

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

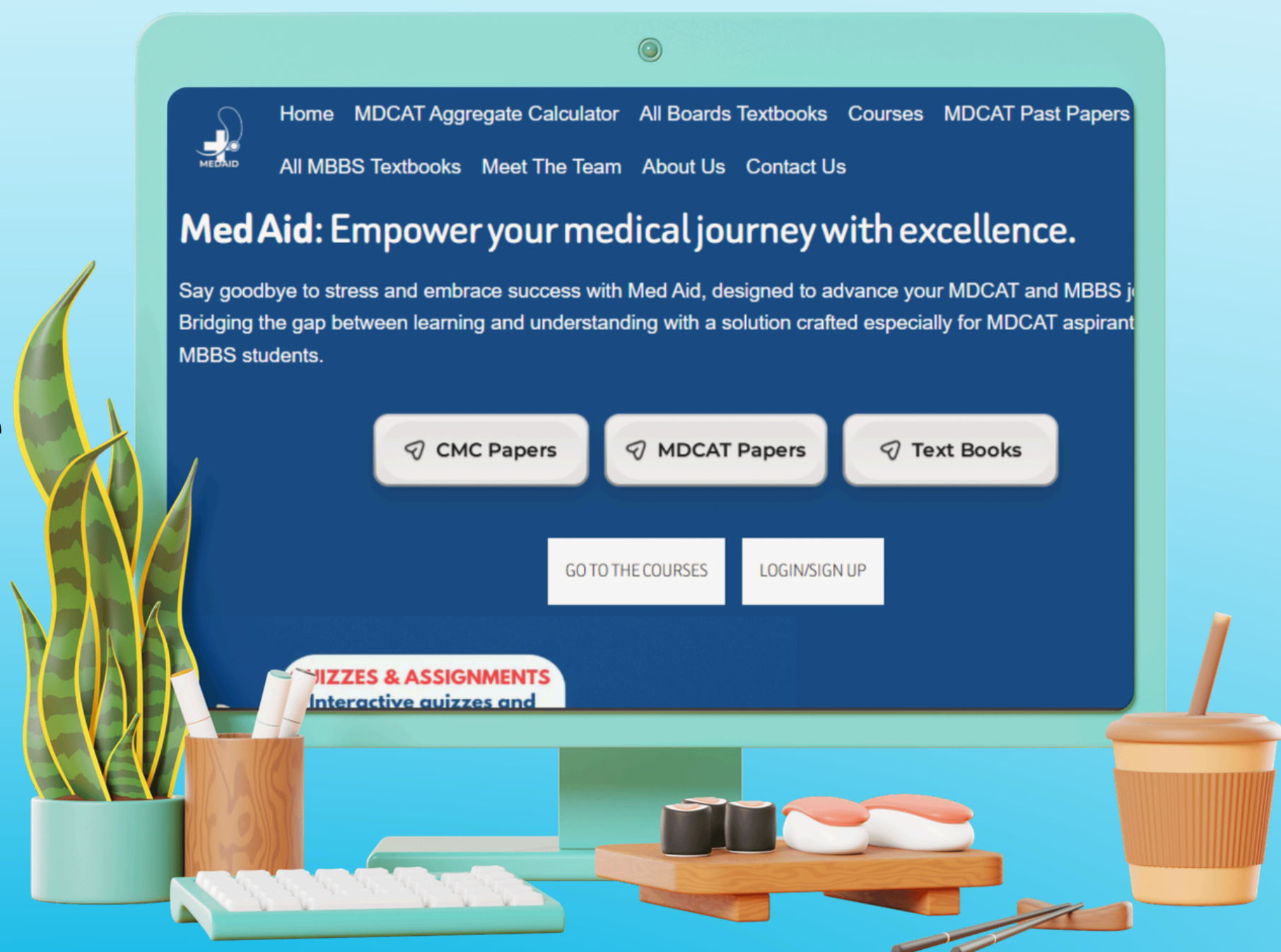
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



Join MedAid  
Whatsapp  
Community



**CLICK HERE MEDAIDPK.COM**

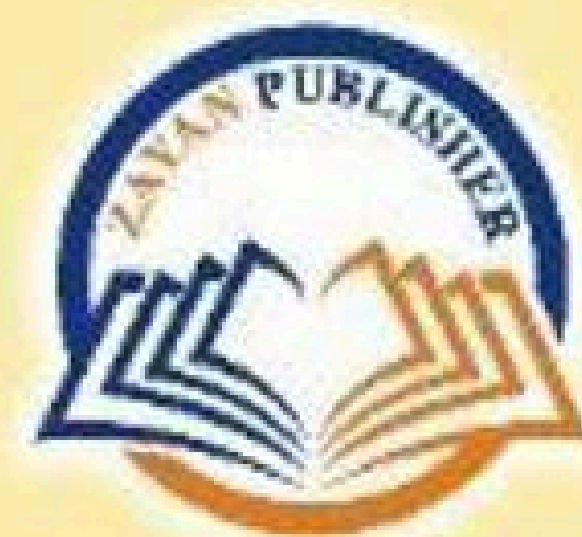


MEDAID.CONTACT@GMAIL.COM



+92 333 1617207

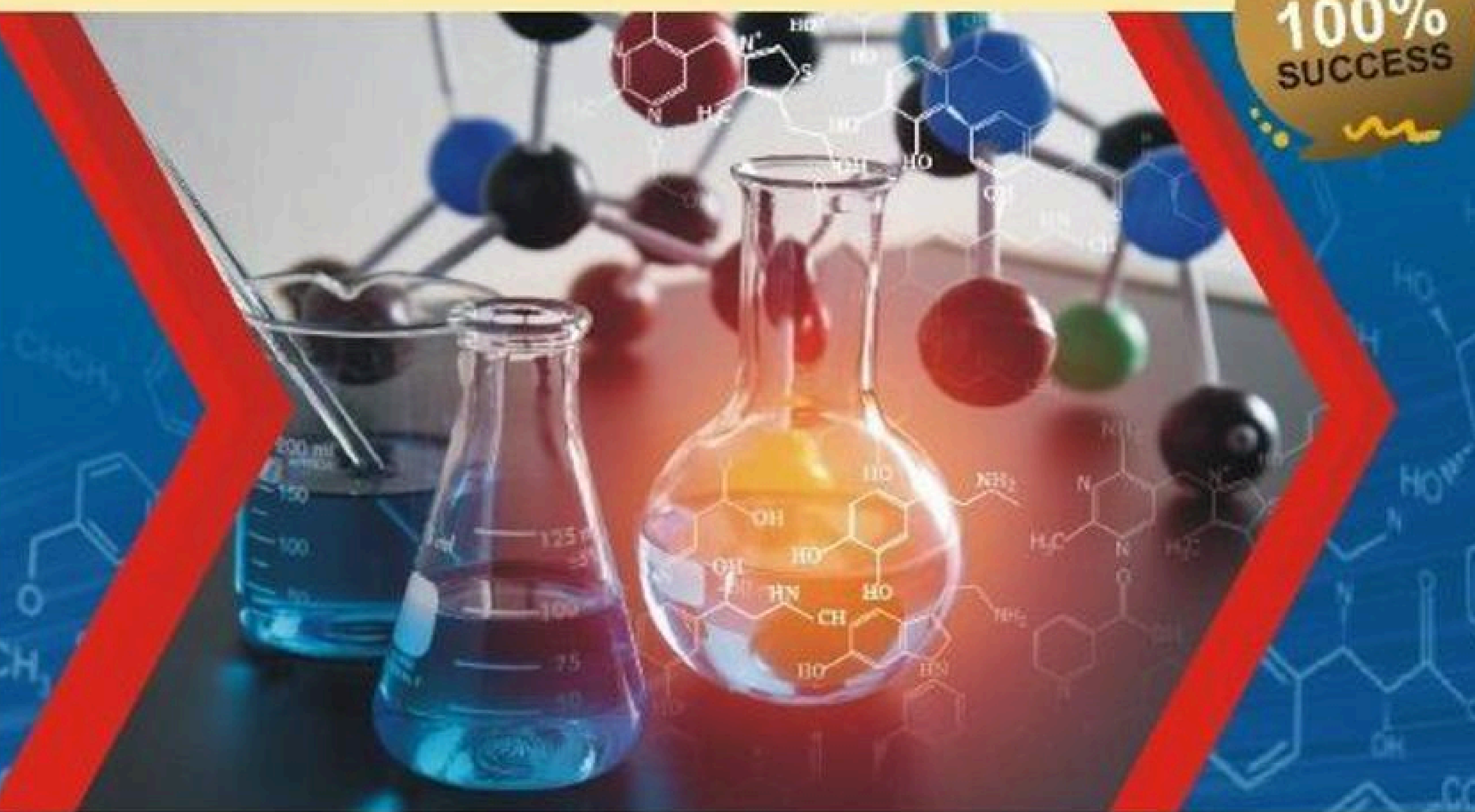
According to new syllabus



# MDCAT CHEMISTRY

PREPARATION & PRACTICE BOOK

SELF STUDY GUIDE  
TO SECURE  
**100%**  
SUCCESS



- Conceptual Approach
- Shortcuts & Tricks for Easy Solution
- Explanation of Topics In Urdu For Ease of Students
- High-yield Practice Questions
- Answer Key with Explanation

*Written By:*

**Fazal Raheem**

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

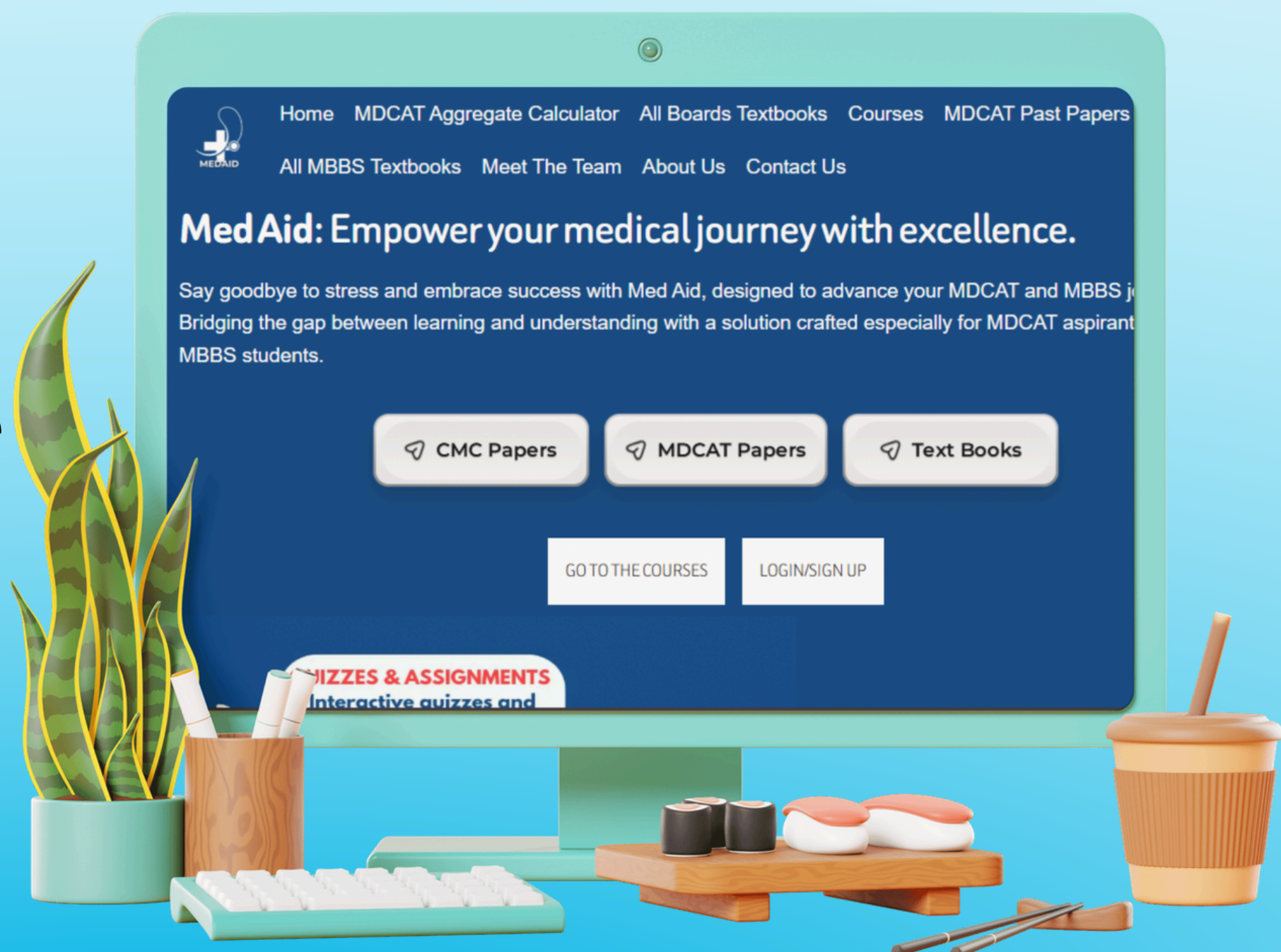
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



Join MedAid Whatsapp Community



**CLICK HERE MEDAIDPK.COM**



MEDAID.CONTACT@GMAIL.COM



+92 333 1617207

# TOPIC 1 >>

## INTRODUCTION TO FUNDAMENTAL CONCEPTS OF CHEMISTRY

### MCQs

- (1) What is the mass of 0.5 moles of  $O_3$  molecules  
(a) 16 gm (b) 20 gm (c) 40 gm (d) 24 gm
- (2) What has maximum number of oxygen atoms  
(a) 1gm of O (b) 1gm of  $O_2$   
(c) 1 gm of  $O_3$  (d) All have same no of O-atoms
- (3) A mole of substance is related to  
(a) No of particles (b) Volume of gaseous substance  
(c) mass (d) all of these
- (4) The no of oxygen atom in 4.4 g of  $CO_2$  is  
(a)  $1.2 \times 10^{23}$  (b)  $6 \times 10^{23}$  (c)  $11 \times 10^{23}$  (d)  $12 \times 10^{23}$
- (5) Which of following is heaviest  
(a) one mole of oxygen (b) one mole of Sulphur trioxide  
(c) 100 amu of uranium (d) 44 g of  $CO_2$
- (6) One mole of  $CH_4$  contains  
(a) 4.0 g atoms (mole) of hydrogen (b) 3 g atom of carbon  
(c)  $6.02 \times 10^{23}$  atoms of hydrogen (d)  $1.81 \times 10^{23}$  molecules of  $CH_4$
- (7) 7.5 gram of a gas occupies 5.6 litres at S.T.P. The gas is  
(a) CO (b) NO (c)  $CO_2$  (d)  $N_2O$
- (8) The incorrect statement for 14 g CO is  
(a) It occupies 2.24 litres at NTP (b) It correspond to 0.5 moles of CO  
(c) It corresponds to same mole of CO and  $N_2$   
(d) It corresponds to  $3.0 \times 10^{23}$  molecules of CO
- (9) Which of following pair of gases contain equal number of molecules  
(a)  $CO_2$  and  $NO_2$  (b) CO and  $(CN)_2$   
(c) NO and CO (d)  $N_2O$  and  $CO_2$
- (10) Express 145.6 L of chlorine in terms of grams moles  
(a) 6.5 g moles (b) 4.5 g moles (c) 0.65 g moles (d) 9.5 g moles
- (11) Find the number of atoms present in 0.016 g methane  
(a)  $0.005 N_A$  (b)  $0.5 N_A$  (c)  $0.05 N_A$  (d)  $N_A$

### Answer Key

Question	1	2	3	4	5	6	7	8	9	10	11
Answer	d	d	d	a	d	a	b	a	d	a	a

- (12) If  $N_A$  is Avogadro's number then the no of valence electron in 4.2 g Nitride ions ( $N^{3-}$ ) is  
 (a)  $3.2 N_A$  (b)  $1.6 N_A$  (c)  $2.4 N_A$  (d)  $1.2 N_A$
- (13) No of atoms in 4.25 g of  $NH_3$  approximately  
 (a)  $6 \times 10^{23}$  (b)  $15 \times 10^{23}$  (c)  $1.0 \times 10^{23}$  (d)  $2.5 \times 10^{23}$
- (14) The weight of one molecule of compound  $C_{60}H_{122}$  is  
 (a)  $1.4 \times 10^{-21}$  g (b)  $4.1 \times 10^{-21}$  g  
 (c)  $6.02 \times 10^{23}$  g (d)  $5.005 \times 10^{23}$  g
- (15) Which has maximum no of molecules  
 (a) 7g  $N_2$  (b) 2g  $H_2$  (c) 18 g  $NO_2$  (d) 16 g  $O_2$
- (16) The total no of protons in 10 g of  $CaCO_3$  is  
 (a)  $3.0 \times 10^{24}$  (b)  $4.06 \times 10^{24}$  (c)  $30.1 \times 10^{24}$  (d)  $3.01 \times 10^{23}$
- (17) The weight of single atom of oxygen is  
 (a)  $5.057 \times 10^{23}$  g (b)  $1.556 \times 10^{23}$  g  
 (c)  $2.656 \times 10^{-23}$  g (d)  $4.538 \times 10^{-23}$  g
- (18) 0.25 mole of  $P_4$  molecules contains \_\_\_\_\_ atoms  
 (a)  $1.764 \times 10^{23}$  (b)  $6.02 \times 10^{23}$  (c)  $8.086 \times 10^{23}$  (d)  $4 \times 6.02 \times 10^{23}$
- (19) Number of atoms in 560 g of Fe (Atomic mass 56  $gmol^{-1}$ ) is  
 (a) Twice that of 70 g N (b) Half that of 20 g H  
 (c) both correct (d) None is correct
- (20) Molecular mass of 18 g of water means  
 (a) One gram atom (b) one gram molecule  
 (c) One gram formula ions (d) Eighteen mole
- (21) 49 g of  $H_2SO_4$  the number of moles of oxygen atom  
 (a) 4 moles (b) 1/2 moles (c) 2 moles (d) 1 mole
- (22) 18 g molecules of water is equal to  
 (a) 18 g  $H_2O$  (b) 18 moles of  $H_2O$   
 (c) 1 moles of  $H_2O$  (d) both a and b
- (23) Which of following has maximum no of molecules  
 (a) 1.7 g  $NH_3$  (b) 2 g  $H_2$  (c) 4.6 g  $NO_2$  (d) 3.2 g  $SO_2$
- (24) Which of following is relative atomic mass of Cl  
 (a) 35.5 amu (b) 37 amu (c) 35 amu (d) All of these
- (25) Why C-12 is taken in standard  
 (a) Due to its Abundance (b) Its mass is not in fraction  
 (c) Due to its stability (d) All of these
- (26) No of moles of  $CO_2$  which contains 8 g of oxygen is  
 (a) 1 mole (b) 0.25 mole (c) 0.50 mole (d) 0.75 mole
- (27)  $1.2 \times 10^{24}$  water molecules weight  
 (a) 18 g (b) 36 g (c) 1.8 g (d) 3.6 g

