. 2: 3: 1 D. 3: 2: 1

Q. 50 The sulphate of a certain metal has formula M_2SO_4.The formula of metal chloride would be

A. MCl
B. MCl_2
C. M_2Cl_2
D. MCl_3

Q. 51 Which of the following sets contains only compounds?

A. air, water, sodium
B. hydrogen, ammonia, oxygen
C. carbon monoxide, phosphine, phosgene
D. table salt, glucose, German silver

Q. 52 Iso–electronic pair among following is

A. Cl, Cl^-
B. Na^+, Ne
C. Al^{+3}, Cl
D. Mg^{+3}, Ne^{+1}

Q. 53 Total ions in 5 formula units of $NaClO_3$ is equal to the number of

A. 10 electrons in neon
B. 8 protons in an oxygen atom
C. 23 nucleons in sodium atom
D. 2 isotopes of chlorine

Q. 54 Which one of the following pair is isoelectronic?

A. Si, CO_2
B. H_2O, Ne
C. Na, K
D. NH_3, Mg

Q. 55 Mass of acetone is equal to the mass of

A. Ethanal
B. Ethanol
C. Propanal
D. 1-Butanol

Q. 56 Which of the following set of elements form nearly 50% of earth crust?

A. O , Mg , C , Ca , Fe
B. O , Mg , Si , Ca , Fe
C. O , Mg , S , Fe , K
D. O , Mg , C , Si , Fe

Q. 57 Total number of radioactive isotopes produced through artificial disintegration

A. 240
B. 40
C. 300
D. 340

Q. 58 Which one of the following statements is not involved in the determination of empirical formula?

A. %age of each element
B. gram atom of each element
C. isotopes of each element
D. atomic ratio of element

Q. 59 A pair of compounds that has same empirical formula

A. Acetic acid and glucose
B. Acetic acid and formic acid
C. Formic acid and sucrose
D. Both a and b

Q. 60 A compound used as artificial sweetener has formula

A. $C_{14}H_{18}N_2O$
B. $C_{14}H_{16}N_2O_5$
C. $C_{14}H_{18}N_2O_5$
D. $C_{18}H_{14}N_2O$

Q. 61 There are different steps in determining the empirical formula
Step I. Calculating the number of gram atom
Step II. Determining the atomic ratio
Step III. Determining the percentage composition
What is the correct sequence of the above steps?

A. I, II, III
B. III, II, I
C. II, I, III
D. III, I, II

Q. 62 The value of 'n' in determining molecular formula is obtained from the relation

A. $n = \frac{\text{molar mass}}{\text{atomic mass}}$
B. $n = \frac{\text{empirical mass}}{\text{molar mass}}$
C. $n = \frac{\text{molar mass}}{\text{empirical formula mass}}$
D. Cannot be determined

Q. 63 The simplest formula of a compound containing 50% of element X (At.wt = 10) and 50% of element Y (At. wt = 20) is

A. XY
B. XY_2
C. X_2Y
D. X_2Y_3

Q. 64 A pair of compounds that has same empirical formula

A. Acetic acid and glucose
B. Acetic acid and formic acid
C. Formic acid and sucrose
D. Ethane and Ethyne

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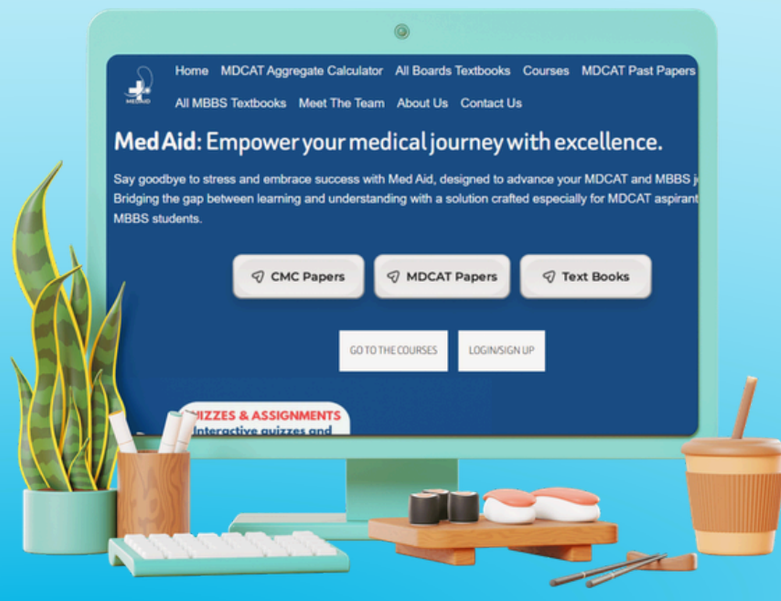
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Q. 65 CH_2O is the empirical formula of

A. $C_{12}H_{22}O_{11}$ B. CH_3COOH
C. $CH_2(OH)CH_2(OH)$ D. CH_3CHO

Q. 66 The simplest formula of a compound containing 50% of element X (At.wt = 10) and 50% of element Y (At. wt = 20) is

A. XY B. XY_2
C. X_2Y D. X_2Y_3

Q. 67 3.0 g of NO gas occupies volume

A. 22.424 dm^3 B. 2.2414 dm^3
C. 11.2 dm^3 D. 1.2 dm^3

Q. 68 18.0g of glucose contains number of hydrogen atoms

A. 7.2×10^{23} B. 6.3×10^{23}
C. 2.7×10^{23} D. 3.6×10^{23}

Q. 69 The largest number of molecules are present in

A. 3.6g H_2O B. 2.8g CO
C. 4.6g C_2H_5OH D. 10.8g N_2O_5

Q. 70 Equal volumes of N_2O and CO_2 are taken in identical conditions, the correct relation between the masses of two gases is

A. $N_2O > CO_2$ B. $N_2O < CO_2$
C. $N_2O = CO_2$ D. $N_2O = CO_2$

Q. 71 The number of OH- ions required to react completely with H^+ ions produced by 100% dissociation of 49g H_3PO_4

A. 3.01×10^{23} B. 6.02×10^{23}
C. 9.03×10^{23} D. 12.04×10^{23}

Q. 72 Which of the following has maximum number of molecules?

A. 16g of O_2 B. 7g of N_2
C. 23g of NO_2 D. 2g of H_2

Q. 73 Which of the following has same number of moles?

A. 12g of C, 10g of Mg B. 15g of C, 30g of Mg
C. 12g of C, 20g of Mg D. 15g of C, 24g of Mg

Q. 74 Avogadro's number is the number of molecules present in

A. 1 dm^3 of molecule B. 1 g of formula mass
C. Gram molecular mass D. 1 g of atom

Q. 75 4 g of CH_4 gas has molar volume at S.T.P

A. 22.414 cm^3 B. 5.60 dm^3
C. 11.2 cm^3 D. 22414 cm^3

Q. 76 Maximum number of molecules will be in

A. 1g of H_2 B. 10 g of N_2
C. 22 g of O_2 D. 44 g of CO_2

Q. 77 2.8g of N_2 molecules contain number of chemical bonds

A. 1.8×10^{23} B. 1.204×10^{23}
C. 6.02×10^{22} D. 1.8×10^{22}

Q. 78 The total number of atoms in 9g of water are

A. 3.01×10^{23} B. 4.51×10^{23}
C. 6.02×10^{23} D. 9.03×10^{23}

Q. 79 One mole of which of the following will have different number of electrons than others

A. Na^{+1} B. H_2O
C. NH_3 D. CO^{+1}

Q. 80 How many moles of neutron are present in one mole of heavy water?

A. 10 B. 18
C. 8 D. 20

Q. 81 Avogadro's number is the number of molecules present in

A. 1 dm^3 of molecule B. 1 g of hydrogen gas
C. 1 g atom D. Gram molecular mass

Q. 82 Total number of anions produced by complete ionization of 50g $CaCO_3$

A. 6.02×10^{23} B. 3.01×10^{23}
C. 9.03×10^{23} D. 12×10^{23}

Q. 83 When 0.1 kg of $CaCO_3$ is decomposed the CO_2 produced occupies a volume at STP

A. 2.2414 dm^3 B. 22.414 dm^3
C. 22414 dm^3 D. 224014 dm^3

Q. 84 The number of O-atoms in 45g of $C_6H_{12}O_6$

A. $6 \times N_A$ B. $1.50 \times N_A$
C. $3 \times N_A$ D. $0.25 \times N_A$

Q. 85 How many chlorine atoms are in 4 moles of Cl_2?

A. $4 \times 6.022 \times 10^{23}$ atoms B. $8 \times 6.022 \times 10^{23}$ atoms
C. $2 \times 6.022' 10^{23}$ atoms D. $2 \times 6.02 \times 10^{22}$ atoms

Q. 86 Which among the following is the lowest mass?

A. One mole of nitrogen B. 22.414dm^3 of O_2 at STP
C. 6.02×10^{23} molecules of CO_2 D. 20g of Neon

Q. 87 The volume of NH_3 obtained by the combination of 10 cm^3 of N_2 and 30 cm^3 of H_2 at S.T.P. is

A. 20 cm^3 B. 40 cm^3
C. 30 cm^3 D. 10 cm^3

Q. 88 One mole each of NO_2 and CO_2 has same number of

A. Molecules B. Electrons
C. Protons D. Neutrons

Q. 89 The weight of 5.6 dm^3 of NH_3 at STP would be

A. 34 g B. 17g
C. 8.5 g D. 4.25g

Q. 90 Avogadro's number of particles of hydrogen gas weighs

A. 1.008 amu B. 1.008 g
C. 2.016 amu D. 2.016 g

Q. 91 Which of the following sample contains the largest number of atoms?

A. 1 g of Ni B. 1 g of Ca
C. 1 g of N_2 D. 1 g of B

Q. 92 The weight of 11.2 dm^3 of CO_2 at STP would be

A. 88 g B. 44 g
C. 32 g D. 22 g

Q. 93 Which one of the following is correct formula to find number of molecules?

A. $m \times M$ B. $\frac{m}{M}$
C. $n \times NA \times$ atomicity D. $n \times NA$

Q. 94 Which of the following are limitations of chemical equations?

A. They do not talk about the conditions of reactions
B. Rate of reaction
C. Phase change involved
D. All of these

Q. 95 Stoichiometric calculation assumes that

A. All the reactants are completely converted into product
B. No side reaction occurs
C. In calculation law of conservation of mass and law of definite proportions are obeyed
D. All of these

Q. 96 Which type of relationship can be studied with the help of balanced chemical equation

A. Mass – mass relationship B. Mole – Mass relationship
C. Mass – volume relationship D. All relations can be studied

Q. 97 Which one acts as a limiting reactant when 6g of carbon and 16 g of oxygen react to produce CO_2

A. Carbon
B. Oxygen
C. Carbon dioxide
D. None of these

Q. 98 "X" gram of calcium carbonate was completely burnt in air as. The weight of solid residue formed is 14g. What is value of "X" in grams

A. 25
B. 50
C. 100
D. 200

Q. 99 Two nuclides X and Y are isotonic to each other with mass number 70 and 72 respectively. If the atomic number of X is 34, then that of Y would be

A. 32
B. 34
C. 36
D. 38

Q. 100 In the reaction $4NH_{3(g)} + 5O_{2(g)}$ $4NO_{(g)} + 6H_2O$ when one mole of ammonia and 1-mole of O_2 are made to react to completion, then

A. 1.0 mol of H_2O is produced
B. All the ammonia will be consumed
C. 1.0 mol of NO will be produced
D. All the oxygen will be consumed

SKN

ANSWERS & EXPLANTION: -

Q.1	**C**	Maltose is not macromolecule. Maltose is a disaccharide formed from two units of glucose joined with an $\alpha(1 \rightarrow 4)$ bond, formed from a condensation reaction but hemoglobin is macromolecule of protein, lipoprotein is conjugated macromolecule formed from protein and lipids. Cellulose is polysaccharide carbohydrate
Q.2	**D**	Mixture: air, alloy, water gas ($CO + H_2$), milk Compound: table salt , Glucose, sucrose, aspartame, serotenin,
Q.3	**D**	Haemoglobin is 68,000 times heavier than hydrogen atom and 34,000 heavier than hydrogen molecule.
Q.4	**D**	Sn has maximum number of isotopes. Sn as eleven isotopes. **Element** **No. of Isotopes** Ca 6 Pd 6 Cd 9 Sn 11
Q.5	**B**	Fractional atomic masses can be calculated from relative abundance of isotope Average atomic mass $= \frac{(\text{Mass of one isotope} \times \%\text{age}) + (\text{Mass of other isotope} \times \%\text{age})}{100}$
Q.6	**B**	$CN^{-1} = 6e^- + 7e^- + 1e^- = 14e^-$ $H_2O = 2e^- + 8e^- = 10e^-$ $CO = 6e^- + 8e^- = 14e^-$ $CO_2 = 6e^- + 16e^- = 22e^-$ $NH_3 = 7e^- + 3e^- = 10e^-$
Q.7	**D**	Isotopes have same number of proton. So they occupied same position in periodic table.
Q.8	**C**	
Q.9	**B**	
Q.10	**A**	
Q.11	**B**	
Q.12	**B**	
Q.13	**D**	The 0.25 moles of CH4 which contains 3.0g of Carbon. We know, 1 mole of CH4 contains carbon = 12 g OR 12g Carbon present in = 1 mole of CH_4 1 g Carbon present in = 1/12 mole of CH_4 So, 3g carbon is present in $= \frac{1}{12} \times 3 = \frac{1}{4} = 0.25$ moles
Q.14	**C**	4g H_2 react with 32.0g O_2 to produce 2.0 mole of water. Chemical equation used: $\underset{4g}{2H_{2(g)}} + \underset{32g}{O_{2(g)}} \rightleftharpoons \underset{36g(2-\text{moles produced})}{2H_2O_{(l)}}$ H_2 and O_2 both are consumed so no one is limiting reactant.

Q.15	**C**	$\frac{6.02\times10^{23}}{28}\times2.8$ $=1.8\times10^{23}$
Q.16	**C**	
Q.17	**C**	CH_3OH C H O = 1 4 1 C_2H_5OH 2 6 1
Q.18	**D**	
Q.19	**A**	
Q.20	**B**	
Q.21	**D**	$\frac{8}{16}\times22.4$ $=11.2dm^3$
Q.22	**D**	$\frac{V}{Vm}=\frac{N}{N_A}$ $N=\frac{V}{Vm}\times N_A=\frac{89.6}{22.4}\times16.02\times10^{23}$ $=2.408\times10^{24}$
Q.23	**B**	$\frac{V}{Vm}=\frac{m}{Mr}$ $Mr=\frac{22.4\times15}{11.2}=30g/mol$ $Moler\ mass\ of\ NO=30\ g/mol$
Q.24	**C**	
Q.25	**A**	
Q.26	**B**	
Q.27	**B**	
Q.28	**B**	
Q.29	**D**	
Q.30	**A**	
Q.31	**C**	Ionic compound cannot exist independently so it's mass is formula mass, No of particle is called formula unit.
Q.32	**B**	$n=\frac{90}{45}=\frac{molecular\ mass}{empirical\ formula\ mass}=2$ $molecular\ formula=n\times empirical\ formula$ $=2\times CHO_2=C_2H_2O_4$ which is molecular formula of oxalic acid

Q.33	**A**	$C=\frac{34.6}{12}$ $H=\frac{3.85}{1.008}$ $O=\frac{61.55}{16}$ $C=\frac{2.88}{2.88}$ $H=\frac{3.81}{2.88}$ $O=\frac{3.84}{2.88}$ $C=1$ $H=1.33$ $O=1.33$ $C=3$ $H=4$ $O=4$
Q.34	**C**	Elemental analysis is technique used to determine type of element in compound.
Q.35	**C**	Molecular formula $CH_3\ CH(OH)\ COOH=C_3H_6O_3$ Empirical formula = CH_2O
Q.36	**C**	$n = \frac{62}{31} = 2$ Molecular formula = $= 2\times CH_3O$ $= C_2H_6O_2$ $CH_2(OH)CH_2(OH)$
Q.37	**B**	H_2O, $C_{12}H_{22}O_{11}$, CO_2 have same empirical formula and molecular formula but H_2O_2 is molecular formula and HO is empirical formula.
Q.38	**A**	
Q.39	**B**	
Q.40	**C**	
Q.41	**A**	$FeCl_3 \rightleftharpoons Fe^{+3} + 3Cl^- = 3N_A\ ion$ $Na_2SO_4 \rightleftharpoons 2Na^+ + SO_4^{-2} = 1N_A\ ion$ $NaOH \rightleftharpoons Na^+ + OH^- = 1N_A\ ion$ $ZnCl_2 \rightleftharpoons Zn^+ + 2Cl^{-1} = 2N_A\ ion$
Q.42	**C**	Efficiency of a chemical reaction is calculated by percentage yield. **Percentage Yield:** The ratio of actual yield to theoretical yield multiplied by 100 gives us percentage yield. A chemist is usually interested in the efficiency of a reaction. The efficiency of the reaction is expressed in the form of percentage yield. $\%\text{age Yield} = \frac{\text{Actual Yield}}{\text{Theoretical Yiel}} \times 100$ **(i) Theoretical Yield:** The amount of product calculated from the balanced chemical equation is called theoretical yield. It is the maximum amount of product that should be produced according to the balanced chemical equation. **(ii) Actual Yield:** The amount of the product obtained experimentally as a result of chemical reaction is called actual yield.
Q.43	**A**	Aluminium(Al) is limiting and Oxygen(O_2) is non-limiting reactant respectively. Chemical equation used:

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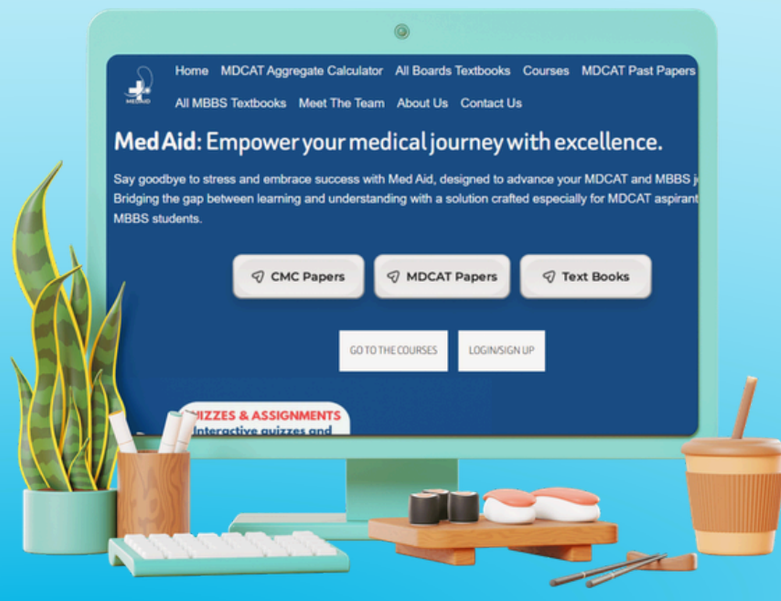
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		$4Al_{(s)} + 3O_{2(g)} \longrightarrow 2Al_2O_{3(s)}$ Al : O2 4 moles : 3 moles (According to balance equation) So 1 mole : $\frac{3}{4}$ 0.36 moles : $\frac{3}{4} \times 0.36 = 0.27$ moles It means 0.36 moles of aluminium completely consumed but oxygen only 0.27 moles consumed out of 0.36 moles. So aluminium is limiting reactant and oxygen is in excess.
Q.44	**D**	The condition for balancing equation are following Number of atom of reactant = Number of atoms of products Mole of reactant and product should be mention
Q.45	**D**	Both have same molar ratio so none will be limiting reacting
Q.46	**B**	Assumption for stoichiometry
Q.47	**A**	
Q.48	**D**	
Q.49	**D**	
Q.50	**A**	
Q.51	**C**	Carbon monoxide, phosphine, phosgene are compounds. **Type** **Specie** Element Sodium, Hydrogen, Oxygen Compound Water, Carbon monoxide, Phosphene (PH_3), Phosgene ($COCl_2$), Ammonia, Table salt, Glucose Mixture Air, Alloy
Q.52	**B**	Na^+, Ne= 10 electron Isoelectronic have equal number of electron
Q.53	**A**	
Q.54	**B**	H_2O and Ne are isoelectronic species. Isoelectronic species having same number of electrons. **Sr. No** **Specie** **Total Number of Electron** 1 H_2O 2+8=10 2 Ne 10 3 Si 14 4 CO_2 6+8+8=22 5 Na 11 6 K 19 7 NH_3 7+3=10 8 Mg 12
Q.55	**C**	Mass of acetone = 58 g/mol Mass of Ethanol = 46 g/mol Mass of Ethanal = 32 g/mol Mass of propanal = 58 g/mol Mass of 1-Butanol = 74 g/mol
Q.56	**B**	
Q.57	**C**	
Q.58	**C**	

Q.59	**A**	Acetic acid ($C_2H_4O_2$)and glucose ($C_6H_{12}O_6$)have empirical formula CH_2O and the molecular formula of formic acid is CH_2O.
Q.60	**C**	Aspartame $C_{14}H_{18}N_2O_5$ is used as artificial sweetener
Q.61	**D**	Steps determine Empirical formula (i) Determine % Composition of element. (ii) Determine gram & atom (iii) Determine atomic ratio
Q.62	**C**	The value of "n" in determining molecular formula is obtained from the relation $n = \frac{\text{molecular mass}}{\text{empricial formula mass}}$
Q.63	**C**	Gram atom of $X = \frac{50}{10} = 5$ Gram atom of $Y = \frac{50}{20} = 2.5$ Atomic ratio X : Y $\frac{5}{2.5} : \frac{2.5}{2.5}$ X_2Y
Q.64	**A**	
Q.65	**B**	
Q.66	**C**	
Q.67	**B**	
Q.68	**A**	18.0g of glucose contains number of hydrogen atoms = 3.6×10^{23}. Calculation: The number of moles of glucose = $\frac{18g}{180gmol^{-1}} = 0.1\ moles$ We know: One molecule of glucose (C6H12O6) contains number of H-atoms = 12 So 0.1 moles of glucose contains number of H-atoms $= 12\times0.1\times N_A = 1.2N_A$ $= 1.2\times6.02\times10^{23}$ $= 7.2\times10^{23}$
Q.69	**A**	$\frac{3.6}{18}\times N_A = 0.2N_A\ H_2O$ $\frac{2.8}{28}\times N_A = 0.1N_A\ CO$ $\frac{4.6}{46}\times N_A = 0.1N_A\ C_2H_5OH$ $\frac{10.8}{108}\times N_A = 0.1N_A\ N_2O_5$
Q.70	**C**	$N_2O = CO_2 = 44g\ mol^{-1}$

Q.71	**C**	$H_3PO_4 \rightleftharpoons 3H^+ + PO_4^{-3}$ $\quad \frac{49}{98} = 0.5\,mol\ of\ H_3PO_4$ $H_3PO_4 : H$ $1:3$ $0.5:3\times0.5 = 1.5$ $H^+ : OH^{-1}$ $3:3$ $1.5:1.5$ $1.5\times6.02\times10^{23}$ $=9.03\times10^{23}$
Q.72	**D**	No of molecule of $H_2 = \frac{2}{2}\times N_A = N_A$ No of molecule of $O_2 = \frac{16}{32}\times N_A = 0.5N_A$ No of molecule of $N_2 = \frac{7}{14}\times N_A = 0.5N_A$ No of molecule of $NO_2 = \frac{23}{46}\times N_A = 0.5N_A$
Q.73	**B**	No of mole of $C = \frac{15}{12}\times N_A = \frac{5}{A}N_A$ No of mole of $mg = \frac{30}{24}\times N_A = \frac{5}{A}N_A$
Q.74	**C**	
Q.75	**B**	$\frac{V}{Vm} = \frac{m}{M}$ $V = \frac{4}{16}\times 22.414$ $= 5.603dm^3$
Q.76	**D**	$\frac{1}{2}\times N_A = 0.5N_A\ of\ H_2$ $\frac{10}{28}\times N_A = 0.35N_A\ of\ N_2$ $\frac{22}{32}\times N_A = 0.6875N_A\ of\ O_2$ $\frac{44}{44}\times N_A = N_A\ of\ CO_2$
Q.77	**A**	
Q.78	**D**	
Q.79	**D**	
Q.80	**A**	$D_2O = 2+$ $= 10neutron$
Q.81	**D**	

Q.82	**B**	
Q.83	**B**	$CaCO_3 \longrightarrow CaO + CO_2$ 100g 56g 44g 44g of CO_2 = 1mole of CO_2 = 22.4 dm^3 at STP
Q.84	**B**	No of oxygen atom $= \frac{m}{M} \times N_A \times 6$ $= \frac{45}{180} \times N_A \times 6$ $= 1.50\ N_A$
Q.85	**B**	No of Cl atoms $= n \times N_A \times 2$ $= 4 \times 2 \times 6.02 \times 10^{23}$ $= 8 \times 6.02 \times 10^{23}$
Q.86	**D**	
Q.87	**A**	
Q.88	**A**	
Q.89	**D**	
Q.90	**D**	
Q.91	**D**	
Q.92	**D**	
Q.93	**D**	
Q.94	**D**	All of these Significance of Limiting Reactant: The significance of limiting reactant is as follows. (i) Expensive reactant is taken as limiting to ensure that it is completely used up in a chemical reaction. (ii) Sometimes one of the reactant is taken as limiting reactant to make the reaction faster e.g. Taking oxygen in excess to burn a substance makes the burning faster. (iii) To determine the effect of concentration on the rate of reaction.
Q.95	**D**	Stoichiometric calculation assume that (i) All the reactants are completely converted into product (ii) No side reaction occurs (iii) In calculation law of conversation of mass and law of definite proportions are obeyed
Q.96	**D**	
Q.97	**D**	
Q.98	**A**	
Q.99	**C**	
Q.100	**D**	

ATOMIC STRUCTURE

Discovery of Fundamental Particles, Properties of Fundamental Particles & Plancks Theory and Bohr's Model

Q. 1 From discharge tube experiments, it is concluded that

A. Mass of proton is in fraction
B. Nucleus contains positive charge
C. Matter contains electrons
D. Positive rays are always lighter than cathode rays

Q. 2 Consider the following reaction $_4Be + _2He \rightarrow _6C + _1n$ This reaction is

A. An exothermic reaction
B. A nuclear reaction
C. An example of artificial radioactivity
D. All of these

Q. 3 The nature of cathode rays in discharge tube

A. Depends upon the nature of the gas used in discharge tube
B. Depends upon the nature of the cathode used in discharge tube
C. Is independent of the nature of the gas used in discharge tube
D. Depends upon the nature of anode in the discharge tube

Q. 4 Which of the following specie has more electrons than neutrons?

A. Na^+
B. F^{-1}
C. O^{-1}
D. Mg^{+2}

Q. 5 A fast-moving neutron can eject from nitrogen

A. γ – rays
B. α – rays
C. β – rays
D. Electrons

Q. 6 e/m ratio of cathode rays is ..... than that of canal rays

A. Smaller
B. Greater
C. Equal
D. Depend upon the condition

Q. 7 Which of the following relationship is incorrect?

A. $E \propto \beta$
B. $E \propto \beta$
C. $\bar{v} = \lambda$
D. $E \propto 1/\lambda$

Q. 8 Which of the following is not the unit of wave number?

A. m^{-1}
B. Cm^{-1}
C. mm^{-1}
D. Cm

Q. 9 An electron makes a transition from energy state E_3 to E_1 will emit a photon of frequency

A. $\upsilon = E_1 - E_3/h$
B. $\upsilon = (E_3 - E_1)\, h$
C. $\upsilon = (E_3 - E_1)/h$
D. None of these

Q. 10 All of the following were theorized by Bohr in the description of atom except

A. Angular momentum of electron is multiple of $h/2\pi$
B. Electrons circulate in discrete circular orbit
C. Electron continuously radiate energy in the form of radiation in a given orbit
D. Distance between successive orbits are increasing

Quantum numbers and Shapes of orbitals

Q. 11 Which of the following quantum numbers is not derived from Schrodinger wave equation?

A. Principal quantum number from Schrodinger
B. Azimuthal quantum number from Schrodinger
C. Magnetic quantum number from Schrodinger
D. Spin quantum number from Schrodinger

Q. 12 The number of orbitals in the 2nd principal quantum number of an atom is

A. 4
B. 9
C. 16
D. 1

Q. 13 Which of the following sets of quantum numbers is not allowed?

A. $n = 3, l = 2, m = 0, s = -1/2$
B. $n = 3, l = 1, m = -1, s = -1/2$
C. $n = 3, l = 0, m = 0, s = -1/2$
D. All are allowed

Q. 14 Quantum Number values for 5p orbital is

A. $n = 5\ l = 0$
B. $n = 5\ l = 1$
C. $n = 5\ l = 2$
D. $n = 5\ l = 3$

Q. 15 A sub shell having n = 6, and l = 3 is designated as

A. 5s
B. 6p
C. 6f
D. 6d

Q. 16 The number of degenerate orbitals in p–subshell is

A. 2 B. 3
C. 5 D. 7

Q. 17 n + l value for 4f will be _____ and 5p will be _____

A. 7, 5 B. 5, 7
C. 7, 6 D. 9, 6

Q. 18 The total number of orbitals containing electrons, if atomic number of the element is 19

A. 9 B. 6
C. 10 D. 16

Q. 19 When azimuthal quantum number l =2, then 'm' can have _____ value

A. 3 B. 5
C. 7 D. 9

Q. 20 How many numbers of clockwise electrons are present in helium?

A. 0 B. 1
C. 2 D. 4

Electronic configuration of elements

Q. 21 Which of the following orbitals can accommodate 2 electrons?

A. Atomic orbital B. Hybrid orbital
C. Molecular orbital D. All of these

Q. 22 If the value of n = 4 what is probable value of ℓ

A. 0,1 B. 0,1,2
C. 0,1,2,3 D. None of above

Q. 23 Electronic configuration of an atom is $1s^2$, $2s^2$,$2p^4$.. Number of unpaired electrons are

A. 1 B. 2
C. 3 D. 4

Q. 24 The number of orbitals in M – shell are

A. 1 B. 4
C. 16 D. 9

Q. 25 The electronic configuration of metal ion M^{+2} is 2, 8, 14 and its atomic mass is 56. The number of neutrons in its nucleus is

A. 30 B. 32
C. 34 D. 42

Q. 26 Which of the following specie has more electrons than neutrons?

A. Na^+ B. F^{-1}
C. O^{-1} D. Mg^{+2}

Q. 27 An electron occupies the available orbital before pairing in any one sub-shell according to

A. (n + l) Rule B. Pauli's exclusion principle
C. Hund's rule D. Heisenberg's principle

Q. 28 Total number of valence electrons in phosphonium PH_4^+ ion is

A. 16 B. 32
C. 8 D. 18

Q. 29 Which of the following oxides of nitrogen is isoelectronic with CO_2?

A. N_2O_3 B. NO
C. N_2O D. NO_2^-

Q. 30 The atomic number of an element having maximum number of unpaired electrons in p-subshell, is

A. 7 B. 10
C. 12 D. 16

Q. 31 Positive rays are produced

A. By burning of gas
B. By cooling of the gas
C. By ionizing the gas
D. From anode like cathode rays, produced from cathode

Q. 32 Pressure in gas discharge tube was kept _____ to produce cathode rays

A. 10torr B. 1torr
C. 0.1torr D. 0.01torr

Q. 33 Number of electrons, protons and neutrons present in $^{66}_{30}Zn^{+2}$ respectively

A. 28, 30, 36
B. 28, 28, 36
C. 32, 30, 36
D. 28, 36, 30

Q. 34 Which of the following are not able to ionize the gas?

A. α-rays
B. β-rays
C. γ-rays
D. Neutrons

Q. 35 Which order of mass is correct in ascending order

A. $e^- > p^\circ > n$
B. $e^- < n < p^+$
C. $e^- < p^+ < n$
D. $n > p^+ > e^-$

Q. 36 The nucleus of an atom is made up of 8 protons and 8 nutrons. which atoms it is

A. C
B. N
C. O
D. F

Q. 37 Which rays are more penetrating in nature?

A. α-rays
B. β-rays
C. γ-rays
D. All have same nature

Q. 38 Positive rays give flash on

A. $AgNO_3$ plate
B. AgCl plate
C. ZnO
D. ZnS

Q. 39 The wave number of the light emitted by a certain source is 2×10^6 m^{-1}. The wavelength of this light will be

A. 500nm
B. 500m
C. 200nm
D. 5×10^7m

Q. 40 The e/m ratio for the positive rays is maximum for

A. Hydrogen
B. Helium
C. Oxygen
D. Nitrogen

Q. 41 Total number of fundamental particles in one atom ^4_2He of is

A. 6
B. 8
C. 14
D. 20

Q. 42 Electronic configuration of species M^{2+} is $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^0\ 3d^6$ and its atomic weight is 56, number of neutrons in the nucleus of species M is

A. 20
B. 26
C. 28
D. 30

Q. 43 Magnetic quantum number is related to

A. Size of orbit
B. Shape of orbital
C. Orientation of orbital
D. Spin of electron

Q. 44 Existence of pair of lines in spectrum of sodium is explained by

A. Principal quantum number
B. Azimuthal quantum number
C. Magnetic quantum number
D. Spin quantum number

Q. 45 According to Bohr's atomic theory, the angular momentum (mvr) of an electron is equal to

A. $\frac{nh}{2\pi}$
B. $\frac{nh}{\pi}$
C. $\frac{3nh}{2\pi}$
D. $\frac{2nh}{\pi}$

Q. 46 Which set of quantum numbers is not possible

A. $n = 5, l = 3, s = +1/2$
B. $n = 3, l = 3, s = +1/2$
C. $n = 4, l = 2, s = +1/2$
D. $n = 6, l = 0, s = +1/2$

Q. 47 The last electron in the Na and K can be distinguished by

A. Principal quantum number
B. Azimuthal quantum number
C. Magnetic quantum number
D. Spin quantum number

Q. 48 If the value of n = 4 what is probable value of ℓ

A. 0,1
B. 0,1,2
C. 0,1,2,3
D. 0, 1, 2, 3, 4

Q. 49 How many electrons can fit into the sub-shell for which n = 3, ℓ = 1?

A. 8
B. 18
C. 6
D. 32

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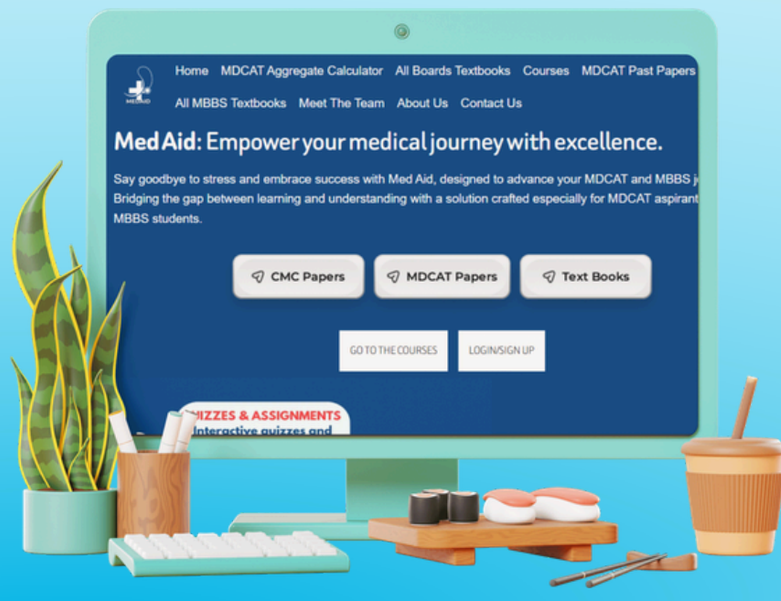
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Q. 50 Which set of quantum numbers is not possible

A. $n = 5, l = 3, s = + ½$ B. $n = 3, l = 3, s = +1/2$

C. $n = 4, l = 2, s = +1/2$ D. $n = 6, l = 0, s = +1/2$

Q. 51 The number of unpaired electrons in p-sub shell of sulphur atom is

A. 4 B. 6

C. 2 D. 3

Q. 52 The number of electrons in a shell can be calculated by formula

A. $2l + 1$ B. $2(2l + 1)$

C. $2n^2$ D. n^2

Q. 53 Which quantum number is used to represent the subshells?

A. Principal Quantum number B. Azimuthal quantum number

C. Magnetic quantum number D. Spin quantum number

Q. 54 The maximum probability of finding an electron in a hydrogen atom according to Schrodinger is

A. 0.053nm B. 0.043nm

C. 0.073nm D. 0.057nm

Q. 55 Which of following statement is correct about azimuthal quantum number, It tells

A. Size of orbital B. Shape of orbital

C. Orientation of orbital in space D. Nuclear stability

Q. 56 The shape of p-orbital is

A. Spherical B. Spherical symmetrical

C. Dumb-bell shape D. Circular

Q. 57 Which subshell is nearest to nucleus?

A. 1s B. 2s

C. 2p D. Both A and B

Q. 58 Which atomic orbital has highest energy

A. 4d B. 4f

C. 5s D. 5p

Q. 59 An orbital which is spherically symmetrical is

A. p-orbital B. d-orbital

C. f-orbital D. s-orbital

Q. 60 Which one of the following sub-shells does not exist?

A. 2p B. 2d

C. 3p D. 4d

Q. 61 (An) _____ is a region of space in which there is a high probability of finding an electron in an atom

A. Shell B. Atomic orbital

C. Nucleus D. Main energy level

Q. 62 According to quantum mechanics, the size of electronic shell is told by the quantum number

A. Spin quantum number B. Magnetic quantum number

C. Azimuthal quantum number D. Principal quantum number

Q. 63 Which of the following rule/principle helps us to determine order of filling of sub shells by electrons?

A. Aufbau principle B. Hund's rule

C. Pauli exclusion principle D. Mosleys law

Q. 64 Filling order of 4s, before 3d is explained by

A. Hund's rule B. (n+l) rule

C. Pauli-exclusion principle D. Auf-bau principle

Q. 65 Decreasing energy order of subshell of a particular shell is

A. $f > d > s > p$ B. $f > d > p > s$

C. $s > p > d > f$ D. $p > s > f > d$

Q. 66 Which of the following helps to predict valency of element?

A. Pauli's Exclusion Principle B. Sidgewick rule

C. Hund's rule D. Aufbau Principle

Q. 67 Which of the following contains unpaired electrons?

A. Ca^{+2} B. Ni^{+2}

C. K^{+1} D. Zn^{+2}

Q. 68 The atomic number of an element is sixteen. It belongs to period and group number of the periodic table respectively.