Answer Key

Question	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Answer	c	d	a	b	a	c	b	c	b	c	b	b	a	d	b	b

- (28) How many moles of  $\text{CO}_2$  will occupy  $5.6 \text{ dm}^3$  volume at STP  
 (a) 4 moles (b)  $1/4$  moles (c)  $1/2$  moles (d) 1 moles
- (29) Volume occupied by 4.4 g of  $\text{CO}_2$  at STP  
 (a)  $22.414 \text{ dm}^3$  (b)  $1.12 \text{ dm}^3$  (c)  $11.2 \text{ dm}^3$  (d)  $2.24 \text{ dm}^3$
- (30) Oxygen gas occupy  $11.2 \text{ dm}^3$  volume at S.T.P. No of molecules of oxygen will be  
 (a)  $6.02 \times 10^{23}$  (b)  $3.02 \times 10^{23}$  (c)  $1.2 \times 10^{24}$  (d)  $1.5 \times 10^{23}$
- (31) No of atoms in 49 g of  $\text{H}_2\text{SO}_4$   
 (a)  $2 N_A$  (b)  $3.5 N_A$  (c)  $N_A$  (d)  $7 N_A$
- (32) 7 g  $\text{N}_2$ , 8 g  $\text{O}_2$  and 1 g  $\text{H}_2$  gas enclosed in container. Total volume occupied by these gases at S.T.P  
 (a)  $11.2 \text{ dm}^3$  (b)  $22.4 \text{ dm}^3$  (c)  $5.6 \text{ dm}^3$  (d)  $44.8 \text{ dm}^3$
- (33) Which statement is incorrect  
 (a) One gram atom of sodium is equal to one gram 8 sodium  
 (b) One gram molecule of water is equal to eighteen gram of  $\text{H}_2\text{O}$   
 (c) One mole of ions is equal to ninety six gram of sulphate  
 (d) One formula unit mass of lime stone is equal to hundred grams of lime stone
- (34) 27 g of Al will with how many mass of  $\text{O}_2$  to produce  $\text{Al}_2\text{O}_3$   
 (a) 8 g (b) 24 g (c) 16 g (d) 32 g
- (35) Which statement is incorrect  
 (a) 23 g of sodium and 232 g U have equal no of atoms  
 (b) Mg atom in twice heavier than that of carbon atom  
 (c) 180 g of glucose and 342 g of sucrose has same no of atoms  
 (d) 4.9 g of  $\text{H}_2\text{SO}_4$  and 4.9 g of  $\text{H}_3\text{PO}_4$  have equal moles
- (36) The correct formula of magnesium per chlorate is  
 (a)  $\text{MgClO}_4$  (b)  $\text{Mg}(\text{ClO}_3)_2$  (c)  $\text{MgClO}_4$  (d)  $\text{Mg}(\text{ClO}_4)_2$
- (37)  $\text{CH}_2\text{O}$  is the empirical formula of  
 (a) Formic acid (b) Methanol (c) Lactic acid (d) Sucrose
- (38) Empirical formula of compound is  $\text{CH}_2$  and molar mass is  $28000 \text{ gmol}^{-1}$   
 (a) Empirical formula is 200 times higher than molecular formula  
 (b) Molecular formula is 2000 times heavier than Empirical formula  
 (c) Molecular formula is 25000 times heavier than Empirical formula  
 (d) Molecular formula is 1000 times heavier than Empirical formula
- (39) Empirical formula of compound is  $\text{CH}_2\text{O}$ . The molar mass is  $60 \text{ gmol}^{-1}$  give the compound  
 (a) Glucose (b) Ethylene glycol  
 (c) Acetic acid (d) All

Answer Key

Question	28	29	30	31	32	33	34	35	36	37	38	39
Answer	b	d	b	b	b	a	b	c	d	c	b	c

- (40) An unknown compound consists of 25% X with atomic mass 5 amu and 75% Y with atomic mass is 10 amu  
 (a) XY (b) X<sub>2</sub>Y<sub>3</sub> (c) XY<sub>2</sub> (d) X<sub>2</sub>Y
- (41) How many moles of N<sub>2</sub> are needed to react with 7.5 moles of H<sub>2</sub>  
 (a) 7.5 (b) 2.5 (c) 3.5 (d) 4
- (42) How many moles of hydrogen are needed to produce 0.8 moles of NH<sub>3</sub>  
 (a) 0.4 (b) 0.12 (c) 12 (d) 0.6
- (43) How many grams of NH<sub>3</sub> is produced if you react 42 g of N<sub>2</sub>  
 (a) 21 (b) 28 (c) 51 (d) 3
- (44) What mass of CO<sub>2</sub> will be produced from the reaction of 37.5 g of C<sub>2</sub>H<sub>6</sub>  
 $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$   
 (a) 110 (b) 120 (c) 40 g (d) 30
- (45) What mass of H<sub>2</sub>O is produced from the reaction of  $2.8 \times 10^{24}$  molecule of C<sub>2</sub>H<sub>6</sub>  
 $2C_2H_6 + 7O_2 \rightarrow 4CO_2 + 6H_2O$   
 (a) 4 gm (b) 251 gm (c) 260 gm (d) 100 gm
- (46) CaCO<sub>3</sub> decompose according to following equation  $CaCO_3 \rightarrow CaO + CO_2$   
 How many moles of CO<sub>2</sub> will be obtained by decomposition of 50g of CaCO<sub>3</sub>  
 (a) 3/2 (b) 5/2 (c) 1/2 (d) 1
- (47) In equation 4 moles of H<sub>2</sub> reacts with 4 moles of oxygen which is limiting reactant  $2H_2 + O_2 \rightarrow 2H_2O$   
 (a) H<sub>2</sub> (b) O<sub>2</sub> (c) both (d) none
- (48) When 1 mole of hydrogen and 10 moles of oxygen are reacted to form water. The limiting reactant will be.  
 (a) H<sub>2</sub>O<sub>2</sub> (b) H<sub>2</sub> (c) O<sub>2</sub> (d) H<sub>2</sub>O
- (49) When 4 moles of hydrogen react with 4 moles of oxygen then the amount of product will be.  
 (a) 4 moles (b) 2 moles (c) 6 moles (d) 8 moles
- (50) 50 g of H<sub>2</sub> and O<sub>2</sub> react to form HCl which is Limiting Rreactant.  
 (a) Cl<sub>2</sub> (b) H<sub>2</sub> (c) HCl (d) None
- (51) When 56 g of nitrogen and 12 g of hydrogen are reacted to form NH<sub>3</sub> limiting reactant is.  
 (a) N<sub>2</sub> (b) H<sub>2</sub> (c) NH<sub>3</sub> (d) None
- (52) When 32g of SO<sub>2</sub> and 32 g of O<sub>2</sub> are reacted to form SO<sub>3</sub> limiting reactant will be.  
 (a) SO<sub>2</sub> (b) SO<sub>3</sub> (c) O<sub>2</sub> (d) None
- (53) 28 g of N<sub>2</sub> reacts with 3 g of H<sub>2</sub>. What mass of NH<sub>3</sub> will be formed  
 $N_2 + 3H_2 \rightleftharpoons 2NH_3$   
 (a) 36 g NH<sub>3</sub> (b) 20 g NH<sub>3</sub> (c) 17 g NH<sub>3</sub> (d) 5 g NH<sub>3</sub>

Answer Key

Question	40	41	42	43	44	45	46	47	48	49	50	51	52
Answer	b	b	c	c	a	b	c	a	b	a	a	d	a

- Which statement about one mole of metal is always correct.
- (a) It contains the same number of atom as 1 mole of H-atoms  
 (b) It contains the same number of atom as 1/12 mole of C-12  
 (c) It contains the same mass as 1 mole of H-atoms  
 (d) All
- A mole is quantity of substance in grams, which contains Avogadro's number of particles which of following is incorrect about mole.
- (a) 1 gram molecule of  $H_2O = 18g = 6.02 \times 10^{23}$  molecules  
 (b) 1 gram atoms of  $Na = 23g = 6.02 \times 10^{23}$  atoms  
 (c) 1 gram formula of  $HCl = 58.5g = 6.02 \times 10^{23}$  formula unit  
 (d) 1 mole of chlorine gas has the number of chlorine atoms =  $71g = 6.02 \times 10^{23}$
- The mass of chlorine is 35.5 amu. All of the following are used for this mass except.
- (a) Fractional atomic mass  
 (b) Relative atomic mass  
 (c) Mass number  
 (d) Average atomic mass
- The atomic nuclei which have same number of neutron are.
- (a) isotones  
 (b) Isosters  
 (c) Isobares  
 (d) Isotopes
- Which of the following statement 12 g sample of C-12 is incorrect.
- (a) The no. of carbon atom is  $6.02 \times 10^{23}$   
 (b) The no. of C-atom is same as 1.0 g of  $H_2$   
 (c) The number of C-atom is same as number of atoms in 4.0 g of  ${}^4_2He$   
 (d) The number of C-atoms is same as in 16.0 g of  ${}^{32}_{16}S$
- 20 g of calcium carbonate is decomposed on heating as  $CaCO_3 \longrightarrow CaO + CO_2$  the mass of  $CO_2$  produced is
- (a) 4.4 g  
 (b) 8.8 g  
 (c) 2.2 g  
 (d) 6.6 g
- How many carbon atoms are present in 36.0 g of glucose (molar mass = 180).
- (a)  $1.2 \times 10^{23}$   
 (b)  $1.2 \times 10^{24}$   
 (c)  $1.2 \times 10^{23}$   
 (d)  $7.2 \times 10^{24}$
- A ring is made up of 36 g of diamond in pure carbon. It has number of carbon atoms.
- (a) INA  
 (b) 2.5 NA  
 (c) 2 NA  
 (d) 3.0 NA
- Which mass of gas would occupy a volume of  $3dm^3$  at  $25^\circ C$  and 1 atmospheric pressure (1 mole of gas occupy  $24 dm^3$  at  $25^\circ C$  and 1 atmospheric pressure).
- (a) 3.2 g  $O_2$   
 (b) 5.6 g  $N_2$   
 (c) 8.0 g  $SO_2$   
 (d) 11.0 g  $CO_2$  gas
- 1 mole of calcium phosphide on reaction with excess of  $H_2O$  gives
- $$Ca_3P_2 + 6H_2O \longrightarrow 3Ca(OH)_2 + 2PH_3$$
- (a) 2 moles of  $PH_3$   
 (b) 1 mole of  $H_3PO_4$   
 (c) 3 moles of  $PH_3$   
 (d) 1mole of  $P_2O_3$

Answer Key

Question	56	57	58	59	60	61	62	63
Answer	a	d	c	a	d	b	c	d

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

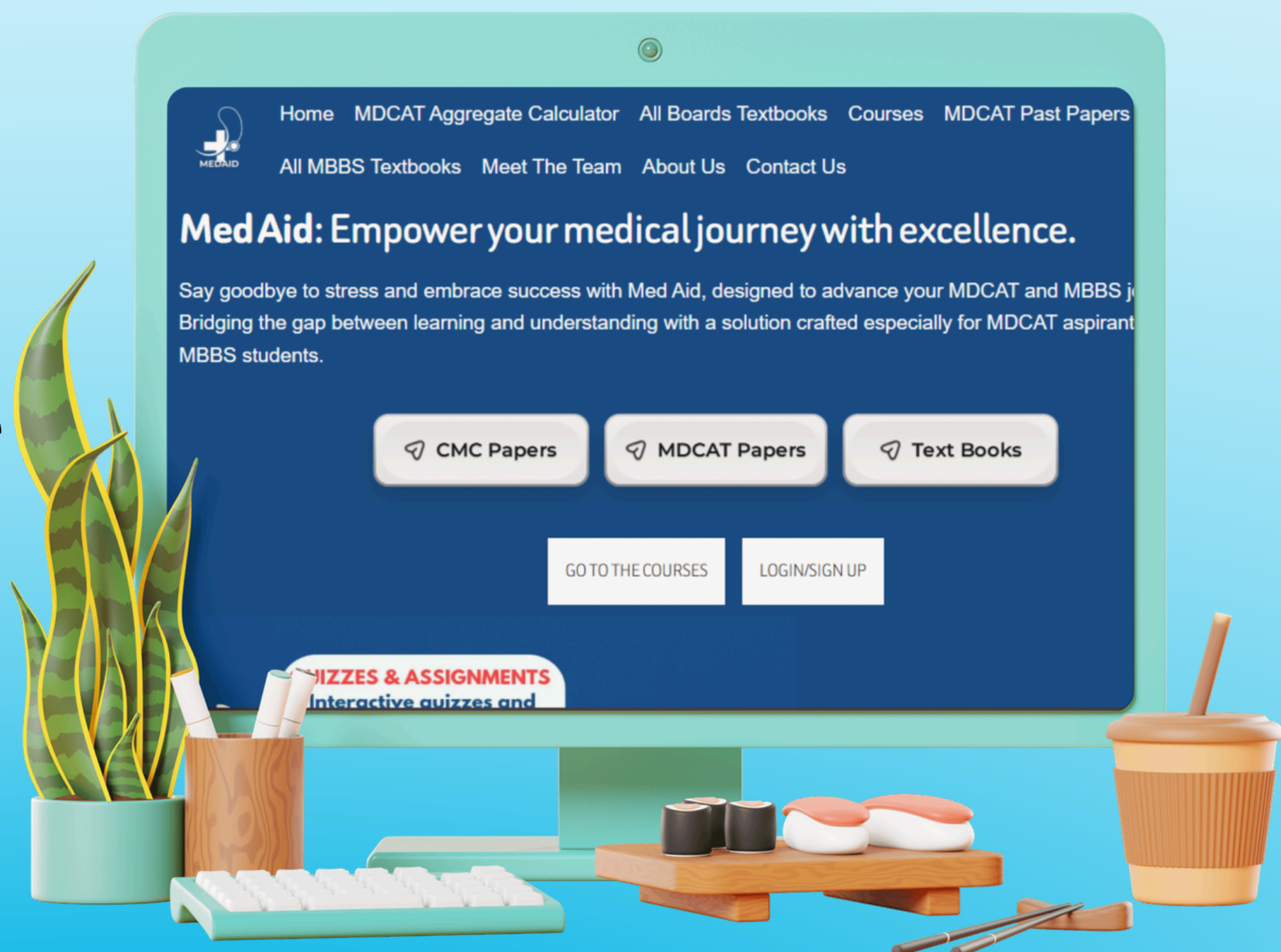
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



Join MedAid  
Whatsapp  
Community



**CLICK HERE MEDAIDPK.COM**



MEDAID.CONTACT@GMAIL.COM



+92 333 1617207

- (64) The no of molecules in  $22.4 \text{ dm}^3$  of  $\text{H}_2$  gas at  $0^\circ\text{C}$  and 1 atm are.  
 (a)  $6.02 \times 10^{23}$  (b)  $6.02 \times 10^{25}$  (c)  $6.02 \times 10^{24}$  (d)  $6.02 \times 10^{22}$
- (65) In the mass spectrometer, detector or ions measures the.  
 (a) Mass of isotopes (b) Percentage of isotopes  
 (c) Mass no of isotopes (d) Relative abundance of isotopes
- (66) Which is not correct regarding  $22.0 \text{ g}$  of  $\text{CO}_2$ .  
 (a) It contains  $11.2 \text{ g dm}^3$  volume of gas at STP  
 (b) It contains 1 g atm of oxygen  
 (c) It contains 0.5 mole of carbon (d) It contains 1 g molecule of  $\text{CO}_2$
- (67) Nauman has body mass  $60.0 \text{ kg}$ . He has 18% water in its body. Total number of water molecule in his body is.  
 (a)  $2.4 \times 10^{24}$  (b)  $1.2 \times 10^{25}$  (c)  $3.6 \times 10^{26}$  (d)  $4.8 \times 10^{26}$
- (68) The largest number of molecules are present in.  
 (a) 10 g of  $\text{H}_2\text{O}$  (b) 10 g of  $\text{C}_2\text{H}_5\text{OH}$   
 (c) 10 g of  $\text{CO}$  (d) 10 g of  $\text{N}_2\text{O}_4$
- (69) 1 a.m.u is reciprocal of Avogadro's number ( $1/\text{NA g}$ ) mathematically it is equal to all of following except.  
 (a)  $1.661 \times 10^{-27} \text{ kg}$  (b)  $1.661 \times 10^{-25} \text{ kg}$  (c)  $1.661 \times 10^{-24} \text{ g}$  (d)  $1.661 \times 10^{-21} \text{ mg}$
- (70) By the combustion analysis of an organic compound,  $\text{CO}_2$  and  $\text{H}_2\text{O}$  are produced.  $\text{CO}_2$  is absorbed in pre weighed amount of 50% aqueous solution of  $\text{KOH}$ , it involves .  
 (a) Physical change only (b) Chemical change only  
 (c) Both physical and chemical change (d) Neither physical nor chemical change
- (71) How many moles of  $\text{H}_2\text{S}$  are needed to react with sulphur dioxide to produce one mole of sulphur  $2\text{H}_2\text{S} + \text{SO}_2 \longrightarrow \text{S} + \text{H}_2\text{O}$   
 (a)  $1/3$  mole (b)  $2/3$  moles (c)  $3/2$  mole (d) 2 moles
- (72) How many oxygen atoms are in 2 moles of oxygen  $\text{O}_2$  gas.  
 (a)  $2 \times 6.02 \times 10^{22}$  atm (b)  $2 \times 6.02 \times 10^{22} \times 2$  atoms  
 (c)  $2 \times 6.02 \times 10^{22}$  atoms (d)  $2 \times 10^{23}$  atoms
- (73) Select the most suitable answer from the given one in each.  
 (a) Isotopes with even atomic masses are comparatively abundant  
 (b) Isotopes with odd atomic masses are comparatively abundant  
 (c) Isotopes with even atomic masses and even atomic numbers are comparatively abundant  
 (d) Isotopes with even atomic masses and odd atomic number are comparatively abundant
- (74) The relative abundance of isotopes of an element can be determined.  
 (a) X-rays (b) Solvent extraction  
 (c) Mass spectrometry (d) chromatography

Answer Key

Question	64	65	66	67	68	69	70	71	72	73	74
Answer	b	d	d	c	a	b	b	b	a	c	c

- (75) For a reaction  $X + 2y \rightarrow Z$ . The amount of Z formed by starting the reaction with 5 moles of x and 8 moles of y.
- (a) 5 moles (b) 8 moles (c) 16 moles (d) 4 moles
- (76) 1 mole is not equal to.
- (a)  $6.02 \times 10^{23}$  particles (b) 24 dm<sup>3</sup> g gas at STP  
(c) Gram molecules of covalent compound (d) Gram atom of an element
- (77) Which of following is fundamental unit for amount of substance in SI units.
- (a) Gram (b) Kilogram (c) Mole (d) Milligram
- (78) On combustion analysis of an organic compound CO<sub>2</sub> and water are produced. Water is absorbed in.
- (a) MgCl<sub>2</sub> (b) Mg(ClO<sub>4</sub>)<sub>2</sub> (c) Mg(ClO<sub>3</sub>)<sub>2</sub> (d) Mg(ClO<sub>2</sub>)<sub>2</sub>
- (79) The number of moles of SO<sub>2</sub> which contains 16 g of oxygen is.
- (a) 0.25 moles (b) 1.0 moles (c) 0.5 moles (d) 1.5 moles
- (80) A container contain 9 g water which statement is incorrect about it.
- (a) It contains 0.5 NA water molecules (b) It contains 1 NA hydrogen atoms  
(c) It contains 0.5 NA oxygen atoms (d) It contains 1 NA water molecules
- (81) The volume occupied by 3.2 g of O<sub>2</sub> gas at STP is.
- (a) 2.24 dm<sup>3</sup> (b) 22.4 dm<sup>3</sup> (c) 1.12 dm<sup>3</sup> (d) 112 cm<sup>3</sup>
- (82) Which of the following has largest number of atoms.
- (a) 2 g of ethene (b) 2 g of ozone (c) 2 g of oxygen (d) 2 g of helium
- (83) The deflection of positive ions in Dempster mass spectrometer depends on all of the followed except.
- (a) Strength of magnetic field (b) The ions of definite e/m value  
(c) Strength of magnetic filed (d) The ions of definite m/e value
- (84) Stoichiometric calculations depends upon all of following assumptions except.
- (a) All the reactants are completely converted into products  
(b) No side reaction occurs  
(c) Law of conservation of mass and law of definite proportion is obeyed  
(d) Are applicable to both reversible and irreversible reaction
- (85) H<sub>3</sub>PO<sub>4</sub> has been dissolved in excess of water to dissociation. Completely into ions. Which is incorrect statement about it dissociation.
- (a) It produces 3 moles of H<sup>+</sup> ions  
(b) It produces 2 moles of H<sup>+</sup> ion because it is weak acid  
(c) It produces 1 mole of PO<sub>4</sub><sup>-3</sup>  
(d) It produces 2 moles of total ions

Answer Key

Question	75	76	77	78	79	80	81	82	83	84	85
Answer	d	b	c	c	c	d	a	d	b	d	b

- (86) Actual yield is less than theoretical yield. It is because of all of the following reasons except.  
 (a) Experiment conducted by inexperienced worker  
 (b) Lack of proper application of technique  
 (c) Some of the reactant might take part in computing side reaction  
 (d) Calculation error
- (87) Which of following contains the same number of atoms as 1 g of hydrogen gas.  
 (a) 22g of  $\text{CO}_2$  (b) 8 gm of ozone  
 (c) 20 g of neon (d) 8 g of  $\text{CH}_4$
- (88) What is the number of molecules in  $500 \text{ cm}^3$  of oxygen under room conditions.  
 (a)  $1.25 \times 10^{22}$  (b)  $3.0 \times 10^{22}$   
 (c)  $1.34 \times 10^{22}$  (d)  $3.0 \times 10^{26}$
- (89) An organic compound with C = 60%, H = 8% will have empirical formula.  
 (a)  $\text{C}_5\text{H}_8\text{O}_2$  (b)  $\text{C}_3\text{H}_8\text{O}_2$  (c)  $\text{CH}_4\text{O}$  (d)  $\text{C}_4\text{H}_7\text{O}_2$
- (90) Number of nitrogen atoms in 30 g of urea is.  
 (a)  $6.0 \times 10^{23}$  (b)  $1.81 \times 10^{24}$  (c)  $6.02 \times 10^{24}$  (d)  $3.0 \times 10^{23}$
- (91) Which of following compounds have different empirical formula from others.  
 (a) Formaldehyde (b) Glucose (c) Sucrose (d) Acetic acid
- (92) The oxide of Sulphur contains 50% S. What will be its empirical formula.  
 (a) SO (b)  $\text{SO}_2$  (c)  $\text{SO}_3$  (d)  $\text{S}_2\text{O}_3$
- (93) Which of 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, F, K (d) O, Mg, C, Si, Fe
- (94) Which of following terms is used for 238 g of uranium.  
 (a) 1 g molecule (b) 1 g ion (c) 1 g formula (d) 1 g atom
- (95) How many moles of neutron are present in one mole of heavy water.  
 (a) 10 (b) 18 (c) 8 (d) 20
- (96) Number of Peak's in mass spectrum represents.  
 (a) Relative abundance of isotopes (b) Number of isotopes  
 (c) Mass number of isotope (d) Atomic number of isotopes
- (97) Which of following has maximum number of isotopes.  
 (a) Oxygen (b) Carbon (c) Tin (d) Chlorine
- (98)  $\text{CH}_2\text{O}$  is the empirical formula of.  
 (a)  $\text{C}_{12}\text{H}_{22}\text{O}_{11}$  (b)  $\text{CH}_3\text{COOH}$   
 (c)  $\text{CH}_2(\text{OH})\text{CH}_2(\text{OH})$  (d)  $\text{CH}_3\text{CHO}$

Answer Key

Question	86	87	88	89	90	91	92	93	94	95	96	97	98
Answer	d	c	a	a	a	c	b	a	d	a	b	c	b

- (99) An unknown compound has empirical formula  $\text{CH}_3\text{O}$ , its molar mass is 62 g / mole. The compound may be.
- (a)  $\text{CH}_2(\text{OH})\text{CH}(\text{OH})\text{CH}_2(\text{OH})$  (b)  $\text{CH}_3\text{COCH}_3$   
 (c)  $\text{CH}_2(\text{OH})\text{CH}_2(\text{OH})$  (d)  $\text{C}_2\text{H}_5\text{OH}$
- (100) %age of oxygen in combustion analysis is calculated by the formula of.
- (a)  $100 + (\% \text{ of C} + \% \text{ of H})$  (b)  $100 - (\% \text{ of C} + \% \text{ of H})$   
 (c)  $100 - (\% \text{ of C} - \% \text{ of H})$  (d)  $100 + (\% \text{ of C} - \% \text{ of H})$
- (101) 720 g of glucose contains how many moles of glucose.
- (a) 2 (b) 6 (c) 4 (d) 8
- (102) When 0.5 mole of phosphoric acid is dissolved in aqueous solution how many moles of -ve and +ve ions are collected altogether (Assuming in complete dissociation).
- (a) 0.5 (b) 1.0 (c) 1.5 (d) 2.0
- (103) Avogadro's number is the number of molecules present in.
- (a)  $1 \text{ dm}^3$  of molecules (b) 1 g of hydrogen gas  
 (c) 1 g atom (d) Gram molecular mass
- (104) 0.5 mole of  $\text{H}_2\text{O}$  is formed when 1 g  $\text{H}_2$  reacts with — g of  $\text{O}_2$ .
- (a) 8 (b) 32 (c) 4 (d) 16
- (105) If sample of Ammonium phosphate  $(\text{NH}_4)_3 \text{PO}_4$  contains 6 moles of hydrogen atom. The number of moles of oxygen atoms in the sample is.
- (a) 1 (b) 2 (c) 4 (d) 6
- (106) A chemist is more interested about — to express the efficiency of a chemical process.
- (a) Theoretical yield (b) Actual yield  
 (c) %age yield (d) Non limiting reagent
- (107) The law of conservation of mass and law of definite proportion are obeyed while doing calculations of.
- (a) Limiting reactant (b) Theoretical yield  
 (c) Stoichiometry (d) All of these
- (108) 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 %age composition
- What is the sequence of above steps
- (a) I, II, III (b) III, II, I (c) III, I, II (d) II, I, III
- (109) Total ions in 5 formula units of  $\text{NaClO}_3$  is equal to the number of.
- (a) 10 electrons in neon (b) 8 Proton in oxygen atom  
 (c) 23 nucleon in sodium chloride (d) 2 isotopes of chlorine atom

Answer Key

Question	99	100	101	102	103	104	105	106	107	108	109
Answer	c	b	c	d	d	a	b	c	d	c	a

- (110) An atom of carbon is twelve times heavier than atoms.  
 (a) H (b) Ne (c) He (d) Li
- (111) How many number of electrons in 4.2 g of Azide ( $\text{N}_3^-$ ) ion.  
 (a) 2.1 NA (b) 2.2 NA (c) 21 NA (d) 22 NA
- (112) Isoelectronic pair among the following is.  
 (a) Cl,  $\text{Cl}^-$  (b)  $\text{Na}^+$ , Ne (c)  $\text{Al}^{+3}$ , Cl (d)  $\text{Mg}^{+2}$ ,  $\text{Ne}^{+1}$
- (113) 8 g  $\text{H}_2$  react with 2 moles of oxygen has much mass of  $\text{H}_2\text{O}$  is produced.  
 (a) 50 g (b) 36 g (c) 18 g (d) 72 g
- (114) Volume occupied by 32 g of  $\text{CH}_4$  is.  
 (a) 22.4  $\text{dm}^3$  (b) 44.8  $\text{dm}^3$  (c) 16.8  $\text{dm}^3$  (d) 224  $\text{cm}^3$
- (115)  $\text{CH}_4 + \text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O}$  How many moles of water are formed by 8g of  $\text{CH}_4$   
 (a) 1 mole (b) 1/2 mole (c) 2 moles (d) 1/4 mole
- (116) Percentage of N in  $\text{N}_2\text{H}_4$ .  
 (a) 87% (b) 50% (c) 70% (d) 32%
- (117) Mass of one mole of an ionic species when expressed in grams is known as.  
 (a) Atomic mass (b) Formula mass  
 (c) Molecular mass (d) Ionic mass
- (118) Which of following does not relate to limiting reactant.  
 (a) It is consumed earlier (b) It produces lesser amount of product  
 (c) It offers lesser no of molecules for reaction  
 (d) It is found in reversible reaction
- (119) Mass of formula units of NaCl is.  
 (a) 58.5 g (b) 58.5 mg  
 (c)  $58.5 \times 6.02 \times 10^{23}$  (d)  $58.5 \times 1.66 \times 10^{23}$
- (120) The volume of 0.001 mole of gas at STP.  
 (a) 22.414  $\text{dm}^3$  (b) 22414  $\text{dm}^3$  (c) 22.414  $\text{cm}^3$  (d) 0.22414  $\text{cm}^3$
- (121) The molecular formula of compound having empirical formula  $\text{C}_3\text{H}_3\text{O}$  and molar mass is 110  $\text{g mol}^{-1}$ .  
 (a)  $\text{C}_3\text{H}_3\text{O}$  (b)  $\text{C}_6\text{H}_6\text{O}_2$  (c)  $\text{C}_9\text{H}_9\text{O}_2$  (d)  $\text{C}_3\text{H}_6\text{O}_2$
- (122) The number of atoms in 49 g of  $\text{H}_2\text{SO}_4$ .  
 (a)  $6.02 \times 10^{23}$  (b)  $6.02 \times 10^{24}$   
 (c)  $3.01 \times 10^{22}$  (d)  $3.01 \times 10^{23}$
- (123) HCl when added in  $\text{H}_2\text{O}$  produces  $\text{H}^+$  and  $\text{Cl}^-$  ions. If one mole of HCl weighs 36.5 which of the following terms describes the molar mass.  
 (a) Molecular mass in grams (b) Ionic mass in grams  
 (c) Formula mass in grams (d) atomic mass in grams

Answer Key

Question	110	111	112	113	114	115	116	117	118	119	120	121	122	123
Answer	a	b	b	d	b	a	a	d	d	d	c	b	d	a

- Q.24) The atomic mass is obtained by comparing the mass of an atom of an element with 1/12 of C-12. This mass of 1/12 of C-12 comes out to be.
- (a) 1 gram (b) 1 amu (c) 1 gram atm (d) 1 mole
- Q.25) 2.24 dm<sup>3</sup> of N<sub>2</sub> gas has mass.
- (a) 28 g (b) 2.8 g (c) 1.2 g (d) 2.5 g

Answer Key

Question	124	125							
Answer	b	b							

**Explanation**

Q.2 (d)

No. of atoms =  $\frac{m}{M} \times N_A \times \text{atomicity}$

$$= \frac{1}{16} \times N_A \times 1 = \frac{N_A}{16}$$

$$= \frac{1}{32} \times N_A \times 2 = \frac{N_A}{16}$$

$$= \frac{1}{48} \times N_A \times 3 = \frac{N_A}{16}$$

Q.4 (a)

No. of O-atoms =  $\frac{m}{M} \times N_A \times \text{atomicity}$

$$= \frac{4.4}{44} \times 6.02 \times 10^{23} \times 2$$

$$= 1.2 \times 10^{23}$$

Q.7 (b)  $\frac{m}{M} = V/V_m$

یہ دونوں مولز کے برابر ہیں اس لیے آپس میں برابر ہیں۔ کیوں کہ

$$\frac{7.5}{M} = \frac{5.6}{22.4}, n = \frac{m'}{M}$$

$$n = \frac{v}{V_m}$$

$$M \times 5.6 = 7.5 \times 22.4$$

$$M = \frac{7.5 \times 22.4}{5.6}$$

M = 30 **NO**

Q.9 (d) Because they have same mass

Q.10 (a)  $n = \frac{V}{V_m} = \frac{145.6}{22.4} = 6.5 \text{ g mol}^{-1}$

Q.12(c) No. of valence e<sup>-</sup> =  $\frac{m}{M} \times N_A \times$   
 No. of valence electron in one ion.  
 $= \frac{4.2}{14} \times N_A \times 8 = 2.4 N_A$   
 $\times N_A \times \text{No. of valence electron in one ion}$

Q.17 (c) Mass =  $\frac{16}{6.0 \times 10^{23}}$   
 $= 2.656 \times 10^{-23} \text{ g}$

Q.19 (c) No. of atoms =  $\frac{\text{mass}}{M} \times N_A$   
 $\frac{560}{56} \times N_A = 10 N_A$

No. of atoms in 70 g of N =  $\frac{m}{M} \times N_A$   
 $= \frac{70}{14} N_A = 5 N_A$

No. of atoms in 20 g of H =  $\frac{20}{1} N_A = 20 N_A$   
 half = 20NA, 5NA, 10NA

Q.22 (b) Since 1 g molecule = 1 mole  
 18 g molecule = 1 × 18 = 18 mole

Q.23 (b) No. of moles × No. of molecules  
 2 گرام H<sub>2</sub> میں مولز سے زیادہ ہیں۔

Q.24 (a) Relative atomic mass

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

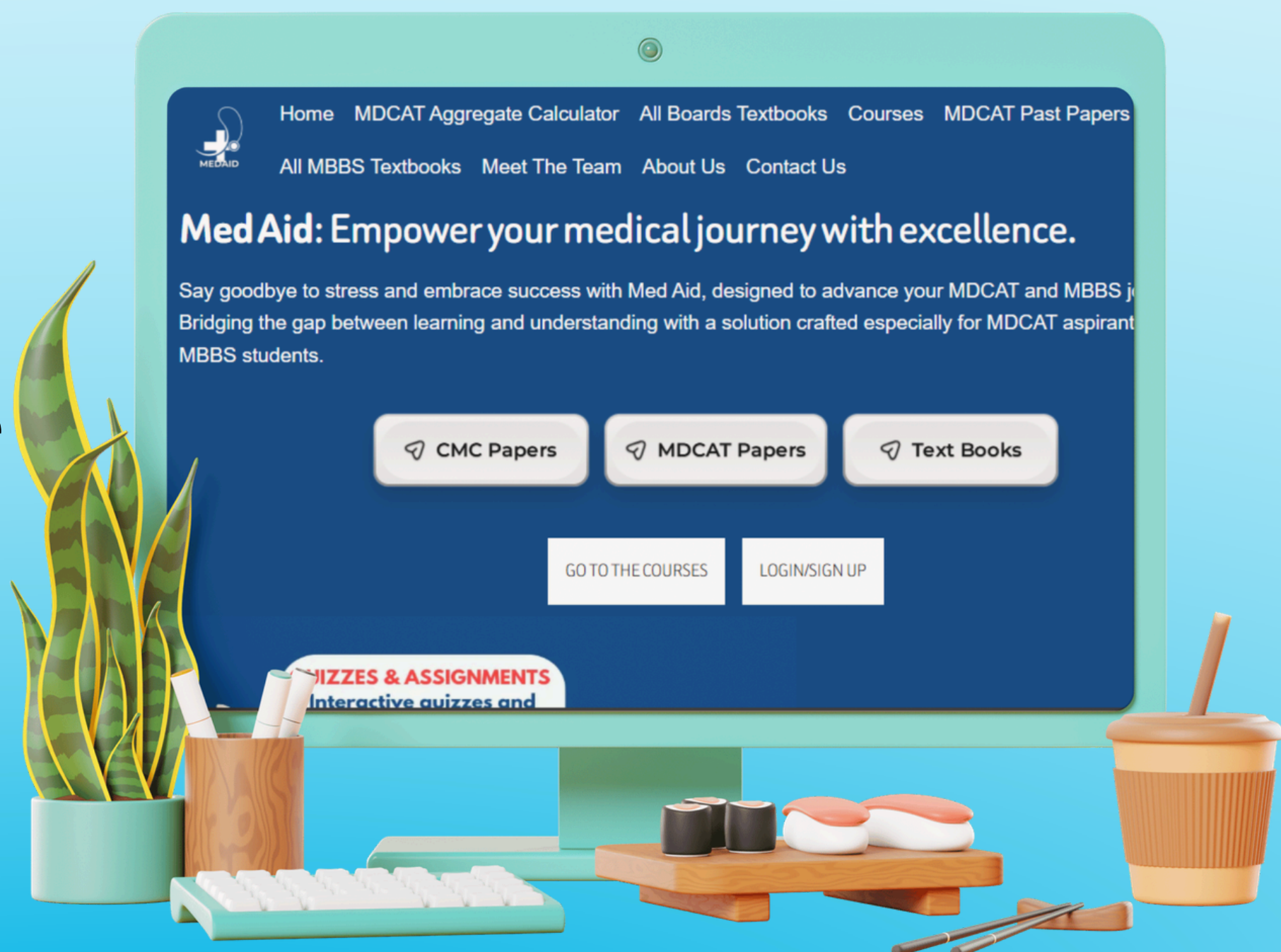
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