A. 3, 7 B. 6, 3
C. 3, 6 D. 7, 3

Q. 69 Which electronic configuration is not possible?

A. $1s^2, 2s^2, 2p^6, 2d^2, 3s^1$ B. $1s^1$
C. $1s^2, 2s^2, 2p^1_x, 2p^1_y, 2p^1_z$ D. $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2$

Q. 70 How many electrons can fit into the sub-shell for which n = 3, *l* = 1?

A. 8 B. 18
C. 6 D. 32

Q. 71 How many total unpaired electrons are present in an atom with Z = 24

A. Two B. Five
C. Six D. Eight

Q. 72 When 4f orbital is complete the entering electron goes into

A. 6s B. 5p
C. 5d D. 4d

Q. 73 Without applying Hund's rule the electronic configuration of one of the following cannot be justified

A. Fluorine B. Neon
C. Sodium D. Phosphorous

Q. 74 Which one of the following statements is not correct?

A. Unit of frequency is cycle per second
B. Lyman series of hydrogen spectrum occurs in the ultraviolet region
C. The angular momentum of the electron in the ground state of hydrogen atom is equal to h / 2p
D. The radius of first Bohr orbit of hydrogen atom is 2.116×10^{-8}cm

Q. 75 Which species has same number of electrons in valence shell and penultimate (second last) shell

A. Na^+ B. O^{-2}
C. Al^{+3} D. Cl^-

Q. 76 Which of the following does not correctly relate the arrangement of electrons?

A. Arrangement of electrons in sub shell is given by (n + l) rule
B. Arrangement of electrons in degenerate orbitals is given by Hund's rule
C. Arrangement of electron in an orbital is given by Pauli's exclusion principle
D. Arrangement of electrons in a shell is given by octet rule

Q. 77 The electronic configuration of an element with atomic number 29 is

A. $1s^2,2s^2,2p^6,3s^2,3p^6,3d^9,4s^2$ B. $1s^2,2s^2,2p^6,3s^2,3p^6,3d^{10},4s^1$
C. $1s^2,2s^2,2p^6,3s^2,3p^6,3d^8,4s^2$ D. $1s^2,2s^2,2p^6,3s^2,3p^6,3d^{10},4s^2$

Q. 78 Which of the following has minimum number of unpaired d-electrons?

A. Fe^{3+} B. Co^{3+}
C. Co^{2+} D. Mn^{2+}

Q. 79 Number of unpaired electron in p subshell of 'F' is

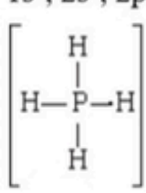
A. 1 B. 2
C. 3 D. 4

Q. 80 Electronic configuration of K is

A. $[Ar]4s^2$ B. $[Ar]4s^1$
C. $[Kr]5s^1$ D. $[He]2s^1$

ANSWERS & EXPLANTION: -

Q.1	**C**	In discharge cathode rays is produced from sample gas and cathode are basically electron
Q.2	**D**	This reaction is nuclear exothermic and artificial radioactivity
Q.3	**C**	Nature of cathode rays is independent of nature of gas
Q.4	**C**	(a) Na^{+} = Neutron = 12 Electron = 10 (b) F^{-1} = Neutron = 10 Electron = 10 (c) O^{-1} = Neutron = 8 Electron = 9 (d) Mg^{+2} = Neutron = 12 Electron = 10
Q.5	**B**	$^{14}_{7}N + {}^{1}_{0}n \longrightarrow {}^{11}_{5}B + {}^{4}_{2}He(\alpha - particle)$
Q.6	**B**	The e/m value for the positive rays is always smaller than that of electrons and depends upon the nature of the gas used in the discharge tube.
Q.7	**C**	$\bar{V} = \lambda$ is incorrect $E \propto V$ Frequency $E = hv$ We know : $v = \frac{c}{\lambda}$ $E = E = \frac{hC}{\lambda}$ We know : $\bar{v} = \frac{1}{\lambda}$ ($\bar{v}$ = wave number) So $E = hc\bar{v}$
Q.8	**A**	As wave number $\propto \frac{1}{\text{wave length}}$ to its unit is inverse of length
Q.9	**C**	An electron makes a transition from energy state E3 to E1 will emit a photon of frequency $v = (E_3 - E_1)/h$. Formula used $\Delta E = hv$ $v = \frac{\Delta E}{h}$ We know: $\Delta E = E_3 - E_1$ or $v = \frac{(E_3 - E_1)}{h}$
Q.10	**C**	According to Bohr's model of an atom electrons circulate in discrete circular orbits with fixed energy, distance between successive orbits are increasing and angular momentum of electron is multiple of h/2 except electron continuously radiate energy in the form of radiation in a given orbit.
Q.11	**D**	Spin quantum number is not derived from Schrodinger wave equation. It was given by Goudsmit and Uhlenbech
Q.12	**A**	The number of orbitals in any shell (n) can be calculated by taking n2.\ e.g, if n = 2 So number of orbitals = $(2)^2 = 4$
Q.13	**D**	When n=3, l=2, 'd' present in 3rd shell When n=3, l=1, 'p' present in 3rd shell When n=3, l=o, 's' present in 3rd shell so all are possible

Q.14	**B**	$n = 5$ $\ell = 0 \rightarrow s$ $\ell = 1 \rightarrow p$ $\ell = 2 \rightarrow d$ $\ell = 3 \rightarrow f$
Q.15	**C**	$n = 6$ = number of shell $l = 3$ = shape of orbital $\ell = 0 \rightarrow s$ $\ell = 1 \rightarrow p$ $\ell = 2 \rightarrow d$ $\ell = 3 \rightarrow f$
Q.16	**B**	Number of orbitals in subshell = $(2l+1) = 2(1)+1 = 3$
Q.17	**C**	n + l value for 4f = (4+3) = 7 5p = (5+1) = 6
Q.18	**C**	Number of orbitals = total electron / 2 = 19 / 2 = 9.5 @ 10 (Fraction is rounded to higher number)
Q.19	**B**	$m = \pm l$ $m = \pm 2 = -2, -1, 0, 1, 2$
Q.20	**B**	Helium has 2 electrons, 1 is clock wise and other is anti-clock wise
Q.21	**D**	Any orbital of any type can't accumulate more than two electrons.
Q.22	**C**	If the value of n = 4 then probable values of ℓ is 0,1,2,3. If n = 4 than l = n–l So l = 4 -1 = 0, 1, 2, 3 s p d f
Q.23	**B**	
Q.24	**D**	M = n = 3 Number of orbital in shell = $n^2 = 3^2 = 9$
Q.25	**A**	$M^{+2} = 2+ 8+14+2 = 26$ 2 e- are removed to form cation so added again in total Number of neutrons = 56 - 26=30
Q.26	**C**	Electron Neutron Na^+ 10 12 F^{-1} 10 10 O^{-1} 9 8 Mg^{+2} 10 12
Q.27	**C**	Hund's rule If de-generate orbital available for filling of more than one e- then e- will be filled in different orbital with same spin rather than filling in same orbital with opposite spin
Q.28	**C**	$1s^2, 2s^2, 2p^6, 3s^2, 3p^3$ 

Q.29	**C**	(a) $N_2O_3 = 38$ (b) NO = 15 (c) N_2O = 22 $CO_2 = 22$ (d) NO_2 = 23
Q.30	**A**	$Z_7 = 1s^2, 2s^2, 2p_x^1, 2p_y^1, 2p_z^1 = 3$ $Z_{10} = 1s^2, 2s^2, 2p^2_x, 2p^2_y, 2p^2_z = 0$ $Z_{12} = 1s^2, 2s^2, 2p_x, 2s^2 = 0$ $Z_{16} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^2_x, 3p^1_y, 3p^1_z$
Q.31	**C**	When cathode rays are strike with molecule of gas it eject electrons from gas molecule and produce positive ions. $M + e^- \longrightarrow M^{+1} + 2^-$
Q.32	**D**	Pressure should be reduced for movement of cathode rays and to avoid hindrance.
Q.33	**A**	
Q.34	**D**	Neutrons are not able to ionize the gas but α-ray, β-rays and γ-rays can ionizes the gases.
Q.35	**C**	Electron is the lightest particle while neutron is heaviest among three
Q.36	**C**	Oxygen have atomic number 8 and atomic mass 16.
Q.37	**C**	γ – Rays are less ionizing and more penetrating
Q.38	**D**	positive rays give flash on ZnS plates
Q.39	**A**	
Q.40	**A**	Lesser the mass greater the e/m value When hydrogen gas is used in the discharge tube, the e/m value is found to be the maximum in comparison to any other gas because the value e/m is the lowest for the positive particle obtained from the hydrogen gas.
Q.41	**A**	Number of proton = 2 Number of electron =2 Number of neutron = 2
Q.42	**D**	
Q.43	**C**	Magnetic quantum number is related to orientation of orbital
Q.44	**D**	Spin quantum number explains doublet line while others explain fine or multiple structures. For valance electron of sodium spin will be clockwise or anticlockwise
Q.45	**A**	
Q.46	**B**	$n > l, l^3 m$
Q.47	**A**	The values of Azimuthal, magnetic and spin quantum numbers of sodium and potassium are same while their value of principal quantum number is changed. For sodium it is three and for potassium it is four
Q.48	**C**	If the value of n = 4 then probable values of ℓ is 0,1,2,3. If n = 4 than l = n–1 So l = 4–1 = 0, 1, 2, 3 s p d f
Q.49	**C**	Number of electron = 2(2l+1) = 2(2(1)+1)=6
Q.50	**B**	n = 3 means 3rd shell l = 3 means f-subshell f will be start 4th shell $n > l, l^3 m$

Q.51	**C**	S16 = [Ne] , $3s^2$, 3 px^2 , $3py^1$, $3pz^1$ = 2 un-paired
Q.52	**C**	$2l + 1$ = number of orbital in shell $2(2l + 1)$ = number of electron in subshell $2n^2$ = number of electron in shell n^2 = number of orbital in shell
Q.53	**B**	Azimuthal quantum number represents the subshell
Q.54	**A**	
Q.55	**B**	Azimuthal quantum number describe the shapes of orbitals
Q.56	**C**	l = o s = Spherical shape l = 1 = dumb-bell shape l = 2 d = Double dumb shape l = 4 f = Complicated
Q.57	**A**	Coefficient represent principle quantum number (n) smaller the value of (n) a sub shell closer it to the nucleus
Q.58	**B**	n + l value is highest for 4f (4+3) is equal to 7
Q.59	**D**	Shape of s-orbital is spherically symmetrical
Q.60	**B**	d-Subshell does not exist in 2nd shell
Q.61	**B**	An atomic orbital is a region of space in which there is a high probability of finding an electron in an atom
Q.62	**D**	Principal quantum number explain the size of shell
Q.63	**A**	Aufbau principle helps us to determine order of filling of sub shells by electrons. 1. Aufbau principle = Filling of electrons in sub-shells 2. Hund's rule = Filling of electrons in degenerate orbitals 3. Pauli exclusion principle = Filling of electrons in orbitals Mosley's law = Arrangement of elements in periodic table on atomic number basis.
Q.64	**B**	Filling order of 4s, before 3d is explained by (n+l) rule. (n+l) rule: (a) The electrons are filled in subshells in increasing order of their (n+l) values. (b) If two subshells have same (n+l) values, then the subshell with low 'n' value will be filled first.
Q.65	**B**	The correct order of sub-shells, within a shell w.r.t decreasing energy is f > d > p > s.
Q.66	**C**	Valency of an element is equal to number of unpaired electrons in half filled orbitals. Hund's rule help use to predict number of half filled orbitals in an atom. So indirectly Hund's rule helps us to predict valency of an atom.
Q.67	**B**	Nickel ions(Ni^{+2}) contains unpaired electrons. The electronic configurations of ions given below: A. $_{20}Ca^{+2} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6$ B. $^{20}_{28}Ni^{+2} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^2_{yz}, 3d^2_{xz}, 3d^2_{xy}, 3d^1_{x^2-y^2}, 3d^1_{z_2}, 4s^0$ C. $^{28}_{19}K^{+1} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6$ A. $^{19}_{30}Zn^{+2} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^2, 3d^{10}$
Q.68	**C**	K = 2 L = 8 M = 6 Valance electron is 6 so it belongs to VI group and 3rd period.
Q.69	**A**	d-subshell start from third shell
Q.70	**C**	Number of electron = 2(2l+1) = 2(2(1)+1)=6
Q.71	**C**	$_{24}Cr = [Ar]4s^1, 3d^1_{xy}, 3d^1_{zx}, 3d^1_{x^2-y^2}, 3d^1_{z^2}$ = 6 unpaired electron

Q.72	**C**	The filling of electron according to n+l rule 1s, 2s,2p,3s,3p,4s,3d,4p,5s,4d,5p,6s,4f,5d
Q.73	**D**	P_{15} = [Ne] $3s^2$ $3p^1_x$, $3p^1_y$, $3p^1_z$
Q.74	**D**	
Q.75	**D**	Na^+ = K = 2 L= 8 O^{-2} = K = 2 L= 8 Al^{+3} = K = 2 L= 8 Cl^- = K = 2 L= 8 M = 8
Q.76	**D**	Octet rule is not relate with arrangement of electron according to energy.
Q.77	**B**	The atomic weight is 29 is chromium. When d-subshell will be half filled or complete filled are more stable than d^4 and d^9.
Q.78	**C**	(a) $Fe^{3+} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6$ (b) $CO^{3+} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6$ (c) $CO^{2+} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6$ (d) $Mn^{2+} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^{6*}$
Q.79	**A**	⇅ ⇅ ⇅ ⇅ 1
Q.80	**B**	$K_{19} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$

SKN

GASES, LIQUIDS & SOLIDS

Properties of Gases, Boyle's Law, Charles's Law &Avogadro's law

Q. 1 The volume of given mass of gas is _____ to inverse of pressure
A. Inversely proportional
B. Directly proportional
C. Equal
D. Constant

Q. 2 At constant temperature, by doubling the pressure volume of gas reduced to _____
A. 1/2 of original volume
B. 1/4 of original volume
C. 1/3 of original volume
D. Remain same

Q. 3 In Boyles law, plot between pressure and constant 'K' obtained is _____
A. Straight line passing through origin
B. Curve (hyperbolic)
C. Straight line parallel to pressure axis
D. Straight line perpendicular to pressure axis

Q. 4 The units of 'R' depends upon
A. Moles
B. Temperature
C. Pressure and volume
D. All of these

Q. 5 The SI unit of pressure is Nm^{-2}. 10^{-3} atm is equal to
A. 1.01325 Nm^{-2}
B. 1.01325 Pa
C. 101.325 KPa
D. 0.101325 KPa

Q. 6 One dm^3 of each of H_2. He, N_2 and O_2 in separate vessels at STP, have number of molecules in each.
A. 6.02×10^{23}
B. 6.02×10^{22}
C. 2.68×10^{22}
D. 3.01×10^{23}

Q. 7 The molar volume of CO_2 gas is maximum at
A. 273 k and 1 atm
B. 127°C and 1 atm
C. 0°C and 2 atm
D. 273°C and 2 atm

Q. 8 For a given mass with initial volume 'V', if pressure is reduced to one half and absolute temperature is increased two times. The volume will become
A. $2V_2$
B. 2V
C. 4V
D. 6V

Q. 9 Temperature is the measure of average K.E. At a temperature of -273.13°C, K.E will become
A. Low
B. High
C. Very low
D. Drop to zero

Q. 10 Pressure remaining constant at which temperature the volume of gas will become twice of what it is at 0°C
A. 546 °C
B. 200 °C
C. 546 K
D. 273 K

General gas equation, KMT of gases and interpretation of T

Q. 11 The units of 'R' depends upon
A. Pressure
B. Temperature
C. Volume
D. Both A and C

Q. 12 A container contains 0.2 moles of H_2, 0.3 moles of O_2 and 0.5 moles of N_2. What is the total pressure exerted by mixture of gases if volume of container is 20 dm^3, temperature is 25°C and R = 0.0821 atm dm3 mol^{-1} K^{-1}?
A. 22.4 atm
B. 1.12 atm
C. 11.2 atm
D. 2.24 atm

Q. 13 When the value of general gas constant 'R' is given as 8.314, the relevant units will be
A. Cal, mol^{-1} $degree^{-1}$
B. dm^3. atm mol^{-1}. k^{-1}
C. J. mol^{-1}. K^{-1}
D. Ergs.mol^{-1}.$degree^{-1}$

Q. 14 The amount of energy required to increase the temperature of 1-mole of gas by 2K is
A. R
B. 2R
C. 1/2 R
D. 3R

Q. 15 The root mean square velocity at STP for the gases H_2, N_2, O_2 and HBr are in the order
A. $H_2 < N_2 < O_2 < HBr$
B. $HBr < O_2 < N_2 < H_2$
C. $H2 < N_2 < HBr < O_2$
D. $HBr < O_2 < H_2 < N_2$

Q. 16 The molecules of which gas has highest average kinetic energy at 25°C
A. CO_2
B. O_2
C. CH_4
D. All have same

Q. 17 A gas with lowest root mean square velocity at 300K. is

A. SO_2 B. SO_3

C. Cl_2 D. H_2

Q. 18 According to kinetic molecular theory the kinetic energy of gas molecules varies directly with

A. Pressure B. Density

C. Volume D. Absolute temperature

Q. 19 Which of the following is NOT the basic assumptions of the kinetic theory of gases

A. The collisions among the molecules of the gas are perfectly elastic.

B. The molecules of the gas are always in the state of ceaseless haphazard motion

C. The pressure of a gas is due to collision of gas molecules with the wall of container

D. The molecules exert appreciable attraction on each other

Q. 20 In a closed vessel of 1000 cm^3, H_2 gas is heated from 27°C to 127°C. Which statement is not correct?

A. The rate of collision increases B. The energy of gas molecules increases

C. Pressure of gas increases D. The number of moles of gas increase

Real and Ideal Gases (Van der Waals Eq)

Q. 21 Which of the following statement is correct according to the Vander Waal's equation?

A. 'a' and 'b' constant of both NH_3 and N_2 have greater value

B. 'a' and 'b' constant of both NH_3 and N_2 have smaller value

C. 'a' constant of NH_3 is greater than that of N_2 and b constant of NH_3 is less than that of N_2

D. 'a' constant of NH_3 is smaller than that of N_2 and 'b' constant of NH_3 is more than that of N_2

Q. 22 Real gases show more deviation from ideal behaviour under which of the following conditions

A. At high temperature and low-pressure B. At low temperature and low pressure

C. At low temperature and high-pressure D. At high temperature and high pressure

Q. 23 A gas that has highest value for vander waals coefficient of attraction

A. NH_3 B. CO_2

C. H_2 D. O_2

Q. 24 Real gases deviate at low temperature from ideal behaviour due to

A. Decrease in translational motion of molecules

B. Increase in the collisions between the molecules

C. Significant increase in the intermolecular attractive forces

D. Change in the volume of gas

Q. 25 A gas under what conditions will behave non ideally

	Temperature	Pressure
A	Low	Low
B	High	High
C	High	Low
D	Low	High

Q. 26 Effective volume of molecules per mole of a gas is____ times greater than actual volume of 1 mole of gas molecules.

A. 2 B. 3

C. 4 D. 5

Q. 27 Gases deviate from ideal behavior at high pressure. Which of the following is correct for non-ideality?

A. At high pressure, the gas molecules move in one direction

B. At high pressure, the collisions between the gas molecules are increased manifold

C. At high pressure, the volume of the gas becomes insignificant

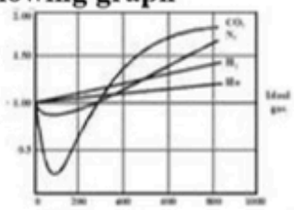
D. At high pressure, the intermolecular attractions become significant

Q. 28 Which of the following shows strange behavior when subjected to gradual increase in pressure at 0°C?

A. H_2 B. He

C. CO_2 D. All show same behavior

Q. 29 In the following graph



Which quantities are represented by X-axis and Y-axis?

	X-axis	Y-axis
A	Temperature	PV
B	Pressure	PV/nRT
C	Volume	PV/nRT
D	Number of moles	PV/nRT

Q. 30 The compressibility factor, (Z=PV/nRT) has value at which a gas show maximum non-ideality in behavior

A. 1.5 B. 1.1
C. 1.0 D. 0.9

Properties of liquids, Intermolecular forces (Van DER WAAL's Forces)

Q. 31 London dispersion forces are strongest in

A. F_2 B. Cl_2
C. Br_2 D. I_2

Q. 32 Naphthalene is soluble in carbon tetrachloride due to the force

A. Dipole-Dipole force B. Dipole-induced dipole force
C. Hydrogen bonding D. London forces

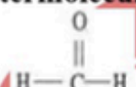
Q. 33 The polarizabilities of elements mostly increase down the group due to the

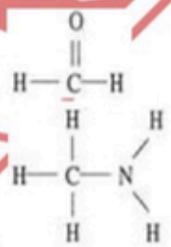
A. Increase in the atomic number B. Increase in the number of shell
C. Increase in the number of protons D. The behaviour of element remains the same

Q. 34 London forces are more significant in

A. Polar molecules B. Metals
C. Ionic solids D. Non polar molecules

Q. 35 Which one of the following substances will have hydrogen bonding as one of its intermolecular forces among itself?

A. 

B. 

C. $CH_3 - O - CH_3$

D.

Q. 36 Kerosene is liquid at room temperature due to

A. Hydrogen bonding B. Organic nature
C. Dipole-dipole forces D. Molecular size

Q. 37 Which one of the following exhibits dipole-dipole attraction between molecules?

A. $SnCl_2$ B. CH_4
C. CO_2 D. BCl_3

Q. 38 The inter-molecular attractive forces vary in the order

A. Water < alcohol < ether B. Alcohol < water < ether
C. Ether < alcohol < water D. Ether < water < Alcohol

Q. 39 Forces of attractions in liquids are _____

A. Stronger than gases B. Weaker than solids
C. Stronger than solids D. Both A and B

Q. 40 Rather than gases liquid contain _____

A. Fix shape B. Fix volume
C. Weak forces of attraction D. High molecular motion

Evaporation and Vapour Pressure, Boiling point and external pressure & Hydrogen Bonding

Q. 41 Vapour pressure of a liquid is not affected by

A. Amount of liquid B. Volume of container
C. Surface area D. All of the above

Q. 42 If heat is to be supplied continuously, the boiling point of any liquid remains constant, as

A. Extra heat is spread in the air
B. High energy molecules continuously leaving the surface of liquid
C. The external pressure remains the same
D. The vapour pressure of the boiling liquid becomes greater than the external pressure

Q. 43 Vapour pressure of liquid is measured when liquid and the vapours are in equilibrium it means that

A. Liquid and vapours have same value of kinetic energy
B. Liquid and vapours have same heat content
C. Rate of evaporation is equal to the rate of condensation
D. Rate of evaporation and condensation are different

Q. 44 When a liquid is evaporated

A. Temperature of liquid increases
B. Temperature of liquid decreases
C. Liquid molecules becomes more energetic
D. Both "A" and "C"

Q. 45 During which process the particles come so close to each other that the empty spaces between them are minimum

A. Evaporation
B. Sublimation
C. Condensation
D. Fusion

Q. 46 Moving from 4°C to 0°C, the density of H_2O

A. Increases
B. Decreases
C. 1st increase than decrease
D. Remains same

Q. 47 Which gas is most soluble in water?

A. H_2S
B. NH_3
C. SO_2
D. CO_2

Q. 48 H_2O has higher boiling point than H_2S because

A. H_2O is smaller molecule and hence more closedly packed
B. The bond angle in H_2O is more than in H_2S and hence the former molecules are more tightly packed
C. Of intermolecular hydrogen bonding in liquid H_2O
D. The latent heat of vaporizaion is higher for H_2O than for H_2S

Q. 49 The strongest H-bond is

A. $H-O^{-\delta}---H^{+\delta}-O$
B. $H-F^{-\delta}---H^{+\delta}-F$
C. $H-N^{-\delta}---H^{+\delta}-N$
D. $H-Cl^{-\delta}---H^{+\delta}-Cl$

Q. 50 Pick out the correct arrangement with respect to boiling point

A. $H_2O > H_2Se > H_2Te > H_2S$
B. $H_2O > H_2Te > H_2Se > H_2S$
C. $H_2O > H_2S > H_2Se > H_2Te$
D. $H_2O > H_2S > H_2Te > H_2Se$

Types of solids and Properties of crystalline solids

Q. 51 All are crystalline solids except

A. Zinc
B. Sugar
C. Iodine
D. Glass

Q. 52 Which is a pseudo solid?

A. Rock salt
B. Aluminum nitride
C. Glue
D. Graphite

Q. 53 _____may be isotropic under ordinary conditions

A. Diamond
B. Borax
C. Bromine
D. Sodium Chloride

Q. 54 The most important characteristic of a solid through which it is identified as crystalline solid

A. Geometrical arrangement of particles
B. Sharp melting point
C. Definite shape
D. Definite volume

Q. 55 Diamond and graphite are

A. Isomorphous
B. Polymorphous
C. Allotropes
D. Both "B" and "C"

Q. 56 NaCl and CsF have same geometry because

A. Their cations belong to 1A group
B. Their anions belong to VIIA group
C. Both are soluble in water
D. They have similar radii ratio

Q. 57 Which one is not the anisotropic behaviour

A. Cleavage of crystal
B. Electrical conductivity
C. Co-efficient of thermal expansion
D. Melting point and boiling point

Q. 58 The arrangement of particles as a points in a crystal is called

A. Unit cell
B. Crystal lattice
C. Space lattice
D. Both B and C

Q. 59 A crystal has _____ parameters to measure its dimension

A. Three
B. Four
C. Six
D. Eight

Q. 60 The crystalline part of amorphous solid is called

A. Unit cell
B. Crystallite
C. Crystallography
D. None of these

Q. 61 Which type of intermolecular forces are present in molecular solids?

A. Dipole-dipole interaction
B. Vander Waal's force
C. Both a and c
D. None of these

Q. 62 An example of three-dimensional giant structure is

A. Ice
B. Diamond
C. Sodium chloride
D. Iodine

Q. 63 Which one of the following may not be related to ionic compounds?

A. Transition temperature
B. Isomorphison
C. Polymorphism
D. Isomerism

Q. 64 A wrong statement is

A. KCl is harder than Na – metal
B. Copper is malleable and ductile
C. Carborundum (SiC) is a soft solid
D. The crystal of NaCl is brittle

Q. 65 Ionic solids do not conduct the electrical current because

A. Ions don't have translatory motion
B. Free electrons are less
C. The coordination number of ion is very high
D. Strong covalent bonds are present in their structure

Q. 66 The crystals formed due to London's forces are

A. Ionic
B. Covalent
C. Molecular
D. Metallic

Q. 67 Which one is true about lattice energy?

A. It increases with increasing the size of cation
B. It decreases with increase the size of anion
C. All ionic compounds have same lattice energy
D. Lattice energy of NaCl is greater than that of LiCl

Q. 68 Ionic solids are mostly of high density due to

A. Chemical bonding
B. Structure
C. Close packing of ions
D. None of these

Q. 69 Crystalline solids are classified on the basis of bonding into

A. Two types
B. Seven types
C. Five types
D. Four types

Q. 70 Diamond, Silicon carbide are insoluble in most of the solvents because

A. They have very high lattice energy
B. They have very big size
C. They do not interact with the solvent
D. All of these

Q. 71 By what factor the pressure on a gas be decreased to triple the volume.

A. 1/3
B. 1/2
C. 3/1
D. 1/4

Q. 72 Volume of gas at 0°C and 1 atm pressure is $10dm^3$, volume of gas at 0.8atm will be

A. $10dm^3$
B. $12.5dm^3$
C. $8dm^3$
D. $5dm^3$

Q. 73 Which of the following laws can be explained only on the basis of Kelvin Scale?

A. Boyle's law
B. Charle's law
C. Avogadro's law
D. Dalton's law

Q. 74 Gases are soluble in water at

A. Low temperature and high-pressure
B. High temperature and high pressure
C. Low temperature and low-pressure
D. High temperature and low pressure

Q. 75 Which one has more mass at STP

A. 1 dm^3 of O_2
B. 1dm3 He
C. $1dm^3$ CO
D. $1dm^3$ of CH_4

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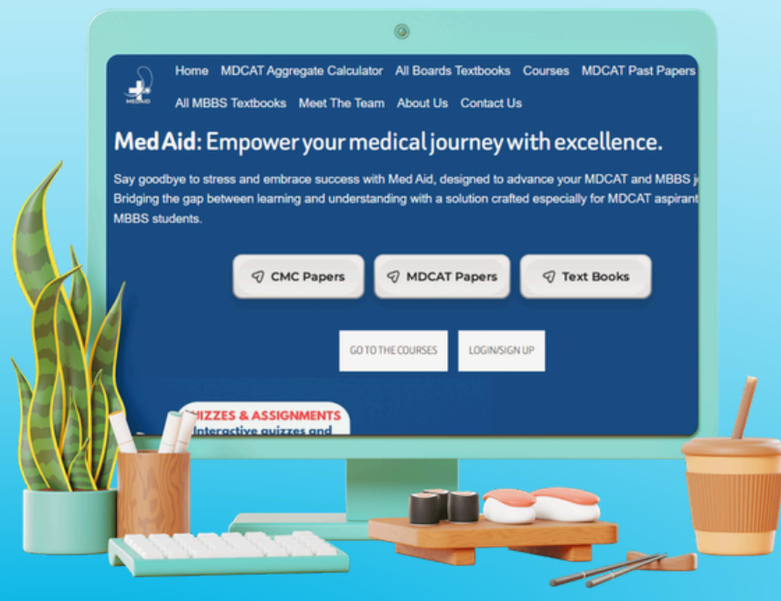
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Q. 76 Two gases having same temperature and pressure will have

A. Same volume
B. Same no. of molecules
C. Same moles
D. All of these

Q. 77 If volume of O_2 is 11.2dm^3 at STP, then the number of moles would be

A. 2.0 moles
B. 0.5 moles
C. 1.0 moles
D. 0.25 moles

Q. 78 The original volume of a gas at 0°C is 273cm^3 at constant pressure. Its volume at 273°C becomes

A. Zero cm^3
B. 546 cm^3
C. 446 cm^3
D. 346 cm^3

Q. 79 Which of the following expressions at constant pressure represents Charles's law?

A. $V \propto \frac{1}{T}$
B. $V \propto \frac{1}{T^2}$
C. $V \propto T$
D. $V = d$

Q. 80 The equation $Vt = Vo(1 + \frac{t}{273})$ is based on

A. Celsius scale
B. Fahrenheit scale
C. Kelvin scale
D. Absolute scale

Q. 81 Which of following relation is true for the density of an ideal gas?

A. RT/PM
B. M/V
C. P/RT
D. PM/RT

Q. 82 In the ideal gas equation PV = n RT, the value of R depends upon

A. Units of measurement
B. Pressure of gas
C. Temperature of gas
D. Nature of gas

Q. 83 According to Kinetic theory of gases which relation is correct

A. $PV = k$
B. $PV = \frac{2}{3}kT$
C. $P_1V_1 = P_2V_2$
D. All of the above

Q. 84 The expression for root mean square velocity is

A. $C_{rms} = \sqrt{\left(\frac{3RT}{M}\right)^2}$
B. $C_{rms} = \sqrt{\frac{3RT}{M}}$
C. $C_{rms} = \frac{3RT}{M}$
D. $C_{rms} = \sqrt{3/2RT/M}$

Q. 85 All of the following are conclusions of the kinetic theory of gases except

A. Derivation of the Van der waal's equation
B. Derivation of Boyle's and Charle's law
C. Relation of average kinetic energy of gases to temperature
D. Graham`s law of diffusion

Q. 86 If the temperature of a gas is increased four times, then its average K.E.

A. Increases 2 times
B. Increases 4 times
C. Decreases 2 times
D. Decreases 4 times

Q. 87 Van der Waal's equation is reduced to general gas equation at

A. High temperature and low-pressure
B. Low temperature and high pressure
C. High temperature and high-pressure
D. Low temperature and low pressure

Q. 88 Observed pressure of gas on the walls of container is less than actual pressure due to

A. Haphazard motion
B. Elastic collision
C. Inter molecular attractive forces
D. Repulsive forces

Q. 89 Which one of the following is a solid with lowest melting point?

A. NaCl
B. I_2
C. $C_6H_{12}O_6$
D. Fe

Q. 90 The low acidic strength of HF molecule as compared to HCl is due to

A. Dipole – dipole forces
B. London forces
C. Hydrogen bonding
D. Covalent bond

Q. 91 Which one of the following arrangements represents the correct order of increasing interactions?

A. Hydrogen bonding, London forces, Dipole – Dipole
B. London force, Hydrogen bonding, Dipole – Dipole
C. London forces, Dipole – Dipole, Hydrogen bonding
D. Dipole – Dipole, London forces, Hydrogen bonding

Q. 92 Which of the following inter molecular forces may be present in molecular solids?

A. Dipole – dipole forces
B. Van der Waal's forces
C. H- bonding
D. All of the these

Q. 93 Which statement about evaporation is incorrect

A. It causes cooling
B. It is exothermic process
C. It is surface phenomenon
D. It is continuous process

Q. 94 Vapour pressure of a liquid depends upon one of the following factors

A. Amount of substance
B. Surface area
C. Size of liquid container
D. Inter molecular forces

Q. 95 A substance with maximum vapour pressure at 25°C

A. Diethyl ether
B. Chloroform
C. Methyl alcohol
D. Water

Q. 96 Steam causes more severe burn than the boiling water because it possesses

A. Latent heat of fusion
B. Latent heat of vaporization
C. Latent heat of sublimation
D. Latent heat of solution

Q. 97 At top of mount Everest water boils at 69°C the external pressure is

A. 1200 torr
B. 323 torr
C. 760 torr
D. 23.7 torr

Q. 98 Which of the following liquid has the highest vapour pressure or is the most volatile?

A. HF (ℓ)
B. NH_3 (ℓ)
C. C_2H_5OH (ℓ)
D. H_2O (ℓ)

Q. 99 Water can boil at

A. 25°C
B. 100°C
C. 120°C
D. All of these

Q. 100 A correct comparison of boiling point is

A. $NH_3 > HF$
B. $HF > H_2O$
C. $C_2H_5OH > HF$
D. $NH_3 > H_2O$

Q. 101 Hydrogen bonding links one spiral (DNA) to the other. The H-bonding is more dominant between

A. C and H
B. N and H
C. O and H
D. O and N

Q. 102 During the cleansing action, the detergents attract stain particles with a force

A. Hydrogen bonding
B. London forces
C. Dipole-induced dipole force
D. Dipole-dipole force

Q. 103 One of the following statement s regarding hydrogen bond is wrong.

A. The molecule should have an atom which is highly electronegative and small in size.
B. The hydrogen bonds formed in water are stronger compared to those formed in ammonia.
C. Compounds showing this property are usually high melting and high boiling
D. Molecules forming hydrogen bonds are soluble is in benzene

Q. 104 The average possible number of H–bonds an NH_3 molecule can form is

A. 1
B. 3
C. 2
D. 4

Q. 105 The compound soluble in water not through hydrogen bonding is

A. Sugar
B. Salt
C. Urea
D. Glucose

Q. 106 Value of gas constant "R" is _____ If unit is atm dm^3 $mol^{-1}K^{-1}$

A. 0.0821
B. 8.3143
C. 62.4
D. 1.98

Q. 107 Density of liquid water _____ if temperature decreases from 25°C to 0°C

A. Decreases
B. Increases
C. First increases and then decreases
D. First decreases and then increases

Q. 108 Which gas show marked deviation from ideal behavior?

A. He
B. H_2
C. N_2
D. CO_2

Q. 109 Butter melts over a wide range of temperature. On this basis, it is classified as

A. Molecular solid
B. Crystalline solid
C. Amorphous solid
D. Covalent solid

Q. 110 Glass is called super cooled liquid. The reason is that glass has

A. Definite volume
B. Definite shape
C. Crystalline structure
D. No crystalline structure

Q. 111 Which property is incorrect about silica?

A. High transparency to light
B. Very low thermal expansion
C. Excellent insulator
D. Soluble in water

Q. 112 Which of the following is wrong?

A. Water has maximum density at 4°C
B. Molecular solids are relatively soft and volatile
C. In graphite carbon atom has tetrahedral geometry
D. Graphite is a good conductor of electricity

Q. 113 K_2SO_4 and K_2CrO_4 are isomorphic substances they have similar properties except one

A. Atomic ratio
B. Crystalline shape
C. Chemical properties
D. Geometry of anion

Q. 114 Crystalline structure of diamond is

A. Body centered cubic
B. Face centered cubic
C. Hexagonal close packing
D. Cubic close packing

Q. 115 In structure of NaCl, the number of formula units per unit cell is

A. 3
B. 4
C. 5
D. 6

Q. 116 Which of the following is an example of molecular solid?

A. Aluminium nitride
B. Glucose
C. Sodium sulphate
D. Graphite

Q. 117 Ionic solids are characterized by which one of the following properties

A. Moderate vapour pressure
B. High vapour pressure
C. Good conductivity in solid state
D. Solubility in polar solvents

Q. 118 The number of Na^+ ions which surround each Cl^- ion in the NaCl crystal lattice is

A. 2
B. 4
C. 6
D. 8

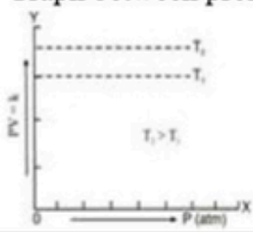
Q. 119 Unit cell is the smallest part and represented all features of the entire _____

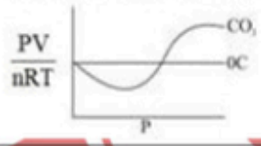
A. Molecule
B. Compound
C. Atom
D. Crystal

Q. 120 Unit cells of all crystal system vary from each other by

A. Sides (a,b,c) only
B. Angles (alpha, beta, gama) only
C. Sides or angles
D. Can't predicted

ANSWERS & EXPLANTION: -

Q.1	**B**	$V \propto \frac{1}{P}$ $if \frac{1}{p} = x \Rightarrow V \propto x$
Q.2	**A**	Volume is inversely proportional to pressure
Q.3	**C**	Graph between pressure and constant K is straight line parallel to pressure axis 
Q.4	**C**	The units of 'R' depends upon units of pressure and volume. By changing unit of P, V unit of R is changed.
Q.5	**D**	1atm = 101.325 kPa 10^{-3} atm = 0.101325 kPa
Q.6	**C**	22.4dm^3 of each gas contain 6.02×10^{23} molecules 1dm^3 of each gas contain 2.68×10^{22} molecules
Q.7	**B**	Volume of gas is directly proportional to temperature, 127°C =400K which is highest with lowest pressure
Q.8	**C**	$V \propto \frac{1}{P}$, $V \propto T$, $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$
Q.9	**D**	Kinetic energy is directly proportional to temperature in Kelvin scale, –273.13°C = 0K , At zero Kelvin average kinetic energy drop to zero
Q.10	**C**	0°C = 273K, by doubling the temperature, volume of gas became double, 273K $\longrightarrow$ V, 546 K $\longrightarrow$ 2V,
Q.11	**D**	The units of 'R' depends upon units of pressure and volume. By changing unit of P, V unit of R is changed.
Q.12	**B**	n = 0.2+0.3+0.5 = 1 P = 298K $\cong$ 300 $PV = nRT$ $P = \frac{nRT}{V} = \frac{1\times0.0821\times300}{20} = 1.12atm$
Q.13	**C**	R=8.314Jk^{-1}mol^{-1} is the S.I units of "R"
Q.14	**B**	The physical meaning of R is that if we have one mole of an ideal gas at 273.16k and one atmospheric pressure and if its temperature is increased by 1k ten it requires R amount of energy (0.0821 atm dm^3 mol^{-1}k^{-1}) To increase the temperature by 2oC it will require 2R energy
Q.15	**B**	$HBr < O_2 < N_2 < H_2$ $C_{rms} = \sqrt{\frac{3RT}{M}} \rightarrow C_{rms} \propto \frac{1}{\sqrt{M}}$ HBr = Polar O_2 = 32g/mol N_2 = 28g/mol H_2 = 2.016g/mol

Q.16	**D**	Average kinetic energy ∝ Temperature
Q.17	**B**	$C_{rms} \propto \frac{1}{\sqrt{M}}$
Q.18	**D**	$E_k \propto T$
Q.19	**D**	Molecules of gas do not have forces of attraction
Q.20	**D**	Number of moles are independent of temperature
Q.21	**C**	'a' constant of NH_3 is greater than that of N_2 because NH_3 is polar while N_2 is non-polar and 'b' constant of NH3 is less than that of N_2 because N_2 molecule is larger in size as compared to NH_3 is correct according to the Van der Waal's equation. 'a' = attractive forces constant 'b' = effective volume constant NH_3 has greater intermolecular forces than N_2 and N_2 has little greater volume at closest approach in the gaseous state.
Q.22	**C**	Real gases deviate from ideal behavior at low temperature and high pressure.
Q.23	**A**	NH_3 being polar molecule it had highest coefficient of attraction
Q.24	**C**	Attractive forces develop at low T and high 'P'
Q.25	**D**	At low temperature-and high-pressure intermolecular forces develop significantly.
Q.26	**C**	b = 4Vm
Q.27	**D**	At high pressure and low temperature distance molecule is small so the intermolecular attraction become significant
Q.28	**C**	Ow increasing pressure, compressibility factor decreases then it keep an increasing 
Q.29	**B**	Pressure taken on X-axis and Z= PV / nRT at Y-axis
Q.30	**A**	Greater the value of 'z' greater the real behaviour
Q.31	**D**	London dispersion forces are strongest in I_2. London dispersion forces polarizability I_2 is more polarizable due to large size of molecule so it is solid at room temperature. Intermolecular forces or polarizability order $I_2 > Br_2 > Cl_2 > F_2$
Q.32	**D**	Naphthalene and CCl_4 are non-Polar
Q.33	**B**	Polarizability is directly related to size of electronic cloud
Q.34	**D**	Non-polar have only L.D.F as I.M.F.
Q.35	**D**	$CH_3 - NH_2$ have hydrogen bonding
Q.36	**D**	Greater the size of molecule, greater the polarizability, greater the forces of attractions
Q.37	**A**	All molecules except $SnCl_2$ are non-polar due to zero dipole moment, so $SnCl_2$ has dipole-dipole forces.
Q.38	**C**	Water > alcohol > ether is the correct order of force of attraction , water and alcohol have hydrogen bonding while ether has London forces.
Q.39	**D**	Forces of attraction of liquids are stronger than gases but weaker than solids
Q.40	**B**	Liquid molecule have fix volume
Q.41	**D**	Vapour pressure of a liquid is not affected by amount of liquid, volume of container and surface area.