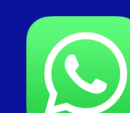
Join MedAid  
Whatsapp  
Community



**CLICK HERE MEDAIDPK.COM**



MEDAID.CONTACT@GMAIL.COM



+92 333 1617207

Q.26 (b) If 32 g oxygen then moles of  $\text{CO}_2 = 1$

If 1g oxygen then moles of  $\text{CO}_2 = \frac{1}{32}$

If 8 g oxygen then moles of  $\text{CO}_2 = \frac{1}{32} \times 8$

$$= \frac{1}{4} = 0.25$$

Q.27(b) very important formula

$$n = \frac{m}{M} = \frac{N}{NA} = \frac{V}{V_m}$$

ان تینوں کو آپس میں correlate کر کے آپ کوئی بھی چیز معلوم کر سکتے ہیں جیسا کہ

$$\frac{m}{M} = \frac{N}{NA}$$

$$\frac{m}{18} = \frac{1.2 \times 10^{24}}{6.0 \times 10^{23}}$$

$$m \times 6.0 \times 10^{23} = 18 \times 1.2 \times 10^{24}$$

$$m = \frac{18 \times 1.2 \times 10^{24}}{6.0 \times 10^{23}}$$

$$m = 36 \text{ g}$$

Q.29(d)  $\frac{m}{M} = \frac{V}{V_m}$

$$\frac{4.4}{44} = \frac{V}{22.4}$$

$$V \times 44 = 4.4 \times 22.4$$

$$V = \frac{4.4 \times 22.4}{44}$$

$$V = 2.24 \text{ dm}^3$$

Q.30(b)  $\frac{V}{V_m} = \frac{N}{NA}$

$$\frac{11.2}{22.4} = \frac{N}{6.0 \times 10^{23}}$$

$$N \times 22.4 = 11.2 \times 6.0 \times 10^{23}$$

$$V = \frac{11.2 \times 6.0 \times 10^{23}}{22.4}$$

$$V = 3.01 \times 10^{23}$$

Q.31(b)

$$\text{No. of atoms} = \frac{m}{M} \times NA \times \text{atomicity}$$

$$\frac{49}{98} \times NA \times 7 = 3.5 NA$$

Q.32 (b)  $n = \frac{7}{28} = 0.25$

$$n = \frac{8}{32} = 0.25$$

total moles = 0.25 + 0.25 + 0.50 = 1 mole

ایک مول کا حجم 22.4 dm<sup>3</sup> ہوتا ہے۔

Q.33 (a)

One gram atom is one mole = (23 g)

So 23g = 1 g of Na

Q.34 (b) In  $\text{Al}_2\text{O}_3$  formula shows that

54g of Al reacts with mass of oxygen = 48g

1 g of Al reacts with mass of oxygen =  $\frac{48}{54}$

27g of Al reacts with mass of oxygen

$$= \frac{48}{54} \times 27 \text{ g} = 24 \text{ g}$$

27g Al اور 48g O کے مولر تناسب ہیں۔

Q.37 (c) Formic acid

Methanol

$\text{HCOOH}$

$\text{CH}_3\text{OH}$

$\text{CH}_2\text{O}_2$

$\text{CH}_4\text{O}$

Lactic acid

Short form

$\text{CH}_3 - \text{CH} - \text{COOH}$

$\text{C}_3\text{H}_5\text{O}_3$

OH

$\text{CH}_2\text{O}$

Q.40 (b) x : y

25% 75%

$$\frac{5}{5} = \frac{7.5}{5}$$

$$\frac{25}{5} = \frac{75}{10}$$

$$1 = 1.5$$

$$5 = 7.5$$

$$2 = 3$$

$\text{X}_2\text{Y}_3$

Q.41 (b)

$$\frac{B}{A} = \frac{\text{coeff}(B)}{\text{Coeff}(A)} \times \frac{\text{molar mass B}}{\text{Molar mass A}} \times \frac{NB}{NA} \times \frac{V_{mB}}{V_{mA}}$$

معلوم A اور B کی مقدار معلوم کرنا

A پیش Data میں given ہوگا coefficient اور B کے تازگی  
 لکھنے ہیں باقی دلچیز قدر مولے میں اس طرح fit کرنی ہے مولر اس کا فٹ کرنا ہے  
 جس کا data میں اس given یا پوچھا ہو۔ نمبر آف پر ٹیکلز بھی اس کے fit  
 کرنے ہیں جس کے ساتھ given ہو یا پوچھے ہوں۔ یہی حال و ایوم کا ہے۔ جس کا  
 کچھ given ہو اور نہ پوچھا ہو اس کی جگہ one لکھنا ہے۔

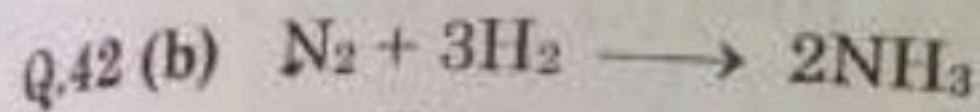


(3) (A)

$$\frac{B}{7.5} = \frac{1}{3}$$

$$B \times 3 = 7.5 \Rightarrow B = \frac{7.5}{3} = \boxed{2.5}$$

B نہ معلوم جبکہ A given ہے۔ one اور three پٹیس eq کے  
 coefficient ہیں۔

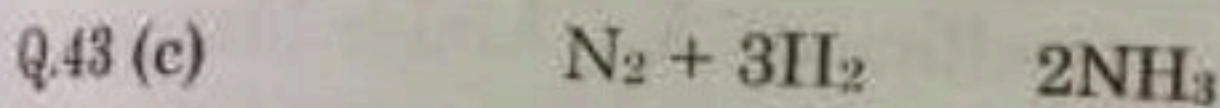


(B) (A)

$$\frac{B}{0.8} = \frac{3}{2} \Rightarrow B \times 2 = 3 \times 0.8$$

$$B = \frac{3 \times 0.8}{2}$$

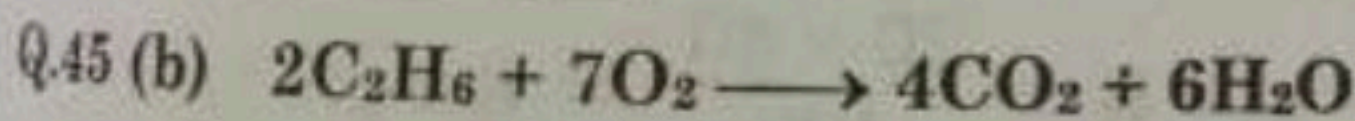
$$\boxed{B = 12}$$



A B

$$\frac{B}{42} = \frac{2}{1} \times \frac{17}{28}$$

$$\boxed{B = 51 \text{ gm}}$$

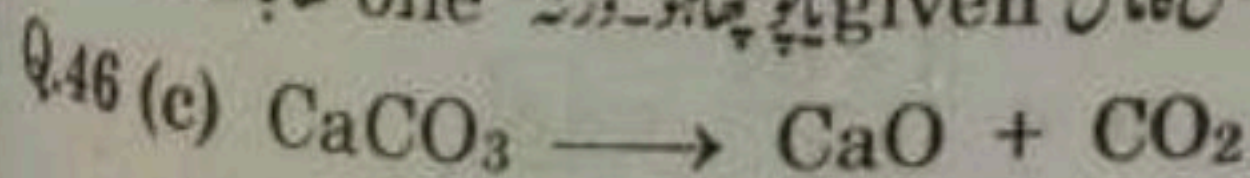


A B

$$\frac{B}{2.8 + 10^{24}} = \frac{6}{2} \times \frac{18}{1} \times \frac{1}{6.02 \times 10^{23}}$$

$$\boxed{B = 251 \text{ gm}}$$

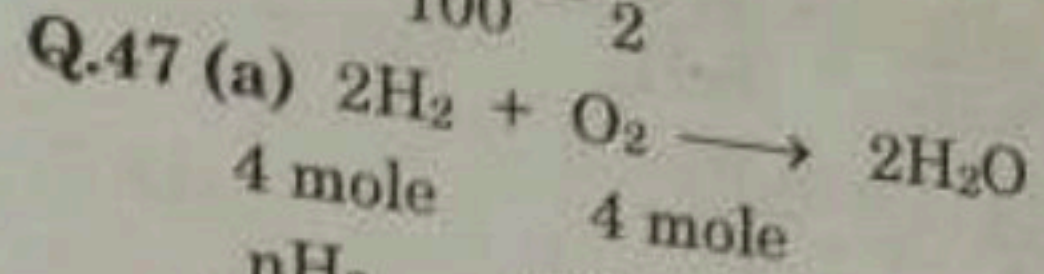
نمبر آف پر ٹیکلز اس species کے لکھنے ہیں جس کے پوچھے ہو یا given  
 ہو۔ ورنہ (one) ایک لکھا جائے گا باقی جگہ پر اس طرح مولر اس بھی اسی کا لکھا  
 جائے گا جس کا اس given یا پوچھا ہو۔ ورنہ one لکھا جائے گا۔



A B

$$\frac{B}{50} = \frac{1}{1} \times \frac{1}{100}$$

$$B = \frac{50}{100} = \frac{1}{2}$$



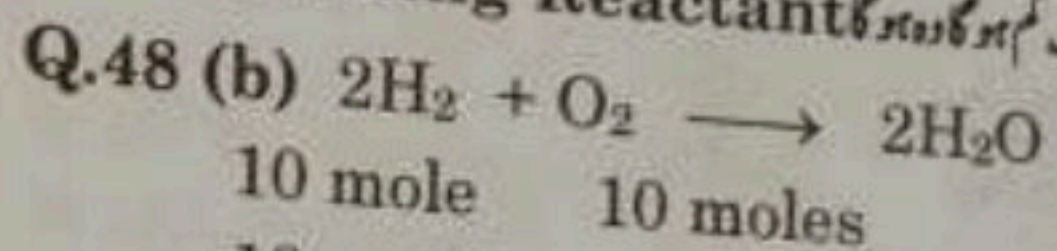
$$\frac{n\text{H}_2}{\text{ScH}_2} = \frac{n\text{O}_2}{\text{ScO}_2}$$

$$\frac{4}{2} = \frac{4}{1}$$

$$\boxed{2 = 4} \text{ Hydrogen is LR}$$

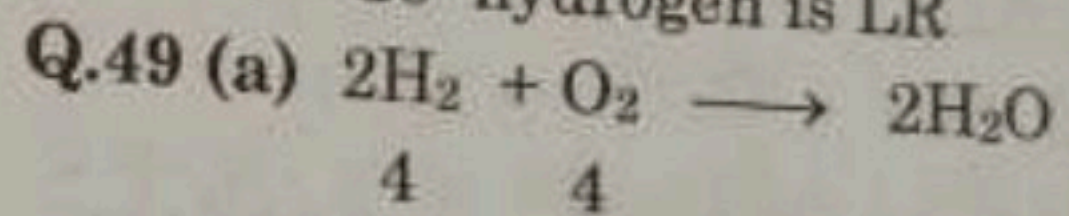
Sc سے مراد ہے Stoichiometric coefficient

Limiting Reactant ہے جو جواب کم ہو گا اور اس کو LR کہتے ہیں۔



$$\frac{10}{2} = \frac{10}{1}$$

$$5 = 10 \text{ hydrogen is LR}$$



سب سے پہلے LR معلوم کریں۔

$$\frac{n\text{H}_2}{\text{ScH}_2} = \frac{n\text{O}_2}{\text{ScO}_2}$$

$$\frac{4}{2} = \frac{4}{1}$$

$$2 = 4 \text{ Hydrogen is LR}$$

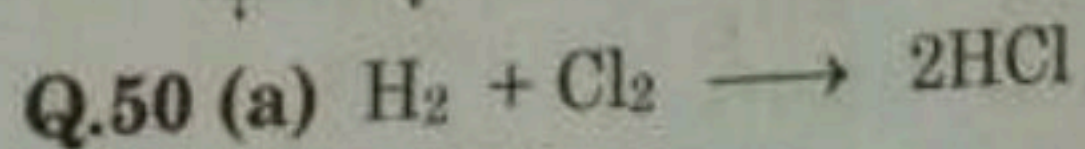
اب دوسرا قدر مولا

$$\frac{n \text{ LR}}{\text{ScLR}} = \frac{n\text{P}}{\text{ScP}}$$

$$\frac{4}{2} = \frac{np}{2}$$

$$\boxed{np = 4}$$

Np سے مراد نمبر آف مولر آف پراڈکٹ ScP سے مراد ہے  
 Stoichiometric coefficient آف پراڈکٹ ہے۔



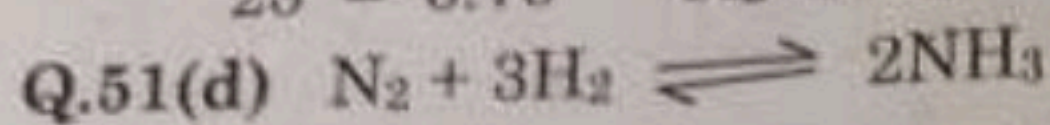
$$n\text{H}_2 = \frac{50}{2} = 25 \text{ ماس کو پہلے مولر بناؤ}$$

$$r\text{Cl}_2 = \frac{50}{71} = 0.70$$

$$\frac{nH_2}{ScH_2} = \frac{nCl_2}{ScH_2}$$

$$\frac{25}{1} = \frac{0.70}{1}$$

$$25 = 0.70 \quad Cl_2 \text{ is LR}$$



ماس کو پہلے مولز میں بدلو

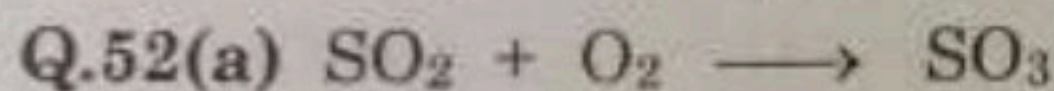
$$nN_2 = \frac{56}{28} = 2$$

$$nH_2 = \frac{12}{2} = 6$$

$$\frac{nN_2}{SN_2} = \frac{nH_2}{ScH_2}$$

$$\frac{2}{1} = \frac{6}{3}$$

2 : 2 None دونوں جواب برابر ہے



$$nSO_2 = \frac{32}{128} = \frac{1}{4} \quad \text{ماس کو پہلے مولز میں بدلو}$$

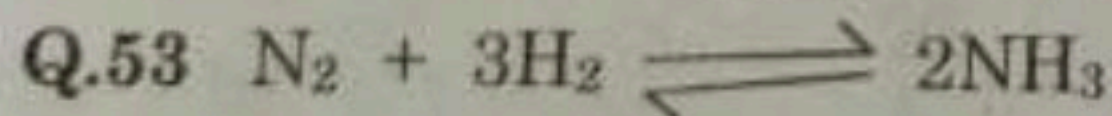
$$nO_2 = \frac{32}{32} = 1$$

$$\frac{nSO_2}{ScSO_2} = \frac{nO_2}{ScO_2}$$

$$\frac{1/4}{1} = \frac{1}{1}$$

$$\frac{1}{4} = 1$$

LR کا  $SO_2$  کم آئے گا اور وہ LR



$$nN_2 = \frac{28}{28} = 1 \quad \text{ماس کو پہلے مولز میں بدلو}$$

$$nH_2 = \frac{3}{2} = 1.5$$

$$\frac{nN_2}{ScN_2} = \frac{nH_2}{ScH_2}$$

اب LR معلوم کرو

$$\frac{1}{1} = \frac{1.5}{3}$$

$$1 = 0.5 \quad H_2 \text{ is LR}$$

$$\frac{nLR}{ScLR} = \frac{nP}{ScP}$$

$$\frac{1.5}{3} = \frac{nP}{2}$$

$$2 \times 1.5 = 3 \times nP$$

$$\frac{2 \times 1.5}{3} = nP$$

$$nP = 1 \text{ mole}$$

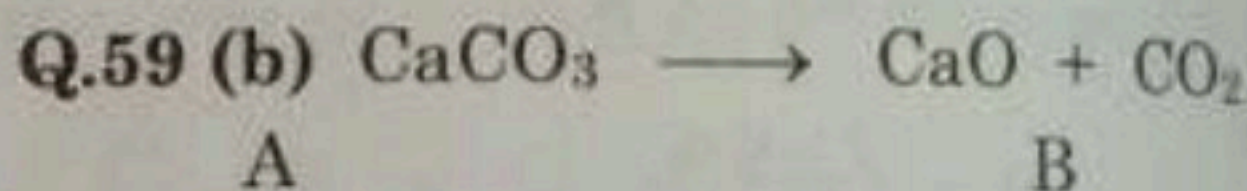
$$\text{Mass of } NH_3 = 1 \times 17 = 17 \text{ g}$$

Q.55 (d) 1 mole of  $Cl_2$  gas = 71 g =  $2 \times 6.02 \times 10^{23}$  atoms

Q.58 (d)  $\frac{12}{12} \times 6.02 \times 10^{23}$

(b)  $\frac{1}{2} \times 6.02 \times 10^{23}$  (c)  $\frac{4}{4} \times 6.02 \times 10^{23}$

(d)  $\frac{16}{32} \times 6.02 \times 10^{23}$



Unknown

$$\frac{B}{A} = \frac{\text{Coefficient B}}{\text{Coefficient A}} \times \frac{\text{Molar mass B}}{\text{Molar Mass of A}}$$

Known

$$\frac{B}{20} = \frac{1}{1} \times \frac{44}{100}$$

$$B \times 100 = 20$$

$$B = \frac{20 \times 40}{100} = 8.8 \text{ g}$$

Q.60 (c)  $\frac{36}{180} \times 6 \times 10^{23} = 1.2 \times 10^{23}$

Q.62 (c)  $\frac{V}{V_m} = \frac{m}{M}$

$$\frac{3}{24} = \frac{m}{64}$$

$$m \times 24 = 3 \times 64$$

$$m = \frac{3 \times 64}{24} = \boxed{8}$$

Q.67 (c) 18% water means  
100g has water = 18

$$1 \text{ g has water} = \frac{18}{100}$$

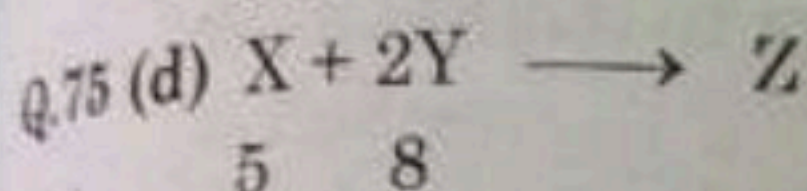
$$60 \times 1000 = \frac{18}{100} \times 60 \times 10^3$$

$$= 18 \times 6 \times 10^2$$

$$\text{No. of molecule} = \frac{m}{M} \times N_A$$

$$= \frac{18 \times 6 \times 10^2}{18} \times 6.02 \times 10^{23}$$

$$= 3.6 \times 10^{26}$$



$$\frac{nX}{ScX} = \frac{nY}{ScY}$$

$$\frac{5}{1} = \frac{8}{2}$$

$$5 = 4 \quad Y \text{ is LR}$$

$$\frac{nLR}{ScLR} = \frac{nP}{ScP}$$

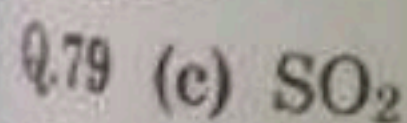
$$\frac{8}{2} = \frac{nP}{1}$$

$$nP \times 2 = 8$$

$$nP = 8/2 = 4$$

$n_P$  = No. of moles of product

$Sc_P$  = Stoichiometric coefficient of product

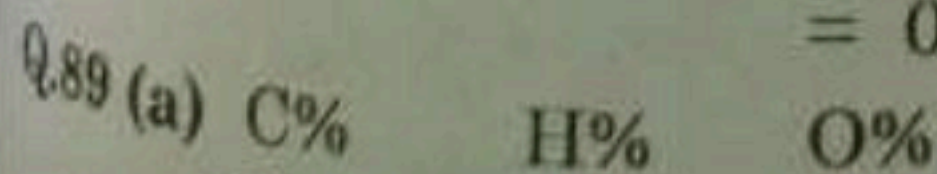


32 g oxygen has moles of  $SO_2 = 1$

$$1 \quad // \quad // \quad // \quad = \frac{1}{32}$$

$$16 \quad // \quad // \quad // \quad = \frac{1}{32} \times 16 = \frac{1}{2}$$

$$= 0.5 \text{ moles}$$



$$60 \quad 8 \quad 32$$

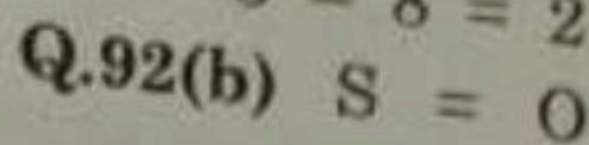
$$\frac{60}{12} \quad \frac{8}{1} \quad \frac{32}{16}$$

$$\frac{5}{2} : \frac{8}{2} : \frac{2}{2}$$

$$2.5 : 4 : 1$$

Multiply it with 2 to convert it into whole number

$$5 = 8 = 2 = C_5H_8O_2$$



$$50\% \quad 50\%$$

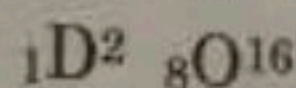
$$\frac{50}{32} = \frac{50}{16}$$

$$\frac{50/32}{50/16} = \frac{50/16}{50/16}$$

$$\frac{1}{2} = 1$$

$$1 = 2 \quad \boxed{SO_2}$$

Q.95 heavy water is  $D_2O$   
Deuterium oxide



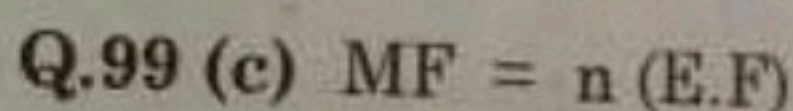
$$n = 2 - 1$$

$$n = 16 - 8 = 8$$

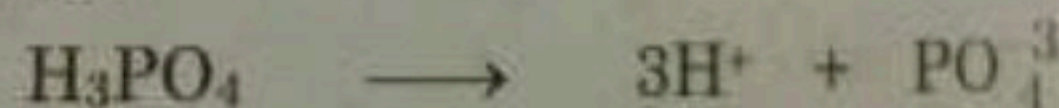
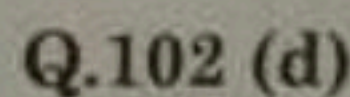
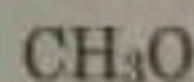
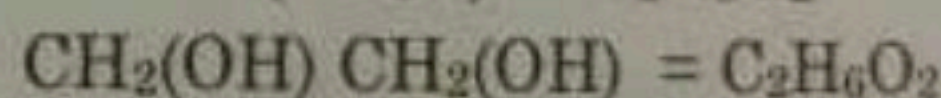
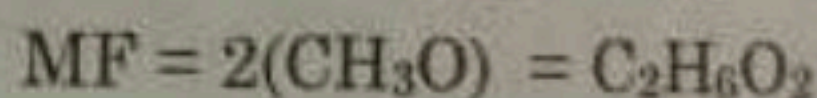
$$n = 1$$

$$n = 8$$

$$\text{Total no. of neutron} = 1 + 1 + 8 = \boxed{10n}$$



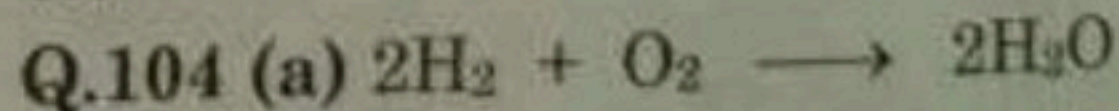
$$n = \frac{\text{Molar mass}}{\text{E.F. Mass}} = \frac{62}{31} = 2$$



$$1 \text{ mole} \quad \quad \quad \underline{3 \text{ mole}} \quad \underline{1 \text{ mole}}$$

$$1 \text{ mole produces ions} = 4 = 4 \text{ mole}$$

$$0.5 \text{ -----} = 2 \text{ moles}$$



Mass

0.5 moles

$$\frac{B}{A} = \frac{\text{Coeff B}}{\text{Coeff A}} \times \frac{M_B}{M_A}$$

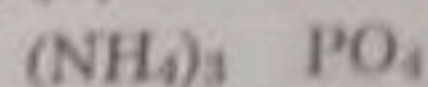
مولر ماس اس کا لکھا جائے گا جس کا یاتو given یا پو چھا ہو۔ ورنہ one لکھا جائے گا۔

$$\frac{B}{0.5} = \frac{1}{2} \times \frac{32}{1}$$

$$B \times 2 = \frac{0.5 \times 32}{2}$$

$$B = 8$$

Q.105 (b)



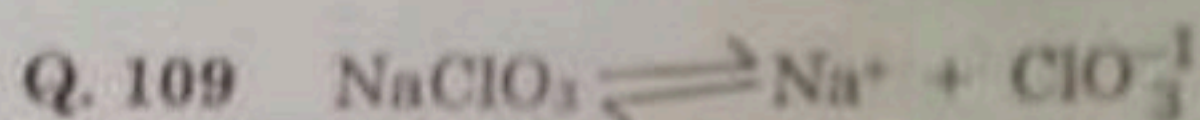
$$H = 0$$

$$12 = 4$$

$$6 = 2 \quad \boxed{2}$$

Q.107 (d)

Theoretical & Limiting Reactant کے  
 application of Stoichiometry & yield  
 کے لیے استعمال



1 mole  $\quad \quad \quad 1 \quad 1 = 2$   
 (2 moles ions)

5 mole  $\quad \quad \quad 5 \times 2 = 10$

Q.111 (b) No. of  $e^-$  = moles  $\times$  electrons in  
 one mole  $\times N_A$

$$\frac{4.2}{42} \times 22 \times N_A = 2.2 N_A$$

$$N_3^{-1} = 7 \times 3 = 21 + 1 = 22e^-$$



$$nH_2 = \frac{8}{2} = 4$$

$$nO_2 = 2$$

اب LR مقرر کرنے کے لیے

$$\frac{nH_2}{ScH_2} = \frac{nO_2}{ScO_2}$$

$$\frac{4}{2} = \frac{2}{1}$$

$$2 = 2$$

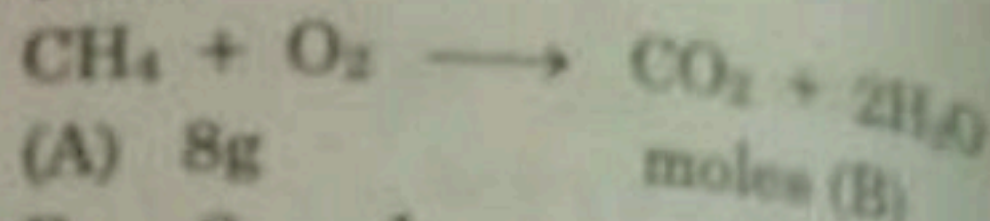
$$\frac{nLR}{ScLR} = \frac{nP}{ScP}$$

$$2 = \frac{nP}{2}$$

$$N_p = 4 \text{ moles}$$

$$\text{Mass of } H_2 = 4 \times 18 = 72 \text{ g}$$

Q.115 (a) o



(A) 8g

moles (B)

$$\frac{B}{8} = \frac{2}{1} \times \frac{1}{16} \Rightarrow B = \frac{16}{16} = 1$$

# TOPIC 2 >>

## ATOMIC STRUCTURE



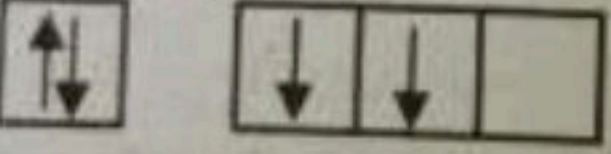

**MCQs**

- (1) The number of electrons, neutrons, protons in a species are equal to, 10, 8 and 8 respectively, The proper symbol of species is  
 (a)  ${}_8\text{O}^{16}$  (b)  ${}_8\text{O}^{18}$  (c)  ${}_{10}\text{Nc}^{18}$  (d)  ${}_8\text{O}^{16-2}$
- (2) Wave length of spectral line emitted is inversely proportional to  
 (a) Energy (b) Velocity (c) Radius (d) Quantum number
- (3) Which one of the following forms colourless solution in aqueous medium  
 (a)  $\text{V}^{+3}$  (b)  $\text{Cr}^{+3}$  (c)  $\text{Ti}^{+3}$  (d)  $\text{Sc}^{+3}$   
 (Atomic no Sc = 21, Ti = 22, V = 23, Cr = 24)
- (4) Chromium is represented by the electronic configuration  
 (a)  $[\text{Ne}] 3s^2, 3p^6, 3d^1, 4s^2$  (b)  $[\text{Ne}] 3s^2, 3p^6, 3d^2, 4s^1$   
 (c)  $[\text{Ne}] 3s^2, 3p^6, 3d^5, 4s^1$  (d)  $[\text{Ne}] 3s^2, 3p^6, 4s^2, 3d^4$
- (5) The correct set of quantum numbers is  
 (a)  $n = 2, l = 1, m = 2, S = 0$  (b)  $n = 2, l = -2, m = 1, S = +1/2$   
 (c)  $n = 2, l = 2, m = -1, S = -1/2$  (d)  $n = 2, l = 1, m = 0, S = +1/2$
- (6) The value of an quantum numbers of valence electron of an element are  $n = 4, l = 0, m = 0$  and  $S = +1/2$  the element is  
 (a) He (b) K (c) Na (d) Cl
- (7) Set of iso-electronic species is  
 (a)  $\text{H}_2, \text{CO}_2, \text{CN}^-, \text{O}^-$  (b) N,  $\text{H}_2\text{S}, \text{CO}$   
 (c)  $\text{N}_2, \text{CO}, \text{CN}^-, \text{O}_2^{+2}$  (d) Ca, Mg, Cl
- (8) Number of orbitals in L energy level  
 (a) 1 (b) 2 (c) 3 (d) 4
- (9) Ratio of radii of second and first Bohr's orbits of H-atom  
 (a) 2 (b) 4 (c) 3 (d) 8
- (10) The outermost configuration of most electronegative element is  
 (a)  $ns^2, np^5$  (b)  $ns^2, np^6$   
 (c)  $ns^2, np^4$  (d)  $ns^1, np^6$
- (11) Quantum number of an atom can be defined on the basis of  
 (a) Auf bau Principle (b) Heisenberg uncertainty  
 (c) Hund's Rule (d) Pauli exclusion principle

**Answer Key**

Question	1	2	3	4	5	6	7	8	9	10	11
Answer	d	a	d	c	d	B	c	d	b	a	d

Topic 2

- (12) How many electrons can be accommodated in p-orbital  
 (a) 6 electrons (b) 2 electrons (c) 4 electrons (d) None
- (13) The quantum number  $m$  of a free accommodated in P-orbitals  
 (a) The effective volume of the orbital  
 (b) The shape of shell  
 (c) The spatial orientation of the orbital  
 (d) The energy of the orbital in the absence of magnetic field
- (14) The number of nodal planes in  $P_x$  orbital is  
 (a) 1 (b) 2 (c) 3 (d) zero
- (15) If  $l = 3$  then the value of magnetic quantum numbers are  
 (a)  $\pm 1, \pm 2, \pm 3$  (b)  $0, \pm 1, \pm 2, \pm 3$   
 (c)  $-1, -2, -3$  (d)  $0, +1, +2, +3$
- (16) The radius of hydrogen atom is  $0.53 \text{ \AA}$ . The radius of  $\text{Li}^{+2}$  is of  
 (a)  $1.27 \text{ \AA}$  (b)  $0.17 \text{ \AA}$  (c)  $0.57 \text{ \AA}$  (d)  $0.99 \text{ \AA}$
- (17) The atomic number of an element is 35 what is the total number of electrons present in all p-orbital of the ground state atom of that element  
 (a) 17 (b) 11 (c) 23 (d) 6
- (18) The electrons configuration of an element is  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^5, 4s^1$ . This represents  
 (a) Excited state (b) Ground state  
 (c) Cationic form (d) Anionic form
- (19) When the electron of H-atom moves from  $n = 4$  to  $n = 1$  the number of spectral line emitted is  
 (a) 3 (b) 6 (c) 7 (d) 15
- (20) The orbital diagram in which both the Pauli exclusion principle and Hund's rule are violated as  
 (a)  (b)   
 (c)  (d) 
- (21) The electron density between 1s and 2s orbital is  
 (a) High (b) Low (c) Zero (d) None of these
- (22) The atomic number of Ni and Cu are 28 and 29 respectively the electronic configuration  $1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^m$   
 (a)  $\text{Cu}^{+1}$  (b)  $\text{Cu}^{+2}$  (c)  $\text{Ni}^{+2}$  (d) Ni
- (23) The maximum number of 3d electrons having  $S = +1/2$  are  
 (a) 10 (b) 5 (c) 14 (d) 7

Answer Key

Question	12	13	14	15	16	17	18	19	20	21	22	23
Answer	b	c	a	b	b	a	b	b	a	c	a	b

Topic 2

- (24) The angular momentum of an electron cant be  
 (a)  $\frac{h}{\pi}$  (b)  $\frac{2h}{2\pi}$  (c)  $\frac{2.5h}{2\pi}$  (d)  $\frac{0.5h}{\pi}$
- (25) If wavelength of electromagnetic radiation is  $2000 \text{ \AA}$ . What is the energy in erg  
 (a)  $9.92 \times 10^{-19}$  (b)  $9.94 \times 10^{-12}$   
 (c)  $4.97 \times 10^{-12}$  (d)  $4.97 \times 10^{-19}$
- (26) The total no of electrons present in the all the S orbital. All the P-orbital and all d orbitals cesium ions are (Atomic no = 55)  
 (a) 12, 20, 22 (b) 8, 22, 14 (c) 10, 24, 20 (d) 26, 10
- (27) The relation between energy E, of two radiation with wavelength  $8000 \text{ \AA}$  and energy of the radiation with wavelength  $16000 \text{ \AA}$   
 (a)  $E_1 = 2 E_2$  (b)  $E_1 = 4 E_2$  (c)  $E_1 = 6 E_2$  (d)  $E_1 = E_2$
- (28) An electron is moving in Bohr's fourth orbit, its De-Broglie wavelength is  $\lambda$ . What is the circumference of fourth orbit.  
 (a)  $2 \lambda$  (b)  $2 \sqrt{\lambda}$  (c)  $3 \lambda$  (d)  $4 \lambda$
- (29) The atomic number of an elements X, Y, Z are 19, 21, 25 the number of electrons present in M shells of these elements follow the order  
 (a)  $Z > Y > X$  (b)  $X > Y > Z$   
 (c)  $Z > X > Y$  (d)  $Y > Z > X$
- (30) The energy ratio of photon of wavelength  $3000 \text{ \AA}$  and  $6000 \text{ \AA}$  is  
 (a) 1:1 (b) 2:1 (c) 1:2 (d) 1:4
- (31) The energy of seconds Bohr's orbit of hydrogen atom is  $-328 \text{ KJmol}^{-1}$ . Hence the energy of the fourth orbit would be  
 (a)  $-164 \text{ KJmol}^{-1}$  (b)  $-41 \text{ KJmol}^{-1}$   
 (c)  $-82 \text{ kJmol}^{-1}$  (d)  $-1312 \text{ KJmol}^{-1}$
- (32) The velocity of an electron in the second shell of hydrogen atom  
 (a)  $10.94 \times 10^6 \text{ ms}^{-1}$  (b)  $18.88 \times 10^6 \text{ ms}^{-1}$   
 (c)  $1.88 \times 10^6 \text{ ms}^{-1}$  (d)  $1.094 \times 10^6 \text{ ms}^{-1}$
- (33) Which electronic level would allow the hydrogen atom to absorb a photon but not emit a photon.  
 (a) 1s (b) 2s (c) 2p (d) 3s
- (34) The ionization energy of hydrogen atom is 13.6 eV. What will be the ionization energy of  $\text{He}^+$   
 (a) 13.6 eV (b) 54.4 eV (c) 122.4 eV (d) zero
- (35) Predict the total spin in  $\text{Ni}^{+2}$  ion  
 (a)  $\pm 5/2$  (b)  $\pm 3/2$  (c)  $\pm 1/2$  (d)  $\pm 1$

Answer Key

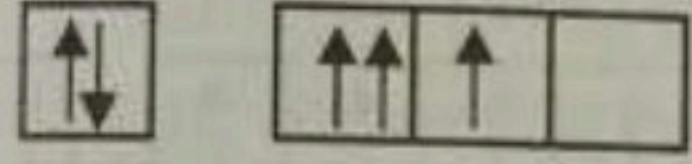
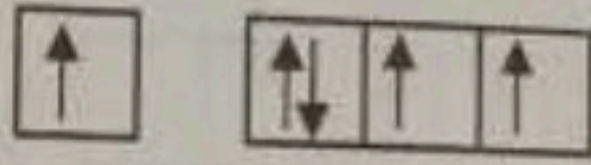
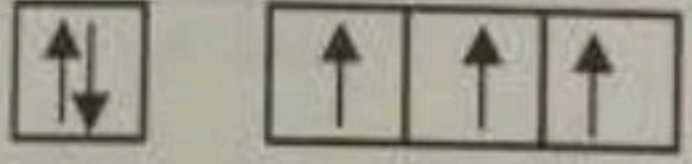
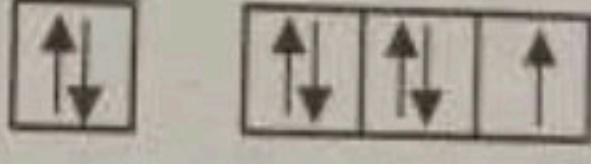
Question	24	25	26	27	28	29	30	31	32	33	34	35
Answer	c	b	c	a	d	a	b	c	d	a	b	d

- (36) Angular momentum of H-atom in the ground state is  
 (a)  $\frac{h}{2\pi}$  (b)  $\frac{2h}{2\pi}$  (c)  $\frac{\pi}{2h}$  (d)  $\frac{2n}{h}$
- (37) Which of the following has more electrons than proton and more protons than neutrons  
 (a) D (b)  $\bar{D}$  (c)  $\bar{H}$  (d) He
- (38) Quantum number describe the orientation with three dimensional space  
 (a) Principle (b) Azimuthal (c) Magnetic (d) Spin
- (39) Which of the following quantum number is called orientation quantum number  
 (a) Principle (b) Azimuthal (c) Spin (d) Magnetic
- (40) Which of the following is fundamental particles  
 (a) Electron (b) Proton (c) Hypron (d) Neutron
- (41) The ionization potential of hydrogen is 13.6 eV. The energy of the electron in 2nd orbit is  
 (a) -10.2 eV (b) -3.4 eV (c) +3.4 eV (d) -1.5 eV
- (42) For reduction purpose in chemical reaction. We can also use  
 (a) X-Rays (b) Cathode Rays  
 (c) Gamma Rays (d) Alpha Rays
- (43) If charge of electron and proton become half and present value of Rydberg Constant is R than its new value will be  
 (a) R/2 (b) R/4 (c) R/8 (d) R/16
- (44) For principle Q.No.3 the value of secondary Quantum number is  
 (a) -1, 0, +1 (b) 1, 2, 3 (c) 0, 1, 2 (d) -1/2, 0, +1/2
- (45) Which equation do you think is wrong  
 (a)  $V \propto \frac{1}{\lambda}$  (b)  $\Delta E = \frac{hc}{\lambda}$  (c)  $\bar{V} \propto \frac{1}{\lambda}$  (d)  $\bar{V} = \frac{\Delta E}{hc}$
- (46) Electronic Configuration which is high to ionize to positive ions  
 (a)  $\uparrow \uparrow \uparrow$  (a)  $\uparrow \uparrow \uparrow \downarrow$  (c)  $\uparrow \uparrow \square$  (d)  $\uparrow \uparrow \downarrow \downarrow$
- (47) Choose the correct arrangement of the various region of Electromagnetic spectrum in terms of wavelengths  
 (a) IR > UV > Visible >  $\mu$  wave > Radio  
 (b)  $\mu$  wave > IR > visible > UV > Radio frequency  
 (c) Radio frequency >  $\mu$  wave > IR > visible > UV  
 (d) Visible > IR > UV >  $\mu$  wave > Radio frequency