Q.42	**B**	Energy given at B.P is consumed by escaping molecules to overcome IMF.
Q.43	**C**	Evaporation and condensation are reversible.
Q.44	**B**	Evaporation is endothermic.
Q.45	**C**	By decreasing the temperature, forces of attractions increases and molecules come close to each other.
Q.46	**B**	Density of water decreases from 4°C to 0°C due to increase sin distance between their molecule
Q.47	**B**	Those compound which form strong hydrogen bond with water. NH_3 form H – Bond with water.
Q.48	**C**	Hydrogen bonding present in water
Q.49	**C**	Greater electronegativity difference grater the forces of attraction
Q.50	**B**	Water has hydrogen bonding H_2Te have strong London Forces
Q.51	**D**	Zinc makes metal crystals, sugar and iodine are examples of crystalline molecular solids but glass is amorphous solid (not crystalline).
Q.52	**C**	Glue is amorphous solid Pseudo solid is also called amorphous solid
Q.53	**C**	Bromine exist as liquid at normal temperature so it may be isotopic
Q.54	**B**	The crystalline solid have sharp melting point
Q.55	**C**	Diamond graphite both consist of C-atoms.
Q.56	**D**	Radius ratio of NaCl and CsF is same
Q.57	**D**	Melting point and boiling point is not anisotropic behaviour
Q.58	**D**	The arrangement of particles as a points in a crystal is called Crystal lattice or Space lattice
Q.59	**C**	Crystal has six parameters 3 sides a, b, c 3 angles alpha, beta, gama
Q.60	**B**	The crystalline part of amorphous solid is called Crystallite
Q.61	**C**	Two types of intermolecular forces are responsible for holding the particles together. (i) Dipole – dipole interactions or hydrogen bonding. (ii) Van der Waal's forces or London forces.
Q.62	**B**	Ice (Molecular solid) Sodium chloride (Ionic solid) Iodine (Molecular solid)
Q.63	**D**	In ionic compound there is non-directional forces so did not show isomerism
Q.64	**C**	Molecular solid is soft but carborundum (SiC) is a covalent solid
Q.65	**A**	Ionic bond is very strong so, it does not have translatory motion
Q.66	**C**	Weak intermolecular forces are present in molecular solids
Q.67	**B**	$L.E \propto \frac{Charge}{size}$
Q.68	**C**	Ionic solids have oppositely charge ions which are very closely packed. Due to close packing density increases.
Q.69	**D**	Ionic bond Covalent solid Molecular solid Metallic solid

Q.70	**D**	Non-polar and Macromolecules having giant structure.
Q.71	**A**	$V \propto \frac{1}{P}$, to increase the volume 3 times, pressure must be decreased to 1/3 of its initial pressure
Q.72	**B**	$P_1V_1 = P_2V_2$ $V_2 = \frac{P_1V_1}{P_2} = \frac{1\times10}{0.8} = 12.5$
Q.73	**C**	Charle's law can be explained only on the basis of Kelvin Scale or absolute temperature scale. Statement: The volume of the given mass of a gas is directly proportional to the absolute (Kelvin) temperature at constant pressure. $V \propto T$ (at constant pressue and fixed no. of moles) or $V = KT$ or $\frac{V}{T} = K$
Q.74	**A**	Gases are soluble in water at high temperature which increase the forces of attraction in gases so solubility increases.
Q.75	**A**	$\frac{32}{22.4} = 1.42g$ $\frac{4}{22.4} = 0.17g$ $\frac{28}{22.4} = 1.249g$ $\frac{16}{22.4} = 0.713g$
Q.76	**D**	Two gases having same temperature and pressure will have =Same volume =same no. of molecules = same moles
Q.77	**B**	$11.2dm^3 = 0.5$mole
Q.78	**B**	The original volume of a gas at 0°C is 273cm3 at constant pressure. Its volume at 273°C becomes 546 cm^3 because volume of given mass of gas double on doubling the temperature at kelvin scale Calculation: The original volume (V_1) of gas at 0°C or 273K = 273 cm^3 The new volume (V_2) of gas at 273°C or 546K =? According to Charles's law $\frac{V_1}{T_1} = \frac{V_2}{T_2}$ $V_2 = \frac{V_1}{T_1} \times T_2$ $V_2 = \frac{273cm^3}{273K} \times 546K$ $V_2 = 546cm^3$
Q.79	**C**	Volume is directly proportional to temperature
Q.80	**A**	If temperature is taken in Celsius scale we can use this equation.

Q.81	**D**	$PV = nRT$ $n = \frac{m}{M}$ $PV = \frac{m}{M}RT$ $PM = \frac{m}{V}RT$ $\frac{m}{V} = d$ $PM = dRT$ $d = \frac{PM}{RT}$
Q.82	**A**	Different units of constant "R" depends upon unit of measurement of pressure and volume.
Q.83	**B**	$PV = \frac{2}{3}kT$ $PV = \frac{1}{3}mNc^2 - - - 1$ $\frac{1}{3}mNc^2 \propto T - - - 2$ $\frac{1}{2}mNc^2 = KT$ $PV = \frac{2}{3}(\frac{1}{2}mNc^2)$ $PV = \frac{2}{3}KT$
Q.84	**B**	$C_{rms} = \sqrt{\frac{3RT}{M}}$
Q.85	**A**	Derivation of the Van der waal's equation is not conclusion of the kinetic theory of gases. Van der Waal's equation for non-ideal gases cannot be derived from kinetic molecular theory but gas laws and temperature interpretation can be derived from KMT.
Q.86	**B**	$E_k = \frac{3R}{2N_A}T$ If $T = 4T'$ So, $E'_k = \frac{3R}{2N_A}(4T')$ $E'_k = 4(\frac{3R}{2N_A}T')$
Q.87	**A**	At high temperature and low pressure forces in real gases become insignificant
Q.88	**C**	Observed pressure of gas on the walls of container is less than actual pressure due to Inter molecular attractive forces. A molecule in the interior of the gas is attracted by other molecules on all sides. These forces of attractions cancel the effect of each other. When a molecule strikes the wall of a container, it experiences a force of attraction towards other molecules in centre of gas. This decreases the impact of its force on the wall.
Q.89	**B**	NaCl Ionic bond I_2 London Force $C_6H_{12}O_6$ Dipole-Dipole force / Hydrogen bonding Fe Metallic bond Greater the intermolecular forces greater the Melting point
Q.90	**C**	H of HF is entrapped b/w F-atoms due to H-bond.
Q.91	**C**	LDF are the weak forces that are present between the non-polar molecule. DDF are more stronger than LDF forces because DDF are present between polar molecule. Hydrogen bonding is the strongest attraction betweemn partical positive change hydrogen and highly electronagative atom like (F,O,N)
Q.92	**D**	Types of molecules polar and non-polar molecules solid and all type of forces present between molecules solid.

Q.93	**B**	Evaporation is not exothermic process but its endothermic process. It is continuous surface phenomenon which causes cooling.
Q.94	**D**	Vapor pressure of a liquid depends upon intermolecular forces but does not depends upon amount of substance, surface area and size of liquid container. Vapour pressure Intermolecular forces
Q.95	**A**	Vapour pressure $\propto \frac{1}{\text{I.M.F}}$ diethyl ether there is weak intermoleculr force
Q.96	**B**	Energy used to overcome I.M.F = Latent heat of vaporization.
Q.97	**B**	Air pressure at M.E. is 323torr
Q.98	**B**	NH_3 has weakest forces among all
Q.99	**A**	Water can boil at any temperature by adjusting the external pressure
Q.100	**C**	SO_2 is polar and SO_3 is non-polar it dipole moment is zero due to perfectly triangular.
Q.101	**C**	The H-bonding is more dominant between O and H. Hydrogen bonding is also present between nitrogen and hydrogen.
Q.102	**B**	Detergents contain polar and non-polar part and stain particles also non-polar
Q.103	**D**	H-Bonded molecules will must be polar. Benzene is non-polar. so they will be insoluble in Benzene.
Q.104	**A**	Ammonia has one lone pair which can be associated with one hydrogen atom of other molecule
Q.105	**B**	Salts are soluble in water due to ion dipole forces.
Q.106	**A**	
Q.107	**C**	
Q.108	**D**	
Q.109	**C**	Amorphous solid have no sharp malting point
Q.110	**D**	Glass is solidified by the process annealing, due to which it has non crystalline structure
Q.111	**D**	Silica is giant structure and insoluble in water.
Q.112	**C**	Graphite has layer structure
Q.113	**C**	Isomorphic substance have similar shape, atomic ratio geometry of anion
Q.114	**B**	Crystalline structure of diamond is face centered cubic
Q.115	**D**	In structure of NaCl, the number of formula units per unit cell is 4. **Formula unit of sodium chloride:** Independent molecules of NaCl donot exist in vapour phase as well as in solid state. That is why NaCl is said formula unit of sodium chloride. Number of Formula Units per Unit Cell: The unit cells that shares one Cl^- ion at one corner = 8 A unit cell gets a share of one Cl^- ion at one corner = 1/8 A unit cell gets a total share of Cl^- ion at eight corners = $8\times1/8 = (1)$ A unit cell gets a share of one Cl^- ion at one face = ½ A unit cell gets a total share of Cl^- ions at six faces = $6\times½ = 3$ So, a unit cell gets a total number of Cl^- ions = $4Cl^-$ Similarly, there are four Na^+ ions in a unit cell. Hence, there are four formula units (4NaCl) of NaCl in a unit cell.
Q.116	**C**	Aluminium nitride (Covalent Solid) Sodium sulphate (Ionic Solid) Graphite (Covalent Solid)

Q.117	**D**	Ionic compounds are soluble in Polar.
Q.118	**C**	Each Na^+ surrounded by 6 Cl.
Q.119	**D**	Unit cell is the smallest part, has all features of the entire crystal
Q.120	**C**	Unit cells of all crystal system vary from each other by Sides or angles

SKN

Equilibrium Reversible Reactions & Applications of Kc

Q. 1 **For the reaction $NH_3 \rightleftharpoons N_2 + 3H_2$ the units of Kp will be**

A. $(atm)^2$ B. $(atm)^{-2}$
C. $(atm)^3$ D. atm

Q. 2 **For the following equilibrium which is true** $\ell L \times mM \rightleftharpoons sS + tT$

A. $Kc = [S]^s\,[T]^t / [L]^l[M]^m$ B. $Kp = \dfrac{P_S^s P_T^t}{P_L^\ell P_M^m}$

C. $Kc = \dfrac{C_S^s C_T^t}{C_L^\ell C_M^m}$ D. All of these

Q. 3 **The concentrations of the reactants and products at equilibrium are**

A. Equal B. Maximum
C. Minimum D. Constant

Q. 4 **The rate of decrease in concentration of reactants or that of increase in concentration of products is _____ at the beginning and _____ at the ending.**

A. Faster, slower B. Slower, faster
C. Slower, slower D. Faster, faster

Q. 5 **Appropriate units of Kp for the following reaction is**

$$PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$$

A. mol/dm^3 B. Torr
C. dm^3/mol D. dm^6/mol^2

Q. 6 **The value of Kp and Kc are same for the reaction**

A. Dissociation of $COCl_2$ B. Dissociation of HF
C. Formation of NH_3 from N_2 and H_2 D. Synthesis of SO_3 from SO_2 and O_2

Q. 7 **For which of the following reactions Kc is greater than KP**

A. $COCl_{2(g)} \rightleftharpoons CO_{(g)} + Cl_{2(g)}$ B. $2NO_{(g)} + Cl_{2(g)} \rightleftharpoons 2NOCl_{(g)}$

C. $H_{2(g)} + Cl_{2(g)} \rightleftharpoons 2HCl_{(g)}$ D. $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

Q. 8 $K_c = \dfrac{x^2}{V(a-x)}$ **is true for**

A. $2NO_2 \rightleftharpoons N_2O_4$

B. $H_2 + I_2 \rightleftharpoons 2HI$

C. $PCl_5 \rightleftharpoons PCl_3 + Cl_2$

D. $CH_3COOH + C_2H_5OH \rightleftharpoons CH_3COOC_2H_5 + H_2O$

Q. 9 **For below reaction if Kc is 0.25, then Kp for this reaction will be**

$$2HI_{(g)} \rightleftharpoons H_{2(g)} + I_{2(g)}$$

A. 1.0 B. 0.25
C. 4.0 D. 0.50

Q. 10 **Following is the condition of reversible reaction that is not affected by pressure (where Δn = number of moles of product–number of moles of reactants)**

A. $\Delta n = 0$ B. $\Delta n = -1$
C. $\Delta n = 1$ D. $\Delta n = 2$

Applications of equilibrium constant, The Le Chatelier's principle

Q. 11 **Kc value indicates that the chemical reaction reaches farthest to the completion**

A. 10^{-3} B. 10^{15}
C. 10^3 D. 10^{10}

Q. 12 **If ratio of concentration of products and that of reactants is greater than Kc then reaction will move**

A. Forward B. Backward
C. Unchanged D. At equilibrium

Q. 13 If the value of Kc is very small for a reaction then the reaction is

A. Incomplete
B. Partially complete
C. Almost complete
D. No effect

Q. 14 In the following homogeneous equilibrium when pressure is increased at constant temperature. What would be the direction of reaction for $2O_3 \rightleftharpoons 3O_2 \quad K_C = 10^{55}$

A. Forward
B. No effect
C. Backward
D. Unpredictable

Q. 15 In-------case increase in temperature and decrease in pressure favours the forward reaction

A. $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$
B. $N_{2(g)} + H_{2(g)} \rightleftharpoons 2NH_{3(g)}$
C. $2SO_{2(g)} \rightleftharpoons 2SO_{3(g)}$
D. $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$

Q. 16 If number of moles of reactants are greater than products, then relationship between Kp and Kc is

A. Kp > Kc
B. Kp ≥ Kc
C. Kp = Kc
D. Kp < Kc

Q. 17 In which case, decrease of pressure favours forwards reaction

A. $N_2 + O_2 \rightleftharpoons 2NO$
B. $2SO_2 + O_2 \rightleftharpoons 2SO_3$
C. $PCl_5 \rightleftharpoons PCl_3 + Cl_2$
D. $N_2 + 3H_2 \rightleftharpoons 2NH_3$

Q. 18 Increasing the concentration of reactants or decreasing the concentration of the products moves reaction to_____ direction.

A. Forward
B. Backward
C. No effect
D. None of these

Q. 19 In an exothermic reversible reaction _____ temperature will shift the equilibrium towards the forward direction.

A. Low
B. High
C. Moderate
D. None of these

Q. 20 Which one will not affect both equilibrium position and equilibrium constant?

A. Pressure or volume change
B. Concentration change
C. Temperature change
D. Catalyst

Applications of chemical equilibrium in industry, Common Ion Effect

Q. 21 The catalyst used for the synthesis of ammonia is

A. Pieces of Iron
B. MgO, Al_2O_3, SiO_2
C. V_2O_5
D. Both A & B

Q. 22 The catalyst used for the synthesis of SO_3 is

A. Pieces of Iron
B. MgO, Al_2O_3, SiO_2
C. V_2O_5
D. Both A & B

Q. 23 The optimum temperature and pressure for the synthesis of SO_3 are

A. 400°C/200 atm
B. 450°C/300 atm
C. 400°C/200-300 atm
D. 400-500°C/1 atm

Q. 24 Which statement about following equilibrium correct?

$$2SO_2 + O_2 \rightleftharpoons 2SO_3$$

A. The value of Kp falls with the rise in temperature
B. The value of Kp falls with increasing pressure
C. Adding V_2O_5 catalyst increase the equilibrium yield of SO_3
D. The value of Kp is equal to Kc

Q. 25 A pair of substances that exhibits common ion effect in aqueous solution and help to identify II-group basic radicals

A. $NH_4Cl + NH_4OH$ B. $H_2S + HCl$

C. $NaCl + HCl$ D. $KClO_3 + KCl$

Q. 26 When NH_4Cl is added in NH_4OH solution then ionization of NH_4OH

A. Increases B. Decreases

C. No change occur D. May increase or decrease

Q. 27 NaCl purified from its' saturated solution by passing

A. CO_2 gas B. O_2 gas

C. NH_3 gas D. HCl gas

Q. 28 A beaker contains a saturated solution of potassium Perchlorate. When potassium chloride (KCl) is added to this solution, some of the potassium Perchlorate is precipitated. It means that

A. $KClO_4$ is stronger electrolyte than KCl

B. Solubility of $KClO_4$ is greater than that of KCl

C. Both $KClO_4$ and KCl are soluble in water to some extent

D. KCl is a stronger electrolyte as compared with $KClO_4$

Q. 29 Ionization of phenol can be decreased by adding

A. Methanol B. Toluene

C. Hydrochloric acid D. Benzyl alcohol

Q. 30 The addition of H_2SO_4 will not suppress the ionization of

A. Acetic acid B. Benzoic acid

C. Hydrogen sulphide D. Hydrogen chloride

Buffer Solution, Solubility product

Q. 31 Buffer solution can be explained by

A. Common ion effect B. Law of mass action

C. Le-Chatelier Principle D. All of these

Q. 32 If a buffer solution of higher pH than seven is to be made we use

A. Strong acid and strong base B. Weak acid and strong base

C. Weak acid and its salt with strong base D. Weak base and its salt with strong acid

Q. 33 In buffer solution containing a weak acid and its salt. The ratio of concentration of salt to acid is increased tenfolds, then pH of solution will

A. Increase by one unit B. Increase tenfolds

C. Decrease by one unit D. Decrease tenfolds

Q. 34 Select the buffer which is not acidic

A. HCOOH and HCOONa B. CH_3COOH and CH_3COOK

C. NH_4OH and NH_4NO_3 D. C_6H_5COONa and C_6H_5COOH

Q. 35 pH of buffer in which concentrations of salt and base are 0.1M and 0.01M respectively (pKb = 4.0)

A. 3.0 B. 2.0

C. 9.0 D. 11.0

Q. 36 The solubility product of $PbSO_4$ is 4×10^{-6} $mol^2 . dm^{-6}$. The maximum concentration of Pb^{+2} ions is

A. 1.41×10^{-5} $mol.dm^{-3}$ B. 2×10^{-3} $mol. dm^{-3}$

C. 2×10^{-5} $mole. dm^{-3}$ D. 4×10^{-3} $mol. dm^{-3}$

Q. 37 The solubility product of an ionic compound AB2 is 32×10^{-9} $mol^3 . dm^{-9}$; The maximum concentration of A^{+2} ion is

A. 8×10^{-9} $mol\ dm^{-3}$ B. 2×10^{-9} $mol. dm^{-3}$

C. 2×10^{-3} $mol. dm^{-3}$ D. 1.41×10^{-3} $mol. dm^{-3}$

Q. 38 The solubility product of AgCl is 2.0×10^{-10} mol^2dm^{-6}. The maximum concentration of Ag^+ ions in the solution is _____ mol dm^{-3}.

A. 2.0×10^{-10} B. 1.41×10^{-5}

C. 1.0×10^{-10} D. 4.0×10^{-20}

Q. 39 The solubility product of CdS is 9.0×10^{-4} mol^2. dm^{-6}. The maximum concentration of Cd^{+2} ions is

A. 1.41×10^{-5} mol.dm^{-3} B. 2×10^{-3} mol. dm^{-3}

C. 3×10^{-2} mole. dm^{-3} D. 3×10^{-3} mol. dm^{-3}

Q. 40 On the bases of given values Ksp, which sparingly soluble salt is least soluble in water

A. Ksp = 2×10^{-2} B. Ksp = 2×10^{-6}

C. Ksp = 2×10^{-4} D. Ksp = 2×10^{-3}

Rate of reaction, rate Law, Units of k, Determination of the rate of a chemical reaction & Order of reaction and its determination

Q. 41 The rate of reactions between two specific time intervals is called

A. Average rate of a reaction B. Rate of a reactions

C. Instantaneous rate of reaction D. Velocity constant

Q. 42 Slowest step in the reaction is called

A. Elementary step B. Rate law

C. Rate determining step D. Order of reaction

Q. 43 The rate of reaction

A. Increases as the reaction proceed

B. Decreases as the reaction proceed

C. Remains the same as reaction proceed

D. May decrease or increase as reaction proceeds

Q. 44 Which one is NOT physical method for rate determination of chemical reaction?

A. Dilatometric method B. Spectrometric method

C. Half life method D. Optical rotation method

Q. 45 The mechanism below has been proposed for the reaction of $CHCl_3$ with Cl_2

Step l: $Cl_{2(g)} \rightleftharpoons 2Cl_{(g)}$ **fast**

Step 2: $Cl_{(g)} + CHCl_{3(g)} \longrightarrow CCl_{3(g)} + HCl_{(g)}$ **slow**

Step 3: $CCl_{3(g)} + Cl_{(g)} \longrightarrow CCl_{4(g)}$ **fast**

A. Rate = $[CHCl_3][Cl]^2$ B. Rate = $[CHCl_3][Cl_2]^{1/2}$

C. Rate = $[CCl_3][Cl]$ D. Rate = $[Cl_2]$

Q. 46 Which technique is used to determine the absorption of radiations?

A. spectrometry B. dilatometric method

C. refractometric method D. optical rotation method

Q. 47 Rate expression of two reactions are given below

(1) rate = $k[A]^2$ **(2) rate = $k[A][B]$**

which one is correct?

A. Both have different order

B. Both have same order

C. Equation 1 is 1st order while equation 2 is 2nd order

D. Equation 1 is 2nd order while equation 2 is 1st order

Q. 48 The rate law for the reaction is rate = $k[A][B]^{2/3}$. The order of reaction is

A. Zero B. 2/3

C. 1/3 D. 5/3

Q. 49 Which of the followings is pseudo first order reaction?

A. Acid catalyzed hydrolysis of an ester B. Hydrolysis of tertiary butyl bromide

C. Chloroform to Carbon tetrachloride D. Both (a) and (b)

Q. 50 For a reaction like $X + 2Y \rightarrow Z$ Rate $= k[X]^0[Y]^2$
If concentration of X and Y is doubled, then rate of reaction will increase

A. 8 times
B. 6 times
C. 4 times
D. 16 times

Factors affecting rate of reaction

Q. 51 The rate of a chemical reaction doubles for every 10°C rise of temperature. If the temperature is raised by 50°C, the rate of the reaction increases by about

A. 16
B. 64
C. 32
D. 08

Q. 52 The incorrect order indicated against the rate of reaction

	Rate	Order
A	$\frac{d[C]}{dt} = k[A]$	1
B	$\frac{d[C]}{dt} = k[A][B]$	2
C	$-\frac{d[A]}{dt} = k[A][B]^2$	2
D	$-\frac{d[A]}{dt} = k[A]$	1

Q. 53 Rate of chemical equation increase rapidly even for small increase in temperature because of rapid increase in the

A. Collision theory
B. Activation energy
C. Average kinetic energy of molecules
D. Fraction of molecules with energy more than activation energy

Q. 54 Generally, by increasing temperature rate of chemical reaction increase. it is due to

A. Greater velocity of molecules
B. Greater number of collisions
C. Greater number of molecules having activation energy
D. None of the above

Q. 55 The rate of reaction decreases how may times when temperature drops from 150K to 120K.

A. Two
B. Four
C. Eight
D. Sixteen

Q. 56 The rate of reaction can be increased in general by all of the following factors except

A. By increasing the temperature
B. Using a suitable catalyst
C. By increasing activation energy
D. By increasing concentration of reaction

Q. 57 The rate of chemical reaction roughly doubles for every 10oC rise of temperature. If temperature is raised by 20°C, the rate may become

A. 4 times
B. 16 times
C. 8 times
D. 32 times

Q. 58 The rate of a chemical reaction is independent of

A. Nature of reactant
B. Temperature
C. Molecularity
D. Concentration of reactant

Q. 59 Following is an exothermic reaction Which is correct statement?

A. Rate of reaction will increase by increasing temperature
B. Yield of C can be increased by increasing pressure
C. Rate of reaction will decrease by increasing temperature
D. Rate is not affected by adding catalyst

Q. 60 Factor which does not generally affect the rate of reaction

A. Surface area
B. Light
C. Temperature
D. Pressure

Activation energy and activated complex

Q. 61 Which is the correct expression of Arrhenius equation

A. $k = Ae^{Ea / RT}$
B. $k = Ae^{-Ea / T}$
C. $k = Ae^{RT / Ea}$
D. $k = Ae^{-Ea / RT}$

Q. 62 The energy of activation for an exothermic reaction is 40kJ if H = - 10kJ. What is the energy of activation if the reaction is reversed?

A. 50 Kj
B. 40kJ
C. 60kJ
D. 30kJ

Q. 63 If Ef and Eb are the activation energies for forward and backward reaction respectively. How these can be compared for the exothermic reaction.

A. Ef > Eb
B. Ef < Eb
C. Ef = Eb
D. No prediction can be made

Q. 64 An endothermic reaction A → B has an activation energy of 15 kJ/mole. The enthalpy of reaction is 5kJ / mole. The activation energy for the reaction is B → A

A. 15 kJ/mole
B. 10 kJ/mole
C. 20 kJ/mole
D. 5 kJ/mole

Q. 65 On increasing the temperature, the rate of reaction increases mainly because

A. The activation energy of the reaction increases
B. Concentration of the reacting molecules increases
C. Collision frequency increases
D. None of these

Q. 66 Energy of activation for backward reaction is less than forward reaction for_____ reaction

A. Endothermic
B. Exothermic
C. Moderate
D. Fast

Q. 67 $E_{a(forward)}$, $E_{reactants}$, and $E_{products}$ are 30 KJ, 110 KJ and 120 KJ respectively. The activation energy for backward reaction, Ea(backward) is

A. 140 KJ
B. 40 KJ
C. 130 KJ
D. 20 KJ

Q. 68 Which is incorrect postulate about collision, theory of reaction rate

A. For a chemical reaction to occur, particle must collide with proper orientation
B. Reaction between colliding particles takes place if they possess lower energy than activation energy
C. All collision does not lead to reaction
D. During collision, bond breaking & formation takes place

Q. 69 A reaction has equal activation energy for forward and backward reactions. Which statement is correct?

A. Reaction is zero order
B. Enthalpy change is zero
C. Product has less energy than reactants
D. No catalyst has been used

Q. 70 The catalytic activity of enzymes is greatly enhanced by the presence of

A. Coenzyme
B. Apoenzyme
C. Retarder
D. Without any substance

Q. 71 Calculate the value of Kc for ammonia synthesis when the equilibrium concentration of nitrogen, hydrogen and ammonia are 2M, 2M and 4M at 400°C

A. 1.0 mol^{-2} dm^6
B. 1/64 mol^{-2} dm^6
C. 0.1 $mol^{-2}dm^6$
D. 16 mol^{-2} dm^6

Q. 72 The Kc expression for the reaction

$cA + dB \rightleftharpoons aC + bD$ **is**

A. $\frac{[A]^c\,[B]^d}{[C]^a\,[D]^b}$

B. $\frac{[C]^a\,[D]^b}{[A]^c\,[B]^d}$

C. $\frac{[C]^c\,[D]^d}{[A]^a\,[B]^b}$

D. $[C]^c\,[D]^d + [A]^m\,[B]^n$

Q. 73 For the following reaction $A + B \rightleftharpoons 2C + D$ **The equilibrium constant unit is**

A. $mol^{-1}\ dm^3$

B. $moldm^{-3}$

C. $mol\ dm^3$

D. mol^2dm^{-3}

Q. 74 For the system $2X + 3Y \rightleftharpoons Z$ **the expression for equilibrium constant Kc is**

A. $\frac{2X \times 3Y}{Z}$

B. $\frac{2X^3 \times 3Y}{Z}$

C. $\frac{[Z]}{X^2 \times Y^3}$

D. $\frac{[Z]}{2X \times 3Y}$

Q. 75 For which of the following reactions Kp > Kc

A. $H_{2(g)} + F_{2(g)} \rightleftharpoons 2HF_{(g)}$

B. $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

C. $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$

D. $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

Q. 76 For the reaction $A + B \rightleftharpoons C + D$ **one starts with 6 moles A and 7 moles B per dm3. When equilibrium is attained, 4.5 moles of C is formed, what is the value of Kc for the reaction**

A. 3

B. 1.8

C. 5.4

D. 3.78

Q. 77 The equilibrium expression for reaction is $Kc = \frac{4x^2y^2}{(a-x)(b-3x)}2$

A. Increase of pressure shifts equilibria to right

B. Increase of pressure increases Kc

C. Increase of pressure decreases Kc

D. Both a and b

Q. 78 For which of the following reactions Kp > Kc

A. $H_{2(g)} + F_{2(g)} \rightleftharpoons 2HF_{(g)}$

B. $PCl_{5(g)} \rightleftharpoons PCl_{3(g)} + Cl_{2(g)}$

C. $2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)}$

D. $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

Q. 79 For the reaction $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$**, Which of the following relationship is correct?**

A. $K_c = K_p(RT)^2$

B. $K_c = K_p(RT)^{-2}$

C. $K_p = \frac{K_c}{(RT)^2}$

D. All of these

Q. 80 If ratio of concentration of products and that of reactants is less than Kc then reaction will move

A. Forward

B. Backward

C. Unchanged

D. At equilibrium

Q. 81 If the value of Kc is very large for a reaction then the reaction is

A. Incomplete

B. partially complete

C. almost complete

D. no effect

Q. 82 Kc value for decomposition of HF is 10^{-13} **at 2000°C it means that**

A. Reactants are more stable

B. Products are more stable

C. Reactants are unstable

D. Reactants and products are equally stable

Q. 83 The equilibrium of gaseous reversible reaction that proceeds with decrease in number of moles will shift to right when

A. Pressure increases
B. Volume increases
C. Pressure decreases
D. Both B and C

Q. 84 Which is true about the following equilibrium

$$HNO_3 + 2H_2SO_4 \rightleftharpoons 2HSO_4^- + NO_2^+ + H_2O$$

A. Sulphuric acid is a base
B. Sulphuric acid is dehydrating agent
C. Addition of water reduces $[NO_2^+]$
D. Both B and C

Q. 85 In the following reaction the white ppt i-e artificial milk (BiOCl) disappears when

$$BiCl_3 + H_2O \rightleftharpoons BiOCl + 2HCL$$

A. More HCl is added
B. More water is added
C. More $BiCl_3$ is added
D. Frequent removal of HCl

Q. 86 Change in pressure is not favourable to the reactions having reactants and products in

A. Gaseous phase
B. liquid phase
C. solid phase
D. Both B & C

Q. 87 The optimum temperature and pressure for the synthesis of ammonia are

A. 400ºC/200 atm
B. 450ºC/300 atm
C. 400ºC/200-300 atm
D. 400-500ºC/1 atm

Q. 88 At very high pressure and low temperature, the rate of formation of NH_3 is

A. High
B. low
C. moderate
D. none of these

Q. 89 If in AgCl solution, some salt of NaCl is added, AgCl will be precipitated due to :

A. Solubility
B. Un saturation effect
C. Electrolyte
D. Common ion effect

Q. 90 Silver nitrate in added to aqueous barium chloride according to the stoichiometric ratio. The precipitate is removed by filtration. What are the main ions in the filtrate?

A. Ag^{1+} and NO_3^{1-} only
B. Ba^{2+} and NO_3^{1-} only
C. Ag^{1+}, Ba^{2+}, and NO_3^{1-}
D. Ba^{2+}, NO_3^{1-} and Cl^{1-}

Q. 91 Sodium benzoate and benzoic acid are mixed in equimolar ratio to form buffer if pKa is 2 what will be the pH?

A. 0
B. 1
C. 2
D. Any one

Q. 92 Buffer solution is needed in

A. Clinical analysis
B. Soil sciences
C. Microbiology
D. All of these

Q. 93 In buffer solution containing a weak acid and its salt. The ratio of concentration of salt to acid is increased ten folds, then pH of solution will

A. Increase by one unit
B. Increase ten folds
C. Decrease by one unit
D. Decrease ten folds

Q. 94 Best buffer will be one which have

A. [acid] = [salt]
B. [acid] > [salt]
C. [acid] < [salt]
D. [acid] = [Base]

Q. 95 Buffer is a solution

A. Whose pH is constant
B. Which resists change in its pH
C. Which can absorb large quantity of acid or base without changing its pH
D. Whose pH may or may not change during a chemical reaction

Q. 96 Addition of NH_4OH and NH_4Cl in water gives

A. Standard solution
B. Basic buffer solution
C. Acidic buffer solution
D. Conjugate solution

Q. 97 The solubility of CaF_2 in water of 25°C is 2×10^{-4} mol dm^{-3}. What is the Ksp value at this temperature

A. 3.2×10^{-8}
B. 3.2×10^{-12}
C. 3.2×10^{-4}
D. 3.2×10^{-11}

Q. 98 Smaller the value of Ksp of a salt , _____ is its capability to dissociate.

A. Smaller
B. greater
C. no effect
D. increases but very small

Q. 99 Solubility of which salt in H2O increases with temperature

A. LiCl
B. Li_2CO_3
C. KI
D. Na_2CO_3

Q. 100 Ksp values of four salts are given, which is more soluble in water

A. 10^{-13}
B. 10^{-15}
C. 10^{-11}
D. 10^{-10}

Q. 101 Ksp for following equation can be written as

$$PbCl_2 \rightleftharpoons Pb^{+2} + 2Cl^{-1}$$

A. $[Pb^{+2}]\,[Cl^-]^2$
B. $[Pb^{+2}] + [Cl^-]^2$
C. $[Pb^{+2}]\,[2Cl^-]^2$
D. $[Pb^{+2}]\,[Cl^-]$

Q. 102 A certain reaction has the rate equation, Rate = $k[A][B]^2$. The rate is 2.5×10^{-3} mol $dm^{-3}s^{-1}$. When [A] is 0.2 mol dm^{-3} and [B] is 0.050 mol dm^{-3}. Calculate the numerical value of rate constant

A. 50
B. 5.0
C. 2
D. 0.05

Q. 103 The unit of rate constant for 1st order reaction is

A. mol $dm^{-3}s^{-1}$
B. $mol^{-1}\ dm^3\ s^{-1}$
C. s^{-1}
D. $mol^{-2}\ dm^6\ s^{-1}$

Q. 104 The unit of rate constant is same as that of rate of reaction in

A. First order reaction
B. Second order reaction
C. Third order reaction
D. Zero order reaction

Q. 105 The unit of rate constant 'K' is $mol^{-1}dm3s^{-1}$ for a chemical reaction the order of reaction is

A. 0
B. 1
C. 2
D. 3

Q. 106 The rate expression of a reaction is, Rate = $k[A][B]^2$
What happens to rate of reaction if concentrations of A and B are doubled?