## Answer Key

Question	36	37	38	39	40	41	42	43	44	45	46	47
Answer	a	c	c	d	a	b	b	d	c	c	a	c

Topic 2

- (18) Select the one having half filled P-orbitals on losing an electron  
 (a) Nitrogen (b) Lithium (c) Oxygen (d) Fluorine
- (19) What are the value of  $n, l$  for last electron in chlorine  
 (a) 1, 6 (b) 1, 3 (c) 3, 1 (d) 6, 1
- (20) X Rays are widely used on diagnostic tool in medicine because of its  
 (a) Particle property (b) High penetration power  
 (c) It is not electromagnetic (d) All
- (21) Which of the following element with given electronic configuration has highest Ionization energy  
 (a)  $1s^2, 2s^2, 2p^4$  (b)  $1s^2, 2s^2, 2p^3$   
 (c)  $1s^2, 2s^2, 2p^6, 3s^1$  (d)  $1s^2, 2s^2, 2p^6, 3s^2, 3p^3$
- (22) The radius of hydrogen atom is  
 (a)  $0.529 \text{ \AA}$  (b)  $0.529 \times 10^{-20}$   
 (c)  $0.529 \times 10^{-8}$  (d) Both a, c
- (23) The orbital diagram in which Aufbau Principle is violated  
 (a)  (b)   
 (c)  (d) 
- (24) For  $n = 2$  the correct set of  $l, m$  are:  
 (a)  $l = 2, m = -2, -1, 0, +1, +2$  (b)  $l = 1, m = -2, -1, 0, +1, +2$   
 (c)  $l = 1, m = -1, 0, +1$  (d)  $l = 0, m = -1, 0, +1$
- (25) In hydrogen atom an orbit has diameter of about  $16.92 \text{ \AA}$  what is the maximum number of electron that can be accommodated  
 (a) 32 (b) 16 (c) 48 (d) 72
- (26) Which of the following rules/principle helps us to determine the valency of an element  
 (a) Pauli Exclusion Principle (b) Hund's Rule  
 (c) Aufbau Principle (d) Heisenberg uncertainty principle
- (27) When 6d orbital is complete, the entering electron goes into  
 (a) 7f (b) 7s (c) 7p (d) 7d
- (28) In the ground state of an atom the electron is present in shell  
 (a) In the nucleus (b) Nearest to the nucleus  
 (c) In the second shell (d) Farthest from the nucleus
- (29) Which of the following formula of quantum number helps us to determine number of electrons in a shell  
 (a)  $2n^2$  (b)  $2l + 1$  (c)  $2(2l + 1)$  (d)  $2n + 1$

Answer Key

Question	48	49	50	51	52	53	54	55	56	57	58	59
Answer	c	c	b	b	d	b	c	a	b	b	b	a

(60) Quantum numbers have all the following applications except

- (a) used to determine group of an element  
 (b) used to find valency of element  
 (c) used to find group of an element  
 (d) used to find ionization energy of an element

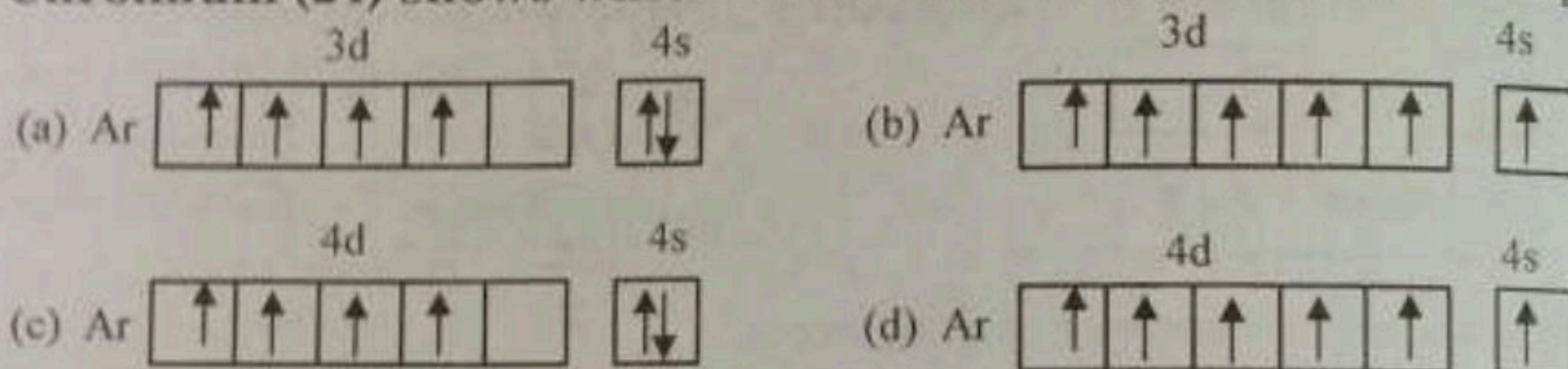
(61) Which of the following is incorrect

- (a) The whole mass of the atom is in the nucleus  
 (b) The number of neutrons in an atom =  $Z - A$   
 (c) Except electrons all the subatomic particles are present in the nucleus  
 (d) In neutral atom, number of protons = number of electrons

(62) Degenerate orbitals filled first singly then pairing takes place. This is accordance with

- (a) Pauli Exclusion Principle (b) Hund's Rule  
 (c) Aufbau Principle (d) Heisenberg uncertainty principle

(63) Chromium (24) shows which of the following electronic configuration



(64) Which of the following atomic orbitals has maximum penetration effect towards the nucleus of an atom

- (a) S (b) d (c) P (d) f

(65) The number of atoms in 3<sup>rd</sup> energy level (shell) is

- (a) 6 (b) 4 (c) 18 (d) 9

(66) Subshell with  $n = 6, l = 2$  can accommodate the maximum number of electrons

- (a) 2 (b) 10 (c) 6 (d) 14

(67) Number of electrons in the outermost shell of chloride ion ( $\text{Cl}^-$ )

- (a) 17 (b) 8 (c) 7 (d) 1

(68) The electrons should be filled in energy subshell in order of energy values. This is accordance to

- (a) Pauli Exclusion Principle (b) Hund's Rule  
 (c) Aufbau Principle (d) Heisenberg uncertainty principle

(69) Which of the following is correct electronic configuration

- (a)  $[\text{Ar}] 4s^1$  (b)  $[\text{Ar}] 4s^2$  (c)  $[\text{Ne}] 4s^1$  (d)  $[\text{Ne}] 4s^2$

### Answer Key

Question	60	61	62	63	64	65	66	67	68	69
Answer	d	b	b	b	a	d	b	b	c	a

- (70) Which of the following has more electron than protons and more protons than neutrons  
 (a)  $\bar{D}^{-1}$  (b)  $\bar{OH}^{-}$  (c)  $He^{+}$  (d)  $\bar{OD}^{-1}$
- (71) In multi electron atom the energy of the electron in particular orbital is determined by  
 (a) n, only (b) l, only (c) n, l, only (d) n, l, m, only
- (72) Consider the following nuclear reaction  ${}_{29}^{66}Cu \longrightarrow {}_{30}^{66}Zn +$  Which of the following rays are produced in the above nuclear reaction  
 (a)  $\alpha$ -Rays (b)  $\beta$ -Rays (c)  $\gamma$ -Rays (d) UV Rays
- (73) The no of axial orbitals are  
 (a) 2 (b) 3 (c) 5 (d) 1
- (74) Mark the incorrect statement  
 (a) For s subshell  $l = 0, m = 0 \pm 1$  (b) For d subshell  $l = 2, m = 0, \pm 1, \pm 2$   
 (c) For p subshell  $l = 1, m = 0, \pm 1$  (d) For f subshell  $l = 3, m = 0, 1 m = 0, \pm 1, \pm 2, \pm 3$
- (75) The charge on one gram of electron is  
 (a)  $1.7586 \times 10^{-11} C$  (b)  $1.7588 \times 10^8 C$   
 (c)  $1.7588 \times 10^{11} C$  (d)  $1.603 \times 10^{-19} C$
- (76) Which of the following has maximum ionizing power  
 (a)  $\beta$ -rays (b)  $\alpha$ -rays (c)  $\gamma$ -rays (d) x-rays
- (77) Mark the correct statement  
 (a) size of 1s-orbital is smaller than 2s (b) all three p-orbitals are degenerate  
 (c) The m value of p-orbital is +1, 0, -1 (d) If  $n = 3$ , then value of  $l = 1, 2, 3$
- (78) Which of the following particles on losing electron has half filled p-subshell  
 (a) C (b)  $\bar{N}$  (c)  $\bar{O}$  (d)  $\bar{O}^{-2}$
- (79) The atom X and Y have the electronic configuration shown below  
 $X = 1s^2, 2s^2, 2p^6, 2s^2, Y = 1s^2, 2s^2, 2p^6, 3s^2, 3p^5$ . The possible chemical formula is  
 (a) XY (b)  $X_3, Y_2$  (c)  $X_2Y$  (d)  $XY_2$
- (80) Correct order of energy is given subshell is  
 (a)  $5s > 3d > 3p > 4s$  (b)  $3p > 3d > 5s > 4s$   
 (c)  $5s > 3d > 4s > 3p$  (d)  $3p > 3d > 4s > 5s$
- (81) The De-Broglie wavelength associated with material particle is  
 (a) inversely proportional to momentum  
 (b)  $\lambda \propto \frac{1}{E}$  (c)  $\lambda \propto mv$  (d)  $\lambda \propto E$

## Answer Key

Question	70	71	72	73	74	75	76	77	78	79	80	81
Answer	b	b	c	a	d	b	b	d	c	d	c	a

Topic 2

- (82) Splitting of spectral line when atoms are subjected to electric field is.  
 (a) Zeeman effect (b) Stark effect  
 (c) Decay (d) disintegration
- (83) The  $n + l$  value for 3p-energy level is.  
 (a) 6 (b) 7 (c) 3 (d) 1
- (84) The potential energy of electron present in the ground state of  $\text{Li}^{+2}$  ion is represented by.  
 (a)  $\frac{+3e^2}{4\pi\epsilon_0 r}$  (b)  $\frac{-3e}{4\pi\epsilon_0 r}$  (c)  $\frac{-3e^2}{4\pi\epsilon_0 r}$  (d)  $\frac{-3e^2}{4\pi\epsilon_0 r}$
- (85) The electron occupying the same orbitals have always spin.  
 (a) paired (b) Unpaired (c) Both a and b (d) None
- (86) The ratio of specific ( $e/m$ ) of an electron to that of hydrogen ion is.  
 (a) 1:1 (b) 1840:1 (c) 1:1840 (d) 2:1
- (87) Dimension of Plank constant ( $h$ ) are .  
 (a) Force  $\times$  time (b) Energy  $\times$  distance  
 (c) Energy / time (d) Energy  $\times$  time
- (88) Positronium is the name given to an atom - like combination formed between.  
 (a) A positron and proton (b) Positron and neutron  
 (c) A positron and  $\alpha$  particle (d) Positron and electron
- (89) The principal quantum number of an atom represents.  
 (a) Size and energy of the orbit (b) Spin angular momentum  
 (c) Orbital angular momentum (d) space orientation of orbitals
- (90) The configuration  $1s^2, 2s^2, 2p^5, 3s^1$  shows.  
 (a) Ground state of fluorine (b) Excited state of fluorine  
 (c) Excited state of neon (d) Excited state of  $\text{O}^-$  ion
- (91) A p-orbital can accommodate.  
 (a) 4 electrons (b) 6 electrons  
 (c) 2 electrons with parallel spin (d) 2 electrons with opposite spins
- (92) Number of unpaired electron in the electronic configuration  $1s^2, 2s^2, 2p^4$ .  
 (a) 2 (b) 3 (c) 4 (d) 6
- (93) The total number of orbitals in a shell with principal quantum number  $n$  is.  
 (a)  $2n$  (b)  $2n^2$  (c)  $n^2$  (d)  $n+1$
- (94) Which orbital is dumb-bell shaped.  
 (a) s (b)  $2p_y$  (c) 3s (d)  $3dz^2$
- (95) Which of the following is axial orbital.  
 (a)  $d_{xy}$  (b)  $d_{yz}$  (c)  $d_{xz}$  (d)  $d_z^2$

Answer Key

Question	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Answer	b	a	d	a	b	d	d	a	c	d	a	c	b	d

- 106) Which represent the correct set of four quantum number of 4d-electron.  
 (a) 4, 3, 2, +1/2 (b) 4, 2, 1, 0  
 (c) 4, 3, -2, +1/2 (d) 4, 2, 1, +1/2
- 107) In potassium the order of energy level for 19th electron.  
 (a)  $3s > 3d$  (b)  $4s < 3d$  (c)  $4s > 4p$  (d)  $4s = 3d$
- 108) Combination of an  $\alpha$ -particle with nuclide result in the formation of a new nuclide which has .  
 (a) less number of neutrons (b) Equal number of electrons  
 (c) Lower mass number (d) Higher atomic number
- 109) The quantum number for last electron of an atom are  $n = 2, l = 0, m = 0, s = +1/2$  the atom is B  
 (a) Li (b) B (c) C (d) H
- 110) How many sets of four quantum number are possible for the electrons present in  $\text{He}^{-2}$ .  
 (a) 4 (b) 3 (c) 2 (d) None of these
- 111) The atomic number of an element is 17. The number of orbitals pairs containing electron in the valency shell is.  
 (a) 8 (b) 2 (c) 3 (d) 6
- 112) Correct set of four quantum number of 4d electrons.  
 (a) 4, 3, -2, 1/2 (b) 4, 2, -1, 0  
 (c) 4, 3, -2, +1/2 (d) 4, 2, -1, -1/2
- 113) The atomic number of an element having maximum number of unpaired 3p-electron is.  
 (a) 15 (b) 10 (c) 12 (d) 8
- 114) The atomic number of an element is 17. The number of orbitals containing electron pairs in the valency shell is.  
 (a) 8 (b) 2 (c) 3 (d) 6
- 115) Which pair of atomic number represents elements of s-block.  
 (a) 7, 15 (b) 9, 17 (c) 6, 12 (d) 3, 12
- 116) When 4-f level of an atom is completely filled with electrons the next electron will enter.  
 (a) 5s (b) 6s (c) 5d (d) 5p
- 117) The value of quantum numbers for the outermost electron in scandium (Sc = 21) are.  
 (a)  $n = 3, l = 2$  (b)  $n = 3, l = 3$   
 (c)  $n = 4, l = 0$  (d)  $n = 2, l = 3$
- 118) Which is correct in case of p-orbital is.  
 (a) They are spherical (b) They have strong directional character  
 (c) They have five fold degenerate (d) They have no directional character

Answer Key

Question	96	97	98	99	100	101	102	103	104	105	106	107	108
Answer	d	b	d	a	a	c	d	a	c	d	c	c	b

Topic 2

- (109) The energy of electromagnetic radiation depends on.  
 (a) Amplitude and wave-length (b) Wave length  
 (c) Amplitude  
 (d) Temperature and medium through which it passes
- (110) The electronic configuration  $1s^2, 2s^2, 2p^6, 3s^1, 3p^1$  correctly describe.  
 (a) Ground state of Na (b) Ground state of  $Si^+$   
 (c) Excited state of Mg (d) Excited state of  $Al^{+3}$
- (111) The orbital cylindrically symmetrical about x-axis is .  
 (a)  $P_z$  (b)  $P_y$  (c)  $P_x$  (d)  $d_{xz}$
- (112) Which represent the correct set up of the four quantum numbers of 4s-electron.  
 (a) 4, 3, 2, +1/2 (b) 4, 2, 1, 0  
 (c) 4, 3, -2, +1/2 (d) 4, 0, 0, 1/2
- (113) In H-atom, the electron is deexcited from 5th shell to 1st shell. How many different line may appear in line spectrum.  
 (a) 4 (b) 8 (c) 10 (d) 12
- (114) The quantum number that does not describe the distance and angular momentum of the electron is.  
 (a) n (b) l (c) m (d) s
- (115) The electron would go to lower energy level first and then to higher energy level according to which of the following.  
 (a) Aufbau Principle (b) Pauli Exclusion Principle  
 (c) Hund's Rule (d) Heisenberg uncertainty principle
- (116) If the radius of First Bohr's orbit will be  $a_0$ , then the radius of third Bohr's orbit would be.  
 (a)  $3 \times a_0$  (b)  $6 \times a_0$  (c)  $9 \times a_0$  (d)  $1/9 \times a_0$
- (117) As electron move away from the nucleus its potential energy.  
 (a) Decreases (b) Increases  
 (c) Remains constant (d) None

Answer Key

Question	109	110	111	112	113	114	115	116	117			
Answer	b	c	c	d	c	d	a	c	b			

Explanation

Q.3 (d)  $Sc^{+3}$  has no unpaired electron. So it is colourless.

Q.6 (b)  ${}_{19}K = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 4s^1$   
 $4s^1$  shows  $n = 4, l = 0, m = 0, s = +1/2$

Q.7 (c) All have fourteen electrons

Q.8 (d) Formula for finding the no. of orbitals  $(n)^2$  for L shell  $n = 2$  so  
 $(2)^2 = 4$

Q.9 (b)  $r_n \propto n^2$  so  $r_2 = 4r_1$

Q.10 (a) Halogen are most electronegative so configuration is  $ns^2, np^3$

Q.16 (b)  $r_n = 0.53 \times \frac{n^2}{z} = \frac{0.53 \times 1^2}{3} = 0.17 \text{ \AA}$

Q.17 (a)  $Z = 35 = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4p^5$   
No. of electrons =  $6 \times 2 + 5 = 17$

Q.19 (b) No. of line =  $\frac{n(n-1)}{2} = \frac{4(4-1)}{2} = 6$

Q.24 (c) Angular momentum =  $\frac{nh}{2\pi}$

as 2.5 is not integer so  $\frac{2.5h}{2\pi}$

is not possible

Q.25 (b)  $E = \frac{hc}{\lambda} = \frac{6.62 \times 10^{-27} \times 3 \times 10^8}{2000 \times 10^{-8}} = 9.94 \times 10^{-12} \text{ erg}$

Q.26 (c)  $Cs^+ = 1s^2, 2s^2, 2p^6, 3s^2, 3p^6, 3d^{10}, 4p^6, 5s^2, 4d^{10}, 5p^6$

No. of electrons in all S =  $5 \times 2 = 10$

No. of electrons in all P =  $4 \times 6 = 24$

No. of electrons in all d =  $10 \times 2 = 20$

Q.28 (d) As circumference =  $n\lambda = 4\lambda$

Q.29 (a) Z has 13 electrons, Y has 9, X has 8 electrons in M shell

Q.30 (b)  $\frac{E_1}{E_2} = \frac{\lambda_2}{\lambda_1} = \frac{6000}{3000} = 2 : 1$

Since  $E \propto \frac{1}{\lambda}$

Q.31 (c) As  $E_n \propto \frac{1}{n^2} = \frac{-328}{4} = -82 \text{ kJ mol}^{-1}$

Q.32 (d)  $V_n = 2.188 \times 10^6 \times \frac{Z}{n} = \frac{2.188 \times 10^6 \times 1}{2}$

Q.33 (a)  $= 1.094 \times 10^6 \text{ ms}^{-1}$   
It is 1s level, the ground state where hydrogen atom can absorb a photon and go to higher excited state.

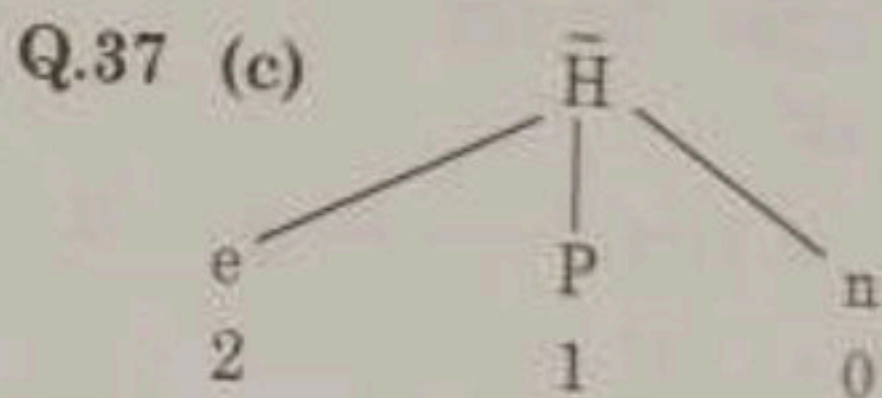
Q.34 (b)  $IE = 13.6 \text{ eV} \times Z^2 = 13.6 \times 4 = 54.4 \text{ eV}$

Q.35 (d) No. of unpaired electron in  $Ni^{+2}$  is two

Total spin =  $\pm \frac{1}{2} \times \text{No. of unpaired electron} = \pm \frac{1}{2} \times 2 = \pm 1$

Q.36 (a)  $mvr = \frac{nh}{2\pi}$  here  $n = 1$

$mvr = \frac{h}{2\pi}$



Q.41 (b)  $E = -13.6 \text{ eV} \cdot \frac{Z^2}{n^2} = -13.6 \times \frac{1}{4} = -3.4$

Q.43 (d)  $R = \frac{me^4}{8\epsilon_0^2 h^3 c}$

$R = \text{constant } e^4$

کی پور 4 پائے اندر کرے کوہاں کیا جائے R کی ویلیو 16 گنا کم ہو جائے گی۔

Q.44 (c) Secondary quantum is called Azimuthal quantum no.

If  $n = 3$   $l, 0 \dots (n-1)$

$l, 0 - (3-1)$

$l, 0 - 2$

$l = 0, 1, 2$

Q.45 (c)  $\bar{V} = \frac{1}{\lambda}$

Q.46 (a) Because half filled and completely filled orbitals are stable.

Topic 2

Q.47 (c) RF > μV > IR > visible > UV > x-ray > γ-rays > Cosmic rays

Q.49 (c)  ${}_{17}\text{Cl} = 1s^2, 2s^2, 2p^6, 3s^2, 3p^3$   
Azimuthal P اس میں ہے جبکہ Principal Q.No میں (3)  
3, 1 ہے اور P کے لیے ایک ویلیو on ہوتی ہے۔

Q.51 (b)

دوسرے شیل کے ہاف فلڈ میں سے الیکٹران نکالنا مشکل ہے نسبت تیسرے شیل کے ہاف فلڈ میں سے

Q.53 (b) Electrons are arranged in increasing order of energy level or  $(n + l)$  value

Q.55 (a)  $r = \frac{\text{Diameter}}{2} = \frac{6.92}{2} = 8.46 \text{ \AA}$

$r = 0.529 \text{ \AA} \cdot n^2$

$n^2 = \frac{r}{0.529} = \frac{8.46}{0.529}$

$n^2 = 16$

$n = 4$  as n is 4 shell so no. of electron

$= 2n^2 = 2 \times 4^2$

$= 32 \text{ electrons}$

Q.65 (d) No. of orbitals =  $(n)^2 = (3)^2 = 9$

Q.66 (b) If  $l = 2$  mean d subshell =  $10e^-$

Q.70 (b)

Ions	Protons	Electrons	Neutrons
$\bar{\text{D}}$	1	2	1
$\text{He}^+$	2	1	2
$\text{OH}^-$	9	10	8
$\text{OD}^-$	9	10	9

Q.81 (a)  $\lambda = \frac{h}{mv}$

$\lambda \propto \frac{1}{\text{momentum}}$

Q.84 (d)  $\text{PE} = \frac{-ze^2}{4\pi\epsilon_0 r}$  ( $z = 3$  for  $\text{Li}^{+2}$ )

Q.86 (b) Change on electron ad  $\text{H}^+$  is same. The ratio of  $e/m$  is the ratio of mass of proton to electron.

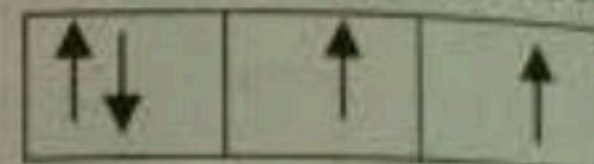
Q.87 (d)  $h = \frac{E}{\nu}$  put the dimension of energy and frequency

$= \frac{\text{energy}}{\text{time}^{-1}} = \text{Energy} \cdot \text{time}$

Q.90 (c) Ground state configuration of Ne =  $1s^2, 2s^2, 2p^6$

Q.91 (d) Pauli exclusion principle

Q.92 (a) P orbitals the electrons are



Q.96 (d) For 4d,  $n = 4, l = 2$

$m = -2, -1, 0, +1, +2, S = +1/2, \text{ or } -1/2$

Q.97 (b)  $n + l$  is more for subshell, more will be its energy

Q.98 (d) Combination of  $\alpha$  particle with nuclide increases mass no by 4 and atomic number by 2 units.

Q.99 (a) Li has  $2s^1$  configuration

$n = 2, l = 0, m = 0, s = +1/2$

Q.100 (a)  $\text{He}^{-2}$  has four electrons, thus four sets are possible (Pauli Exclusion Principle)

Q.101 (c) Element with atomic no.17 has  $3s^2, 3p^5$  in the valence shell. So valence shell no is 3

Q.102 (d) 4-d subshell

$n = 4, l = 2, m = 0, s = \pm 1/2$

Q.103 (a) Element with atomic no.15 has  $3s^2, 3p^3$  valence shell

Q.104 (c) Elements with atomic no.17 has  $3s^2, 3p^5$  valence shell. So shell no is 3

Q.105 (d)  ${}_{3}\text{Li}, {}_{12}\text{Mg}$

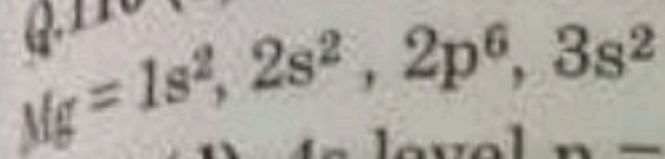
Q.106 (c)  $(n + l)$  for 4f and 5d is same but n is smaller for 4f so energy order  $4f < 5d$

Q.107 (c) The outer most electron in  ${}_{24}\text{Sc}$  is  $4s^2$

Q.108 (b) p orbital is dum-bell in shape and have directional in nature.

Q.109 (b)  $E = \frac{hc}{\lambda} = E \propto \frac{1}{\lambda}$

Q.110 (c) Ground state of



Q.112 (d) 4s level  $n = 4, l = 0$

Q.113 No. of lines during jump =  $\Sigma \Delta n$

$$\Delta n = n_2 - n_1 = 5 - 1 = 4$$

$$\Sigma \Delta = 1 + 2 + 3 + 4 = 10$$

Q.116 (c)  $r_n = r_1 \times n^2$

$$r_n = r_1 \times (3)^2$$

$$r_n = 9a_0$$

Q.117 (b) Potential energy =  $\frac{-Ze^2}{r}$

# TOPIC 3 >>

## GASES

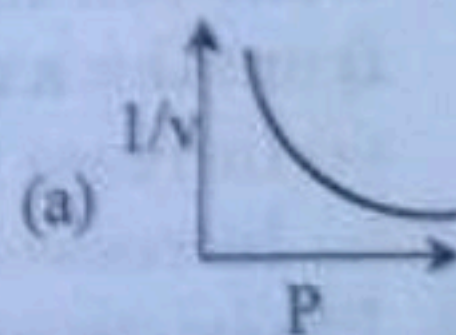
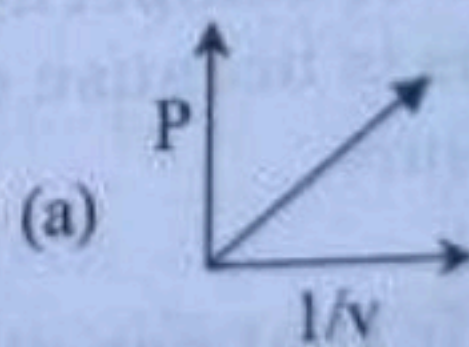
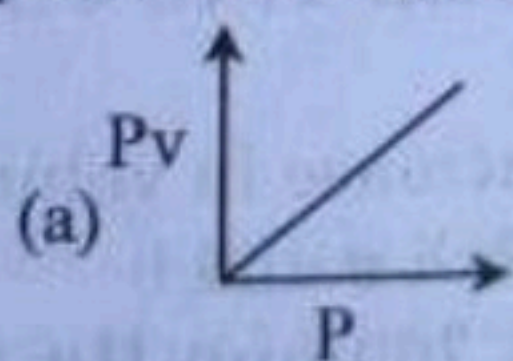
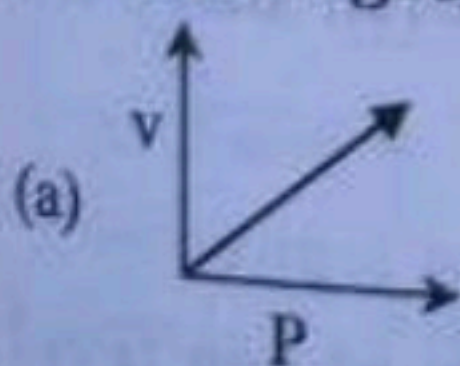
**MCQs**

- (1) In the gas equation  $PV = nRT$  the value of universal gas constant depends upon.
  - (a) The nature of gas
  - (b) The pressure of the gas
  - (c) The temperature of gas
  - (d) The unit of measurement
- (2) Joule Thomson effect for an ideal gas
  - (a) Zero
  - (b) +ve
  - (c) -ve
  - (d) None of these
- (3) Gases deviates from ideal behavior because their molecules
  - (a) Possess negligible volume
  - (b) Have force of attraction between them
  - (c) Are polyatomic
  - (d) All of the above
- (4) The Vander Waal's equation explains the behaviour of
  - (a) Ideal gases
  - (b) Real gases
  - (c) Both
  - (d) None
- (5) Which set of condition represents easiest way to liquefy a gas
  - (a) Low temperature High pressure
  - (b) High temperature Low pressure
  - (c) Low temperature and low pressure
  - (d) High temperature and high pressure
- (6) An ideal gas expand according to  $PV = \text{constant}$  on expansion the temperature of the gas
  - (a) Will rise
  - (b) Will drop
  - (c) Will remain constant
  - (d) Cannot be determined
- (7) Consider an idea gas contained in a vessel if intermolecular interaction suddenly begins to act. Which of following will happen
  - (a) The pressure decreases
  - (b) The pressure increases
  - (c) The pressure remains unchanged
  - (d) The gas collapses
- (8) Which is valid at absolute zero
  - (a) KE of gas become zero but molecular motion does not zero
  - (b) KE of gas become zero but molecular motion also becomes zero
  - (c) KE decreases but does not become zero
  - (d) None of the above
- (9) Root mean square speed at normal temperature and pressure of the gas can be calculated from expression
  - (a)  $\sqrt{3p/d}$
  - (b)  $\sqrt{3pv/m}$
  - (c)  $\sqrt{3RT/M}$
  - (d) All are correct
- (10) Which pair of gaseous species diffuse through a small Jet with the same rate of diffusion at same P and T
  - (a) NO, CO
  - (b) No, CO<sub>2</sub>
  - (c) NH<sub>3</sub>, PH<sub>3</sub>
  - (d) NO, C<sub>2</sub>H<sub>6</sub>

**Answer Key**

Question	1	2	3	4	5	6	7	8	9	10
Answer	d	a	b	b	a	c	a	b	d	d

- (11) Which gas may be collected over water  
 (a)  $\text{NH}_3$  (b)  $\text{N}_2$  (c)  $\text{HCl}$  (d)  $\text{SO}_2$
- (12) A closed vessel contain equal no of nitrogen and oxygen molecule at a pressure of  $P$  mm. If the nitrogen is removed from the system, then the pressure will be .  
 (a)  $p$  (b)  $2p$  (c)  $p/2$  (d)  $p^2$
- (13) Four rubber tubes are respectively filled with first  $\text{H}_2$ ,  $\text{O}_2$ ,  $\text{N}_2$  and  $\text{He}$ . the tube which will be reinflated first.  
 (a)  $\text{H}_2$  filled tube (b)  $\text{O}_2$  filled tube  
 (c)  $\text{N}_2$  filled tube (d)  $\text{He}$  filled tube
- (14) A real gas most closely approaches the behavior of ideal gas.  
 (a) 15 atm and 200k (b) 1 atm, 273k  
 (c) 0.5 atm, 500k (d) 15 atm, 500k
- (15) Which forces of attraction are responsible for liquefaction of  $\text{H}_2$ .  
 (a) Coulomb force (b) Dipole force and vander waals forces  
 (c) Hydrogen bonding (d) None of the above
- (16) The value of  $R$  in SI units is.  
 (a)  $8.315 \times 10^7 \text{ erg k}^{-1} \text{ mol}^{-1}$  (b)  $8.315 \text{ Jk}^{-1} \text{ mol}^{-1}$   
 (c)  $0.0823 \text{ atm liter k}^{-1} \text{ mol}^{-1}$  (d)  $2 \text{ cal k}^{-1} \text{ mol}^{-1}$
- (17) Gas equation  $Pv = nRT$  is obeyed by.  
 (a) only isothermal process (b) only adiabatic process  
 (c) both a and b (d) None
- (18) The pressure of gas having 2 mole in 44.8 liter vessel at 540k is.  
 (a) 1 atm (b) 2 atm (c) 3atm (d) 4 atm
- (19) A gas is heated from  $0^\circ\text{C}$  to  $100^\circ\text{C}$  at 1.0 atm pressure if the initial volume of the gas is 10 liter, its final volume would be.  
 (a) 7.32 litre (b) 10.0 litre (c) 13.66 litre (d) 20 litre
- (20) The kinetic energy of two moles of  $\text{N}_2$  at  $27^\circ\text{C}$  is  $R = 8.314 \text{ jk}^{-1} \text{ mol}^{-1}$ .  
 (a) 549.6J (b) 6491.6 J (c) 7482.6 J (d) 8882.4 J
- (21) Which graph represent Boyle's law.