A. Increased two times
B. Increased four times
C. Increased eight times
D. Increased nine times

Q. 107 If during reaction, there is rotation in plane polarized light, then its rate can be determined by

A. Spectrometry method
B. Electrical conductivity method
C. Optical rotation method
D. Dilatometric method

Q. 108 Which property of liquid is measured by polarimeter?

A. conductance
B. refractive index
C. optical activity
D. change in volume

Q. 109 Arrhenius equation describes the effect of

A. Temperature on rate of reaction
B. Volume on rate of reaction
C. Pressure on rate of reaction
D. Number of moles on rate of reaction

Q. 110 The units of slope are in

A. Degree
B. Kelvin
C. Per Kelvin
D. JK^{-1}

Q. 111 Arrhenius equation describes the effect of

A. Temperature on rate of reaction
B. Volume on rate of reaction
C. Pressure on rate of reaction
D. Number of moles on rate of reaction

Q. 112 If rate constant for any reaction is equal to rate of reaction at all concentrations. Then the order of reaction will be

A. Zero
B. One
C. Two
D. Three

Q. 113 In the hydrolysis of an organic chloride in the presence of large excess of water $R_3C - Cl + H_2O \rightarrow R_3C - OH + HCl$, order of reaction is

A. Second order
B. First order
C. Third order
D. Pseudo First order

Q. 114 All are correct about zero order except

A. All photochemical reactions are zero order
B. Rate is independent of concentration
C. Radioactive decay follows zero order
D. Half-life is directly proportional to initial concentration

Q. 115 The number of atoms or molecules whose concentration determines the rate of a chemical reaction is called the

A. Molecularity of the reaction
B. Order of the reaction
C. Specific activity of the reaction
D. Rate constant of the reaction

Q. 116 A reaction has rate law expression as
$Rate = k[A]^{3/2}[B]^{-1/2}$
The order of reaction is

A. 1
B. 2
C. 3.2
D. -1/2

Q. 117 The value of activation energy of chemical reaction is primarily determined by

A. Nature of reacting species
B. Temperature
C. Number of collisions per unit time
D. Concentration of species

Q. 118 Which statement is incorrect about activated complex?

A. Short lived
B. Maximum energy
C. Unstable combination of atoms
D. Less energy than Ea

Q. 119 The minimum amount of energy required for the reacting molecules to undergo reaction is

A. Potential energy
B. Kinetic energy
C. Thermal energy
D. Activation energy

Q. 120 In a reaction $2X + Y \longrightarrow M + N$
if the concentration of Y kept constant and that of X is trippled. The reaction will be

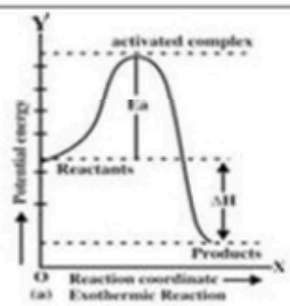
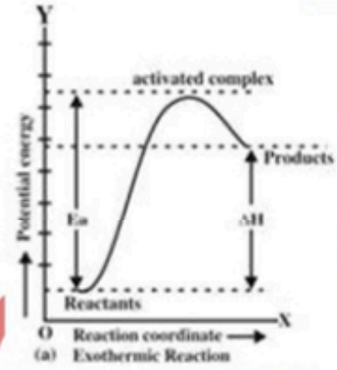
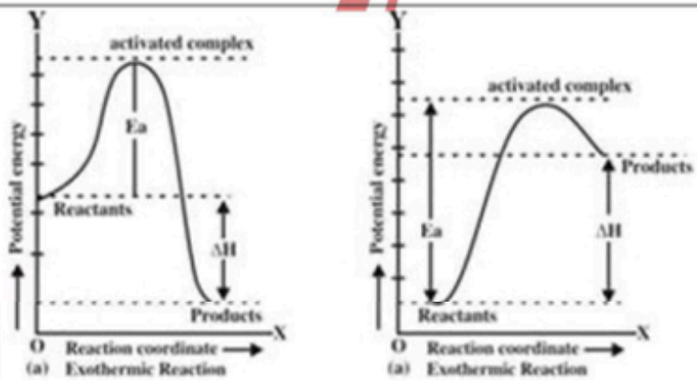
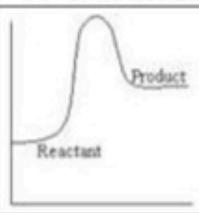
A. Increase 3 times
B. Increase 27 times
C. Increase 9 times
D. Increase 27 times

ANSWERS & EXPLANTION: -

Q.1	**A**	$K_p = \frac{[N_2][H_2]^3}{[NH_3]^2}$ $= \frac{(atm)(atm)^3}{(atm)^2}$ $= atm^2$
Q.2	**D**	
Q.3	**D**	
Q.4	**A**	Reaction proceed faster at the beginning while slower at the end.
Q.5	**B**	Units of gaseous reactions are taken in atm or torr
Q.6	**B**	if the number of moles reactants and product are same the Kp and Kc give same values as $K_p = K_C(RT)^{\Delta n}$ $2HF \rightleftharpoons H_2 + F_2$ $\Delta n = n_P - n_R$ $= 2 - 2 = 0$
Q.7	**B**	If the number of moles of products is less then the moles of reactants then, Kc > Kp
Q.8	**C**	$PCl_5 \rightleftharpoons PCl_3 + Cl_2$
Q.9	**B**	$Kp = Kc\ (RT)^{\Delta n}$ $\Delta n = nP - nR = 2 - 2 = 0$ $Kp = Kc\ (RT)^0$ $Kp = Kc$
Q.10	**A**	If Δn is equal to zero then no effect of pressure on such gaseous reactions
Q.11	**B**	Greater the value of Kc, greater the concentration of product and reaction is nesses to completion.
Q.12	**B**	[Product]↑ reaction will be backward
Q.13	**B**	
Q.14	**C**	By pressure is increases reaction moves towards lesser number of moles.
Q.15	**A**	(i) When pressure is decreased reaction move towards greater number of moles. (ii) When temperature of endothermic reaction is increased, it moves in forward direction.
Q.16	**D**	If mole of reactants is greater than product then Dn is –ve hence Kp < Kc
Q.17	**C**	When pressure of the system decreases then volume of the system increases and reaction moves towards the
Q.18	**A**	↑ Concentration of reactant forward reaction increased. ↑ Concentration of product increasing reverse reaction.
Q.19	**A**	By ↑ rate of exothermic reaction will increase.
Q.20	**D**	Catalyst does not affect both position of equilibrium and equilibrium constant. It just increases the rate of both direction.
Q.21	**D**	Pieces of Iron, MgO, Al_2O_3, SiO_2 this mixture is used as a catalyst
Q.22	**C**	V_2O_5 used as a catalyst
Q.23	**D**	400-500°C/1 atm, at this condition rate of reaction and yield is at optimum level

Q.24	**A**	$Kp = Kc\,(RT)^{\Delta n}$ $Kp = Kc\,(RT)^{-1}$ $Kp = \frac{Kc}{RT}$ As, $Kp \propto \frac{1}{T}$ $\Delta = n_P - n_R$ $= 2 - 3 = -1$
Q.25	**B**	(H_2S + HCl) is the group reagent of basic radical of group II.
Q.26	**B**	NH_4OH is weak electrolyte.
Q.27	**D**	NaCl is a weak electrolyte as compared to HCl.
Q.28	**D**	Strong electrolyte (KCl) will suppress the ionization of weak electrolyte ($KClO_4$)
Q.29	**C**	Strong electrolyte (HCl) will suppress the ionization of weak electrolyte (Phenol)
Q.30	**D**	HCl is strong electrolyte so, not effected by H_2SO_4
Q.31	**D**	Buffer solution can be explained by Common ion effect, Law of mass action and Le-Chatelier Principle
Q.32	**D**	If pH of the buffer is greater than seven then buffer is basic buffer and basic buffer is formed from weak base and its salt with strong acid.
Q.33	**A**	$pH = pKa + \log 10 = pKa + 1$ $pH = pKa + \log 10^2 = pKa + 2$ So if ratio of conc. Of salt and acid is increased 10 times. pH only increased 1 time.
Q.34	**C**	NH_4OH and NH_4NO_3 is example of basic buffer
Q.35	**C**	$pOH = pKb + \log\frac{[salt]}{[base]}$ $pOH = 4 + \log\frac{10^{-1}}{10^{-2}} = 4 + 1 = 5$ $pH = 14 - pOH = 14 - 5 = 9$
Q.36	**B**	$Ksp = s^2$ $4\times10^{-6} = [Pb^{+2}]^2$ $Pb^{+2} = 2\times10^{-3}$
Q.37	**C**	$AB_2 \rightleftharpoons A^{+2} + 2B^{-1}$ $32\times10^{-9} \quad x \quad 2x$ $Ksp = 4x^3$ $32\times10^{-9} = 4x^3$ $x^3 = 8\times10^{-9}$ $x = \left(8\times10^{-9}\right)^{1/3} = 2\times10^{-3}$

Q.38	B	$AgCl \rightleftharpoons Ag^{+} + Cl^{-1}$ $2\times10^{-10} \quad x \quad x$ $Ksp = x^2$ $2\times10^{-10} = x^2$ $x = 1.41\times10^{-5}$
Q.39	C	$CdS \rightleftharpoons Cd^{+2} + S^{-2}$ $9\times10^{-4} \quad x \quad x$ $Ksp = x^2$ $x = (ksp)^{1/2} = (9\times10^{-4})^{1/2} = 3\times10^{-2}$
Q.40	B	Smaller the Ksp lesser the solubility
Q.41	A	The rate of reactions between two specific time intervals is called average rate of a reaction
Q.42	C	Slowest step in the reaction is called rate determining step. It is used if reaction proceed in more than one step
Q.43	B	The rate of reaction decreases as the reaction proceed due to decrease in conc.
Q.44	C	Half-life method is used to find order of reaction
Q.45	B	It is three step reaction, 2nd step is slow step so, rate can be determine by this step Rate = $[CHCl_3][Cl_2]^{1/2}$
Q.46	A	spectrometry is a technique used to measure the amount of radiation absorb.
Q.47	B	Order of reaction is the sum of exponents of a rate equation both reactions are second order
Q.48	D	order of reaction (O.R) is the sum of exponents of a rate equation both reactions are second order O.R = 1 + 2/3 = 5/3
Q.49	D	Acid catalyzed hydrolysis of an ester & Hydrolysis of tertiary butyl bromide are pseudo first order because one reactant ' water' is taken in excess
Q.50	C	By increasing the [X], no effect on rate because its not involved in rate equation, while by increasing the [Y] 2 trime, rate will increase 4 time.
Q.51	C	$\Delta T = 50\Delta$ rate changes by temperature = $(2)^n$ $n = \Delta T / 10 = 50/10 = 5$ rate changes by temperature = $(2)^5 = 32$
Q.52	C	Order of $-d[A] / dt = k[A][B]^{\circ}$ is one
Q.53	D	By increasing in temperature average kinetic energy increase and fraction of those molecule increase which have more energy than activation energy.
Q.54	C	By increasing in temperature number of those molecules increase which have equal or more energy than activation energy.
Q.55	C	Change in rate = (2)n n = DT/10 = 150 -120/10 = 30/10 = 3 Change in rate = $(2)^3$ = 8 times decrease
Q.56	C	Rate of reaction (rate constant K) is inversely related to activation energy.

Q.57	**A**	Change in rate = (2)n n = ΔT/10 = 20 / 10 = 2 Change in rate = (2)2 = 4 time
Q.58	**C**	The rate of a chemical reaction is independent of Molecularity
Q.59	**A**	Rate of reaction will increase by increasing temperature for both endothermic & exothermic reaction
Q.60	**D**	Pressure generally does not effect the rate of reaction
Q.61	**D**	$k = Ae^{-Ea/RT}$ is the correct expression of Arrhenius equation
Q.62	**A**	 For exothermic reaction Eb = Ef + (DH*) * only magnitude Eb = 40 + 10 = 50kj
Q.63	**B**	For exothermic reaction, Eb is always greater than Ef
Q.64		 Eb = Ef – (ΔH) = 15 – 5 = 10kj/mol
Q.65	**C**	Due to temperature increase, kinetic energy of molecules will increase as a result collosion frequency will increase. T ∝ K.E ∝ Collision frequency
Q.66	**A**	
Q.67	**D**	

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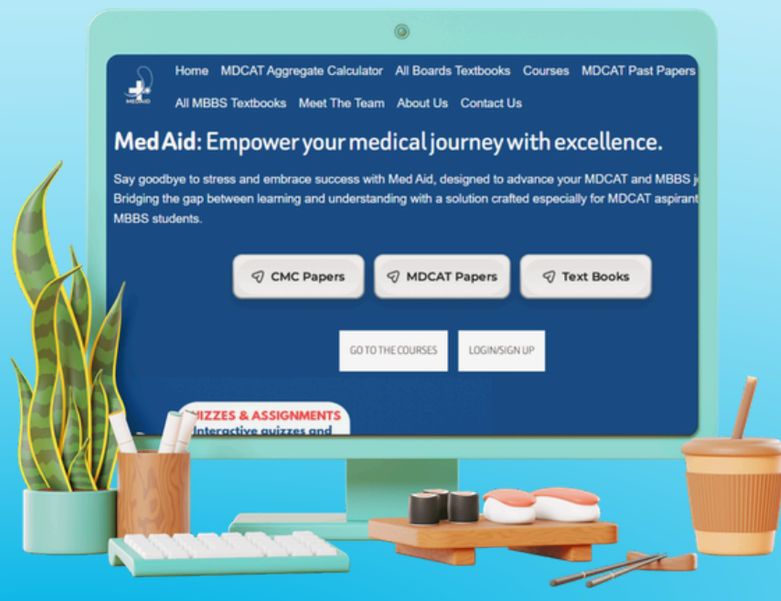
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		As in endohtemric reaction $E_p > E_R$ $\Delta H = E_p - E_R$ $= 120 - 110 = 10kJ$ $E_f = E_b + \Delta H$ $30 = E_b + 10$ $30 - 10 = E_b$ $20kJ = Eb$
Q.68	**B**	All postulates are correct except "b" option. Reaction between colliding particles can only takes place if upon collision they possess energy equal or greater than activation energy.
Q.69	**B**	Both reactant and product have same enthalpy and enthalpy change is zero
Q.70	**A**	Catalytic activity of enzymes is greatly enhanced by the presence of a coenzyme or activator
Q.71	**A**	$N_2 + 3H_2 \rightleftharpoons 2NH_3$ 2M 2M 4M $Kc = \frac{[NH_3]^2}{[N_2][H_2]^3}$ $= \frac{[4]^2}{[2][2]^3}$ $= \frac{16}{2\times 8}$ $= 1mol^{-2}dm^6$
Q.72	**B**	
Q.73	**B**	$(Moldm^{-3})^{\Delta n}$ $\Delta n = +1$
Q.74	**C**	[Z]/ [X]2[Y]3
Q.75	**B**	If number of moles of product are greater than reactant $Kp > Kc$ as $Kp = Kc\ (RT)^{\Delta n}$
Q.76	**C**	$A + B \rightleftharpoons C + D$ 6 7 0 at = 0 6 − 4.5 7 − 4.5 4.5 4.5 at = t^2 1.5 2.5 4.5 4.5 $Kc = \frac{[C][D]}{[A][B]} = \frac{[4.5][4.5]}{[1.5][2.5]}$ $= \frac{45\times 45}{15\times 25} = \frac{27}{5}$ $= 5.4$
Q.77	**A**	Increase of pressure shifts equilibria to right (Products side) because with the increase of pressure volume of the system decrease and product will increase
Q.78	**B**	$Kp = Kc\ (RT)^{\Delta n}$ If Δn is positive then Kp is greater than Kc
Q.79	**D**	$\Delta n = nP - nR = 2 - 4 = -2$ $K_p = K_c(RT)^2$ $K_p = \frac{K_c}{(RT)^2}$ $K_c = K_p(RT)_2$

Q.80	**A**	Rate $\frac{[\text{Product}]}{[\text{Reactant}]}$ of is less than numerical value of Kc means that Reactant is in excess and product is in less amount. So, reaction should move in forward
Q.81	**C**	$K_c < 10^{-10}$ Reaction will be very slow $K_c = 10^{1}$ Reaction will be at equilibrium $K_c = 10^{50}$ Reaction will complete
Q.82	**A**	If Kc value is very small it means that reaction is not proceeding in forward reaction favorably
Q.83	**A**	When a reaction proceeds with decrease in number of moles will shift to right when pressure increased
Q.84	**D**	Both Sulphuric acid is dehydrating agent and Addition of water reduces $[NO_2^+]$
Q.85	**A**	By adding HCl, Rr = increase and [BiOCl] decrease so artificial milk disappear.
Q.86	**D**	Pressure is independent on the solid and liquid.
Q.87	**C**	400^0C/200-300 atm, at this condition rate of reaction and yield is at optimum level
Q.88	**B**	The yield of ammonia is favoured at low temperature and high pressure, but at low temperature rate of reaction is very slow.
Q.89	**D**	The suppression of ionization of weak electrolyte by strong electrolyte having common ion is called common ion effect.
Q.90	**B**	Ba^{2+} and NO_3^{1-} only while Ag^{+1} and Cl^{-1} will react completely
Q.91	**C**	Henderson's = Equation $pH = pKa + \log\frac{[Salt]}{[Acid]}$ $= pKa + \log\frac{[C_6H_5COO^-Na^+]}{[C_6H_5COOH]}$ $= pKa + \log 1\left(\begin{matrix}\text{salt and acid}\\ \text{are equimolar}\end{matrix}\right)$ $pH = pKa + O$ $pH = pKa$ $pH = 2$
Q.92	**D**	Buffer solution are needed in clinical analysis, solid sciences and Micro biology.
Q.93		Log 10 = 1 $pH = pKa + \log\frac{[Salt]}{[Acid]} \times 10$
Q.94	**A**	If concentration of slat and acid are equal then buffer is considered as the best buffer
Q.95	**B**	Buffer is a solution which resists change in its pH
Q.96	**B**	Addition of NH_4OH and NH_4Cl in water gives basic buffer solution
Q.97	**D**	$CaF_2 \rightleftharpoons Ca^{+2} + 2F^-$ Let S is the solubility. $Ksp = 4s^3$ $= 4\times8\times10^{-12}$ $K_{sp} = 3.2\times10^{-11}$
Q.98	**A**	Smaller the ksp less the dissociation of salt

Q.99	**C**	KI give endothermic solution while other 3 slats gives exothermic solution
Q.100	**D**	Greater the ksp greater the solubility of salt
Q.101	**A**	$ksp = \left[Pb^{+2}\right]\left[Cl^{-1}\right]^2$
Q.102	**B**	$Rate = K[A][B]^2$ $K = \frac{[Rate]}{[A][B]^2} = \frac{2.5\times10^{-3}}{0.2\times2.5\times10^{-3}} = \frac{1}{0.2} = 5$
Q.103	**C**	Units of $K = (moldm^{-3})^{1-n}\ s^{-1}$ Units of $K = (moldm^{-3})1^{-1}\ s^{-1}$ $= (moldm^{-3})^0\ s^{-1} = s^{-1}$
Q.104	**D**	Unit of rate of reaction and units of rate constant K for zero order reaction are same ($moldm^{-3}s^{-1}$)
Q.105	**C**	$mol^{-1}dm3s^{-1}$ is the unit of 2nd order reaction
Q.106	**C**	By increasing the concentration of A, rate increases upto two times while by increasing conc. of B, rate increases upto four time due to the square of [B]. So, overall rate increases 8 time.
Q.107	**C**	Optical rotation method is used when substance can rotate plane polarize light
Q.108	**C**	polarimeter is used to measure the optical rotation of plan polarized light.
Q.109	**A**	Explanation: As $k = A^{-\frac{Ea}{RT}}$ where T is temperature.
Q.110	**C**	$\frac{Jmol^{-1}}{Jk^{-1}mol^{-1}} = \frac{1}{k} = k^{-1}$
Q.111	**A**	Arrhenius equation describes the effect of Temperature on rate of reaction
Q.112	**A**	Rate = K [reactant]^0 Rate = K
Q.113	**D**	It is pseudo first order because one reactant ' water' is taken in excess
Q.114	**C**	Radioactive decay is 1st order reaction
Q.115	**B**	The number of atoms or molecules whose concentration determines the rate of a chemical reaction is called the Order of the reaction
Q.116	**A**	O.R = sum of exponents of rate equation = 3/2 -1/2 = 1
Q.117	**C**	Number of collisions per unit time, primarily determines the value of activation energy of chemical reaction.
Q.118	**D**	Activated complex has maximum energy, equivalent of activation energy. It is unstable and decompose to products.
Q.119	**D**	The minimum amount of energy required for the reacting molecules to undergo reaction is Activation energy
Q.120	**C**	Rate reaction for this equation will be Rate = k $[X]^2$ Rate = k$[3]^2$ Rate = k^9 while value of Y is constant

THERMOCHEMISTRY + ELECTROCHEMISTRY

System, Surrounding and State function, Energy in chemical reactions & First Law of thermodynamics

Q. 1 Which of the following sets constitutes of all the state functions of system?

A. Temperature, Pressure, Work
B. Enthalpy, Work, Pressure
C. Enthalpy, Entropy, Internal Energy
D. Heat, Enthalpy, Volume

Q. 2 Hydrogen is a diatomic molecule and its molecule have

A. Translational motion
B. Vibrational motion
C. Vibrational and rotational motion
D. Translational and vibrational motion

Q. 3 The system becomes more stable if it

A. Gains energy
B. Loses energy
C. Does not loses energy
D. Have constant energy

Q. 4 Which of the following process may be exothermic?

A. 1st I.P
B. 2nd I.P
C. 1st E.A
D. 2nd E.A

Q. 5 An exothermic process is

A. $H_{2(g)} \longrightarrow 2H_{(g)}$
B. $O_{(g)} + 1^{-}e \longrightarrow O^{-1}$
C. $O^{-1}_{(g)} + 1^{-}e \longrightarrow O^{-2}_{(g)}$
D. Both B and C

Q. 6 Reaction in which heat evolves is called

A. Endothermic
B. Spontaneous
C. Non-spontaneous
D. Exothermic

Q. 7 All types of energies of particles forming a system is called

A. Enthalpy
B. Kinetic energy
C. Potential energy
D. Internal energy

Q. 8 When ΔE of a system increases, then which of the following possibilities is correct

A. Temperature of the system can increase
B. Phase change may take place
C. Chemical reaction can occur
D. All of the above

Q. 9 $\Delta H = \Delta E$ for which of the following reaction

A. $K_{(s)} + H_2O_{(\ell)} \longrightarrow KOH_{(aq)} + H_{2(g)}$
B. $N_{2(g)} + 3H_{2(g)} \rightleftharpoons NH_{3(g)}$
C. $AlCl_{3(aq)} + 3NaOH_{(aq)} \longrightarrow Al(OH)_{3(aq)} + 3NaCl_{(aq)}$
D. $4Na_{(s)} + O_{2(g)} \longrightarrow Na_2O_{(s)}$

Q. 10 If there is interconversion of solid and liquid states then

A. $\Delta V = 0$
B. $\Delta H \approx \Delta E$
C. $\Delta H > \Delta E$
D. Both A and B

Enthalpy of a reaction and its Types, Born-Haber cycle & Hess's law of constant heat summation

Q. 11 Which of the following enthalpy is always exothermic?

A. Atomization
B. Solution
C. Formation
D. Combustion

Q. 12 For the reaction, $3O_2 \rightleftharpoons 2O_3$; ΔH = + ve . We can say that

A. Ozone is more stable than oxygen
B. Ozone is less stable than oxygen and ozone decomposes forming oxygen readily
C. Oxygen is less stable than ozone and oxygen readily forms ozone
D. None of the above

Q. 13 The heat of neutralization is minimum for

A. $NH_4OH + CH_3COOH$
B. $KOH + HNO_3$
C. $NaOH + H_2SO_4$
D. $NaOH + HCl$

Q. 14 Which of the following statement is incorrect?

A. DH_n is determined by glass calorimeter
B. DH_{latt} of NaCl is -787 kJ mol-1
C. DH_{comb} is determined by bomb calorimeter
D. $Na_{(s)} \longrightarrow Na_{(g)} + e^{-1}\ \Delta H_{at} = 108 kJ\,mol^{-1}$

Q. 15 Greater the lattice energy of an ionic compound, _____ will be the ionic bond or intermolecular forces.

A. Stronger
B. Weaker
C. No relation
D. None of these

Q. 16 Using the hypothetical information given in the table below,

Reactions	ΔH
$K_{(s)} + \frac{1}{2}Br_{2(l)} \longrightarrow KBr_{(s)}$	$-400 kJmol^{-1}$
$K_{(s)} \longrightarrow K_{(g)}$	$+100 kJmol^{-1}$
$K_{(g)} \longrightarrow K^{+}_{(g)} + e^{-}$	$+400 kJmol^{-1}$
$\frac{1}{2}Br_{2(l)} \longrightarrow Br_{(g)}$	$+100 kJmol^{-1}$
$Br_{(g)} + e^{-} \longrightarrow Br^{-}_{(g)}$	$-350 kJmol^{-1}$

Calculate the lattice energy of formation of potassium bromide.

A. $+672 kJmol^{-1}$
B. $-672 kJmol^{-1}$
C. $+650 kJmol^{-1}$
D. $-650 kJmol^{-1}$

Q. 17 ΔH = ΔE for which of the following reaction

A. $K_{(s)} + H_2O_{(l)} \longrightarrow KOH_{(aq)} + H_{2(g)}$

B. $N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$

C. $AlCl_{3(aq)} + 3NaOH_{(aq)} \longrightarrow Al(OH)_{3(aq)} + 3NaCl_{(aq)}$

D. $4Na_{(s)} + O_{2(g)} \longrightarrow 2NaO_{(s)}$

Q. 18 Which of the following enthalpies of formation cannot be measured directly?

A. ΔH^{o}_{latt}
B. $\Delta H^{o}f$ for $CO_{(g)}$
C. $\Delta H^{o}f$ for B_2O_3
D. All of these

Q. 19 Based on the following reactions

$C_{(graphite)} + O_2 \longrightarrow CO_{2(g)}$, $\longrightarrow \Delta H = -394$ kJ/mole and $2CO_{(g)} + O_{2(g)} \longrightarrow 2CO_{2(g)}$, $\Delta H = -569$ kJ/ mol, the heat of formation of CO will be

A. 109.5 kJ/mol
B. 219.0 kJ/mol
C. –109.5 kJ/mol
D. –219.0 kJ/mol

Q. 20 Heat of formation of CO cannot be measured directly due to the

A. Formation of carbon black with it.
B. Formation of carbon dioxide with it.
C. Formation of water with it.
D. Formation of CH_4 with it.

Oxidative number or state, Balancing of redox equations by ion-electron method & Balancing redox equations by oxidation number change method

Q. 21 The oxidation state of group 1A metals is ____ and that of group 2A is_____.

A. +1/-2
B. -1/-2
C. +1/+2
D. None of these

Q. 22 The oxidation state of oxygen in oxides, peroxides and super oxides is

A. -2, +2, -1
B. -1, -2, +1
C. -2, -1, -1/2
D. -2, -1/2, -1

Q. 23 The oxidation number of "P" in PO_4^{-3}

A. +3
B. +8
C. +7
D. +5

Q. 24 $2Cl^{-1} \longrightarrow Cl^{2} + 2e^{-}$ is an example of

A. Oxidation
B. Reduction
C. Redox
D. Disproportionation

Q. 25 When $KMnO_4$ acts as an oxidizing agent and ultimately forms MnO_4^{2-}, MnO_2, Mn_2O_3 and Mn^{2+}, then the number of electrons transferred in each case is

A. 1, 3, 4, 5
B. 1, 5, 3, 7
C. 4, 3, 1, 5
D. 3, 5, 7, 1

Q. 26 To balance oxygen in ion electron method in acidic medium, we add

A. H+ ion
B. OH- ion
C. H_2O
D. O_2

Q. 27 **In fuel cell, N_2H_4 reacts $N_2H_4 + O_2 \rightarrow N_2 + 2H_2O$. The number of electrons lost by each nitrogen atom will be**

A. 3 B. 4
C. 2 D. 6

Q. 28 **HBr is formed when bromine reacts with molecular hydrogen at high temperature. $H_2 + Br_2 \rightarrow 2HBr$, the reaction is an example of**

A. Disproportionation B. Reduction
C. Oxidation D. Redox

Q. 29 **In the reaction $2\ Fe + 3Cl_2 \rightarrow 2FeCl_3$**

A. Fe is reduced B. Fe is oxidized
C. Cl_2 is oxidized D. None of these

Q. 30 **When HNO_3 is converted into N_2O_5.**

A. HNO_3 is oxidized B. HNO_3 neither oxidized nor reduced
C. The oxidation state of 'N' increases D. The oxidation state of 'N' decreases

Explanation of electrolysis (Predict the Product), Standard electrode Potential, SHE and Cell Potential

Q. 31 **Electrochemistry is concerned with the**

A. Nelson cell B. Voltaic cell
C. Hg-cell D. All of these

Q. 32 **In an electrolytic cell current flows in external circuit**

A. From cathode to anode in outer circuit B. From anode to cathode outside the cell
C. From cathode to anode inside the cell D. Both "B" and "C"

Q. 33 **The electrolytic products of which of the following are same as for the electrolysis of water.**

A. Aqueous NaCl B. Aqueous $CuSO_4$
C. Aqueous $ZnSO_4$ D. Aqueous KCl

Q. 34 **During the electrolysis of Brine solution, the gas liberated at the cathode is**

A. H_2 B. O_2
C. Cl_2 D. All of these

Q. 35 **The product of electrolysis will not be same in the case of**

A. $NaNO_{3(aq)}$ B. $H_2SO_{4(aq)}$
C. $NaOH_{(aq)}$ D. $CuSO_{4(aq)}$

Q. 36 **Which of the following has a spontaneous oxidation-reduction reaction?**

A. Electrolytic cell B. Galvanic cell
C. Voltaic cell D. Both B & C

Q. 37 **Standard electrode potential is measured at**

A. 1atm , 25°C , 1.0M B. 1atm , 273K , 1.0M
C. 1atm , 293K , 1.0M D. 1atm , 290K , 1.0M

Q. 38 **Select the correct statement about salt bridge**

A. It acts as catalyst B. It allows exchange of ions
C. Maintain its neutrality D. Both 'B' and 'C'

Q. 39 **Standard electrode potential of a metal depends upon?**

A. Temperature B. Molarity of the ions in solution
C. Nature of metal D. All the above

Q. 40 **_____ is not there in all the galvanic cells**

(I) Salt bridge **(II) electrolyte** **(III) electrode**

A. I only B. I and II only
C. II and III only D. I, II and III

Electrochemical Series and Applications

Q. 41 **Aluminium displaces hydrogen from dilute HCl whereas silver does not. The E.M.F. of a cell prepared by combining Al/Al^{+3} and Ag/Ag^{+} is 2.46 V. The reduction potential of silver electrode is + 0.80 V. The $E°_{red}$ of aluminium electrode is**

A. +1.66 V B. –1.66 V
C. 3.26 V D. –3.26 V

Q. 42 **Which of the following is the weakest oxidizing agent?**

A. I_2 B. Br_2
C. Cl_2 D. F_2

Q. 43 Consider the standard reduction potential of the followings

$Mg^{+2} + 2e^- \longrightarrow Mg \quad E_0 = -2.37\ V$

$Fe^{+3} + 3e^- \longrightarrow Fe \quad E_0 = -0.04\ V$

Best oxidizing agent is

A. Mg^{+2} B. Mg

C. Fe^{+3} D. Fe

Q. 44 Metal that deposits at cathode when aqueous solution of its salt is electrolysed

A. Na B. Cu

C. Zn D. Sn

Q. 45 _____can displace Hydrogen from acid more easily

A. Au B. Al

C. Pb D. Ca

Q. 46 That reaction is feasible which has the net cell voltage

A. Positive B. Negative

C. Zero D. Any of these

Q. 47 Group 1 metals are _____ reactive than group 2 metals.

A. More B. Less

C. Equal D. No relation

Q. 48 _____can displace Hydrogen from acid more easily

A. Au B. Al

C. Pb D. Ca

Q. 49 If electricity is passed through $CuSO_4$ solution by using Pt electrode then which of the following possible change occurs

A. H_2 is deposited at cathode B. Colour of the solution becomes fade

C. Cu is deposited at anode D. All are possible

Q. 50 Which gas will be evolved at cathode during electrolysis of aq. $CuCl_2$ solution?

A. H_2 B. Cl_2

C. Cu D. None of these

Q. 51 _____ is not a state function

A. Enthalpy B. Internal energy

C. Gibb's free energy D. Heat

Q. 52 The environment in which a system is studied is

A. State function B. Phase

C. Surrounding D. State

Q. 53 A balloon filled with oxygen is placed in a freezer. Identify system

A. Balloon B. Oxygen

C. Freezer D. All of these

Q. 54 Work may be defined in terms of pressure-volume as

A. P V B. F x d

C. H+V D. H + PV

Q. 55 An exothermic process is

A. $H_{2(g)} \longrightarrow 2H_{(g)}$ B. $O_{(g)} + 1^-e \longrightarrow O^{-1}$

C. $O^{-1}_{(g)} + 1^-e \longrightarrow O^{-2}_{(g)}$ D. Both B and C

Q. 56 Which of the following process will be spontaneous and endothermic?

A. Melting of ice B. Evaporation of water

C. Dissolution of NH4Cl D. All of these

Q. 57 In exothermic reactions _____

A. Container heats up

B. Container cools down

C. No change in temperature occurs

D. Enthalpy of product become greater than reactants

Q. 58 Which is a non-spontaneous reaction

A. $NaOH + HCl \longrightarrow NaCl + H_2O$ B. $Zn + CuSO_4 \longrightarrow ZnSO_4 + Cu$

C. $N_2 + O_2 \longrightarrow 2NO$ D. $Na + H_2O \longrightarrow NaOH + H_2$

Q. 59 The amount of heat required to raise the temperature of a body through 1^0C is called

A. Molar heat B. Entropy

C. Specific heat D. Heat capacity

Q. 60 There are how many conventional ways to change the internal energy of system

A. 4 B. 3
C. 2 D. 1

Q. 61 Thermodynamics relates heat with other forms of energy. It does not deal with

A. Gibb's free energy B. Activation energy
C. Internal energy D. Potential energy

Q. 62 First law of thermodynamics relates

A. Heat, work and entropy B. Internal energy, heat and work
C. Heat, work and external energy D. Work, internal energy and enthalpy

Q. 63 Absorption of heat occurs when

A. NH_3 is synthesized from N_2 & H_2 B. LiCl is put in H_2O
C. Soda ash is put in water D. NH_4Cl is put in H_2O

Q. 64 Change in enthalpy of DH of a gaseous system can be calculated by following relationship

A. $\Delta H = \Delta E - PV$ B. $\Delta H = \Delta E + q$
C. $\Delta H = \Delta E - Q$ D. $\Delta H = \Delta E + P\Delta V$

Q. 65 Which of the following enthalpy change is always exothermic?

A. Enthalpy of solution B. Enthalpy of formation
C. Enthalpy of neutralization D. Enthalpy of atomization

Q. 66 Standard enthalpies of formation of O3, CO2, NH3 and HI are 142.2, -393.3, -46.2 and +25.9 kJ mol-1 respectively. The order of their increasing stabilities will be

A. O_3 CO_2, NH_3, HI B. CO_2, NH_3, HI, O_3
C. O_3, HI, NH_3, CO_2 D. NH_3, HI, CO_2, O_3

Q. 67 The heat of neutralization is maximum for

A. $NH_4OH + CH_3COOH$ B. $Ca(OH)_2$ HCl
C. $NaOH + H_3PO_4$ D. NaOH + HCl

Q. 68 Which of the following values of heat of formation indicates that the product is most stable?

A. – 94 KJ B. – 230KJ
C. +21 KJ D. +50 KJ

Q. 69 Enthalpy of neutralization of strong acids and bases is same because

A. Acids give H^+ and bases give OH^{-1} B. Neutralization leads to formation of salts
C. Strong acids and bases are ionic compounds D. H^+ and OH^- combine to form H_2O

Q. 70 The enthalpy of formation of an ionic compound is -392 Kj / mol. Total energy changes (ΔHx) involved in the formation of gaseous ions form normal physical state is 280 kJ / mole. The enthalpy of lattice ($\Delta H_{latt.}$) is

A. –112 KJ / mol B. – 672 KJ / mol
C. –267 KJ / mol D. +224KJ / mol

Q. 71 Lattice energies are helpful in discussing the ---------- of ionic compounds.

A. Structure B. Bonding
C. Properties D. All of these

Q. 72 Which of the following change in enthalpy in Born-Haber cycle may be negative?

A. $H_{I.E}$ B. H_{at}
C. $H_{E.A}$ D. H_{diss}

Q. 73 Hess's law can be applied to determine

A. ΔH_f B. ΔH_{latt}
C. ΔH_{comb} D. All of the above

Q. 74 By Hess's Law

A. $\Delta H = 0$ B. $\sum \Delta H = 0$
C. $\sum \Delta E = 0$ D. $\sum \Delta H(cycle) = 0$

Q. 75 Standard heat of formation of Al_2O_3 cannot be determined directly because

A. It reacts with CO_2 B. It does not catch fire
C. Protective layer of Al_2O_3 form D. Al and O_2 do not react

Q. 76 Consider the reaction $4NO_{2(g)} + O_{2(g)} \longrightarrow 2N_2O_{5(g)}$ $\Delta Hr = -111kJ$ If $N_2O_{5(s)}$ is formed instead of $N_2O_{5(g)}$ in the above reaction, the ΔHr value will be

$$(N_2O_{5(g)} \longrightarrow N_2O_{5(s)} \quad \Delta H = -54 kJmol^{-1})$$

A. –219 Kj B. –165 kJ
C. + 54 kJ D. + 219 kJ

Q. 77 The oxidation no. of hydrogen in NaH is

A. +1 B. –1
C. 0 D. All of these

Q. 78 Find the oxidation state of 'S' in H2SO4

A. – 2 B. + 4
C. + 6 D. + 12

Q. 79 The oxidation no. of Mn in MnO_4^{-2} is

A. + 4 B. + 5
C. + 6 D. – 6

Q. 80 To balance oxygen in ion electron method in acidic solution, we add

A. ion B. ion
C. H_2O D. O_2

Q. 81 In which conversion oxidation number of Mn is not changed

A. $MnO_4^{-2} \longrightarrow MnO_4^{-1}$ B. $MnO_2 \longrightarrow MnCl_2$
C. $KMnO_4 \longrightarrow MnSO_4$ D. None of these

Q. 82 How many electrons are required to balance the following half reaction

$$2H_2O + MnO_4^{-1} \longrightarrow MnO_2 + 4OH^-$$

A. $2e^{-1}$ on left side B. $2e^{-1}$ on right side
C. $3e^{-1}$ on right side D. $3e^{-1}$ on left side

Q. 83 Consider the following reaction

$$2Cr_2O_7^{2-}{}_{aq} + 16H^+{}_{aq} + 3C_2H_5OH_{aq} \longrightarrow 4Cr^{3+}{}_{aq} + 11H_2O_{(l)} + 3CH_3COOH_{(aq)}$$

Which atom undergoes decrease in oxidation number

A. Carbon B. Oxygen
C. Hydrogen D. Chromium

Q. 84 Which of the following is not a redox reaction?

A. $4Na + O_2 \longrightarrow 2Na_2O$ B. $NO_2 + H_2S \longrightarrow N_2O + H_2O + S$
C. $BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2HCl$ D. $4KClO_3 \longrightarrow 3KClO_4 + KCl$

Q. 85 Loss of electrons is called ____ and gain of electrons is called _____.

A. Oxidation/reduction B. Reduction/oxidation
C. Hydration/dehydration D. None

Q. 86 In a reaction, the oxidation number of Cr decreases by 3. This indicates that Cr is

A. Reduced B. Oxidized
C. Neutralized D. A reducing agent

Q. 87 Which is true about the reaction $Mg + Cl_2 \longrightarrow MgCl_2$

A. Mg is reduced B. Mg is oxidized
C. Cl_2 is oxidized D. Cl_2 is reducing agent

Q. 88 Which of the following has a non-spontaneous oxidation-reduction reaction?

A. Electrolytic cell B. Galvanic cell
C. Voltaic cell D. Both B & C

Q. 89 The direction of flow of electrons through external circuit in electrolytic cell is from

A. Anode to cathode B. Cathode to anode
C. Do not flow in external circuit D. Vary from cell to cell

Q. 90 If $CuSO_{4(aq)}$ is electrolysed in presence of an inert electrode, product at cathode and at anode respectively

A. O_2 and H_2 B. O_2 and H_2
C. O_2 and Cu D. Cu and O_2

Q. 91 In the electrolysis of dil H_2SO_4 using platinum electrode, what is true

A. OH^- is discharged at the cathode B. H_2 is evolved at anode
C. Oxygen is evolved at anode D. SO_2 is evolved at anode

Q. 92 Temperature for the measurement of standard electrode potential is

A. 298K B. 300K
C. 30°C D. 310K

Q. 93 Potential of SHE is considered as

A. Zero B. Unity
C. Constant D. Multiple of 1

Q. 94 The standard reduction potential of Zn is

A. 0.76 B. – 0.76

C. – 0.34 D. 0.34

Q. 95 The conductivity of strong electrolyte

A. Increases on dilution B. Does not change considerably on dilution

C. Decreases on dilution D. Depends on density

Q. 96 The standard electrode potential is measured by

A. Electrometer B. Voltmeter

C. Galvanometer D. Polarimeter

Q. 97 A standard hydrogen electrode has zero electrode potential because

A. Hydrogen is easier to oxidize

B. This electrode potential is assumed to be zero

C. Hydrogen atom has only one electron

D. Hydrogen is the lightest element

Q. 98 If reduction potentials of different metals are

A = – 0.25V B = – 1.0V C = – 1.50V D = –1.27V

Which can displace all others from their salts.

A. A B. B

C. C D. D

Q. 99 The standard reduction potential of two electrodes are given as

A = + 1.36 V B = –0.44 V the emf of the cell is

A. +1.36V B. +0.92V

C. – 1.36V D. + 1.80V

Q. 100 Metals below copper in electrochemical series do not react with

A. Dil. Acids B. Conc. Acids

C. Both A & B D. None of these

SKN

ANSWERS & EXPLANTION: -

Q.1	**C**	Heat (Q) and Work (W) are not state functions.
Q.2	**D**	Hydrogen moleucle only have translational and vibrational motion. It is diatomic moleucle which does not have rotational motion.
Q.3	**B**	The system becomes more stable if it Loses energy
Q.4	**C**	1st electron affinity (E.A) is exothermic process. 1st E.A value may be exothermic but 2nd E.A and 1st I.P or higher I.P values are endothermic.
Q.5	**B**	First electron affinity is exothermic process
Q.6	**D**	When heat value reaction exothermic
Q.7	**D**	All types of energies of particles forming a system is called Internal energy
Q.8	**D**	When ΔE of a system increases, then temperature of the system can increase, chemical reaction can occur and phase change may takes place.
Q.9	**A**	$\Delta V = 0$, for liquids and solids $\Delta H = \Delta D + PDV$. So, $\Delta H \cong \Delta E$
Q.10	**D**	$\Delta H = \Delta E + P\Delta V$ for solves and liquids: $\Delta V = O$
Q.11	**D**	Enthalpy of combustion is always exothermic
Q.12	**B**	As heat is absorbed, so the product O_2 (O_3) less stable than reactant oxygen (O_2)
Q.13	**A**	The heat of neutralization is minimum for $NH_4OH + CH_3COOH$ because of weak acid and weak base
Q.14	**D**	$Na_{(s)} \longrightarrow Na_{(g)}\ \Delta H_f = 108 kJ\,mol^{-1}$ $Na_{(g)} \longrightarrow Na^+_{(g)} + 1e^-\ \Delta H_{at} = +496 kJ\,mol^{-1}$
Q.15	**A**	Greater the lattice energy of an ionic compound, Stronger will be the ionic bond or intermolecular forces.
Q.16		$\Delta H_{latt.} = \Delta H_f - \Delta H_x$ $= -400 - 250 = -650$ KJ/mol
Q.17	**C**	In case of liquid or solids $\Delta H = \Delta E$
Q.18	**D**	All these enthalpies cannot be measured directly
Q.19	**C**	$(C + O_2 \longrightarrow CO_2 \quad \Delta H = -394)2$ $-2CO \pm O_2 \longrightarrow 2CO_2 \quad \Delta H = \mp 509$ $-2C \pm O_2 \longrightarrow CO_2 \quad \Delta H = -209$ Divide by 2 $2 \pm \frac{1}{2} O_2 \longrightarrow CO_2 \quad \Delta H = -109.5 KJ^- mol^{-1}$
Q.20	**B**	CO_2 is formed with it.
Q.21	**C**	Group number is O.N. of 1 and 2.
Q.22	**C**	Oxidation state of O-atom in oxides, peroxides and super oxides is -2, -1, -1/2 respectively
Q.23	**D**	Explanation $P + 4O = -3$ $P + (-8) = -3$ $P = 5$
Q.24	**A**	Lose of electron is oxidation.
Q.25	**C**	$KMnO_4$ to MnO_4^{2-}, oxidation state changed from +7 to +6, so Mn gains 1 electron $KMnO_4$ to MnO_2, oxidation state changed from +7 to +4, so Mn gains 3 electron $KMnO_4$ to Mn_2O_3 oxidation state changed from +7 to +3, so Mn gains 4 electron

		$KMnO_4$ to Mn^{2+}, oxidation state changed from +7 to +2, so Mn gains 5 electron
Q.26	**C**	Water molecules are added to balance the acid media in ion electron method.
Q.27	**C**	Charge on N on left side is -2 for each nitrogen atom, on the right side it has zero charge, so 2 electron lost by N-atom
Q.28	**D**	O.S of hydrogen change 0 to +1 and the O.S of bromine change 0 to -1. So, oxidation and reduction both takes place. It is the example of redox reaction
Q.29	**B**	Iron (Fe) is oxidized from zero to +3 state.
Q.30	**B**	Both HNO_3 & N_2O_5 have +5 oxidation state of N atom
Q.31	**D**	Electrochemistry is concerned with both voltaic and electrolytic cell
Q.32	**B**	In an electrolytic cell current flows from anode to cathode outside the cell
Q.33	**C**	In case of zinc sulphate, salt remains unchanged and water will be hydrolysed, due lower reduction potential of Zn ion as compare to H ion, for anode, OH-1 has higher oxidation potential as compare to sulphate ions.
Q.34	**A**	At cathode, H ion will reduce to Hydrogen gas due to lower reduction potential of Na ion
Q.35	**D**	In all other options salt remains unchanged, while in case of copper sulphate product will be different at cathode, that is Cu metal.
Q.36	**D**	Both galvanic cell & voltaic cell have a spontaneous oxidation-reduction reaction.
Q.37	**A**	Standard electrode potential is measured at 1atm, 25°C , 1.0M
Q.38	**C**	Salt bridge maintain neutrality of solution by transfer of ions from one half cell to other.
Q.39	**D**	Standard electrode potential of a metal depends upon nature of metal, temperature and the molarity of the ions in the solution. Alkali metals have low reduction potential.
Q.40	**A**	Salt bridge is not present in all the galvanic cell. Sometime porous partition may also be used.
Q.41	**B**	$E°_{cell} = E°_{Oxi} + E°_{Red}$ $E°_{Oxi} = E°_{cell} - E°_{Red} = 2.46 - 0.80 = 1.66V$ this is oxidation potential of Al, while -1.66V is its reduction potential.
Q.42	**A**	Upper position in electrochemical series as compare to F_2, Cl_2, Br_2 so good reducing agent and weak oxidizing agent comparatively.
Q.43	**C**	Metal with high value of reduction potential is good oxidizing agent. As -0.04 > -2.37 so Fe^{3+} is correct.
Q.44	**B**	Reduction potential of Cu is higher (+0.34) then other given options and deposit on cathode.
Q.45	**D**	Those element that lie above the H_2 they can displace hydrogen form acid and elements below cannot displace H form acids
Q.46	**A**	Only those cells are possible and feasible having positive cell potential.
Q.47	**A**	Group 1 metal have only one in valence shall and loss easily where as 2nd group members have 2 valence and are less reactive then group 1 member
Q.48	**D**	Smaller the reduction potential greater the ability to displace H from dilute acid
Q.49	**B**	Cu ions reduced to Cu metal, conc. Of Cu ions in the solution decrease so colour of the solution becomes fade
Q.50	**D**	At cathode, Cu metal will be deposited so no gas evolves at cathode
Q.51	**D**	Heat depend upon direction from high temperature to low temperature
Q.52	**C**	The environment except system is called surrounding
Q.53	**B**	Oxygen gas is the system which is under observation
Q.54	**A**	Work is taken as $P\Delta V$
Q.55	**B**	Enthalpy of atomization will be positive

		When uni-negative ion accept 1 electron it will be endothermic and when neutral atom accept one electron it will be exothermic
Q.56	**D**	In all process, heat is absorbed, so endothermic
Q.57	**A**	Due to release of heat from system to surrounding
Q.58	**C**	$N_2 + O_2 \longrightarrow 2NO$ This reaction proceed at high temperature or due to electric spark
Q.59	**D**	The amount of heat required to raise the temperature of a body through 1^0C is called Heat capacity
Q.60	**C**	The two ways to change the internal energy of system. The energy can be exchanged between system and surrounding only in the form of work and energy. $\Delta E = q + W \longrightarrow$ First law of thermodynamics
Q.61	**B**	Activation energy relate with reaction kinetic
Q.62	**B**	First law of thermodynamics relates Internal energy, heat and work
Q.63	**D**	NH_4Cl is put in H_2O it is a endothermic process
Q.64	**D**	Change in enthalpy of DH of a gaseous system can be calculated by following relationship $\Delta H = \Delta E + P\Delta V$
Q.65	**C**	Enthalpy of neutrilization is always exothermic
Q.66	**C**	Amount of released energy $\propto$ stability
Q.67	**D**	Strong acid and strong base has maximum heat of neutralized i.e. –57.4 kJ/mole
Q.68	**B**	That change is the most stable in which product has low energy than the reactant.
Q.69	**D**	Enthalpy of neutralization of strong acids and bases is same because H^+ and OH^- combine to form H_2O
Q.70	**B**	$\Delta H_f = \Delta H_X + \Delta H_1$ $\Delta H_1 = \Delta H_f - \Delta H_X$ $\Delta H_1 = -392 - 280 = -672\ kJmol^{-1}$
Q.71	**D**	From lattice energy we discuss the structure , bonding and properties of ionic compound. Greater the lattice energy stable is the structure and stronger is the bonding.
Q.72	**C**	Enthalpy of electron affinity is -ve in Born-Haber cycle
Q.73	**D**	Hess's law is applicable to measure the enthalpy of reacting, formation and lattice energy
Q.74	**D**	Enthalpy change in cyclic process is always zero
Q.75	**C**	Standard heat of formation of Al_2O_3 cannot be determined directly because Protective layer of Al_2O_3 form
Q.76	**A**	$4NO_2 + O_2 \rightleftharpoons 2\,N_2O_{5\,s},\ \Delta H = ?$ $4NO_2 + O_2 \rightleftharpoons 2\,N_2O_{5\,g},\ \Delta H_1 = -111KJ$ $2N_2O_{5\,g} \rightleftharpoons 2\,N_2O_{5\,s},\ \Delta H_2 = -108KJ$ $\Delta H = \Delta H_1 + \Delta H_2$ $\Delta H = -111 + -108 = -219\ KJ$
Q.77	**B**	Oxidation number of hydrogen in metal hydrides is "–1".
Q.78	**C**	$2H + S + 4O = 0$ $2 + S + (-8) = 0$ $S - 6 = 0$ $S = 6$
Q.79	**C**	$Mn + 4O = -2$ $Mn + (-8) = -2$

		Mn = –2 + 8 = 6
Q.80	**C**	In ion method to balance 'O' atoms water molecules added.
Q.81	**D**	In all conversion O.N of Mn is changing so (D) option.
Q.82	**D**	Net charge on left side is -1 & on right side it has -4 charge, so to balance the charge 3 electrons are added to the left side.
Q.83	**D**	Oxidation state of Cr is reduced from +6 to +3
Q.84	**C**	No oxidation or reduction takes place.
Q.85	**A**	Loss of electrons is called oxidation and gain of electrons is called reduction
Q.86	**A**	Decrease in oxidation number is reduction
Q.87	**B**	Mg is oxidized from 0 to +2
Q.88	**A**	Electrolytic cell consumes the electrical energy and proceeds
Q.89	**A**	In electrolytic cell the direction of flow of electrons through external circuit is from anode to cathode
Q.90	**D**	Cu^{+2} is reduced into Cu metal instead of H^{+1} ion due to higher reduction potential. At anode OH^{-1} is oxidised to O_2
Q.91	**C**	At anode OH^{-1} is oxidised to O_2 due to higher oxidation potential as compare to sulphate ions
Q.92	**A**	25°C =298K
Q.93	**A**	Potential of SHE is considered arbitrary zero.
Q.94	**B**	The standard reduction potential of Zn is –0.76
Q.95	**B**	Strong electrolyte completely ionize. So, Conductivity of strong electrolyte does not change considerably on dilution.
Q.96	**B**	The standard electrode potential is measured by Voltmeter
Q.97	**B**	This electrode potential is assumed to be zero
Q.98	**C**	Metal with higher –ve value can replace the other metal.
Q.99	**D**	$E^{\circ}_{cell} = E^{\circ}_{Oxi} + E^{\circ}_{Red} = +0.44 + 1.36 = +1.80V$
Q.100	**A**	Metals with low reduction potential react with acid to give H_2 and the metal with high reduction potential (Present at the bottom of E.C.S) do not react with acid

CHEMICAL BONDING

Atomic Size, Trends in IE, EA and EN & Energetics of Bond Formation

Q. 1 In a period, the atomic radii
A. Increases
B. Decreases
C. Remain same
D. First decreases, then increases

Q. 2 Along period of periodic table shielding effect
A. Increases
B. Decreases
C. Remains constant
D. First increases then decreases

Q. 3 Which factor does not effect I.E. across the period
A. Number of shells
B. Shielding effect
C. Nature of orbitals
D. Both A and B

Q. 4 Which of following does not affect I.E in group
A. Shielding Effect
B. Effective Nuclear charge
C. Size of atom
D. Nature of orbital

Q. 5 The correct order of ionization energy is
A. F > Cl > Br > I
B. Cl > Br > F > I
C. Br > F > Cl > I
D. I > Br > Cl > F

Q. 6 In general, ionization energy increases along the period. The group which shows maximum ionization energy
A. IIA
B. VIIA
C. VA
D. VIIIA

Q. 7 Correct order of Electron affinity is
A. Flourine > chlorine > bromine > iodine
B. Chlorine > bromine > flourine > iodine
C. Iodine > bromine > chlorine > flourine
D. Bromine > flourine > chlorine > iodine

Q. 8 The valence shell is
A. The highest energy level occupied by electrons
B. The set of orbitals used to make triple bonds
C. The orbitals belonging to the entire molecule
D. The lowest energy level occupied by electrons

Q. 9 Which of the following have their outer most shell complete in atomic form?
A. Noble gases
B. Alkali metals
C. Coinage metals
D. Gun metals

Q. 10 Which one of the following compounds does not obey Octet rule?
A. PF_3
B. BF_3
C. NF_3
D. AsF_3

Types of Bonds (Lewis Concept)

Q. 11 The compound which have three types of bonds is
A. NH_3
B. H_2O
C. NH_4Cl
D. NaCl

Q. 12 Covalent compounds are
A. Directional and rigid
B. Non-directional and non-rigid
C. Non-directional and rigid
D. Directional and non-rigid

Q. 13 In which of the following central atom can form co-ordinate covalent bond
A. $CaCl_2$
B. NaCl
C. NH_3
D. NH_4^+

Q. 14 Which is not possible
A. Pure (100%) covalent bond
B. Pure (100 %) ionic bond
C. Partial covalent bond
D. Both A and B

Q. 15 Dative bond is present in the molecule
A. NH_4^+
B. BF_3
C. NH_3
D. HF

Q. 16 A compound which is most ionic in nature
A. KCl
B. KF
C. $MgCl_2$
D. RbF

Q. 17 CsF bond is _____ % ionic
A. 72
B. 82
C. 92
D. 100

Q. 18 Formation of MgO is an example of

A. Ionic bond
B. Non-polar Covalent bond
C. Polar covalent bond
D. Double Covalent bond

Q. 19 Most predominantly ionic compounds are obtained by the combination of elements of groups

A. IVA and VIIIA
B. IA and VIIA
C. IIA and VIA
D. IIA of VA

VSEPR Theory

Q. 20 Which of following molecules has different geometry?

A. CO_2
B. $BeCl_2$
C. CS_2
D. H_2S

Q. 21 The shape of is NH_2^{-1}

A. Linear
B. Angular
C. Pyramidal
D. Tetrahedral

Q. 22 By increasing number of lone pair on central atom, the bond angle become

A. Increased
B. Remains same
C. Decreased
D. Depend upon central atom

Q. 23 A molecule that have different geometry than others.

A. $H_3O + H_3O^+$
B. NH_3
C. PH_3
D. $AlCl_3$

Q. 24 Which of the following has minimum bond angle?

A. CCl_4
B. NF_3
C. NH_3
D. CO_2

Q. 25 All of the following pairs have same shapes except

A. SO_2 and $AlCl_3$
B. CCl_4 and $SiCl_4$
C. H_2S and H_2O
D. NH_3 and PH_3

Q. 26 The shape of sulphate ion is

A. Square planar
B. Tetrahedral
C. Trigonal bipyramidal
D. Hexagonal.

Q. 27 In NH_3 and NF_3 molecules the bond angle is

A. $NH_3 = NF_3$
B. $NH_3 > NF_3$
C. $NH_3 < NF_3$
D. $NH_3 \leq NF_3$

Q. 28 The VSEPR theory explains the _____ of molecules

A. Number
B. Kinds
C. Geometry
D. Bonding

Q. 29 According to VSEPR theory, a molecule with the general formula AX4 with one lone pair will have a ____ molecular shape

A. Bent
B. Trigonal planar
C. Trigonal pyramidal
D. Tetrahedral

VBT, Hybridization, Bond Energy and Bond Length & Ionic character of covalent bond (Dipole Moment)

Q. 30 Among following molecules, which has different number of π-electrons than others

A. SO_3
B. C_6H_6
C. $C_6H_5CH_3$
D. CH_3CN

Q. 31 Hybridization is the extended form of _____ theory

A. VSEPR
B. Lewis
C. Molecular orbital
D. Valence bond

Q. 32 Number of sigma and pi bonds in chloroprene

A. 7, 2
B. 9, 2
C. 10, 2
D. 11, 2

Q. 33 The percentage of s-character in hybrid orbital which indicates shortest bond length

A. 25% s-character
B. 33.4% s-character
C. 50% s-character
D. 75% s-character

Q. 34 The hybridization associated with the central atom of a molecule in which all the bond angles are 120° is

A. sp
B. sp^2
C. sp^3
D. dsp^3

Q. 35 Which one of the following is the most stable element?

A. Oxygen
B. Nitrogen
C. Fluorine
D. Hydrogen

Q. 36 Which one has maximum bond dissociation energy

A. F_2 B. Cl_2
C. Br_2 D. I_2

Q. 37 The order of bond strength as a result of following head-to-head overlapping is

A. s – s > p – p > s – p B. p – p > s – s > p – s
C. s –s > s – p > p – P D. p – p > s – p > s – s

Q. 38 Which one has dipole moment

A. Which one has dipole moment B. Benzene
C. o-Dichlorobenzene D. Trans 1, 2-dichloroethene

Q. 39 CH_4 is a nonpolar molecule. Which of the following similar molecules is also non-polar?

A. CH_3Cl B. CH_2Cl_2
C. SiH_3Cl D. SiH_4

Q. 40 Increase in atomic size down the group is due to

A. Decrease in number of shells B. Increase in shielding effect
C. Inert pair effect D. Increase in nuclear charge

Q. 41 Which of the following has largest ionic size?

A. F^- B. O_2^-
C. N_3^- D. Na^+

Q. 42 Which of the following is correct relation for atomic radius?

A. $A^- > A > A^+$ B. $A > A^+ > A^-$
C. $A^+ > A > A^-$ D. $A^- > A^+ > A$

Q. 43 For which molecule the bonding pair of electrons is equally shared between the atoms?

A. HF B. HCl
C. H_2 D. BF_3

Q. 44 Which order of first ionization energy is correct

A. O > N B. S > P
C. Al < Mg D. All are correct

Q. 45 First electron affinity is maximum for

A. Fluorine B. Iodine
C. Chlorine D. Bromine

Q. 46 Which group of periodic table shown generally abnormal trends of ionization energy.

A. IIA and VA B. IIIA and IVA
C. IIIA and VIA D. VIIIA

Q. 47 Which factor does not effect ionization energy across the period

A. Number of shell B. Nuclear Charge
C. Nature of orbital D. Both A & C

Q. 48 Elements with _____ first ionization energies and _____ electron affinities generally form cations

A. Low, large negative B. High, positive or slightly negative
C. Low, positive or slightly negative D. High, large negative

Q. 49 Which pair of species have electronic configuration ends on $2s^2 2p^6$ in their highest occupied energy level

A. Ca_2^+, Ar B. Na^+, Ca_2^+
C. Na^+, O_2^- D. Ar, O_2^-

Q. 50 If electronegativity difference between two atoms is 1.7 units. The bond is roughly

A. 90% ionic B. Non polar covalent
C. 50% ionic and 50% covalent D. Polar covalent

Q. 51 An atom loses or gains electrons, to

A. Gain stability B. Form a bond
C. Complete its outermost shell D. All are accurate justifications

Q. 52 Which of the following has the least bond angle?

A. BCl_3 B. H_2O
C. NH_3 D. CH_4

Q. 53 Which of the following is not considered as an intermolecular force

A. Covalent bond B. Hydrogen bonding
C. Dipole- dipole inter action D. Ion – dipole interaction

Q. 54 A compound which has all the three types of chemical bonds

A. $CuSO_4 . 5H_2O$ B. $NaBH_4$
C. NH_4Cl D. All of these

Q. 55 In which of the following can donate an electron pair to the central atom?

A. BF_3 B. H_3O^+

C. $AlCl_3$ D. None

Q. 56 Bonding in phosphonium ion is _____ percent covalent

A. 25 B. 33

C. 50 D. 75

Q. 57 Which of the following molecules contains six bonding electrons

A. C_2H_4 B. CO_2

C. CH_4 D. NF_3

Q. 58 Which one has lone pair with central atom

A. BF_3 B. CH_4

C. NH_{4+} D. H_2O

Q. 59 In which of the following bond pair-bond pair angle is minimum

A. Water B. Ammonia

C. Hydrogen sulphide D. Nitrogen tri fluoride

Q. 60 All of the following have almost similar bond angle except one

A. BF_3 B. $AlCl_3$

C. NH_3 D. C_2H_4

Q. 61 The structure of CO_2 is similar to that of

A. Ethene B. Carbon disulphide

C. Ethyne D. Both B and C

Q. 62 Which molecule is planar?

A. C_3H_4 B. C_3H_6

C. C_2Cl_4 D. C_3H_8

Q. 63 Which one of the following has maximum bond angle

A. CCl_4 B. NF_3

C. NH_3 D. CO_2

Q. 64 CO_2 is a nonpolar molecule ($\mu = 0$) whereas SO_2 is polar (μ=1.62D). This difference is due to the fact that

A. CO_2 has an even number of double bonds whereas SO_2 has an odd number of double bonds

B. C and O are in different groups whereas S and O are in the same group

C. The C-O bond is nonpolar while the S-O bond is polar

D. CO_2 is linear whereas SO_2 is not linear

Q. 65 H–O–H bond angle in H_2O is 104.5o and not 109.5o because of

A. High electronegativity of oxygen B. Lone pair – lone pair attraction

C. Bond pair –bond pair repulsion D. Lone pair – lone pair repulsion

Q. 66 Choose the species that is incorrectly matched with the shape of the central atom

A. CF_4 tetrahedral B. $BeCl_2$ linear

C. H_2O tetrahedral D. NH_3 pyramidal

Q. 67 Which type of bond is formed by overlap of p-orbitals perpendicular to the two nuclei

A. Pi(π) bond B. sigma (б) bond

C. Hydrogen bond D. Dative bond

Q. 68 Pi(π) bond

A. Increases bond length B. Decreases bond length

C. Distorts the geometry of molecule D. Make homo atomic molecule more reactive

Q. 69 Total no of sigma electrons in one molecule of C_2H_2

A. 3 B. 6

C. 4 D. 8

Q. 70 The carbon number 2 in the structure $CH_2 = CH – CH_2 – CH_3$ shows a type of hybridization

A. sp^3 B. sp^2

C. sp D. dsp^2

Q. 71 If n atomic orbitals mix together with different shapes and energy, then no of bonds formed will be

A. n B. 2n

C. n^2 D. Cannot be predicted

Q. 72 In which of the following molecules central atom is not sp3 hybridized

A. CCl_4 B. NF_3

C. NH_3 D. $SnCl_2$

Q. 73 In which of the following compound, carbon atoms has sp^2 hybridization only

A. Carbon dioxide
B. 1, 3–butadiene
C. Propene
D. Ethane nitrile

Q. 74 When water donates its electron pair to hydrogen ion to form hydronium ion, hybridization is changed from

A. sp^2 to sp^3
B. sp^3 to sp^2
C. sp^3 to sp
D. Remains unchanged

Q. 75 All the atoms are coplanar in the molecule_____

A. CH_4
B. BF_3
C. PH_3
D. NH_3

Q. 76 The hybridization state of 'S' in SO_3 is similar to that of

A. C in C_2H_2
B. C in C_2H_6
C. C in CO_2
D. C in C_2H_4

Q. 77 In the resonance structure of benzene the number of σ-bonds and π-delocalized electrons are respectively

A. 12 and 6
B. 6 and 3
C. 6 and 6
D. 12 and 3

Q. 78 ----------has sp^2 hybridized carbon atom?

A. $CH_3 — CH_2 — CH_3$
B. $CH_3 — CN$
C. $CH_2 = CH_2$
D. CH_3NH_2

Q. 79 Which molecule has smallest bond length?

A. HI
B. HF
C. HCl
D. HBr

Q. 80 Strongest bond among the following is

A. H–H
B. F–F
C. C– C
D. N–N

Q. 81 Bond length decreases with

A. Increase in size of atom
B. Increase in the number of bonds between the atoms
C. Decreases in the number of bonds between the atoms
D. Decrease in the s-character

Q. 82 The bond energy of Cl – Cl bond is

A. $155 kJmol^{-1}$
B. $193 kJmol^{-1}$
C. $242 kJmol^{-1}$
D. $151 kJmol^{-1}$

Q. 83 The molecule having highest bond energy is

A. $N \equiv N$
B. $C \equiv N$
C. $C \equiv C$
D. $C \equiv O$

Q. 84 Which of the following has minimum bond dissociation energy?

A. I_2
B. Br_2
C. F_2
D. Cl_2

Q. 85 Which one of the following molecules is polar?

A. BF_3
B. CCl_4
C. SO_2
D. CO_2

Q. 86 Ionic compounds do not show the phenomenon of isomerism because bonds are

A. Directional and rigid
B. Non directional and rigid
C. Non directional and non-rigid
D. All of the above

Q. 87 _____ has highest dipole moment

A. CH_4
B. CCl_4
C. $CHCl_3$
D. CHI_3

Q. 88 NH3 has dipole moment whereas BF3 has zero dipole moment. It is because

A. F is more electronegative than H
B. BF_3 is pyramidal while NH_3 is triangular planner
C. BF_3 is triangular planner while NH_3 is pyramidal
D. B is less electronegative than N

Q. 89 Which of the following compounds is non-polar?

A. $CHCl_3$
B. SO_2
C. CO
D. CO_2

ANSWERS & EXPLANTION: -

Q.1	**B**	Left to right effective nuclear charge increase. So atomic size decrease.
Q.2	**C**	Along the period sheilding effect does not change, because these are electrons of inner shells which do not change while present in valance shell
Q.3	**D**	IE across the period does not depend upon Shielding effect because it will remain same from left to right.
Q.4	**D**	Ionization energy does not depend upon nature of orbital in the group because all the elements in the group have same orbital
Q.5	**A**	Ionization energy decreases down the group.
Q.6	**D**	Group VIII shows maximum ionization energy.
Q.7	**B**	Flourine has abnormally low E.A value due to its smaller size and electronic repulsion.
Q.8	**A**	The valence shell is the highest energy level occupied by electrons
Q.9	**A**	Only noble gases in periodic table which have complete outermost shell.
Q.10	**B**	BF_3 does not follow octet rule, it forms stable compounds with six electron.
Q.11	**C**	The compound which have three types of bonds is NH_4Cl NH_4Cl = Nitrogen makes 3-covalent and one coordinate covalent bond. NH_4^+ ion makes ionic bond with chloride(Cl^-) ion.
Q.12	**A**	Covalent bonds are directional and rigid
Q.13	**C**	NH_3 have one lone pair of electron which is responsible for the formation of coordinate covalent bond
Q.14	**B**	Maximum ionic character is present in CsF which is not 100% ionic. CsF= 92%
Q.15	**A**	The bond between NH_3 and H^+ dative in NH_4^+ ion
Q.16	**D**	Due to high electronegativity difference
Q.17	**C**	CsF is 92% ionic in nature.
Q.18	**A**	Group I, II & Vi, VII mostly form ionic bonds
Q.19	**B**	Strongest ionic bond formed between group IA & VIIA elements, although group IIA & VIA elements also form ionic bond.
Q.20	**D**	CO_2, $BeCl_2$ and CS_2 are linear but H_2S is angular in structure. H_2S is an example of AB_4 (AB_2L_2) system with two bond pairs and two lone pairs on central sulphur atom.
Q.21	**B**	N has two lone pairs of electrons which is responsible for the angular structure of
Q.22	**C**	Number of lone pair of electrons on central atom is inversely related to the bond angle
Q.23	**D**	All except AlCl3 have trigonal pyramidal structure while $AlCl_3$ has triangular structure
Q.24	**B**	In NF_3, the strong polarity of N-F bond pulls the lone pair of N atom closer to its nucleus and the angle shrinks to 102°
Q.25	**A**	SO_2 ---- triangle pyramidal $AlCl_3$ ---- triangular
Q.26	**B**	The shape of sulphate ion is tetrahedral
Q.27	**B**	$NH_3 > NF_3$ due to attachment of more electro negative atoms
Q.28	**C**	VSEPR theory describe the geometry of covalent molecules.
Q.29	**C**	Shape of AX4 with one lone pair and three bond pair is trigonal pyramidal.
Q.30	**D**	Each molecule have 3 pi bonds or six pi electrons, while in methyl cyanide there are 2 pi bonds and 4 pi electrons.
Q.31	**D**	Hybridization is the extended form of Valence bond theory, which was given to solve some problems and limitations of VBT

Q.32	**B**	There are 9 sigma bonds and 2 pi-bonds in chloroprene molecule.
Q.33	**C**	Bond length and s character have inverse relation, sp hybridizsed orbital having maximum s-character, so shorter the bond length
Q.34	**B**	sp^2 hybrid orbitals arrange them at the angle of 120°
Q.35	**B**	Nitrogen is the most stable element because its bond energy is higher than oxygen, fluorine and hydrogen. N_2 941 kJ/mol F – F 154 kJ/mol H – H 436 kJ/mol O = O 495 kJ/mol
Q.36	**B**	Bond energy ($kJmol^{-1}$) $F_2 = 155$, $Cl_2 = 242$, $Br_2 = 193$, $I_2 = 151$
Q.37	**D**	Extent of overlapping is maximum in case of P - P overlapping
Q.38	**C**	o-dichlorobenzene has dipole moment
Q.39	**D**	both have net dipole moment zero due to regular geometry
Q.40	**B**	Increase in atomic size down the group is due to increase in shielding effect but does not due to increase in nuclear charge. Its true nuclear charge increases down the group but its not factor to increase the atomic size down the group.
Q.41	**C**	The increasing order of size : Anion > Neutral > Cation $N^{-3} > O^{-2} > F^{-1} > Na^{+}$ Greater the negative charge greater the size of ion.
Q.42	**A**	Cation is always smaller than neutral atom and anion is always larger than neutral atom
Q.43	**C**	In H_2 molecule both atoms have same electronegativity .
Q.44	**C**	Mg belongs to IIA while Al belongs to IIIA order of I.E IA < IIA > IIIA < IVA < VA > VIA < VIIA < VIII A
Q.45	**C**	The order of electron affinity for group VII group is Cl>F>Br>I due to smaller size and greater repulsion
Q.46	**C**	Due to complete s-sub shell and half p-sub shell group II & V are most stable, while group III & VI are less stable and easy to remove electron
Q.47	**A**	In period number of shell and shielding effect will remain constant
Q.48	**C**	Cations form when an elements having low I.E and positive or slightly negative E.A.
Q.49	**C**	Na atom after losing 1 electron and O- atom after gaining 2 electrons have given electronic configuration
Q.50	**C**	If electronegativity difference between two atoms is 1.7 units. The bond is roughly 50% ionic and 50% covalent
Q.51	**D**	When an atom loses or gains an electron it produces ions which react to form bond in this way atom gains stability.
Q.52	**B**	$BCl_3 = 120°$ $NH_3 = 107.5°$ $H_2O = 104.5°$ $CH_4 = 109.5°$
Q.53	**A**	Covalent bond is not considered as an intermolecular force. This is intramolecular force.
Q.54	**D**	All these compounds have ionic bond, covalent bond and co-ordinate covalent bond, Ionic bond in Cu^{+2} and SO_4^{-2}, Covalent vond in water molecules as well as in sulphate ion, while coordinate covalent bond formed between water molecules with Cu^{+2} and sulphate ion.
Q.55	**D**	There is no lone pair in central atom of BF_3 , H_3O^{+} (in H_3O^{+} water molecule has formed one dative bond by using its one lone pair)and $AlCl_3$

Q.56	**D**	Total bonds in $PH_4^{+1} = 4$ Total covalent bonds in $PH_4^{+1} = 3$ Total dative bonds in $PH_4^{+1} = 1$ %age covalent character = (total covalent bonds / total bonds) × 100 = (3 / 4) × 100 = 75%
Q.57	**D**	NF_3 has three covalent bonds or six bonding electrons
Q.58	**D**	H_2O has lone pair with central atom. There are two lone pairs on central oxygen atom in water but on central atom of BF_3, CH_4 and NH_4^+ does not have lone pair.
Q.59	**C**	Hydrogen sulphide has bent structure with two lone pairs of electron at the central atom and the angles is 92° S has greater size and comparatively smaller E.N.
Q.60	**C**	NH_3 has lone pair of electron on N atom & angle decrease to 107.5° remaining all other have 120° bond angle
Q.61	**D**	Ethyne is sp hybridized so its geometry is linear like CO_2 also H_2S have same structure
Q.62	**C**	C_2Cl_4 Triangular planar geometry
Q.63	**D**	CO_2 has linear structure and angle of 180° which is maximum.
Q.64	**D**	Due to linear and regular geometry of carbon dioxide it has zero dipole moment hence non polar
Q.65	**D**	Lone pair – lone pair repulsion is maximum, due to which bond angle decrease.
Q.66	**C**	Shape of water is angular or bent.
Q.67	**A**	Pi(π) bond is formed by overlap of p-orbitals perpendicular to the two nuclei. Sigma bond is formed by axial overlapping of orbitals. Hydrogen bond and dative bond(coordinate covalent bond) are formed by donating electron pair to empty orbital of an atom through linear combination.
Q.68	**B**	Pi(π) bond Decreases bond length because atom come closer due to increase in electron density
Q.69	**B**	There are 3 sigma bonds therefore 3x2=6 sigma electrons
Q.70	**B**	Carbon no. 2 forms 3 sigma bonds (two with C atoms and 1 H atom) therefore it is sp^2 hybridized
Q.71	**A**	Number of hybrid orbitals is equal to number of bond formed
Q.72	**D**	$SnCl_2$ is sp^2 hybridize
Q.73	**B**	$CH_2{=}CH - CH = CH_2$ in this structure all carbon are double bonded so are sp^2 hybridized.
Q.74	**D**	In H_2O sp^3 and in $H_3O^+ = sp^3$
Q.75	**B**	All the atoms are coplanar in the molecule BF_3
Q.76	**D**	Both C in C_2H_4 and 'S' in SO_3 are sp^2 hybridized
Q.77	**A**	There are 12 sigma bonds and 6 pi delocalized electrons are there in benzene resonance structure
Q.78	**C**	$CH_2 = CH_2$ has sp^2 hybridized carbon atom
Q.79	**B**	Bond length is directly proportional to the size of atom. HF has smallest bond length.
Q.80	**A**	smaller the size stronger the bond Bond energy kJ/mol H–H = 436, C–C = 348, F–F = 154, N–N = 163
Q.81	**B**	Greater the bond order shorter the bond length
Q.82	**C**	The bond energy of Cl – Cl bond is 242 $kJmol^{-1}$
Q.83	**D**	N ≡ N has non polar nature while among other, C ≡ O has polarity as well as smaller size of O atom.

Q.84	**A**	Larger the size of atom smaller the bond energy.
Q.85	**C**	SO_2 molecule is polar with one lone pair on central sulphur atom but BF_3, CCl_4 and CO_2 are nonpolar molecules with regular geometries with zero dipole moments.
Q.86	**C**	Ionic compounds do not show the phenomenon of isomerism because ionic bonds are non-directional and non-rigid.
Q.87	**C**	Due to high electronegativity between carbon and chlorine and irregular structure.
Q.88	**C**	Boron have no lone pair and regular geometry but N have one lone pair and irregular geometry
Q.89	**D**	Due to linear and regular geometry it has zero dipole moment.

SKN

Periodic Trends in Physical Properties

Q. 1 All are the periodic properties which have same periodicity except
A. Ionization energy
B. Electron affinity
C. Electronegativity
D. Atomic radius

Q. 2 Atomic radius can be determined with the help of
A. X-rays
B. Spectroscopy
C. Polarimeter
D. Both A and B

Q. 3 Which of the following has largest ionic radius
A. Cs^{+}
B. Li^{+}
C. Na^{+}
D. Mg^{+2}

Q. 4 Which among the following is the correct order of increasing ionic radius?
A. $Al^{+3} < Na^{+1} < Mg^{+2}$
B. $Al^{+3} < Mg^{+2} < Na^{+1}$
C. $Na^{+} < Mg^{+2} < Al^{+3}$
D. $Mg^{+2} < Al^{+3} < Na^{+1}$

Q. 5 Which of the following groups show abnormal trends in electron affinity values
A. IIA
B. VA
C. VIIIA
D. All of these

Q. 6 The relative attraction of the nucleus of an atom for the electrons in a chemical bond is
A. Ionization energy
B. Electron affinity
C. Electronegativity
D. Shielding effect

Q. 7 How does melting point varies in a period from left to right?
A. Increases upto group IVA then decreases
B. Generally increases throughout the period
C. Decrease upto group IVA then increases
D. Generally decreases throughout the period

Q. 8 Which of following is a correct order of degree of hydration in alkali metal ions?
A. $Li^{+} > Na^{+} > K^{+} > Rb^{+} > Cs^{+}$
B. $Li^{+} > K^{+} > Na^{+} > Rb^{+} > Cs^{+}$
C. $Li^{+} < Na^{+} < K^{+} > Rb^{+} < Cs^{+}$
D. $Li^{+} > K^{+} > Na^{+} > Cs^{+} > Rb^{+}$

Q. 9 Which of the following has maximum hydration energy?
A. Li^{+}
B. Ca^{++}
C. Na^{+}
D. K^{+}

Q. 10 Which of the following is shows maximum electrical conductance?
A. Na
B. Al
C. Mg
D. All of these

Group 1A Elements (Alkali Metals), Group 2 Elements (Alkaline earth metals) & Reactions of Group IA with Water, Oxygen and Chlorine

Q. 11 Which of the following oxide is most basic among alkali metals?
A. Li_2O
B. Na_2O
C. K_2O
D. BeO

Q. 12 Electronic configuration of alkali metals is_____
A. ns^2, np
B. ns^2, np^1
C. ns^2, np^0
D. ns^1

Q. 13 Which alkali metal explode spontaneously when it is in contact with air/ O_2
A. Cs
B. Na
C. K
D. Rb

Q. 14 Which among the alkali metals does not react with C_2H_2?
A. Li
B. Na
C. K
D. All of these react with C_2H_2

Q. 15 Which of the following element reacts vigorously with H_2O?
A. Na
B. Al
C. Mg
D. S

Q. 16 Lithium is only Group IA metal which combines with nitrogen and carbon to form
A. Lithium nitrite and lithium carbide
B. Lithium nitride and lithium carbonate
C. Lithium nitride and lithium carbide
D. Lithium carbide and lithium nitrite

Q. 17 Which of the following compound is least soluble in water?
A. $Mg(OH)_2$
B. $Ca(OH)_2$
C. $Sr(OH)_2$
D. $Ba(OH)_2$

Q. 18 Which oxide of IIA dissociate into ions in water, most easily?

A. BeO B. MgO
C. CaO D. BaO

Q. 19 On moving down the group in metals, reactivity of metals.

A. Increases B. Decreases
C. Remain unchanged D. Has irregular trend

Q. 20 Solution of group IIA metal hydroxides are _____basic than that of group IA metal hydroxides.

A. More B. less
C. equal to D. two times more

Reactions of Group IIA with Water, Oxygen and Nitrogen, Reactions of Period 3 Elements with Water, Oxygen and Chlorine

Q. 21 In reaction between alkaline earth metal oxide and water the base is

A. OH^{-1} B. H_2O
C. O^{-2} D. M^{+2}

Q. 22 Not true about reaction of Ca with H_2O.

A. The reaction is endothermic B. The reaction is exothermic
C. Reaction is redox D. The reaction gives slaked lime

Q. 23 Reaction of Alkaline earth metals with O_2 is

A. Oxidation B. Decomposition
C. Hydration D. All are correct

Q. 24 Which reaction is practically not possible?

A. $Be + 2H_2O \rightarrow H_2 + Be(OH)_2$ B. $Mg + 2H_2O \rightarrow H_2 + MgO$
C. $Ca + 2H_2O \rightarrow H_2 + Ca(OH)_2$ D. $Ba + 2H_2O \rightarrow H_2 + Ba(OH)_2$

Q. 25 The alkaline earth metal which reacts most vigourously with water.

A. Be B. Mg
C. Ca D. Ba

Q. 26 Which of the following metals produce oxide upon reaction with steam only?

A. Be B. Sr
C. Ca D. Mg

Q. 27 IIA metal which consumes most number of moles of oxygen on burning at high temperature.

A. Be B. Mg
C. Sr D. Ba

Q. 28 Burning of Be in air requires

A. 600°C B. 800°C
C. 1400°C D. 200°C

Q. 29 The elements of period 3rd react violently with water and make the solution

A. Alkaline B. Acidic
C. Amphoteric D. All arepossible

Q. 30 Which of the following element of 3rd period and group III does not react with water?

A. B B. Mg
C. Al D. In

General characteristics (All), Describe electronic structure of elements and ions of d-Block Elements

Q. 31 The first transition series starts with

A. Sc B. Y
C. La D. Ac

Q. 32 The total no. of transition elements is

A. 10 B. 14
C. 40 D. 58

Q. 33 Coinage metals are present in

A. IB (Cu, Ag, Au) B. IIB (Zn, Cd, Hg)
C. IIIB (Sc, Y, La) D. Both B & C

Q. 34 Which group elements usually show single oxidation state.

A. IB B. IIB
C. VB D. VIB

Q. 35 Which group contains the elements with the weakest binding energies

A. IB B. IIB
C. VB D. VIB

Q. 36 d-Block elements are known as

A. Representative elements
B. Outer transition elements
C. Inner transition elements
D. Coinage metals

Q. 37 Which of the following pairs show resemblance in their valence shell configuration:

A. Ti, Ta
B. Mn, Mo
C. Zn, Cd
D. Pt, Au

Q. 38 Which of the following pairs show resemblance in their valence shell configuration?

A. Sc, Y
B. Mn, Mo
C. Zn, V
D. Pt, Au

Q. 39 The correct electronic configuration of manganese is

A. $4s^2 3d^4$
B. $4s^1 3d^5$
C. $4s^0 3d^6$
D. $4s^2 3d^5$

Q. 40 Which one of the following ion has $3d^5$ subshell arrangement?

A. Cr^{+3}
B. Fe^{+3}
C. Mn^{+3}
D. Co^{+3}

Chemistry of Transition Elements of 3d series, Complex Formation

Q. 41 The transition metal which has colorless compounds:

A. Ni
B. Mn
C. Co
D. Sc

Q. 42 The paramagnetic character of substances is due to the presence of

A. Bond pairs of electrons
B. Lone pairs of electrons
C. Unpaired electrons in the atom or molecule
D. Paired electrons in the valence shell of atoms

Q. 43 Which of the following compound can show maximum paramagnetism

A. Cu^{+2}
B. Fe^{+2}
C. Zn^{+2}
D. Fe^{+3}

Q. 44 The transition metal which has only colorless compounds

A. Ti
B. Cr
C. Cu
D. Zn

Q. 45 If violet colour is absorb by complex, then colour of complex looks like

A. Red
B. Orange
C. Green
D. Yellow

Q. 46 Which one of the 3d series element is not usually used as a catalyst?

A. Scandium
B. Chromium
C. Vanadium
D. Manganese

Q. 47 The oxidation state of Cu in $[Cu(NH_3)_4]SO_4$ is

A. +1
B. +2
C. 0
D. None of these

Q. 48 What is the state of hybridization of central metal ion in the following complex $[Cu(NH_3)_4]^{+2}$

A. dsp^2
B. sp^3
C. sp^2
D. d^2sp^3

Q. 49 Which is bidentate neutral ligand

A. Carbonato
B. Oxalato
C. Acetato
D. Hydrazine

Q. 50 The central metal atom in $K_4[Fe(CN)_6]$ is

A. K
B. Fe
C. C
D. N

Q. 51 Which is an incorrect order of atomic radii

A. Mg > Sr
B. Be > C
C. Al > S
D. K > Ar

Q. 52 The correct atomic size order is

A. Li > Mg
B. Be > Al
C. B > Si
D. Ba > Na

Q. 53 Alkaline earth metals are less reactive than alkali metals due to their higher

A. Heat of hydration
B. Atomic numbers
C. Density
D. Ionization energy

Q. 54 Among the following outermost electronic configuration of the least electronegative element in a given period is

A. $ns^2\ np^5$ B. $ns^2\ np^2$
C. $ns^2\ np^4$ D. $ns^2\ np^3$

Q. 55 While moving down a group in the periodic table, which of the following would be not true

A. All the atoms have the same number of valence electrons
B. Electronegativity decreases
C. Atomic size increases
D. Metallic character decreases and the basic nature of their oxides decreases

Q. 56 Mark the correct statement?

A. Melting points of halogens decrease down the group.
B. Melting points of halogens increase down the group.
C. Melting points of halogens remain the same throughout the group.
D. Melting points of halogens first increase and then decrease down the group.

Q. 57 Which is the pair of metalloids

A. Na and K B. F and Cl
C. As and Sb D. Cu and Au

Q. 58 Point out the element which is a non-metal

A. Bi B. Sb
C. Al D. Br_2

Q. 59 Ionization energy of Group IA is minimum for

A. Li B. Na
C. K D. Cs

Q. 60 Carbonate of _____ is least soluble in IA group.

A. Li_2CO_3 B. Na_2CO_3
C. K_2CO_3 D. Cs_2CO_3

Q. 61 One of the following is least reactive among following

A. Li B. Na
C. K D. Cs

Q. 62 Nitrate of which alkali metal does not give Nitrite upon heating

A. Na B. Li
C. K D. Mg

Q. 63 One of the following will form superoxide when burnt in air

A. Li B. Na
C. K D. Be

Q. 64 Lithium shows diagonal relationship with which of the following element

A. Mg B. Na
C. Al D. B

Q. 65 When Na is dropped in water, it catches fire as

A. It is a metal B. It is highly electropositive
C. It has higher atomic mass D. Its reaction is highly exothermic

Q. 66 Which one of the following does not belong to alkaline earth metals?

A. Be B. Ca
C. Ba D. Rn

Q. 67 Which oxide of IIA metal is most stable?

A. BeO B. MgO
C. CaO D. SrO

Q. 68 Which IIA hydroxide decomposes most easly

A. $Mg(OH)_2$ B. $Ca(OH)_2$
C. $SrOH)_2$ D. $BaOH)_2$

Q. 69 Which of followings is not purely base?

A. BeO B. MgO
C. CaO D. BaO

Q. 70 Which of the followings show —1 oxidation state of in its oxides, formed by its reaction with O_2 at 600°C?

A. Be B. Mg
C. Ca D. Ba

Q. 71 **$M + O_2 \rightarrow MO_2$. The metal M is**

A. Be
B. Mg
C. Ca
D. Ba

Q. 72 **The gas evolved when Ca reacts with boiling water is**

A. O_2
B. H_2
C. Both A and B
D. N_2

Q. 73 **Magnesium burns in air to form**

A. MgO
B. Mg_3N_2
C. $MgCO_3$
D. MgO and Mg_3N_2

Q. 74 **Which IIA metal will not form normal oxide in air at 600°C**

A. Be
B. Mg
C. Sr
D. Ba

Q. 75 **Which alkaline earth metal liberates hydrogen when treated with NaOH**

A. Mg
B. Be
C. Ca
D. Ba

Q. 76 **Which of the followings contains non-typical transition elements?**

A. IB (Cu, Ag, Au)
B. IIB (Zn, Cd, Hg)
C. IIIB (Sc, Y, La)
D. Both B & C

Q. 77 **f- block elements are called**

A. Inner transition
B. Outer transition
C. lanthanides & actinides
D. Both A & C

Q. 78 **Which of the following is the non-typical transition element?**

A. Cr
B. Mn
C. Zn
D. Fe

Q. 79 **The stable states of an orbital are when it is**

A. Half-filled
B. Completely filled
C. Empty
D. Both A & B

Q. 80 **Generally, the transition elements have ____melting and boiling points**

A. High
B. Very high
C. Low
D. Very low

Q. 81 **The number of unpaired electrons present in Cr^{3+} ion is/are:**

A. 1
B. 3
C. 2
D. 4

Q. 82 **The number of unpaired electrons present in Cr^{6+} ion is**

A. 1
B. 0
C. 2
D. 4

Q. 83 **Minimum number of unpaired electrons are present in**

A. Mn^{+2}
B. Cu^{+2}
C. Fe^{+2}
D. Cu^{+1}

Q. 84 **Select the pair of ion having five electrons in their outer most d-subshell**

A. Cr^{3+}, Fe^{3+}
B. Sc^{3+}, Cr^{3+}
C. Fe^{3+}, Co^{3+}
D. Fe^{3+}, Mn^{2+}

Q. 85 **The ion that is iso-electronic with argon**

A. Cr^{4+}
B. Sc^{3+}
C. Ti^{3+}
D. Mn^{2+}

Q. 86 **Which pair of ions have same number of unpaired electrons in d-subshell**

A. Sc^{+3}, Ti^{+3}
B. Co^{+2}, Mn^{+2}
C. Ti^{+3}, Cu^{+2}
D. Fe^{+3}, Ni^{+3}

Q. 87 **Cu^{2+} has electronic configuration**

A. [Ar] $3d^9$
B. [Ar] $4d^9$
C. [Ar] $5d^9$
D. [Ar] $3d^8$

Q. 88 **At which state copper has partially filled d-subshell**

A. Atomic state
B. Cu^{+1}
C. Cu^{+2}
D. Cu_2O

Q. 89 **Paramagnetism depends upon no. of unpaired electrons in**

A. s-orbital
B. p-orbital
C. d-orbital
D. all of thes

Q. 90 **The color of transition complexes is due to**

A. d-d transition of electrons
B. paramagnetic nature of transition elements
C. ionization
D. loss of s –electrons

Q. 91 One of the following properties of transition elements does not vary with regular pattern

A. Binding energy
B. Ionic radius
C. Melting point and boiling point
D. All of these

Q. 92 Which of the following element usually not show variable oxidation state?

A. Cr
B. Mn
C. Mn
D. Zn

Q. 93 Among the outer electronic configuration, the highest oxidation state is achieved by which of the following

A. $(n-1)d^8\ ns^2$
B. $(n-1)d^5\ ns^2$
C. $(n-1)d^3\ ns^2$
D. $(n-1)d^5\ ns^1$

Q. 94 The complex of which ion is colourless

A. Ti^{+4}
B. Cu^{+2}
C. Fe^{+3}
D. Mn^{+2}

Q. 95 When a complex absorb blue light then its colour most probably will be

A. Green
B. Red
C. Yellow
D. Orange

Q. 96 The transition metal which has only colourless compounds

A. Ti
B. Cr
C. Cu
D. Zn

Q. 97 The coordination number of cobalt in $[Co(NH_3)_6]Cl_3$

A. 2
B. 4
C. 6
D. 9

Q. 98 Which of the following is monodentate ligand?

A. $C_2O_4^{-2}$
B. $H_2NCH_2CH_2NH_2$
C. NH_3
D. Both A & B

Q. 99 The coordination number of Cu in $[Cu(NH_3)_4]SO_4$ is

A. 2
B. 4
C. 1
D. 6

Q. 100 The substance which donates a pair of electron to transition metal is known as

A. Ligand
B. Electrophile
C. Coordination number
D. Lewis acid

ANSWERS & EXPLANTION: -

Q.1	**D**	I.E, E.A and E.N are increases along the period and decreases down the group but atomic radius decreases along the period and increases down the group.
Q.2	**B**	Atomic radius can be determined by the techniques of X-rays and spectroscopic
Q.3	**A**	Ionic radios for same charge ions increase from top to bottom.
Q.4	**B**	Greater the positive charge smaller the size of cation.
Q.5	**D**	Group IIA, VA and VIIIA show abnormal trends in E.A due to stable configuration.
Q.6	**C**	The relative attraction of nucleus of an atom for the electrons in a chemical bond is electronegativity
Q.7	**A**	Melting point increase with number of valence electrons upto group IVA. But VA to VIIA group element exist as diatomic form. So their melting point is smaller than IVA group.
Q.8	**A**	as size increases down the group degree of hydration decreases.
Q.9	**B**	Hydration energy α charge / size
Q.10	**B**	Electrical conductance increases from IA to IIIA.
Q.11	**C**	Basic character increases down the group.
Q.12	**D**	Electronic configuration of alkali metals is ns^1.
Q.13	**A**	Highly reactive element Cs explodes when treated with oxygen or air.
Q.14	**A**	Li does not react with ethyne to give hydrogen gas due to less electropositive character, while all other alkali metals give this reaction.
Q.15	**A**	Alkali metals are the most reactive metals in periodic table.
Q.16	**C**	Li combines with nitrogen and carbon to form Lithium nitride (Li_3N) and lithium carbide (Li_4C)
Q.17	**A**	Solubility increases down the group
Q.18	**D**	Down the group dissociation increases due to decrease in lattice energy
Q.19	**A**	Due to decrease I.E.
Q.20	**B**	Hydroxides of IIA metals are less soluble than hydroxides of IA.```
Q.21	**C**	O^{-2} donates electron to H_2O and accept H^+ to make OH^- hence O^{-2} is base.
Q.22	**A**	Energy is evolved so reaction is exothermic.
Q.23	**A**	Metal is oxidized to M^{+2}
Q.24	**A**	Be is least reactive in IIA due to very high I.E. and low electropositivity it does not react with water due formation of BeO layer.
Q.25	**D**	Reactivity of IIA I.E decreases down the group.
Q.26	**D**	Be does not react with oxygen while among other group members Mg is least reactive
Q.27	**D**	Only Ba forms peroxide which contains greater amount of oxygen
Q.28	**B**	Be is the least reactive member of IIA and burns at 800°C $2Be + O_2 \rightarrow 2BeO$
Q.29	**D**	Some of 3rd period members form basic, some acidic and amphoteric solution
Q.30	**C**	Al does not react with water, its oxides are amphoteric
Q.31	**A**	first transition series is from 21Sc to 30Zn
Q.32	**D**	58
Q.33	**A**	IB elements are called coinage metals
Q.34	**B**	General electronic configuration of IIB elements is $(n-1)d^{10}$, ns^2 . this means they have completely filled d subshell and ns-subshell. They only show +2 oxidation state

Q.35	**B**	Binding energy is directly related to no. of unpaired electrons. IIB elements have electronic configuration as $(n-1)d^{10}$, ns^2
Q.36	**B**	
Q.37	**C**	$30Zn = [Ar]4s^2, 3d^{10}$ $48Cd = [Kr]5s^2, 4d^{10}$
Q.38	**A**	Both belongs to same group i.e IIIB
Q.39	**D**	$25Mn^{+2} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^5$
Q.40	**B**	$26Fe^{+3} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^5$
Q.41	**D**	Sc is Non-typical transition element and compound of Non-typical transition elements are colorless
Q.42	**C**	
Q.43	**D**	Fe^{+3} has maximum number of unpaired electrons
Q.44	**D**	Zn have completely filled d-subshell
Q.45	**D**	
Q.46	**A**	
Q.47	**B**	NH_3 is neutral ligand, coordination sphere has +2 charge which the oxidation state of Cu
Q.48	**A**	
Q.49	**D**	Hydrazine ($H_2N - NH_2$) is bi-dentate as well as neutral ligand
Q.50	**B**	Fe is central metal atom
Q.51	**A**	Atomic radii decrease from left to right and increase from top to bottom.
Q.52	**D**	Size of Ba is greater than Na due to greater number of shells in Ba atom.
Q.53	**D**	Alkaline earth metals are less reactive than alkali metals due to their higher I.E
Q.54	**B**	E.N increases along the period and maximum for $ns^2\ np^5$ while minimum for $ns^2\ np^2$
Q.55	**D**	Metallic character increases and the basic nature of their oxides increases down the group while statement is wrongly mentioned.
Q.56	**B**	Melting point α LDF α Molecular size
Q.57	**C**	As and Sb are lower members of group V-A and has character in between metals and non-metals.
Q.58	**D**	Br_2 is one of the element in the given lot which is a non-metals.
Q.59	**D**	I.E decreases down the group.
Q.60	**A**	Solubility of G-IA increases down the group due to decrease in lattice energy.
Q.61	**A**	Due to high I.E Li is least reactive.
Q.62	**B**	$LiNO_3$ upon heating give NO_2 and its Oxide along with O_2.
Q.63	**C**	Potassium will form superoxide among all given options, due to high reactivity.
Q.64	**A**	Li and Mg of group II A show diagonal behaviour.
Q.65	**D**	Na is dropped in water, it catches fire because its reaction is highly exothermic
Q.66	**D**	Rn does not belong to alkaline earth metals, it belongs to Noble gases.
Q.67	**A**	BeO has very high lattice energy due the high charge density of Be^{+2}
Q.68	**A**	Ease of decomposition is inverely related to cationic size inc. order of cationic size
Q.69	**A**	BeO is amphoteric oxide and shows basic as well as acidic properties
Q.70	**D**	Ba reacts with O_2 at 600°C to form peroxide and O.S of 'O' in peroxides is —1

Q.71	**D**	MO_2 = Peroxide Ba gives peroxide in air at 500°—600°C
Q.72	**B**	$Ca+2H_2O \rightarrow Ca(OH)_2 + H_2$
Q.73	**D**	$2Mg + O_2 \rightarrow 2MgO$ $3Mg + N_2 \rightarrow Mg_3N_2$
Q.74	**D**	Barium peroxide is formed at given temperature.
Q.75	**B**	$Be + 2NaOH \rightarrow Na_2BeO_2 + H_2$
Q.76	**D**	In tri+ve ions of group IIIB there are no. of electron is present in d-subshell In IIB d-subshell is completely filled
Q.77	**D**	f-block consist of Lanthanides (series starting with element Lanthanum) and Actinides (series starting with element Actinium)
Q.78	**C**	Transition element which have empty or Fully Filled d-orbital are call now-typical Transition element e.g Sc^{+3}, Zn^{+2} IIIB, IIB
Q.79	**D**	Order of stability is Completely filled > Half filled > Partially filled
Q.80	**B**	Transition element have high melting point and boiling point due to strong binding force present between their atoms
Q.81	**B**	it has 3 unpaired electrons, $24Cr = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^3$
Q.82	**B**	$_{24}Cr^{6+} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^0$
Q.83	**D**	There are no unpaired electrons $_{29}Cu^{1+} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^{10}$
Q.84	**D**	$_{26}Fe^{+3} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^5$ $_{25}Mn^{+2} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^5$
Q.85	**B**	Argon has 18 electrons. Sc has 21. So, Sc^{3+} have 18 electrons left behind
Q.86	**C**	Both have only one unpaired electron in d-subshell $_{22}Ti^{+3} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^4$ $_{29}Cu^{+2} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^9$
Q.87	**A**	$_{29}Cu^{+2} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^9$ **Or** $_{29}Cu^{+2} = Ar\ 3d^9$
Q.88	**C**	$_{29}Cu^{+2} = 1s^2 2s^2 2p^6 3s^2 3p^6 4s^0 3d^9$
Q.89	**C**	Paramagnetic no. of unpaired electrons in d-orbital
Q.90	**A**	Transition complexes shows color due to d-d transition of
Q.91	**D**	
Q.92	**D**	Zn have completely filled d-subshell. Zn only show +2 oxidation state
Q.93	**B**	$(n-1)d^5\ ns^2$ is the general electronic configuration of group VIIB. Mn also belongs to group VIIB
Q.94	**A**	Ti^{+4} have empty d-subshell
Q.95	**D**	
Q.96	**D**	Zn have completely filled d-subshell
Q.97	**C**	There are six monodentate ligands directly joint with cobalt
Q.98	**C**	NH_3 can donate only one lone pair
Q.99	**B**	Cu is central metal. it contain 4-amino group (which is monodentate ligand) attached to it
Q.100	**A**	

Classification of organic compounds

Q. 1 Which of the following is alicyclic organic compound?
A. Benzene
B. Cyclohexene
C. Thiophene
D. Toluene

Q. 2 The aliphatic compounds are of two types
A. Straight chain and cyclic
B. Straight chain and branched
C. Branched chain and alicyclic
D. Homocyclic and aliyclic

Q. 3 All are homocyclic compounds except
A. Furan
B. Aniline
C. Benzaldelyde
D. Benzylchloride

Q. 4 Which may not present as heteroatom in heterocyclic compounds generally
A. Sulphur
B. Nitrogen
C. Oxygen
D. Bromine

Q. 5 All are saturated alicyclic compounds except
A. Cyclohexane
B. Methyl cyclopropane
C. Cyclohexene
D. Ethylene epoxide

Q. 6 Which of the following does not contain isolated rings?
A. Biphenyl
B. Phenanthrene
C. Diphenyl amine
D. Triphyenyl methane

Q. 7 Naphthalene and Anthracene are the example of
A. Alicyclic hydrocarbons
B. Acyclic Hydrocarbons
C. Aromatic hydrocarbons
D. Heterocyclic hydrocarbons

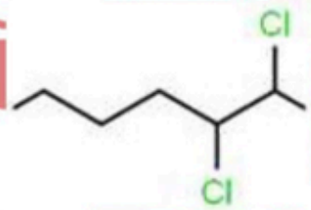
Q. 8 Which of the following pair of organic compounds have same hetero atom?
A. Pyridine, Furan
B. Furan, pyrrole
C. Pyrrole, thiophene
D. Pyridine, Pyrrole

Q. 9 General formula of saturated alicyclic compound is
A. CnH2n
B. CnH2n+2
C. CnH2n–2
D. CnHn

Q. 10 Open chain (Acyclic) compounds are classified into
A. Straight chain and branched chain
B. Aromatic and non-aromatic
C. Homocyclic and heterocyclic
D. Straight chain and closed chain

Nomenclature of organic compunds (All Families)

Q. 11 The name of the below structure is:

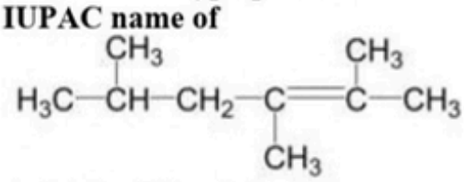


A. 1,1-Dichloropentane
B.1,2-Dichloropentane
C. 2,3-Dichloroheptane
D. 6,7-Dichloroheptane

Q. 12 IUPAC name of $CH \equiv C - CH(CH_3) - C \equiv CH$
A. 3–Methlypent–1,5–diyne
B. 3–Methlybut–1,4–diyne
C. 3–Methlypent–1,4–diyne
D. 2–Methlypent-1,4–diyne

Q. 13 IUPAC name of Tartaric acid is
A. 3-IIydroxypentanoic acid
B. 2,3-dihydroxy-But-1,4-dioic acid
C. 2,3-Diodroxypropanoic acid
D. 2-hydroxypropanoic acid

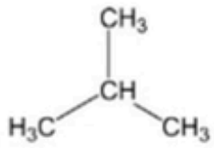
Q. 14 IUPAC name of

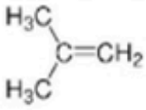


A. 2,3,5 – Trimethyl – 2-hexene
B. 2,3,5 – Trimethyl – 2-hexane
C. 2,4,5 – Trimethyl – 2-hexene
D. 2,4,5 – Trimethyl – 2-pentene

Q. 15 Iso-butylene has structure:

A. CH ° C – CH2 – CH3

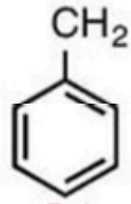
B. 

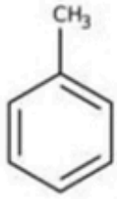
C. 

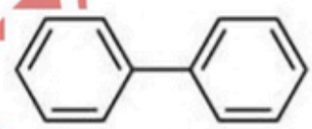
D. None of these

Q. 16 Benzyl group is:

A. 

B. 

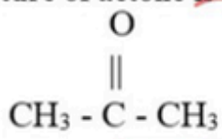
C. 

D. 

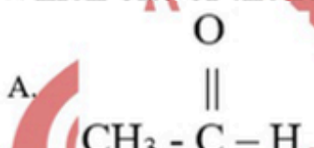
Q. 17 $CH_3-CH=CH-CHO$. The common name is

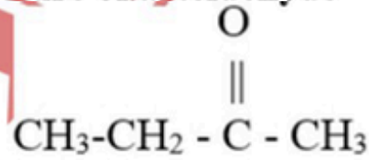
A. Lactic acid
B. Crotonaldehyde
C. 2–Butenal
D. 3–Butenal

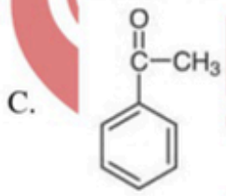
Q. 18 The structure of actone is

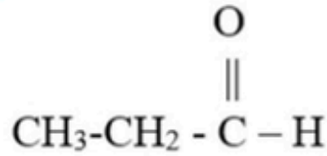


Which one of the following is the structure of acteldehyde

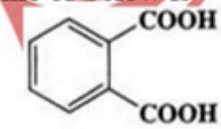
A. 

B. 

C. 

D. 

Q. 19 The common name of below is



A. Phthalic acid
B. Malonic acid
C. Tartaric acid
D. Oxalic acid

Q. 20 IUPAC name of mustard gas is

A. 2,2 – dichloroethylsulphide
B. 2,2 – dichloroethylsulphate
C. 2,2 – dichloroethylsulphite
D. 1,2 – dichloroethylsulphide

Free radical reaction and Mechanism

Q. 21 In halogenation of alkane, the least reactive halogen is

A. F_2
B. I_2
C. Cl_2
D. Br_2

Q. 22 Termination of free radical mechanism takes place by the:

A. Reaction of free radical with free radical
B. Formation of two free radicals
C. Reaction of a free radical with a molecule
D. Reaction between two molecules

Q. 23 The order of reactivity of halogens with alkanes in sunlight is

A. $I_2 > Br_2 > Cl_2 > F_2$ B. $Cl_2 > Br_2 > F_2 > I_2$

C. $F_2 > Cl_2 > Br_2 > I_2$ D. None of these

Q. 24 Formula of chloroform is

A. CH_3Cl B. CCl_4

C. CH_2Cl_2 D. $CHCl_3$

Q. 25 When methane reacts with Cl_2 in the presence of diffused sunlight, the products obtained are

A. Chloroform only B. Carbon tetrachloride only

C. Chloromethane and dichloromethane D. Mixture of A, B, C

Q. 26 Propagation of free radical mechanism takes place by the

A. Reaction of free radical with free radical

B. Formation of two free radicals

C. Consumption as well as production of another free radical

D. Reaction between two molecules

Q. 27 The chlorination of methane to give CCl_4 is an example of

A. An addition reaction B. A chain reaction

C. A reduction D. An elimination reaction

Q. 28 Which one of the following is called free radical?

A. Cl^+ B. Cl^-

C. Cl !vml]--> D. Cl_2

Q. 29 Reaction mechanism of alkanes with halogens is known as

A. Addition B. Elimination

C. Free radical substitution D. Nucleophilic substitution

Q. 30 In halogenation of alkane, the least reactive halogen is

A. F_2 B. I_2

C. Cl_2 D. Br_2

Structure, preparation and reactivity of Alkenes

Q. 31 If ozonolysis of an alkene produce acetone and propionaldehyde, then the alkene is

A. 2-Methyl-1-pentene B. 2-Methyl-3-Ethyl-propene

C. 2-Methyl-2-pentene D. 4-Methyl-3-pentene

Q. 32 Dehydrohalogenation of alkyl halides takes place in the presence of:

A. Aqueous KOH B. Alcoholic KOH

C. Dry $AlCl_3$ D. Anhydrous P_2O_5

Q. 33 The ease of dehydration of alcohols is in the order of:

A. Tertiary alcohol > Primary alcohol > Secondary alcohol

B. Tertiary alcohol > Secondary alcohol > Primary alcohol

C. Tertiary alcohol < Primary alcohol > Secondary alcohol

D. Secondary alcohol > Primary alcohol > Tertiary alcohol

Q. 34 Polymerization of ethene to polyethene takes place in the presence of:

A. $(C_2H_5)_4Pb$ B. $(CH_3)_4Pb$ and $TiCl_4$

C. $Al(C_2H_5)_3$ and $TiCl_4$ D. Zn/HCl

Q. 35 Conversion of alkyl halide to alkene is an example of:

A. Addition reaction B. β-elimination

C. S_N1 reaction D. S_N2 reaction

Q. 36 Addition of HX to $CH_3CH = CH_2$ takes place according to:

A. Hund's Rule B. Markownikov's Rule

C. Aufbau principle D. Octet rule

Q. 37 In which reaction addition Markownikov's rule is not obeyed:

A. $CH_3CH = CH_2 + HCl \rightarrow$ B. $CH_3CH_2CH = CH_2 + HI \rightarrow$

C. $CH_3CH = CH_2 + HBr \rightarrow$ D. $CH_3CH = CHCH_3 + HBr \rightarrow$

Q. 38 Which ion is the most stable carbocation?

A. CH_3^+ B. $(CH_3)_2CH^+$

C. $CH_3 - CH_2^+$ D. $(CH_3)_3C^+$

Q. 39 The olefins are

A. Alkane
B. Alkene
C. Alkyne
D. None of these

Q. 40 The dehydration of tertiary alcohols can be done in the presence of

A. $Al_2O_3/340 - 450^0C$
B. 75% conc. H_2SO_4 / 140-170^0C
C. 20% conc. H_2SO_4 / 85^0C
D. All of these

Structure, preparation and reactivity of Alkynes

Q. 41 When 20% H_2SO_4 reacts with propyne in the presence of $HgSO_4$, it gives

A. Ethanal
B. Propanol
C. Propanoic Acid
D. Acetone

Q. 42 Acetone is prepared by the hydration of

A. Ethyne
B. Propyne
C. Ethane
D. Propane

Q. 43 Which of the following is used as a starting material for the production of ethyne?

A. $CaCl_2$
B. $CaCO_3$
C. CaO
D. CaO + C

Q. 44 Which of the following reagent is used to distinguish between ethene and ethyne?

A. Alkaline $KMnO_4$
B. Br_2 water
C. Cl_2 water
D. Ammoniacal Cu_2Cl_2

Q. 45 Ethyne polymerize into chloroprene in the presence of

A. Cu_2Cl_2 / NH_4Cl
B. Cu_2Cl_2 / NH_4OH
C. $CuCl_2$ / NH_4Cl
D. $CuCl_2$ / NH_4OH

Q. 46 The formation of ethyne from ethylene di-bromide is an example of

A. Spontaneous reaction
B. Elimination reaction
C. Substitution reaction
D. Addition reaction

Q. 47 Ethyne can be identified by treating with ammonical cuprous chloride or ammonical silver nitrate. Which of the following will also give this test?

A. Ethene
B. 1-butyne
C. 2–butyne
D. 2–pentyne

Q. 48 Which of the following reagent is used to distinguish between ethene and ethyne?

A. Alkaline $KMnO_4$
B. Br_2 water
C. Cl_2 water
D. Ammonical Cu_2Cl_2

Q. 49 When Calcium Carbide is treated with water we get

A. Ethyne
B. Ethane
C. Ethene
D. Ethanol

Q. 50 Acetylene has a characteristic ethereal smell resembling that of

A. Ginger
B. Vinegar
C. Garlic
D. Onion

Benzene: Properties, Structure and Stability

Q. 51 According to modern concept benzene has:

A. Three Double bond
B. Two double bonds
C. Six delocalized π electrons
D. One double bond

Q. 52 The C–C bond length in benzene molecule is:

A. 1.54 Å
B. 1.34 Å
C. 1.397 Å
D. 1.20 Å

Q. 53 Which of the following does not contain isolated rings?

A. Biphenyl
B. Phenanthrene
C. Diphenyl methane
D. Tetraphenyl methane

Q. 54 The reaction of bromobenzene with ethylbromide in presence of Na/ether is called:

A. Wurtz reaction
B. Friedal craft reaction
C. Halogenation
D. Wurtz-Fittig reaction

Q. 55 The total resonance structures of benzene are

A. 2
B. 3
C. 4
D. 5

Q. 56 Total number of sigma electrons in benzene are

A. 12 B. 14
C. 18 D. 24

Q. 57 Formula of benzoyl chloride is

A. $C_6H_5CH_2Cl$ B. $C_6H_5CHCl_2$
C. $C_6H_5CCl_3$ D. C_6H_5COCl

Q. 58 2– Butyne on hydrogenation in the presence of Na-Liq NH_3 catalyst generates

A. Trans 2-Butene B. Cis 2-Butene
C. 1-Butene D. n-Butane

Q. 59 Addition of hydrogen accompanied by a bond cleavage is called

A. Hydrogenation B. Hydrolysis
C. Hydrogenolysis D. Hydroxylation

Q. 60 Ammonia when added to acetylene in the presence of hot alumina forms

A. Ethanenitirile B. Acrylonitrile
C. Ethyl nitrile D. Methyl alcohol

Reactivity and Reactions of Benzene

Q. 61 Benzene cannot undergo

A. Substitution reaction B. Addition reaction
C. Oxidation reaction D. Elimination reaction

Q. 62 Benzene shows _____ reactions.

A. Addition B. Substitution
C. Both a & b D. None of these

Q. 63 ___ is less reactive than benzene although it contains ortho, para directing group

A. Nitrobenzene B. Phenol
C. Chlorobenzene D. Benzene sulphonic acid

Q. 64 Under which of the following toluene shows side chain substitution reaction:

A. Cl_2 in presence of UV light B. Cl_2 in presence of $AlCl_3$
C. CH_3COCl in presence of $AlCl_3$ D. Hydrogen in presence of $FeCl_3$

Q. 65 Toluene undergoes oxidation with acidified $KMnO_4$ forming:

A. Maleic anhydride B. Benzoic acid
C. Benzyl Alcohol D. Benzaldehyde

Q. 66 The name of the following compound is: C_7H_7Cl

A. Benzyl chloride B. Benzal chloride
C. Phenyl chloride D. Benzo chloride

Q. 67 Which of the following reactions confirm the presence of unsaturation in benzene:

A. Bromination is sunlight B. Catalytic oxidation
C. Bromination with Fe and Br_2 D. Oxidation by acidified $KMnO_4$

Q. 68 Propyl benzene undergoes oxidation with acidified $KMnO_4$ forming

A. Maleic anhydride B. Benzoic acid
C. Benzyl alcohol D. Benzaldehyde

Q. 69 Which one does not undergo polymerization?

A. Benzene B. Ethyne
C. Ethene D. Chloroprene

Q. 70 In the reaction, Toluene Benzoic acid, which of the following regents are used

A. $KMnO_4$ / H_2SO_4 B. $KMnO_4/H_2O$
C. H_2/ Pt D. N_2H_4 / KOH

Q. 71 Position isomerism is shown by all except

A. Alkene B. Alkyne
C. Alkanol D. Alkanal

Q. 72 Ether and ketone shows the phenomenon of ____isomerism.

A. Position B. Functional group
C. Metamerism D. cis-trans

Q. 73 Ethanol & dimethyl ether, aldehyde & ketone, cycloalkane & alkene show __isomerism.

A. Functional group B. Position
C. Metamerism D. cis-trans

Q. 74 Which isomer will be the most stable for a given alkene?

A. Cis-isomer B. Trans-isomer
C. Both A & B D. None of these

Q. 75 Which isomerism is possible for 2-Chloro-3-methylbutane?

A. Functional group isomerism
B. Metamerism
C. Cis-trans isomerism
D. Positional isomerism

Q. 76 The number of isomers of C_4H_{10} is

A. 1
B. 2
C. 3
D. 4

Q. 77 Which of the following compounds does not exhibit positional isomerism?

A. Alkynes
B. Nitroalkanes
C. Carboxylic acid
D. Alcohol

Q. 78 Esters are the functional group isomers of

A. Ethers
B. Alcohols
C. Aldehydes
D. Carboxylic Acids

Q. 79 Metamerism is shown by

A. Diethyl ether
B. Ethylacetate
C. Diethylketone
D. All of these

Q. 80 Number of position isomers shown by 1-Butene are

A. 2
B. 4
C. 3
D. 0

Q. 81 Which of the following is NOT an amine?

A. $(NH_2)_2CO$
B. NH_2CH_3
C. $C_6H_5NH_2$
D. $N(CH_3)_3$

Q. 82 Which one of the following class of compounds has been incorrectly matched with their general formula

A. Phenol …..Ph –OH
B. Alcohols …….CHO
C. Ketone ……..RCOR'
D. Carboxylic acids …….RCOOH

Q. 83 Imino group is present in

A. CH_3NH_2
B. $HCONH_2$
C. $CH_2 = NH$
D. $(NH_2)_2CO$

Q. 84 Skeletal formula of an organic compound is given below



It is a hydrocarbon. IUPAC name of the compound is:

A. 3,3 dimethyl 3-hexene
B. 3-hexene
C. 3,4 dimethyl 3-hexene
D. 2,3 dimethyl 1-hexene

Q. 85 IUPAC name of the following structure is $(CH_3)_2CHCH_2CHO$

A. 2-Methylbutanal
B. 2-Methylpental
C. 3-Methylbutanal
D. Iso-Butanal

Q. 86 The IUPAC name of TNT is:

A. 2,4,6-Trinitrophenol
B. 1,3,5-Trinitrotoluene
C. 2,4,6-Trinitrotoluene
D. 2,4,6-Trtranitrotoluene

Q. 87 The order of reactivity of halogens with alkanes is in the order of

A. $I_2 > F_2 > Cl_2 > Br_2$
B. $I_2 < Br_2 < Cl_2 < F_2$
C. $I_2 > Br_2 > Cl_2 > F_2$
D. $I_2 < Br_2 < F_2 < Cl_2$

Q. 88 In free radical mechanism the step in which free radical react with free radical is called

A. Initiation
B. Propagation
C. Termination
D. All of the above

Q. 89 Which one of the following is a initiation step in the reaction between CH_4 and Cl_2

A. $\dot{C}H_3 + \dot{C}l \longrightarrow CH_3Cl$
B. $CH_3\bullet + CH_3\bullet \rightarrow\rightarrow CH_3CH_3$
C. $Cl2 \longrightarrow 2\dot{C}l$
D. $\dot{C}H_3 + Cl_2 \longrightarrow CH_3Cl + \dot{C}l$

Q. 90 Which of the following set can be used for dehydration of alcohols?

A. Al_2O_3, H_2SO_4, H_3PO_4, P_4O_{10}
B. $AlCl_3$, H_2SO_4, H_3PO_4
C. Al_2O_3, H_2SO_4, H_2PO_3, P_4O_{10}
D. $AlCl_3$, H_2SO_4, H_3PO_4, P_2O_3

Q. 91 The test for unsaturation of organic compounds is carried out by treating alkenes with 1% dilute alkaline $KMnO_4$ solution. The color of $KMnO_4$ is discharged with the formation of:

A. Ethylene glycol
B. Vicinal glycol
C. Glyoxal
D. Oxalic acid

Q. 92 Ozonides are unstable compounds and are reduced to carbonyl compounds with Z and H_2O. This test is used to locate position of:

A. C = C bond
B. C = O bond
C. C = N bond
D. All of these

Q. 93 The general formula for alkene is

A. C_nH_{2n+2}
B. C_nH_{2n}
C. C_nH_{2n-2}
D. None of these

Q. 94 Ethyne can be identified by treating with ammoniacal cuprous chloride or ammoniacal silver nitrate. Which of the following will also give this test?

A. Ethene
B. 1-butyne
C. 2–butyne
D. 2–pentyne

Q. 95 The Dicopper acetylide can be regenerated into ethyne by using

A. HCl
B. NaOH
C. KMnO4
D. All of these

Q. 96 Chlorine reacts readily with ethyne in presence of _____

A. CH_3COOH
B. $CHCl_3$
C. CCl_4
D. H_2SO_4

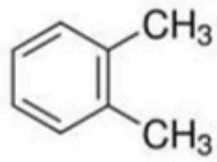
Q. 97 In Kolbe's electrolysis ethyne can be prepared by using

A. Potassium succinate
B. Potassium maleate
C. Potassium acetate
D. Potassium formate

Q. 98 The suffix used when a chain contains three carbon-carbon double bonds

A. – yne
B. – triyne
C. – triene
D. – diene

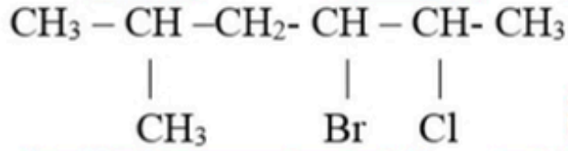
Q. 99



is:

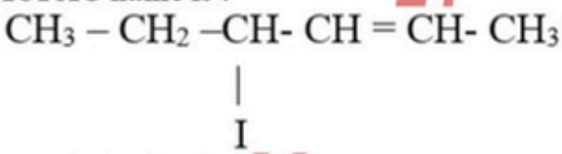
A. o-xylene
B. p-xylene
C. m-xylene
D. Toluene

Q. 100 IUPAC name is :



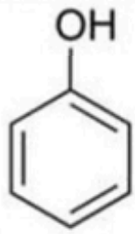
A. 2-chloro-3-bromo-5-methyl hexane
B. 3-bromo-2-chloro-5 methylhexanol
C. 4-bromo-5-chloro-2-methylhexane.
D. 3-bromo-2-chloro-5-methylhexane

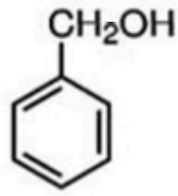
Q. 101 IUPAC name is :

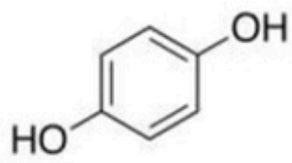


A. 3-Iodo-4-hexene
B. 4-Iodo-2-hexene
C. 3-Iodo-1- methylpentene
D. None of these

Q. 102 Which of the following is alcohol

A. 

B. 

C. 

D. All are alcohols

Q. 103 Maleic acid is

A. Saturated dicarboxylic acid
B. Unsaturated dicarboxylic acid
C. Unsaturated monocarboxylic acid
D. Saturated monocarboxylic acid

Q. 104 The resonance energy of benzene is:

A. 358.5 kJ/mole
B. -150.5 kJ/mole
C. 150.5 kJ/mole
D. 231.5 kJ/mole

Q. 105 Benzene structure is actually:

A. Equilibrium mixture of all 5 contributors
B. Like two kekule's structure
C. Resonance hybrid of all 5 contributors
D. Like three Dewar's structure

Q. 106 Which of the following is a tricyclic compound?

A. Benzene
B. Anthracene
C. Naphthalene
D. Toluene

Q. 107 Compound with highest hydrogen to carbon ratio is:

A. Alkene
B. Alkyne
C. Benzene
D. Alkane

Q. 108 In benzene geometry of each carbon is

A. Trigonal planar
B. Tetrahedral
C. Linear
D. Hexagonal

Q. 109 All of the following are polycyclic aromatic compounds except

A. Biphenyl
B. Xylene
C. Anthracene
D. Naphthalene

Q. 110 Ortho and Para directing groups release electron density to the benzene ring. Which of the following is Ortho, Para directing group:

A. $-NH_2$
B. $-CN$
C. $-COOH$
D. $-COOCH_3$

Q. 111 Among the following compounds which can be readily sulphonated:

A. Phenol
B. Nitrobenzene
C. Benzene
D. Chlorobenzene

Q. 112 Which reagent can best be used to distinguish between 1-hexene and toluene:

A. Aqueous ammoniacal $AgNO_3$ solution
B. Iodine in aqueous sodium hydroxide
C. Bromine in carbon tetrachloride
D. Dilute aqueous sulphuric acid

Q. 113 Which of the following is produced by the action of CH_3Cl on benzene in presence of $AlCl_3$ followed by oxidation in the presence of acidified $KMnO_4$ give?

A. Toluene
B. ortho-Xylene
C. meta-Xylene
D. Benzoic acid

Q. 114 When toluene reacts with Cl2 in the presence of sunlight, the final product will be

A. Benzotrichloride
B. Benzal chloride
C. Benzyl chloride
D. Chlorobenzene

Q. 115 The order of reactivity of halogens with alkanes is in the order of:

A. $I_2 > F_2 > Cl_2 > Br_2$
B. $I_2 < Br_2 < Cl_2 < F_2$
C. $I_2 > Br_2 > Cl_2 > F_2$
D. $I_2 < Br_2 < F_2 < Cl_2$

Q. 116 Termination of free radical mechanism takes place by the:

A. Reaction of free radical with free radical
B. Formation of two free radicals
C. Reaction of a free radical with a molecule
D. Reaction between two molecules

Q. 117 Ethyne polymerize into chloroprene in the presence of

A. Cu_2Cl_2 / NH_4Cl
B. Cu_2Cl_2 / NH_4OH
C. $CuCl_2$ / NH_4Cl
D. $CuCl_2$ / NH_4OH

Q. 118 Vinylacetylene combine with HCl to form

A. Polyacetylene
B. Benzene
C. Chloroprene
D. Divinyl acetylene

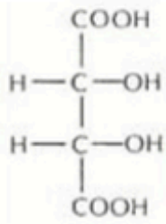
Q. 119 Electrolysis of aqueous solution of potassium salt of maleic acid yields

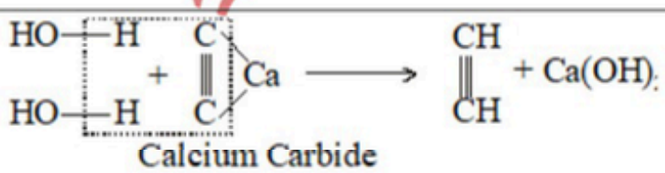
A. Ethane
B. Ethene
C. Ethyne
D. Benzene

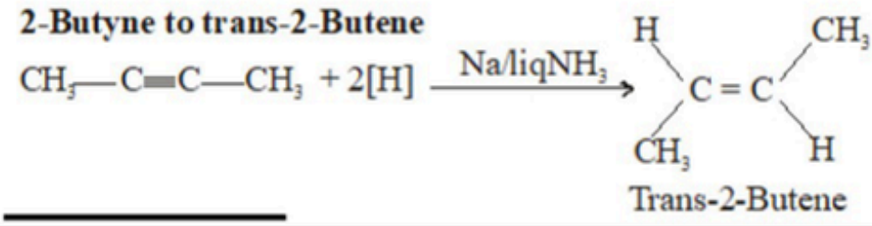
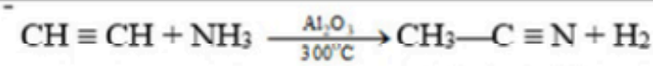
Q. 120 All the alkynes are colourless and odourless except

A. Acetylene
B. Propyne
C. Butyne
D. Pentyne

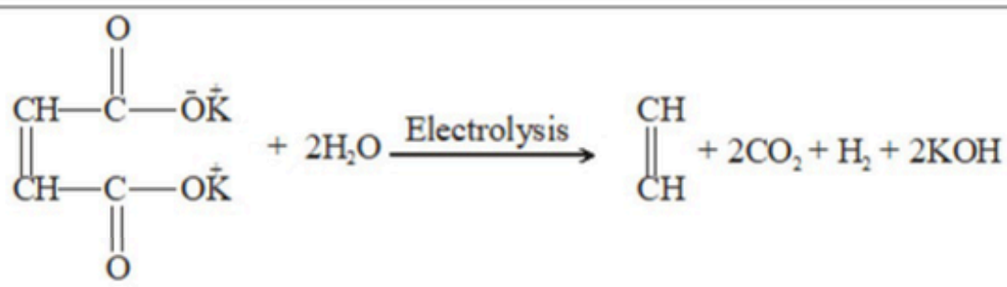
ANSWERS & EXPLANTION: -

Q.1	**B**	An alicyclic compound contains one or more all caron-carbon rings which may be either saturated or unsaturated but do not have aromatic character
Q.2	**B**	
Q.3	**A**	Homocyclic compounds are those which have only carbon atoms in the ring. Furan is not homocyclic as it have an oxygen atom in the ring.
Q.4	**D**	In heterocyclic compounds, the heteroatom might be O, N or S
Q.5	**C**	Cyclohexene have a carbon-carbon double bond
Q.6	**B**	Phenanthrene have fused rings
Q.7	**C**	
Q.8	**D**	Both Pyridine and Pyrrole have nitrogen atom in ring
Q.9	**A**	Both alkenes and saturated alicyclic compound have same general formula
Q.10	**A**	
Q.11	**C**	
Q.12	**C**	
Q.13	**B**	
Q.14	**A**	
Q.15	**C**	
Q.16	**B**	
Q.17	**B**	
Q.18	**A**	
Q.19	**A**	
Q.20	**A**	
Q.21	**B**	The order of reactivity of halogens with alkanes is in the order $I_2 < Br_2 < Cl_2 < F_2$
Q.22	**A**	These are the termination reactions $CH_3^{\bullet} + Cl^{\bullet} \longrightarrow CH_3Cl$ $CH_3^{\bullet} + CH_3^{\bullet} \longrightarrow CH_3CH_3$
Q.23	**C**	The order of reactivity of halogens with alkanes in sunlight is $F_2 > Cl_2 > Br_2 > I_2$
Q.24	**D**	Formula of chloroform is $CHCl_3$
Q.25	**D**	By free Radical Mechanism of alkanes chloroform, chloromethane, dichloromethane, and carbon tetra chloride is produce
Q.26		These are the propagation reactions: $CH_4 + Cl^{\bullet} \longrightarrow CH_3^{\bullet} + HCl$ $CH_3^{\bullet} + Cl_2 \longrightarrow CH_3Cl + Cl^{\bullet}$
Q.27	**B**	Halogenation of alkanes is a free radical mechanism, which consists of three steps: 1. Initiation

		2. Propagation 3. Termination This reaction is also considered as chain reaction
Q.28	**C**	A free radical can be defined as any molecular species capable of independent existence that contains an unpaired electron in an atomic orbital. It is represented as Cl(a dot on top right corner of the symbol)
Q.29	**C**	Reaction mechanism of alkanes with halogens is known as free radical substitution
Q.30	**B**	The order of reactivity of halogens with alkanes is in the order $I_2 < Br_2 < Cl_2 < F_2$
Q.31	**C**	
Q.32	**B**	$R—CH_2—CH_2X + KOH \longrightarrow R—CH=CH_2 + KX + H_2O$
Q.33	**B**	Ease of dehydration of alcohols is 3° Alcohol > 2° Alcohol > 1° Alcohol Because more electron donating group attached with 3° alcohol
Q.34	**C**	
Q.35	**B**	Elimination of HX group. from adjacent carbon is $R—CH_2—CH_2X + KOH \longrightarrow R—CH=CH_2 + KX + H_2O$
Q.36	**B**	Addition of unsymmetrical reagent to an unsymmetrical alkenes follow Markonikov's rule.
Q.37	**D**	Markonikov's rule is obeyed by only unsymmetrical alkenes. 2-Butene ($CH_3CH = CHCH_3$) is symmetrical alkene
Q.38	**D**	Order of stability of carbocations 3° > 2° > 1°
Q.39	**B**	
Q.40	**C**	tertiary alcohols are easily oxidized relative to primary and secondary alcohols. Thus, tertiary alcohols require relatively mild condition for dehydration
Q.41	**D**	
Q.42	**B**	
Q.43	**D**	$CaO + 3C \xrightarrow{1000^\circ C} CaC_2 + CO$ $CaC_2 + 2H_2O \longrightarrow HC \equiv CH + Ca(OH)_2$
Q.44	**D**	Ethyne reacts with Ammoniacal Cu2Cl2 to give reddish brown ppt of dicopperacetylides whereas ethene does not reacts with ammoniacal Cu_2Cl_2
Q.45	**A**	
Q.46	**B**	$Br – CH = CH – Br$ ----(Alc.KOH) $\longrightarrow HC \equiv CH + 2HBr$
Q.47	**B**	
Q.48	**D**	
Q.49	**A**	
Q.50	**C**	
Q.51	**C**	Benzene has six delocalized pi electrons
Q.52	**C**	The C—C bond length in benzene is 1.397A°.
Q.53	**B**	
Q.54	**D**	
Q.55	**D**	

Q.56	**D**	There are total 12 sigma bonds in benzene molecules (6 bonds between C – C and 6 bonds between C – H). So, total number of sigma electrons are 24
Q.57	**D**	
Q.58	**A**	**2-Butyne to trans-2-Butene**  Trans-2-Butene
Q.59	**C**	
Q.60	**A**	 Methyl nitride
Q.61	**D**	Benzene undergoes substitution reactions readily but addition reactions reluctantly.
Q.62	**C**	Benzene gives addition reaction with hydrogen and halogens, and substitution reaction with Conc. HNO_3 and Conc. H_2SO_4
Q.63	**B**	Because halogroups weakly withdraw the electrons of benzene and reactivity of halobenzene is less than benzene
Q.64	**A**	Free radical mechanism. When alkyl benzenes are treated with chlorine or bromine in the presence of sunlight, only the alkyl groups are substituted, like halogenation of alkanes
Q.65	**B**	
Q.66	**A**	
Q.67	**A**	Because it is an addition reaction.
Q.68	**B**	All alkyl benzene gives same product (benzoic acid) on oxidation with acidified $KMnO_4$
Q.69	**A**	
Q.70	**A**	Oxidation of alkyl benzene gives benzoic acid
Q.71	**D**	In Alkanal formyl group always present at terminal end so it cannot show position isomerism
Q.72	**C**	Number of carbon can be changed on both side of functional group.
Q.73	**A**	For functional group isomerism, molecular formula is same but functional group is different
Q.74	**B**	Trans isomer is table than cis isomer
Q.75	**D**	Position of the functional group (Chloro) can be different
Q.76	**B**	There are total two isomers of C_4H_{10} . These are: n-Butane, iso-Butane
Q.77	**C**	In carboxylic acids, functional group is -COOH which always present at the end of chain. So, carboxylic acids do not show position isomerism
Q.78	**D**	Both have same molecular formula but different functional group
Q.79	**D**	Metamerism are shown by those compounds which have functional groups which is present within chain (not at the terminal of chain like -COOH group)
Q.80	**A**	1-Butene and 2-Butene
Q.81	**A**	Amines are $R - NH_2$ whereas $– CO – NH_2$ is amide functional group
Q.82	**B**	– CHO is aldehydic functional group
Q.83	**C**	Imino functional group is C = NH
Q.84	**B**	
Q.85	**C**	
Q.86	**C**	

Q.87	**B**	
Q.88	**C**	These are the termination reactions $CH_3^{\bullet} + Cl^{\bullet} \longrightarrow CH_3Cl$ $CH_3^{\bullet} + CH_3^{\bullet} \longrightarrow CH_3CH_3$
Q.89	**C**	An initiation step is a reaction in which radicals are generated from a stable specie
Q.90	**A**	Dehydrating agents Al_2O_3, H_2SO_4, H_3PO_4, P_4O_{10}
Q.91	**B**	Bayer's test
Q.92	**A**	Ozonolysis is used to test the position of double bond
Q.93	**B**	
Q.94	**B**	Terminal alkynes gives this test
Q.95	**A**	Silver and copper acetylides reacts with acids to regenerate ethyne
Q.96	**C**	
Q.97	**B**	In Kolbe's electrolysis ethyne can be prepared by using salt of unsaturated dicarboxylic acid like Potassium maleate
Q.98	**C**	
Q.99	**A**	
Q.100	**D**	
Q.101	**B**	
Q.102	**B**	
Q.103	**B**	
Q.104	**C**	The resonance energy of benzene is 150.5kj/mol
Q.105	**C**	Benzene structure is resonance hybrid of thee Dewar structures and two Kekule's structure.
Q.106	**B**	
Q.107	**D**	The general formulas are: Alkane: CnH2n+2 Alkene: CnH2n Alkyne: CnH2n-2 Benzene: CnHn
Q.108	**A**	Carbon show sp^2 hybridization and planer geometry
Q.109	**B**	Xylene is monocylclic compound
Q.110	**A**	Ortho and Para directing groups are $—N(CH_3)_2$, $—NH_2$, —OH, $—CH_3$, —Cl, —Br,
Q.111	**A**	Benzene having ortho-para director group are reactive.
Q.112	**C**	1-hexene reacts with bromine and decolorizes reddish-brown color whereas toluene does not reacts in this condition
Q.113	**D**	CH_3Cl with benzene in the presence of $AlCl_3$ gives toluene. Further oxidation of toluene in the presence of acidified $KMnO_4$ gives benzoic acid
Q.114	**A**	When toluene reacts with Cl_2 in the presence of sunlight, chlorine substituted in methyl group and the final product we get is Benzotrichloride
Q.115	**B**	
Q.116	**A**	These are the termination reactions

		$CH_3^{\bullet} + Cl^{\bullet} \longrightarrow CH_3Cl$ $CH_3^{\bullet} + CH_3^{\bullet} \longrightarrow CH_3CH_3$
Q.117	**A**	
Q.118	**C**	
Q.119	**C**	
Q.120	**A**	

SKN

ALKYL HALIDE, ALCOHOL, PHENOL & KETONES

Classification and Nomenclature of alkyl halides

Q.1 The general formula of alkyl halides is:

A. $C_nH_{2n+1}X$ B. $C_nH_{2n}X_2$

C. $C_nH_{2n-1}X_3$ D. All of these

Q.2 The general formula of primary alkyl halides is:

A. $C_nH_{2n+1}X$ B. $C_nH_{2n}X_2$

C. $C_nH_{2n-1}X_3$ D. All of these

Q.3 The general formula of secondary alkyl halides is:

A. $C_nH_{2n+1}X$ B. $C_nH_{2n}X_2$

C. $C_nH_{2n-1}X_3$ D. All of these

Q.4 The general formula of tertiary alkyl halides is:

A. $C_nH_{2n+1}X$ B. $C_nH_{2n}X_2$

C. $C_nH_{2n-1}X_3$ D. All of these

Q.5 Tertiary alkyl halide is that which

A. have only one halogen atom B. have tertiary carbon atom

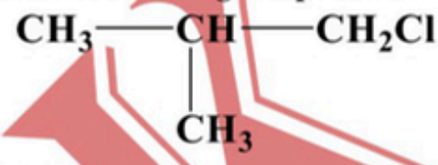
C. have three β-carbons D. All of these

Q.6 1-Chloro-2,2-dimethylpropane also known as

A. Isobutyl chloride B. Neopentyl chloride

C. Tertiary butyl chloride D. Isopropyl chloride

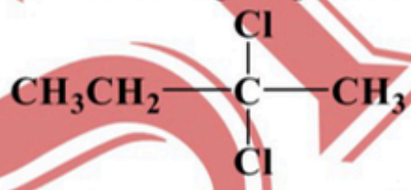
Q.7 The common name of following compound is



A. Isobutyl chloride B. Neopentyl chloride

C. Tertiary butyl chloride D. Isopropyl chloride

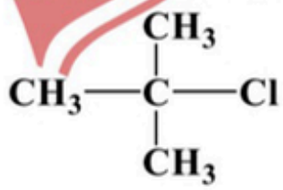
Q.8 The IUPAC name of following compound is



A. 1-Chloro-2-methylpropane B. 2-Chloro-2-methylpropane

C. 2,2-Dichlorobutane D. 2-Chloro-4-methylbutane

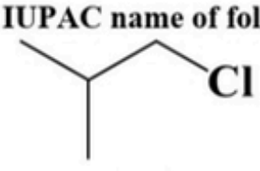
Q.9 The IUPAC name of following compound is



A. 1-Chloro-2-methylpropane B. 2-Chloro-2-methylpropane

C. 2,2-Dichlorobutane D. 2-Chloro-4-methylbutane

Q.10 The IUPAC name of following compound is



A. 1-Chloro-2-methylpropane B. 2-Chloro-2-methylpropane

C. 2,2-Dichlorobutane D. 2-Chloro-4-methylbutane

Discuss Structure and Reactivity of Alkyl Halides

Q.11 2-Bromopentane reacts with Alcoholic KOH to give

A. 1-pentene
B. 1-pentanol
C. 2-pentene
D. 2-pentanol

Q.12 of the following decides the reactivity of alkyl halides

A. C – C bond strength
B. C – H bond strength
C. C – X bond strength
D. C – X bond polarity

Q.13 Tetramethyl lead and tetraethyl lead are used as anti-knocking agent in

A. Kerosene
B. Gasoline
C. Gas oil
D. Naphtha

Q.14 Which pair of reactants can form tertiary amine?

A. R—X + HCN
B. R—X + $(NH_2)_2CO$
C. R—X + N_2
D. R—X + NH_3

Q.15 Alkyl halides undergo:

A. Electrophilic substitution reaction
B. Nucleophilic addition reaction
C. Electrophilic addition reaction
D. Nucleophilic substitution reaction

Q.16 Elimination bimolecular reaction involves:

A. First order kinetics
B. Second order kinetics
C. Third order kinetics
D. Zero order kinetics

Q.17 The conversion of ethyl bromide to ethene requires

A. Alcoholic KOH
B. Aqueous KOH
C. Etheral KOH
D. Dry KOH

Q.18 For which mechanism, the first step involved is the same

A. E_1 and E_2
B. E_2 and S_N2
C. S_N1 and E_2
D. E_1 and S_N1

Q.19 The removal of Halogen acid is not possible in which of the following compounds

A. Methyl chloride
B. Ethyl bromide
C. iso-propyl chloride
D. Tertiary butyl bromide

Q.20 E2 reaction is best carried out by

A. CH_3—X
B. CH_3—CH_2X
C. $(CH_3)_2CHX$
D. $(CH_3)_3CX$

Classification and Nomenclature of alcohols, Prepapration of Alcohols & Reactivity of Alcohols

Q.21 Which of the following is correct name of $CH_3 – CH = CH – CH_2OH$

A. 4-Hydroxy-2-butene
B. 2-Buten-1-ol
C. 1-Butenol
D. 2-Buten-4-ol

Q.22 Ethylene glycol is a

A. Monohydric
B. Dihydric alcohol
C. Secondary alcohol
D. Tertiary alcohol

Q.23 Which alcohol will form three hydrogen bonds in water?

A. Ethanol
B. 3-Pentanol
C. Propylene glycol
D. Glycerol

Q.24 In glycerol how many hydroxyl groups are present

A. one
B. two
C. three
D. four

Q.25 Which enzyme is used to convert sucrose into glucose and fructose?

A. Zymase
B. Invertase
C. Diastase
D. Maltase

Q.26 Absolute alcohol is obtained when rectified spirit is distilled with

A. $Ca(OH)_2$ B. $CaCO_3$

C. $CaCl_2$ D. CaO

Q.27 Enzyme maltase helps the hydrolysis of

A. Starch to maltose B. Maltose to glucose

C. Glucose to ethyl alcohol D. Ethyl alcohol to carboxylic acid

Q.28 Ethanol is denatured by addition of 10% methanol to make it unfit for drinking is called

A. Rectified spirit B. Methylated spirit

C. Absolute alcohol D. Commercial alcohol

Q.29 If an electrophile attacks alcohols, which bond will break

A. C – O B. C – H

C. O – H D. C – C

Q.30 Which is correct order of reactivity of alcohols with $ZnCl_2$ and HCl

A. Tertiary alcohol > Primary alcohol > Secondary alcohol

B. Tertiary alcohol < Secondary alcohol > Primary alcohol

C. Tertiary alcohol < Secondary alcohol < Primary alcohol

D. Tertiary alcohol > Secondary alcohol > Primary alcohol

Q.31 Which of the following is not considered to be closer to water in structure?

A. Alcohols B. Phenols

C. Ethers D. Aldehydes

Q.32 In tertiary alcohols the tertiary carbon is attached to

A. One hydrogen atom B. Two hydrogen atoms

C. Three hydrogen atoms D. One hydroxal group

Q.33 Which of the following is not used for denaturing of alcohol?

A. Pyridine B. Acetone

C. Methyl alcohol D. Carbon tetrachloride

Q.34 Optimum temperature for fermentation is

A. 100 –120°C B. 10 – 20°C

C. 50 – 80°C D. 50 – 80°C

Q.35 The final products of fermentation of molasses is

A. Ethanol and CO_2 B. Ethanol and oxygen

C. Glucose and water D. Ethanol and acetic acid

Q.36 1-Propanol and 2-Propanol can be distinguished by

A. Lucas test B. Alkaline KMnO4 test

C. Fehling's solution D. Sodium nitroprusside test

Q.37 The compound which undergoes dehydration most readily is

A. $(CH_3)_2CHCH2OH$ B. $(CH_3)_3COH$

C. $CH_3CH_2CH_2CH_2OH$ D. $CH_3CH(OH)CH_2CH_3$

Q.38 Dehydration products of alcohols are

A. Alkanes B. Alkenes

C. Alkynes D. Aldehydes

Q.39 Which alcohol is most reactive towards sodium metal

A. ter.Butyl alcohol B. n-Propyl alcohol

C. Isopropyl alcohol D. All have same reactivity

Q.40 The boiling points of alcohols are _____ than corresponding alkanes

A. Higher B. Almost equal

C. Lower D. No regular trend

Nomenclature and Physical Properties of Phenols, Acidity and Reactivity of Phenol

Q.41 Phenol is also known as

A. Picric acid
B. Carbolic acid
C. Formic acid
D. Carbonic acid

Q.42 Which of the following shows more acidic strength?

A. RCOOH
B. HOH
C. C_6H_5OH
D. ROH

Q.43 Which one of the following is not property of phenol?

A. It is insoluble in water
B. It is weaker acid than carboxylic acid
C. It is less reactive to nucleophiles
D. It is poisonous nature

Q.44 When phenol is treated with Zn, the product formed is

A. Benzoic acid
B. Benzene
C. Toluene
D. Phenyl acetate

Q.45 Phenol reacts with alkaline acetyl chloride to form

A. ortho-Hydroxy acetophenone
B. Phenyl acetate
C. para-Hydroxy acetophenone
D. Acetophenone

Q.46 C_6H_5OH reacts with alkalies to form

A. Carbonic acid
B. Benzene
C. Salt
D. Ester

Q.47 Phenol is

A. White PPt
B. Brown liquid
C. Reddish brown liquid
D. Colorless

Q.48 Which of the following is not the property of phenol?

A. Phenol is colorless
B. It is crystalline solid
C. It is sparingly soluble in water
D. All are properties of phenol

Q.49 Which of the following has following properties?

i) Deliquesent solid
ii) Melting point = 41°C
iii) Boiling point = 182°C
iv) Sparingly soluble in water

A. Methanol
B. Ethanol
C. Phenol
D. Benzoic acid

Q.50 IUPAC name is:



A. 4-Hydroxyaniline
B. 4-Hydroxyamine
C. 4-aminophenol
D. p-aminophenol

Nomenclature and structure of aldehydes and ketones, Preparation of aldehydes and ketones

Q.51 3-Pentanone forms a yellow precipitate with 2,4-dinitrophenyl hydrazine but does not form precipitate with:

A. Ammonical silver nitrate solution
B. Aqueous NaOH and Iodine
C. Saturated NaHSO3 solution
D. All of these

Q.52 Ketones are prepared by the oxidation of:

A. Primary alcohols
B. Tertiary alcohols
C. Secondary alcohols
D. All of these

Q.53 The oxidation of iso-propyl alcohol in the presence of acidify $K_2Cr_2O_7$ gives

A. Propanal
B. Propanone
C. Propane
D. Butanone

Q.54 The reduction of ____ gives secondary alcohols always.

A. Alcohol
B. Aldehyde
C. Ketone
D. Carboxylic acid

Q.55 The reduction of ____ gives Primary alcohols always.

A. Alcohol
B. Aldehyde
C. Ketone
D. Carboxylic acid

Q.56 Formalin is

A. 10% solution of formaldehyde in water
B. 20% solution of formaldehyde in water
C. 40% solution of formaldehyde in water
D. 60% solution of formaldehyde in water

Q.57 The catalyst used for the laboratory preparation of formaldehyde is

A. Cd-asbestos
B. Pb-asbestos
C. Pt-asbestos
D. Cu-asbestos

Q.58 Y reacts with another molecule of Y in the presence of dil. NaOH, Z is formed. If the compound Z is 3-Hydroxybutanal then what is Y?

A. Ethanol
B. Ethanal
C. Propanol
D. Acetone

Q.59 Homologous series of both aldehyde and ketones have the general formula

A. C_nH_{2n}
B. $C_nH_{2n+2}O$
C. $C_nH_{2n}O_2$
D. $C_nH_{2n}O$

Q.60 The structure and hybridization of carbonyl carbon in alkanal and alkanone is

A. Trigonal and sp^3
B. Linear and sp^2
C. Linear and sp^3
D. Planar and sp^2

Reactivity of aldehydes and ketones and their comparison

Q.61 Which one of the following does not give aldol condensation reaction?

A. Ethanal
B. Propanal
C. Propanone
D. Methanal

Q.62 Which of the following is not oxidized by mild oxidizing agents?

A. HCHO
B. Glucose
C. CH_3CHO
D. $(CH_3)_2CO$

Q.63 Which of the following statements is incorrect about ethanal and propanone:

A. Both can be prepared by oxidation of alcohols
B. Both gives wine red or orange colour with sodium nitroprusside
C. Both react with 2,4-Dinitrophenyl hydrazine reagent
D. Both give positive iodoform test

Q.64 Which of the following tests are given by both aldehyde and ketones?

A. 2,4 – DNPH test & sodium nitroprusside test
B. Fehling solution & Tollen's reagent test
C. Benedict's solution test & sodium bisulphite test
D. 2,4 – DNPH test & sodium bisulphite test

Q.65 Which of the following is also called silver mirror test?

A. 2,4 – DNPH test
B. Sodium nitroprusside test
C. Tollen's reagent test
D. None of these

Q.66 Aldehydes give _____ precipitate with Benedict's solution on boiling.

A. Wine red or orange red
B. Brick red
C. Silver mirror
D. White

Q.67 Which of the following is the oxidizing agent?

A. Tollen's reagent
B. Fehling's solution
C. Benedict's solution
D. All of these

Q.68 Which of the following will react with nitroprusside solution?

A. CH_3CH_2CHO
B. $(CH_3)_2CO$
C. CH_3COOH
D. $CH_3–CH_2–OH$

Q.69 Which of the following compounds give positive Fehling solution test?

A. Benzaldehyde
B. Acetone
C. Acetaldehyde
D. Both A and C

Q.70 Which compound gives positive silver mirror test

A. Propanone
B. Propanol
C. Propanal
D. Propanoic acid

Reduction and Oxidation of aldehydes and ketones

Q.71 An organic compound P when treated with $NaBH_4$ forms Q, which is used in denaturing of the spirit. The compound P is

A. Ethanol
B. Methanal
C. Methanol
D. Ethanal

Q.72 All of the following can produce ketone except

A. Secondary alcohol
B. Propyne
C. Calcium acetate
D. Primary alcohol

Q.73 Alcohols react with aldehydes in presence of dry HCl to give

A. Esters
B. Ethers
C. Acetals
D. Glyoxal

Q.74 Sodium borohydride reduces the _____ bond

A. C = C
B. C ≡ N
C. C = C
D. C = O

Q.75 Statement NOT true about reduction of acetone

A. With $NaBH_4$ it follows nucleophilic addition
B. With $LiAlH_4$ it gives propane
C. It gives to propanol with $NaBH_4$
D. Can easily be reduced with $LiAlH_4$

Q.76 The acid(s) produced by the oxidation of butanone is/are

A. Formic acid + propanoic acid
B. Formic acid + Acetic acid
C. Only propionic acid
D. Only acetic acid

Q.77 Acetophenone cannot give

A. Iodoform
B. Cannizaro's reaction
C. Aldol Condensation
D. Sodium nitroprusside test

Q.78 Consider the following reaction $2HCHO + NaOH \longrightarrow CH_3OH + HCOONa$. The formation of alcohol is

A. Oxidation process
B. Reduction process
C. Addition reaction
D. Disproportionation reaction

Q.79 The conversion of ethylene in the presence of $PdCl_2$ and $CuCl_2$ into acetaldehyde involves

A. Hydration
B. Oxidation
C. Oxidative cleavage
D. Reduction

Q.80 Among the following, _____ is NOT a structural derivative of water

A. Alcohols
B. Phenols
C. Ethers
D. Aldehydes

Q.81 Alkyl halide is represented by the formula

A. RCH_2X B. $RCHX_2$
C. RCHXCHX D. All of these

Q.82 $C_nH_{2n}X_2$ is the general formula of

A. Mono haloalkanes B. Di- haloalkanes
C. Tri- haloalkanes D. None of these

Q.83 The reactivity of "C—X" bond depends upon mainly

A. Bond strength B. Bond polarity
C. E.N difference D. Ionic character

Q.84 Which of the following is a good leaving group

A. OR^{-1} B. HSO_4^{-1}
C. OH^{-1} D. NH_2^{-1}

Q.85 Wurtz's synthesis reaction is particularly useful for the preparation of

A. Symmetrical alkenes B. Symmetrical alkanes
C. Symmetrical alkynes D. Unsymmetrical alkanes

Q.86 S_N2 mechanism is favored in

A. Polar solvent B. Non-Polar solvent
C. Strongly polar solvent D. Both A and C

Q.87 When alkyl halide reacts with excess ammonia, ---------- amine is formed.

A. Primary amine B. Secondary amine
C. Tert. Amine D. Quart. Amine

Q.88 Which of following will not form elimination product on treating with alcoholic KOH?

A. Chloromethene B. 2,2Dimethyl-1-Chloropropane
C. 1,1 - Dichloroethane D. Both A and B

Q.89 In SN2 reaction the % of retention of configuration is:

A. 0% B. 100%
C. 50% D. 66%

Q.90 The removal of two atoms or groups from adjacent carbon atoms in presence of Nucleophile is _____

A. Nucleophilic substitution Reaction B. Condensation reaction
C. Redox reaction D. None of the above

Q.91 What will be the product when ethyl bromide reacted with methanol?

A. Dimethyl ether B. Diethyl ether
C. Ethyl methyl ether D. Propanol

Q.92 S_N2 reaction can be best carried out with

A. Primary alkyl halide B. Secondary alkyl halide
C. Tertiary alkyl halide D. All of the above

Q.93 How an alkyl halide can be converted into an alkene

A. Dehydration B. Substitution
C. Elimination D. Addition

Q.94 The molecularity of elimination reaction followed by R—X depends upon

A. Concentration of substrate B. Concentration of nucleophile
C. Concentration of base D. Nature of R—X

Q.95 Which of the following can produce ketone:

A. Secondary alcohol B. Propyne
C. Calcium acetate D. All of these

Q.96 The oxidation of primary alcohol gives

A. Alcohol B. Aldehyde
C. Ketone D. None of these

Q.97 2-Methyl-2-propanol is an example of

A. Primary alcohol B. Secondary alcohol
C. Tertiary alcohol D. Dihydric alcohol

Q.98 Acetone reacts with $NaHSO_3$ to form bisulphite adduct. This is an example of?

A. Electrophilic substitution reaction
B. Nucleophilic substitution reaction
C. Electrophilic addition reaction
D. Nucleophilic addition reaction

Q.99 Acetaldehyde when treated with "HCN" and followed by acidic hydrolysis gives

A. Acetal
B. Lactic acid
C. Aldol
D. Cyanohydrin

Q.100 Which of the following reagents will react with both aldehyde and ketones?

A. Grignard's reagent
B. Tollen's reagent
C. Fehling's reagent
D. Benedict's reagent

Q.101 $CH_3 - CO - CH_2 - CH_3 + [O] \rightarrow C + D$ In the given reaction, C and D are

A. $CH_3COOH + CH_3COOH$
B. $CH_3COOH + CH_3CH_2CHO$
C. $CH_3COOH + CH_3CH_2COOH$
D. $HCHO + 2CH_3COOH$

Q.102 Which of the following is the formula of crotonaldehyde?

A. $CH_3 - CH_2 - CH_2 - CHO$
B. $CH_3 - CH = CH - CHO$
C. $CH_3 - CH_2 - CHO$
D. $CH_3 - CHO$

Q.103 The least reactive carbonyl compound towards nucleophilic addition reactions is

A. HCHO
B. CH_3CHO
C. C_2H_5CHO
D. CH_3COCH_3

Q.104 Which of the following will produce white precipitate on reaction with $NaHSO_3$?

A. 2-butanone
B. Propanone
C. Ethanal
D. All of these

Q.105 When two moles of acetone are treated with a base the product is

A. 4-hydroxy -4 methyl -2-pentanone
B. 3-hydroxy butanone
C. 3-hydroxy -2-methyl pentanone
D. 3- hydroxyl pentanal

Q.106 Which of the following show no reactivity with hydrazine?

A. HCHO
B. CH_3OH
C. CH_3CHO
D. $(CH_3)_2CO$

Q.107 When acetaldehyde reacts with hydrazine in presence of an acid the product formed is

A. Hydroxy acetaldehyde
B. Acetaldehyde hydrazone
C. Acetaldehyde oxime
D. Acetaldehyde phenyl hydrazone

Q.108 Methyl ketones are usually characterized by

A. Tollen's tests
B. Lucas test
C. Iodoform test
D. Fehling solution test

Q.109 2, 3- Dihydroxy butanedioic acid is also called

A. Tartaric acid
B. Oxalic acid
C. Phenol
D. Lactic acid

Q.110 The oxygen atom in alcoholic group is

A. sp-hybridized
B. sp^3 hybridized
C. sp^2 hybridized
D. Only carbons are hybridized

Q.111 The concentration of ethanol obtained by fermentation is

A. 1.2 – 1.4%
B. 12 – 14%
C. 95%
D. 99.9%

Q.112 Ethanol is denatured by addition of 10% methanol to make it unfit for drinking is called

A. Rectified spirit
B. Methylated spirit
C. Absolute alcohol
D. Commercial alcohol

Q.113 Rectified spirit cannot be purified directly to 99.9% ethanol because

A. It contain 5% methanol
B. It is an azeotropic mixture
C. It kills micro-organisms
D. It contains 5% ethanol

Q.114 Enzyme Zymase helps the hydrolysis of

A. Starch to maltose
B. Maltose to glucose
C. Glucose to ethyl alcohol
D. Ethyl alcohol to carboxylic acid

Q.115 Which enzyme is used to convert sucrose into glucose and fructose?

A. Zymase
B. Invertase
C. Diastase
D. Maltase

Q.116 1-propanol is oxidized in the presence of acid dichromate, the product is

A. Acetone
B. Propanal
C. Acetaldehyde
D. Butanal

Q.117 One of the following can produce greater number of moles of ethylchloride on reacting with excess of ethanol

A. PCl_5
B. $HCl / ZnCl_2$
C. PCl_3
D. $SOCl_2$

Q.118 Ethyl alcohol is heated with conc. H_2SO_4 at 180°C. The product formed

A. $CH_3COC_2H_5$
B. C_2H_4
C. CH_3COCH_3
D. C_2H_2

Q.119 Ketones are prepared by the oxidation of

A. Primary alcohols
B. Tertiary alcohols
C. Secondary alcohols
D. All of these

Q.120 Which one of the following is not property of phenol?

A. It is insoluble in water
B. It is weaker acid than carboxylic acid
C. It is less reactive to nucleophiles
D. It is poisonous nature

Q.121 Phenol reacts with alkaline acetyl chloride to form

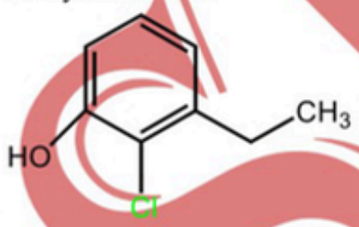
A. Arial
B. Phenyl acetate
C. para-Hydroxy acetophenone
D. Acetophenone

Q.122 The monomers for bakelite are

A. O-Hydroxybenzyl alcohol
B. P-Hydroxybenzyl alcohol
C. Formaldehyde + Phenol
D. Both (a) and (b)

Q.123 When hydrogen gas is passed through phenol at 150°C with Ni as catalyst. It forms

A. Benzene
B. Cyclohexane
C. Cyclohexanol
D. Benzoic acid



Q.124

A. Tartaric acid
B. 2-chloro 3-hydroxy ethylbenzene
C. 1-Hydroxy-2-chloro-3-ethylbenzene
D. 2-chloro-3-ethylphenol

Q.125 Which pair of compounds cannot be distinguished by means of Tollen's test:

A. HCHO & CH_3COCH_3
B. HCHO & CH_3CHO
C. CH_3CHO & CH_3COCH_3
D. $C_6H_5COCH_3$ & C_6H_5CHO

Q.126 Which of the following test is given by ketones only?

A. 2,4 – DNPH test
B. Sodium nitroprusside test
C. Tollen's reagent test
D. None of these

Q.127 An alkaline solution of cupric tartrate complex ion is called

A. Tollen's reagent
B. Fehling's solution
C. Benedict's solution
D. None of these

Q.128 An aldehyde when strongly heated with Fehling's reagent gives brick red precipitate of

A. CuO
B. Cu_2O
C. CuO_2
D. $Cu(OH)_2$

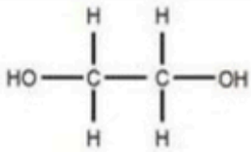
Q.129 Acetophenone is also called

A. Diphenyl ketone
B. Dimethyl ketone
C. Ethyl methyl ketone
D. Methyl phenyl ketone

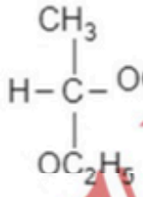
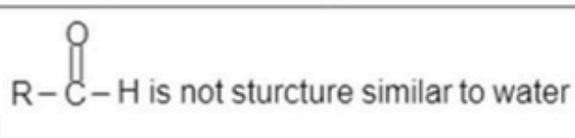
Q.130 Among the following, _____ is NOT a structural derivative of water

A. Alcohols
B. Phenols
C. Ethers
D. Aldehydes

ANSWERS & EXPLANTION: -

Q.1	**A**	Mono halo alkanes (R – X) are called alkyl halide
Q.2	**A**	Mono halo alkanes (R – X) are called alkyl halide. These are classified as primary, secondary and tertiary. All have same general formula. The difference in the position of halo group
Q.3	**A**	Mono halo alkanes (R – X) are called alkyl halide. These are classified as primary, secondary and tertiary. All have same general formula. The difference in the position of halo group
Q.4	**A**	Mono halo alkanes (R – X) are called alkyl halide. These are classified as primary, secondary and tertiary. All have same general formula. The difference in the position of halo group
Q.5	**D**	Tertiary alkyl halides are type of mono-haloalkanes
Q.6	**B**	
Q.7	**A**	
Q.8	**C**	
Q.9	**B**	
Q.10	**A**	
Q.11	**C**	
Q.12	**C**	Deciding factor for the reactivity of alkyl halide is C – X bond strength
Q.13	**B**	
Q.14	**D**	The reaction between R—X + NH_3 is nucleophilic substitution reaction. In this reaction we can get primary, secondary, tertiary and quaternary amines as; $CH_3—\overset{\delta+}{C}H_2—\overset{\delta-}{B}r + \ddot{N}H_3 \longrightarrow \underset{\text{Ethylamine}}{C_2H_5—NH_2} + HBr$ $CH_3—\overset{\delta+}{C}H_2—\overset{\delta-}{B}r + CH_3—CH_2—\ddot{N}H_2 \longrightarrow \underset{\text{Diethylamine}}{(CH_3—CH_2)_2NH} + HBr$ $CH_3—\overset{\delta+}{C}H_2—\overset{\delta-}{B}r + (CH_3—CH_2)_2\ddot{N}H \longrightarrow \underset{\text{Triethylamine}}{(CH_3—CH_2)_3N} + HBr$ $CH_3—\overset{\delta+}{C}H_2—\overset{\delta-}{B}r + (CH_3—CH_2)_3\ddot{N} \longrightarrow \underset{\text{Quaternary ethylammonium ion}}{(CH_3—CH_2)_4N} + Br$
Q.15	**D**	Alkyl halides undergo Nucleophilic substitution reaction and β-elimination reaction
Q.16	**B**	Rate equation is: Rate = k[Substrate]^1 [Base]^1
Q.17	**A**	Elimination is promoted by Alcoholic KOH because in alcoholic medium, OH- becomes strongly basic
Q.18	**D**	The first step in both E_1 and S_N1 is ionization.
Q.19	**A**	
Q.20	**B**	Primary alkyl halide form eliminations product through E2 mechanism
Q.21	**B**	
Q.22	**B**	
Q.23	**D**	Because glycerol have 3-hydroxyl group

Q.24	**C**	Glycerol CH_2-OH $CH-OH$ CH_2-OH
Q.25	**B**	
Q.26	**D**	
Q.27	**B**	
Q.28	**B**	
Q.29	**C**	It is an example of electrophilic substitution reaction in which hydrogen will be replaced by electrophile and O – H bond breaks.
Q.30	**D**	It is an example of substitution reaction in which carbocation is produced. Tertiary carbocation is most stable that's why it is most reactive.
Q.31	**D**	Alcohol, ether and phenol a derivative of water so they will resemble closely with the structure of water.
Q.32	**D**	In tertiary alcohol, tertiary carbon is attached to one hydroxyl group three carbons and no hydrogen.
Q.33	**D**	
Q.34	**D**	25 – 35°C
Q.35	**A**	
Q.36	**A**	
Q.37	**B**	Order of dehydration of alcohol is Tertiary > Secondary > Primary
Q.38	**B**	Dehydration is an example of elimination reaction which will produce alkene.
Q.39	**B**	It is an example of electrophilic substitution reaction in which primary alcohols are most reactive. Ter. > Sec > Pri
Q.40	**A**	Boiling points are higher in alcohol due to hydrogen bonding.
Q.41	**B**	
Q.42	**A**	
Q.43	**A**	
Q.44	**B**	
Q.45	**B**	
Q.46	**C**	Sodium phenoxide salt is formd.
Q.47	**D**	
Q.48	**D**	
Q.49	**C**	
Q.50	**C**	
Q.51	**D**	3- Pentanone does not react with Tollen's reagent (A)
Q.52	**C**	
Q.53	**B**	
Q.54	**C**	
Q.55	**B**	
Q.56	**C**	Formalin is a mixture of 40% formaldehyde, 8% methyl Alcohol abd 52% water.
Q.57	**C**	Pt-asbestos is sued for preparation of formaldehyde in laboratory.
Q.58	**B**	

Q.59	**D**	
Q.60	**D**	
Q.61	**D**	
Q.62	**D**	Oxidation of ketone is difficult
Q.63	**B**	Sodium nitroprusside gives wine red color only with ketones.
Q.64	**D**	Aldehydes show reduction with NaHSO3 + Fehling's + Benedict + Tollen's test + 2,4-DNPH Ketones only react with i) Nitropruside ii) 2,4-DNPH iii) With $NaHSO_3$
Q.65	**C**	Tollen's test is known as silver mirror test because silver mirror is formed as product.
Q.66	**B**	Aldehyde give brik red precipties of Cu_2O on reacting with Bendict solution.
Q.67	**D**	These above mentioned compound weak oxidizing agent.
Q.68	**B**	Ketones react with nitro prusside solution
Q.69	**C**	Aldehyde give reaction with fehling solution
Q.70	**C**	aldehyde gives silver mirror test
Q.71	**B**	Q is methanol, so P will be methanal.
Q.72	**D**	Primary alcohol gives aldehyde
Q.73	**C**	
Q.74	**D**	Carbonyl compound reduced by $NaBH_4$
Q.75	**B**	$LiAlH_4$ reduces carboxylic acid
Q.76	**D**	 split on oxidation group remain attached with smaller chain
Q.77	**B**	Acetophenone has α-hydrogen and α-methyl group
Q.78	**B**	Aldehyde reduced to form alcohol.
Q.79	**B**	Cleavage oxidation of ethylene
Q.80	**D**	 is not sturcture similar to water
Q.81	**A**	Mono halo alkanes (R – X) are called alkyl halide
Q.82	**B**	Di- haloalkanes have two halogens
Q.83	**A**	Deciding factor for the reactivity of alkyl halide is C – X bond strength
Q.84	**B**	Cl^-, Br^-, I^-, HSO_4^- are good leaving groups
Q.85	**B**	
Q.86	**B**	
Q.87	**A**	In excess ammonia, only one single reaction takes place resulting primary amine as

		$CH_3—\overset{\delta+}{C}H_2—\overset{\delta-}{B}r + \ddot{N}H_3 \longrightarrow C_2H_5—NH_2 + HBr$ (Limited; Excess; Ethylamine)
Q.88	**D**	Elimination is not possible where there is no β-Hydrogen atom
Q.89	**A**	In S_N2 reaction nucleophile always attacks from opposite to the leaving group which results in inversion of configuration
Q.90	**D**	Removal of two species from adjacent carbon atoms result in elimination reaction
Q.91	**C**	$C_2H_5 - Br + CH_3 - OH \longrightarrow C_2H_5 - O - CH_3 + HBr$
Q.92	**A**	S_N2 reaction is single step bimolecular reaction in which nucleophile attacks and leaving group leaves simultaneously. This is best carried out with primary alkyl halides
Q.93	**C**	β-Elimination reaction
Q.94	**D**	Primary alkyl halide follow E2 mechanism. The molecularity of this reaction is 2 while in case of tertiary alkyl halides which follow E1 mechanism its molecularity is one.
Q.95	**D**	
Q.96	**B**	
Q.97	**C**	
Q.98	**D**	
Q.99	**B**	
Q.100	**A**	
Q.101	**A**	
Q.102	**B**	
Q.103	**D**	
Q.104	**D**	Mechanism of Cannizzaro's reaction
Q.105	**A**	Acetone condense with each other in the presence of base.
Q.106	**B**	Alcohols do not react
Q.107	**B**	Name of reactant + hydrazone
Q.108	**C**	α-methyl ketones gives iodoform reaction.
Q.109	**A**	
Q.110	**B**	Oxygen atom is sp^3 hybridized
Q.111	**B**	Above this limit enzymes become inactive
Q.112	**A**	
Q.113	**B**	Rectified spirit contains 95.6% ethanol and 4.4% water. This mixture of ethanol is known as an azeotropic mixture.
Q.114	**C**	
Q.115	**B**	
Q.116	**B**	
Q.117	**C**	PCl_3 consumes three moles of alcohol, and produce three moles of ethyl chloride.
Q.118	**B**	At 180°C elimination is favoured over elimination.
Q.119	**C**	Secondary alcohol on oxidation yields ketones
Q.120	**A**	
Q.121	**B**	
Q.122	**C**	

Q.123	**C**	
Q.124	**D**	
Q.125	**B**	HCHO and CH_3CHO both give silver mirror so cannot be distinguished.
Q.126	**B**	Aldehydes show reaction with $NaHSO_3$ + Fehling + Benedict + Tollen's test + 2,4-DNPH Ketones only react with i) Nitropruside ii) 2,4-DNPH iii) With $NaHSO_3$
Q.127	**B**	Alkaline solution of cupric tartarate is Fehling's solution. Alkaline solution cupric citrate is Benedict's solution.
Q.128	**B**	$R-CHO+2Cu(OH)_2+NaOH \rightarrow R-COONa + Cu_2O + 3H_2O$ Brickred ppt.
Q.129	**D**	
Q.130	**D**	$R-\overset{\overset{O}{\|}}{C}-H$ is not sturcture similar to water

SKN

Carboxylic acids & Macromolecules

Nomenclature, Classification and Physical Properties of Carboxylic Acids, Preparations and Reactivity of carboxylic acids

Q.1 Which of the following is not a fatty acid:

A. Formic acid
B. Palmitic acid
C. Stearic acid
D. All are fatty acids

Q.2 Carboxylic acids are soluble in benzene forming cyclic dimmers. The number of carbon atoms in the dimmeric ring are:

A. 8
B. 6
C. 4
D. 2

Q.3 $C_{17}H_{35}COO^-Na^+$ is sodium salt of a fatty acid, its solubility is:

A. Higher than fatty acid
B. Lower than the fatty acid
C. Completely soluble
D. Not predictable

Q.4 Which of the following is a polyproticacid:

A. Acetic acid
B. Salicylic acid
C. Oxalic acid
D. Benzoic acid

Q.5 Which of the followings is the formic acid?

A. HCOOH
B. CH_3COOH
C. $(COOH)_2$
D. $CH_2(COOH)_2$

Q.6 C_6H_5COOH is the chemical formula of

A. Palmitic acid
B. Stearic acid
C. Benzoic acid
D. Phthalic acid

Q.7 $C_6H_4(COOH)_2$ is the chemical formula of

A. Palmitic acid
B. Stearic acid
C. Benzoic acid
D. Phthalic acid

Q.8 The number of atoms present in the ring of dimer of acetic acid in benzene solvent are

A. 2
B. 4
C. 6
D. 8

Q.9 Phthalic acid is also called

A. Benzoic acid
B. 1, 2-benzenedicarboxylic acid
C. 1, 3-benzenedicarboxylic acid
D. 1, 4-benzendicarboxylic acid

Q.10 The carboxylic acids which are liquid with pungent smell have number of carbons

A. $C_1 - C_4$
B. $C_1 - C_3$
C. $C_4 - C_6$
D. $C_2 - C_5$

Interconversion of carboxylic acid derivatives

Q.11 Which of following is cannot be directly prepared from acetic acid:

A. Acetamide
B. Acetic anhydride
C. Ethyl acetate
D. Acetyl chloride

Q.12 Conversion of wine to vinegar requires

A. Reduction
B. Oxidation
C. Addition
D. β-elimination

Q.13 Ammonium acetate on strong heating gives

A. Ammonium carbamate
B. Acetamide
C. Urea
D. Ammonia

Q.14 If benzyl acetate is added to a liquid, it will develop a flavor of:

A. Banana
B. Jasmine
C. Pineapple
D. Apricot

Q.15 Apricot flavor is given by

A. Amylacetate
B. Benzylacetate
C. Amylbutyrate
D. Isobutylformate

Q.16 Pineapple flavor is given by

A. Amylacetate
B. octylacetate
C. ethylbutyrate
D. isobutylformate

Q.17 Orange flavor is given by

A. Amylacetate
B. octylacetate
C. ethylbutyrate
D. isobutylformate

Q.18 Carboxylic acids yields____ on reaction with alcohols in the presence of conc. H_2SO_4.

A. Ester
B. aldehyde
C. ketone
D. alcohols

Q.19 Which reagent is used to reduce a carboxylic acid to an alkane?

A. H_2 / Ni
B. HI / P
C. $NaBH_4$
D. $LiAlH_4$

Q.20 Acetic acid can be manufactured by _____ of carbohydrates.

A. Distillation
B. Fermentation
C. Ozonolysis
D. Esterification

Proteins, Role of enzymes as biocatalysts

Q.21 In formation of protein, carboxylic group of one amino acid and amino group of other amino acid condensed together to give:

A. Peptide linkage
B. Ester linkage
C. 1 → 6 glycosidic linkage
D. β 1-4 Glycosidic linkage

Q.22 The bond that join two amino acids cannot be called as

A. Covalent bond
B. Peptide bond
C. Amide linkage
D. Di sulfide bond

Q.23 Amino acids are the building blocks of

A. Carbohydrates
B. Proteins
C. Vitamins
D. Fats

Q.24 Denaturation of protein is caused by

A. Changing the temperature
B. Intensified light
C. Changing the Ph
D. All of these

Q.25 The molecular weight of protein is

A. > 1000 amu.) < 1000 amu.
B. < 1000 amu.
C. > 10000 amu.
D. < 10000 amu.

Q.26 Which enzyme is used to catalyze the addition of ammonia, water or carbon dioxide to double bond

A. Phospho-transferase
B. Phospho-glyceromutases
C. Fumarase
D. Succinic thiokinase

Q.27 Enzyme used for conversion of starch to glucose and glucose to ethanol are

A. Invertase + Diastase
B. Zymase + Invertase
C. Invertase + Zymase
D. Diastase + Zymase

Q.28 Which statement is incorrect

A. Enzymes are stereo specific
B. Enzymes are highly specific
C. Enzymes can be crystallized
D. Enzyme can resist the radiation

Q.29 Indicate the enzyme which catalyses the following reaction

$$(NH_2)_2CO + H_2O \longrightarrow 2NH_3 + CO_2$$

A. Zymase
B. Invertase
C. Urease
D. Diastase

Q.30 The three-dimensional twisting and folding of the polypeptide chain results in the ----------of proteins.

A. Primary structure
B. Secondary structure
C. Tertiary structure
D. Quaternary structure

Q.31 Which of the following is most acidic in nature?

A. Fluoroacetic acid
B. Nitroacetic acid
C. Acetic acid
D. Aminoacetic acid

Q.32 Which of the following acid is found in the stings of bees and ants:

A. Formic acid
B. Benzoic acid
C. Acetic acid
D. Phthalic acid

Q.33 The highest melting point is of:

A. C_4H_9COOH
B. C_3H_7COOH
C. C_2H_5COOH
D. All have same melting points

Q.34 Only first four members of aliphatic acids are soluble in water due to:

A. Hydrogen bonding
B. Ion dipole
C. Debye forces
D. All of these forces

Q.35 Which of the following will give acetic acid on acid hydrolysis:

A. CH_3CN
B. Acetone
C. C_2H_5CN
D. Lactic acid

Q.36 Which of the following is a cyclic carboxylic acid:

A. Phthalic acid
B. Oxalic acid
C. Lactic acid
D. Succinic acid

Q.37 Which of the followings is the acetic acid?

A. HCOOH
B. CH_3COOH
C. $(COOH)_2$
D. $CH_2(COOH)_2$

Q.38 Which of the followings is the oxalic acid?

A. HCOOH
B. CH_3COOH
C. $(COOH)_2$
D. $CH_2(COOH)_2$

Q.39 $C_{17}H_{35}COOH$ is the chemical formula of

A. Palmitic acid
B. Stearic acid
C. Benzoic acid
D. Phthalic acid

Q.40 CH_3CH_2COOH is the chemical formula of

A. Propanoic acid
B. Propionic acid
C. Ethyl acetate
D. Both A and B

Q.41 A carboxylic acid contains

A. Hyroxyl group
B. Carboxyl group
C. Hydroxyl & carboxyl group
D. Carboxyl & formyl group

Q.42 Formic acid was first isolated from

A. Butter
B. Vinegar
C. Milk
D. Red ant

Q.43 Butyric acid was first isolated from

A. Butter
B. Vinegar
C. Milk
D. Red ant

Q.44 The solubility of carboxylic acids _with the increase in the no. of carbons and hydrogens.

A. Increases
B. Decreases
C. Un-affected
D. First increases and then decreases

Q.45 Which of the following is the weaker acid?

A. HCl
B. H_2SO_4
C. CH_3COOH
D. None of these

Q.46 2-Butene when heated with alkaline $KMnO_4$ gives

A. Glycol
B. Glyoxal
C. Carboxylic acid
D. Ester

Q.47 $CH_3CN + HCl \rightarrow A + B$ in presence of water in the above reaction A and B are

A. Acetic acid and acid amide
B. Acetic acid and ammonia
C. Acetic acid and methyl chloride
D. Acetic acid and ammonium chloride

Q.48 Which of the following has maximum number of carbon atoms?

A. Succinic acid
B. Adipic acid
C. Oxalic acid
D. Malonic acid

Q.49 Glacial acetic acid freezes to ice like solid at

A. 8^0C
B. 25^0C
C. 39^0C
D. 17^0C

Q.50 Which one is aliphatic dicarboxylic acid?

A. Ethanoic acid
B. Oxalic acid
C. Benzoic acid
D. Phthalic acid

Q.51 The boiling points of carboxylic acids are _____ than their corresponding alkanes.

A. Low due to low molecular masses
B. High due to hydrogen bonding
C. High due to high molecular masses
D. Low due to weak intermolecular forces

Q.52 The solution of which acid is used for seasoning of food

A. Formic acid
B. Benzoic acid
C. Acetic acid
D. Butanoic acid

Q.53 Which one of the following acid has different odour from others?

A. Methanoic acid
B. Butanoic acid
C. Ethanoic acid
D. Propanoic acid

Q.54 The general formula of aliphatic carboxylic acid is

A. $(CH_2O)_n$
B. $(C_6H_{10}O_5)_n$
C. $C_nH_{2n}O_2$
D. $C_nH_{2n}O$

Q.55 Only first four members of aliphatic acids are soluble in water due to

A. Hydrogen bonding
B. Ion dipole
C. Debye forces
D. London dispersion forces

Q.56 $C_{17}H_{35}COO^-Na^+$ is sodium salt of a _____

A. Adipic acid
B. Oleic acid
C. Stearic acid
D. Palmitic acid

Q.57 Hydrolysis of alkane nitriles with mineral acids or alkali yields:

A. Primary amine
B. Alkane
C. Carboxylic acid
D. Tertiary amine

Q.58 Which of the following will give positive bromine water test:

A. Malonic acid
B. Succinic acid
C. Oxalic acid
D. Maleic acid

Q.59 When a carboxylic acid is protonated, protonation occurs at:

A. Hydroxyl oxygen atom
B. Carbonyl oxygen atom
C. Hydroxyl hydrogen atom
D. Carbonyl carbon atom

Q.60 Which of the following compound will convert acetic acid to acetyl chloride:

A. NaCl
B. HCl
C. $ZnCl_2$
D. $SOCl_2$

Q.61 Acetic acid undergoes reduction with $LiAlH_4$ to give:

A. Ethanol
B. Methanol
C. Ethane
D. Methane

Q.62 What is obtained if n-Propyl acetate is boiled with aqueous sodium hydroxide:

A. CH_3OH B. C_3H_8

C. C_3H_7OH D. C_3H_7COONa

Q.63 Banana flavor is given by

A. Amylacetate B. Benzylacetate

C. Amylbutyrate D. Isobutylformate

Q.64 Jasmine or peach flavor is given by

A. Amylacetate B. Benzylacetate

C. Amylbutyrate D. Isobutylformate

Q.65 Raspberry flavor is given by

A. Amylacetate B. Benzylacetate

C. Amylbutyrate D. Isobutylformate

Q.66 Acetamide is prepared by

A. Heating CH_3COONH_4 B. Heating CH_3CN

C. Heating $CH_3COOC_2H_5$ D. Hydrolysis of CH_3CN

Q.67 Organic compounds having fruity smell are

A. Alcohols B. Carboxylic acids

C. Ethers D. Esters

Q.68 2-Hydroxylpropanoic acid is called___and 2,3-Dihydroxybutandioic acid is called___.

A. Oxalic acid, Maleic acid B. Lactic acid, tartaric acid

C. Citric acid, aspartic acid D. None of these

Q.69 The reactivity of carboxylic acids is due to the presence of ____group.

A. Carbonyl group B. Hydroxyl group

C. Ester group D. Both A and B

Q.70 Organic compounds X and Y react to form organic compound Z. what type of compounds can X, Y and Z be?

	X	Y	Z
A	Alcohol	Ester	Acid
B	Acid	Ester	Alcohol
C	Ester	Alcohol	Acid
D	Alcohol	Acid	Ester

Q.71 Which acid is used in the manufacture of synthetic fiber?

A. Formic acid B. Oxalic acid

C. Carbonic acid D. Acetic acid

Q.72 The three-dimensional twisting and folding of polypeptide chain results in:

A. Primary structure B. Secondary structure

C. Tertiary structure D. Quaternary structure

Q.73 Which of following is / are examples of simple protein?

A. Polypeptide B. Collagen and albumin

C. Phospo proteins D. Peptones

Q.74 Gelatin is obtained by heating:

A. Bones B. Skin

C. Tendons D. All

Q.75 All proteins yield _____ upon complete hydrolysis

A. Ketones B. Amino acid

C. Carbohydrates D. Alcohols

Q.76 The secondary structure of protein is maintained by H-bonding between

A. N and H B. O and H

C. O and C D. C and H

Q.77 Many enzymes contain a protein part and non protein part. This protein part is_____

A. Apoenzyme
B. Holoenzyme
C. Co-factor
D. Co-enzyme

Q.78 The enzyme which can catalyze the conversion of glucose to ethyl alcohol is

A. Zymase
B. Invertase
C. Urease
D. Maltase

Q.79 Which one of the following statements is incorrect?

A. Enzymes are protein in nature
B. Enzymes can act as a catalyst
C. Enzymes can catalyze any reaction
D. Urease is an enzyme

Q.80 Glucose is converted into ethanol by the enzyme

A. Zymase
B. Invertase
C. Urease
D. Diastase

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ANSWERS & EXPLANTION: -

Q.1	**D**	Aliphatic mono-carboxylic acid and fatty acid.
Q.2	**D**	
Q.3	**A**	
Q.4	**C**	oxalic acid have formula $(COOH)_2$
Q.5	**A**	HCOOH is formic acid.
Q.6	**C**	book information
Q.7	**D**	phthalic acid is 1,2-benxzene dicarboxylic acid
Q.8	**D**	every dimer of carboxylic acid have 8 carbon atoms
Q.9	**B**	IUPAC name
Q.10	**B**	first three carboxylic acid have pungent smell
Q.11	**A**	Ammonium salt of acetic acid formed as intermediate
Q.12	**B**	Wine contains ethanol which on oxidation produces acetic acid which is present in vinegar.
Q.13	**B**	Acetamide cannot be prepared directly
Q.14	**B**	book information
Q.15	**C**	**Ester** / **Flavour** **Amylacetate** / **Banana** **Isobutyl formate** / **Raspberry** **Benzylacetate** / **Jasmine** **Ethyl butyrate** / **Pineapple** **Amyl butyrate** / **Apricot** **Octyl acetate** / **Orange**
Q.16	**C**	SEE EXPLANTION OF Q.15
Q.17	**B**	SEE EXPLANTION OF Q.15
Q.18	**A**	When carboxylic acid react with acid it always converted into ester.
Q.19	**B**	$LiAlH_4$ is the reducing agent which is used to converted carboxylic acid into alcohol.
Q.20	**B**	Partial oxidation
Q.21	**A**	Peptide linkage formed by the combination of carboxylic acid and amino group
Q.22	**D**	Di sulfide bond is responsible for physical properties and structure rather than that of chemical bond
Q.23	**B**	Amino acids are the building blocks of proteins
Q.24	**D**	All these factors are involved in denaturation of proteins
Q.25	**C**	The molecular weight of protein is greater than 10000 amu
Q.26	**B**	Phospho-glyceromutases is used to catalyze the addition of ammonia, water or carbon dioxide to double bond
Q.27	**D**	Enzyme used for conversion of starch to glucose and glucose to ethanol are Diastase + Zymase
Q.28	**D**	Enzyme can denature by radiation.
Q.29	**C**	The enzyme which act at urea is called Urease
Q.30	**C**	The three dimensional twisting and folding of the polypeptide chain results in the Tertiary structure

Q.31	**B**	Electron withdrawing group increases acidic character of carboxylic acid
Q.32	**A**	
Q.33	**B**	Even number of carbon atoms in carboxylic acid have melting point.
Q.34	**A**	Hydrogen bonding.
Q.35	**A**	
Q.36	**A**	
Q.37	**B**	CH_3COOH ethanoic acid/acetic acid
Q.38	**C**	book information
Q.39	**B**	book information
Q.40	**B**	Propionic acid common name of Propanoic acid
Q.41	**B**	general formula is RCOOH
Q.42	**D**	book information
Q.43	**A**	book information
Q.44	**B**	Solubility of carboxylic acid in H_2O
Q.45	**C**	organic acids are weaker
Q.46	**C**	oxidative cleavage reaction
Q.47	**D**	
Q.48	**B**	COOH $(CH)_2COOH$
Q.49	**D**	book information
Q.50	**B**	book information
Q.51	**B**	polar hydroxyl group causes hydrogen bonding
Q.52	**C**	information
Q.53	**B**	butanoic acid have unpleasant smell
Q.54	**C**	book information
Q.55	**A**	polar hydroxyl group forms hydrogen bonding with water
Q.56	**C**	$C_{17}H_{35}COOH$ is stearic acid
Q.57	**C**	CN group hydrolysis to produce COOH
Q.58	**D**	Maleic acid have double bond (C=C).
Q.59	**B**	lone pairs of CO attach proton
Q.60	**D**	Thionyl chloride can replace OH group with Cl
Q.61	**A**	Partial reduction of acetic acid gives ethanol
Q.62	**C**	hydrolysis
Q.63	**A**	book information
Q.64	**B**	book information
Q.65	**D**	book information
Q.66	**A**	book information
Q.67	**D**	
Q.68	**B**	IUPAC names
Q.69	**D**	both groups give corresponding reactions

Q.70	**D**	Esterification
Q.71	**D**	uses
Q.72	**C**	The three dimensional twisting and folding of polypeptide chain results in tertiary structure
Q.73	**B**	Albumins globulins legumin and collagen are examples of simple proteins
Q.74	**A**	Gelatin is obtained by heating bones
Q.75	**B**	All proteins made up of amino acids so, on hydrolysis, proteins yield Amino acids.
Q.76	**B**	Hydrogen bonding exist between O atom and H atom in secondary proteins
Q.77	**A**	protein part of enzyme is apoenzyme
Q.78	**A**	enzyme which can catalyze the conversion of glucose to ethyl alcohol is Zymase
Q.79	**C**	Enzymes catalysis is highly specific, for example, urease catalyzes the hydrolysis of urea only and it cannot hydrolyse any other amide even methyl urea.
Q.80	**A**	

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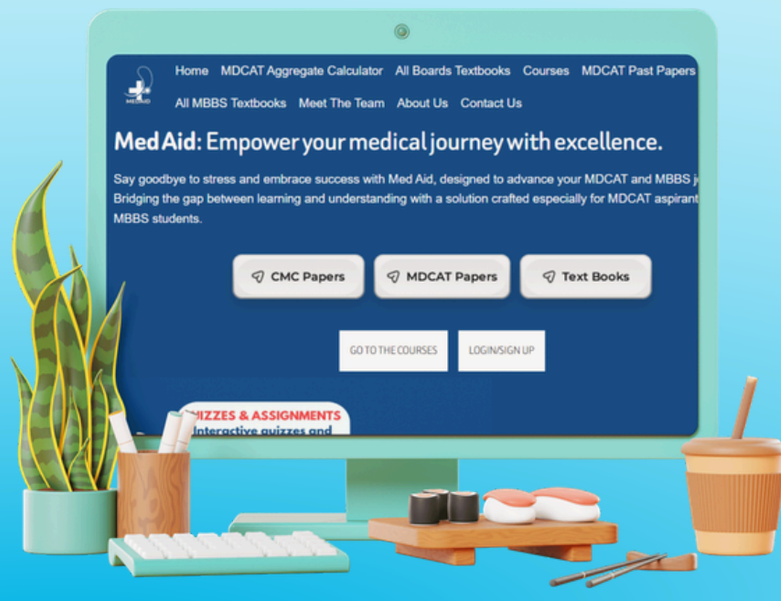
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