- (22) The deviation of gas from ideal behavior is maximum at.  
 (a)  $-10^\circ\text{C}$  and 5.0 atm (b)  $-10^\circ\text{C}$  and 2.0 atm  
 (c)  $100^\circ\text{C}$  and 2.0 atm (d)  $-0^\circ\text{C}$  and 2.0 atm

## Answer Key

Question	11	12	13	14	15	16	17	18	19	20	21	22
Answer	b	c	a	c	b	b	c	b	c	c	c	a

- (23) If absolute temperature of gas is increased 2 times and pressure is also increased two times the volume of the gas will be.  
 (a) Remains unchanged (b) Increase four times  
 (c) Increase two times (d) Reduce 1/4th
- (24) Which of following gases show more deviation from ideal behavior.  
 (a) N<sub>2</sub> (b) O<sub>2</sub> (c) NH<sub>3</sub> (d) Ar
- (25) Which of following laws can only be explained on the basis of absolute Kelvin scale..  
 (a) Boyle's law (b) Dalton's law (c) Charle's law (d) Avogadro's law
- (26) Which of following is correct equation to calculate relative molar mass of gas.  
 (a)  $M = mPR/VT$  (b)  $M = mPRT/V$  (c)  $M = Pv/mRT$  (d)  $M = mRT/Pv$
- (27) The value and unis of ideal gas constant R depends on.  
 (a) Unit of pressure ad volume only (b) Units of temperature only  
 (c) Both A and B (d) Neither A and B
- (28) The value of ideal gas constant is  $dm^3 \text{ torr } k^{-1}mol^{-1}$  is .  
 (a) 0.0821 (b) 62.4 (c) 1.98 (d) 8.314
- (29) According to kinetic molecular theory of gas moleculaes varies directly with.  
 (a) Pressure (b) Density (c) Volume (d) Absolute temperature
- (30) 16 g of each of CH<sub>4</sub> and He are in container at 50°C the rato of kinetic energy is.  
 (a) 1:16 (b) 16 : 1 (c) 1 : 4 (d) 4 : 1
- (31) Molar volume of CO<sub>2</sub> is maximum at.  
 (a) STP (b) 0°C and 2 atm  
 (c) 127°C and 1 atm (d) 227°C and 2 atm
- (32) Which of the following shows minimum deviation from ideal gas behavior.  
 (a) N<sub>2</sub> (b) Cl<sub>2</sub> (c) H<sub>2</sub> (d) O<sub>2</sub>
- (33) With the increase of temperature from T<sub>1</sub> to T<sub>2</sub>. Isotherm have away from the axis. This is because of  
 (a) Increase in pressure (b) Increase in volume  
 (c) Increase in mass (d) Both a and b
- (34) Pressure of the air that can support 760 mm Hg column at sea level is called.  
 (a) 1 atm (b) 114.7 PSI (c) 101325 Nm<sup>-2</sup> (d) All
- (35) If absolute temperature of gas is reduced to 1/2 and pressure is doubled the volume of the gas will.  
 (a) Remain unchanged (b) increase four times (c) Reduce to 1/4<sup>th</sup> (d) be doubled

Answer Key

Question	23	24	25	26	27	28	29	30	31	32	33	34	35
Answer	a	c	c	d	c	b	d	c	c	c	b	d	c

- (36) A gas will approach ideal behavior at.  
 (a) Low temperature (b) Low pressure high temperature  
 (c) High temperature low pressure (d) High temperature high pressure
- (37) The expression for root mean square velocity is.  
 (a)  $C_{rms} = \left(\frac{3RT}{M}\right)^{1/2}$  (b)  $C_{rms} = \left(\frac{3PV}{M}\right)^{1/2}$  (c)  $C_{rms} = \left(\frac{3P}{d}\right)^{1/2}$  (d) All are correct
- (38) At constant pressure, the pressure of an ideal gas is doubled if its density became.  
 (a) Half (b) Double (c) Same (d) None
- (39) Which one has lowest density at room temperature..  
 (a) Ne (b)  $N_2$  (c)  $NH_3$  (d) CO
- (40) Which of the following mixture of gases does not obey Dalton law of partial pressure.  
 (a)  $O_2$  and  $CO_2$  (b)  $N_2$  and  $O_2$  (c)  $Cl_2$  and  $SO_2$  (d)  $NH_3$  and HCl
- (41) The dimension of pressure are same as that of.  
 (a) Energy (b) Energy per unit volume  
 (c) Force per unit area (d) Force per unit volume
- (42) Ideal gas obeying kinetic theory of gases can be liquefied if.  
 (a)  $T > T_c$  (b)  $P > P_c$   
 (c)  $P > P_c$  and  $T < T_c$  (d) It can not be liquefied at any value of P and T
- (43) An ideal gas obeying kinetic theory of gas cannot be liquefied because.  
 (a) Its critical temperature is above  $0^\circ C$   
 (b) Its molecules are relatively small in size  
 (c) It solidifies before becoming a liquid  
 (d) Forces acting b/w its molecules are negligible
- (44) Which of the following expression correctly represents the relationship between the average molar kinetic energy of CO and  $N_2$  molecules at the same temperature .  
 (a)  $\bar{KE}_{CO} > \bar{KE}_{N_2}$  (b)  $\bar{KE}_{CO} < \bar{KE}_{N_2}$   
 (c)  $\bar{KE}_{CO} = \bar{KE}_{N_2}$  (d) cannot be predicted unless gas are given
- (45) Which of the following law leads to conclusion that 1g-molecule of each gas at STP occupies a volume of 22.42.  
 (a) Dalton's law (b) law of combination volume  
 (c) Avogadro's law (d) Boyle's law
- (46) The compressibility factor of an ideal gas is.  
 (a) 1 (b) 2 (c) 4 (d) 0

Answer Key	36	37	38	39	40	41	42	43	44	45	46
Question	36	37	38	39	40	41	42	43	44	45	46
Answer	b	d	b	c	d	c	d	d	c	c	a

- (47) The temperature below which a gas can be made to liquefy by variation in pressure is called its.  
 (a) Inversion in temperature (b) critical temperature  
 (c) Neutral temperature (d) All
- (48) By ideal gas law pressure of 0.60 mole  $\text{NH}_3$  gas in 3.0 litre vessel at  $25^\circ\text{C}$  is.  
 (a) 48.9 atm (b) 4.89 atm (c) 0.489 atm (d) 489 atm
- (49) At what centigrade temperature will be the volume of gas at  $0^\circ\text{C}$  double of itself, when the pressure remains constant.  
 (a)  $0^\circ\text{C}$  (b)  $273^\circ\text{C}$  (c) 273 K (d) 546 K
- (50) Pressure of mixture of 4g of  $\text{O}_2$  and 2g of  $\text{H}_2$  is in a bulb of 1.0L capacity at  $0^\circ\text{C}$  is.  
 (a) 25.18 atm (b) 31.20 atm (c) 40.215 atm (d) 15.21 atm
- (51) The volume occupied by 9.0 g of nitrogen gas at 300 K and 750 mm Hg pressure is.  
 (a) 5.85 (b) 6.74 (c) 8.84 (d) 8.022
- (52) What are conditions under which the relation between volume V and number of moles n of gas is plotted (P = pressure, T = temperature).  
 (a) Constant P and T (b) Constant V and v  
 (c) Constant P and V (d) Constant n and v
- (53) n moles of an ideal gas at temperature T in kelvin occupy V liters of volume exerting a pressure of P atmosphere what is its concentration in mole  $\text{L}^{-1}$ .  
 (a)  $P/RT$  (b)  $RT/P$  (c)  $PT/R$  (d)  $R/PT$
- (54) 7.5 grams of gas occupy 5-6 liters of volume at STP the gas is.  
 (a)  $\text{N}_2\text{O}$  (b) NO (c) CO (d)  $\text{CO}_2$
- (55) The compressibility factor for one mole of Van der Waals gas at  $0^\circ\text{C}$  and 100 atmosphere pressure is found to be 0.5 the volume of gas molecule is.  
 (a) 2.02 L (b) 1.466 L (c) 0.58 L (d) 0.1119 L
- (56) 4 gram of an ideal gas occupies 5.6035 liter of volume at 546 K and 2 atm pressure what is molecular weight  
 (a) 4 (b) 16 (c) 32 (d) 64
- (57) The kinetic energy of 4 moles of nitrogen gas at  $127^\circ\text{C}$  is — Kcal ( $R = 2 \text{ cal mol}^{-1}\text{K}^{-1}$ ).  
 (a) 4400 (b) 3200 (c) 4800 (d) 1524
- (58) A gaseous mixture contains 56 g of  $\text{N}_2$ , 44 g  $\text{CO}_2$  and 16 g of  $\text{CH}_4$  total pressure of mixture is 720 mm Hg. The partial pressure of methane is.  
 (a) 75 mm (b) 160 mm (c) 180 mm (d) 215 mm

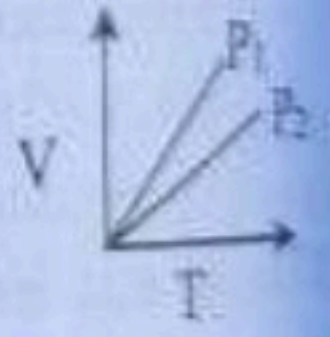
## Answer Key

Question	47	48	49	50	51	52	53	54	55	56	57	58
Answer	b	b	b	a	d	a	a	b	d	b	c	c

- (59) At 25°C and 730mm pressure, 380 ml & dry oxygen was collected of temperature is constant. What volume will oxygen occupy at 760 mm pressure  
 (a) 365 ml (b) 2 ml (c) 10 ml (d) 20 ml
- (60) At certain pressure, volume of gas at 27°C is 20 litre If pressure and temperature are doubled its volume will be  
 (a) 20 litre (b) 40 litre (c) 8.2 litre (d) 10.9 litre
- (61) If two mole of an ideal gas at 540 K has volume 44.8 L than its pressure will be  
 (a) 1 atm (b) 2 atm (c) 3 atm (d) 4 atm
- (62) The densities of two gases are in ratio of 1:16. The ratio of their rate of diffusion  
 (a) 16:1 (b) 4:1 (c) 1:4 (d) 1:16
- (63) The critical temperature of water is higher than that of O<sub>2</sub> because the H<sub>2</sub>O molecule has  
 (a) Fewer electrons than O<sub>2</sub> (b) Two covalent bonds  
 (c) V-shape (d) Dipole moment
- (64) If pressure of 2 moles of an ideal gas at 546K having volume 44.8 litre is  
 (a) 2 atm (b) 3 atm (c) 4 atm (d) 1 atm
- (65) 56 g nitrogen and 96g of oxygen are mixed isothermally and the total pressure is 10 atm. This partial pressure of oxygen and nitrogen (in atm) are respectively.  
 (a) 4, 6 (b) 5, 5 (c) 6, 4 (d) 8, 2
- (66) A bottle of dry NH<sub>3</sub> and dry HCl connected through a long tube are opened. Simultaneously at both ends the white NH<sub>4</sub>Cl first formed will be  
 (a) At the centre of the tube (b) Near HCl bottle  
 (c) Near NH<sub>3</sub> (d) Through out the length of tube
- (67) If gas expands at constant temperature 1. Pressure decrease 2. Kinetic energy of molecules remains the same 3. Kinetic energy of molecules decrease 4. the no. of molecules of gas increase  
 (a) 1, 2 (b) 1, 2, 3 (c) 1, 2, 4 (d) 2, 3
- (68) At what temperature the rms of gas shown at 50°C will be doubled  
 (a) 626 K (b) 1019°C (c) 218 K (d) 1019 K
- (69) An ideal gas cannot be liquefied because  
 (a) it solidifies before becoming a liquid  
 (b) forces operative between its molecules are negligible  
 (c) its molecules are relatively small in size  
 (d) its critical temperature is above 0°C

## Answer Key

Question	59	60	61	62	63	64	65	66	67	68	69
Answer	a	a	b	b	d	a	c	b	a	b	b

- (70) The value of Vander Waal's constant 'a' for the gases  $O_2$ ,  $N_2$ ,  $NH_3$  and  $CH_4$  are 1.360, 1.390, 4.170, 2.253 the gas which can most easily be liquefied is  
 (a)  $O_2$  (b)  $N_2$  (c)  $NH_3$  (d)  $CH_4$
- (71) The Density of gas A is twice than that of B and molecular weight is of a half of that of B, The ratio of partial pressure of  $P_A$  and  $P_B$  is  
 (a)  $1/4$  (b)  $4/1$  (c) 2 (d)  $1/2$
- (72) The density of Neon gas will be highest at  
 (a) STP (b)  $0^\circ C$ , 2 atm  
 (c)  $273^\circ C$ , 1 atm (d)  $273^\circ C$ , 2 atm
- (73) AT constant volume for fixed number of moles of gas, the pressure of the gas increases with the rise in the temperature due to  
 (a) increase in average molecular speed  
 (b) increase in rate of collision  
 (c) increase in molecular attraction  
 (d) increase in mean free path
- (74) Four one litre flasks are separately filled with gases  $O_2$ ,  $F_2$ ,  $CH_4$  and  $CO_2$  under the same conditions the ratio of the number of molecules in these gases are  
 (a) 2:2:4:3 (b) 1:1:1:1 (c) 1:2:3:4 (d) 2:2:3:4
- (75) 6.4 g of  $SO_2$  at  $0^\circ C$  and 0.99 atm pressure occupies a volume of 2.24 L. Predict which of the following is correct.  
 (a) the gas is ideal  
 (b) the gas is real with the intermolecular attraction  
 (c) the gas is real without intermolecular attraction  
 (d) the gas is ideal with intermolecular repulsion
- (76) V vs T curves at constant pressure  $P_1$ , and  $P_2$  for an ideal gas are shown below which of the following is correct  
 (a)  $P_1 > P_2$  (b)  $P_2 < P_1$   
 (c)  $P_1 = P_2$  (d) All the above
- 
- (77) If increase in temperature and volume of an ideal gas is two time than the initial pressure changes to  
 (a) 4 P (b) 2 P (c) P (d) 3 P
- (78) What is the ratio of kinetic energy of 3g of hydrogen and 4 gram of oxygen at T(K)  
 (a) 12:1 (b) 6:1 (c) 1:6 (d) 24:1
- (79) The density of a gas is  $1.964 \text{ g dm}^{-3}$  at 273 K one of 76 cm. The gas is  
 (a)  $CH_4$  (b)  $C_2H_6$  (c)  $CO_2$  (d) Xe

## Answer Key

Question	70	71	72	73	74	75	76	77	78	79
Answer	c	b	b	a	b	a	b	c	a	c

- (98) By Charle's law, there will be change in the volume of given mass of gas by  $1/273$  of its original volume at  $0^\circ\text{C}$ , if temperature of gas is hanged by.
- (a)  $10^\circ\text{C}$  (b)  $1^\circ\text{C}$  (c)  $100^\circ\text{C}$  (d)  $2^\circ\text{C}$
- (99) A graph obtained between pressure and number of moles is.
- (a) Straight line parallel to x-axis (b) Straight line passing through the origin  
(c) Straight line parallel to y-axis (d) Descending curve
- (100) Vapour pressure of liquid .
- (a) Increase with decrease of temperature  
(b) Increase with the size of container  
(c) Increase with increase of temperature  
(d) Increases with volume of liquid
- (101) In van der Waal's equation if the value of 'a' and 'ab' are zero for certain gas. Then the gas is.
- (a) Non ideal (b) Real (c) Ideal (d) Noble gas
- (102) Which order of vapour pressure in the following liquid is correct.
- (a) Water > Ethanol > Acetone (b) Ethanol > Acetone > water  
(c) Acetone > ethanol > water (d) Water > acetone > ethanol
- (103) In the process of respiration there is application of .
- (a) Dalton's law (b) Boyle's law  
(c) Charle's law (d) Graham's law
- (104) Absolute zero is unattainable, current attempts have resulted temperature as low as.
- (a)  $10^{-4}\text{K}$  (b)  $10^{-1}\text{K}$  (c)  $10^{-2}\text{K}$  (d)  $10^{-5}\text{K}$
- (105) The root mean square velocity of gases is inversely proportional to the square root of their .
- (a) Molar mass (b) Pressure (c) Temperature (d) volume
- (106) Which one of the following is mathematical expression represents the Avogadro's law.
- (a)  $v = R \frac{nT}{P}$  (n, T constant) (b)  $V = R \frac{P}{nT}$  (P, n constant)  
(c)  $V = \frac{R nT}{P}$  (p, T and n constant) (d)  $V = \frac{R nT}{P}$  (p, T constant)
- (107) Minimum value of root mean square velocity is .
- (a)  $\text{NH}_3$  (b)  $\text{CO}_2$  (c)  $\text{N}_2$  (d)  $\text{CH}_4$
- (108) If we decrease temperature and pressure by a factor of two then the volume of the gas will.
- (a) Increases two times (b) Decreases  $1/4$  times  
(c) Decreases two times (d) Remains constant

## Answer Key

Question	98	99	100	101	102	103	104	105	106	107	108
Answer	c	b	c	c	c	a	d	a	d	b	d

- (88) If 20g of gas at one atmosphere pressure is cooled from  $273^{\circ}\text{C}$  to  $0^{\circ}\text{C}$  at constant volume, its pressure would become.  
 (a) 2.0 atm (b) 1.5 atm  
 (c) 1.0 atm (d) 0.5 atm
- (89) If P, V, M, T and R are pressure, volume, molar mass, temperature and gas constant respectively, then for an ideal gas the density is given by  
 (a)  $\frac{RT}{PM}$  (b)  $\frac{M}{V}$   
 (c)  $\frac{P}{RT}$  (d)  $\frac{PM}{RT}$
- (90) According to kinetic theory of gases, the average kinetic energy depends upon.  
 (a) Collision (b) volume  
 (c) temperature (d) atomic number
- (91) If volume of  $\text{O}_2$  is  $11.2 \text{ dm}^3$  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
- (92) One mole of gas refers to.  
 (a) The number of molecules in  $1 \text{ dm}^3$  of gas  
 (b) The no. of molecules in one formula weight of gas  
 (c) The number of molecules in  $22.4 \text{ dm}^3$  of gas at STP (d) All
- (93) The compressibility factor ( $Z = \frac{PV}{nRT}$ ) has value at which a gas shows maximum non-ideality in behaviour.  
 (a) 1.5 (b) 1.1  
 (c) 1.0 (d) 0.9
- (94) The statement equal volume of gases measured at same temperature and pressure contain the same number of molecules is known as.  
 (a) Boyle's law (b) Avogadro's law  
 (c) Charles's law (d) Graham's law
- (95) The mean square velocity of gas molecules — to temperature.  
 (a) Inversely proportional (b) Independent  
 (c) Directly proportional (d) constant
- (96)  $3\text{NA}$ ,  $2\text{NA}$  and  $1\text{NA}$  molecules of  $\text{N}_2$ ,  $\text{O}_2$ , and He are present in a container. The mole ratio of these gases is.  
 (a) 2:1:3 (b) 3:1:2  
 (c) 2:3:1 (d) 3:2:1
- (97) At constant temperature when the pressure of the gas is increased to three times then its volume becomes.  
 (a)  $\frac{2V}{3}$  (b)  $3V$   
 (c)  $\frac{V}{3}$  (d)  $5V$

## Answer Key

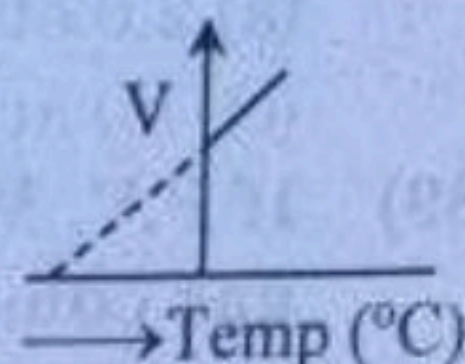
Question	88	89	90	91	92	93	94	95	96	97
Answer	d	d	c	b	c	a	b	c	d	c

(80) If two moles of an ideal gas at temperature 546 K occupy a volume of 44.8 litre its pressure must be

- (a) 4 atm                      (b) 3 atm                      (c) 2 atm                      (d) 1 atm

(81) The following graph illustrates

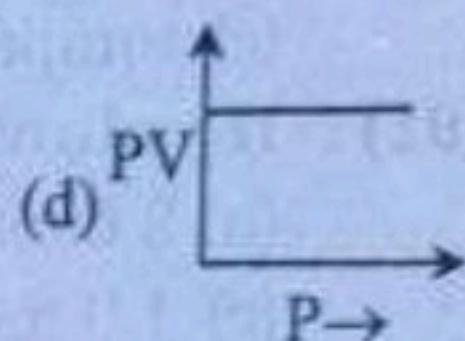
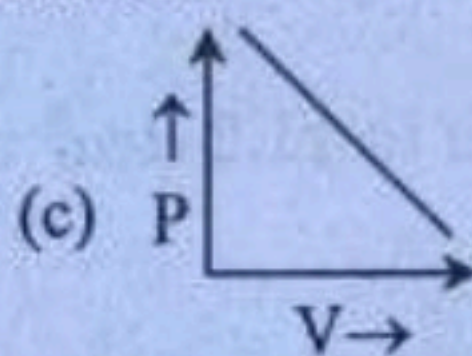
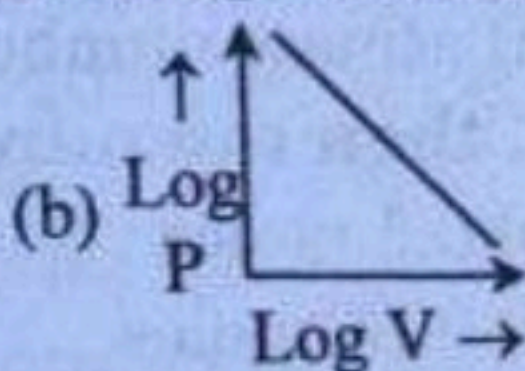
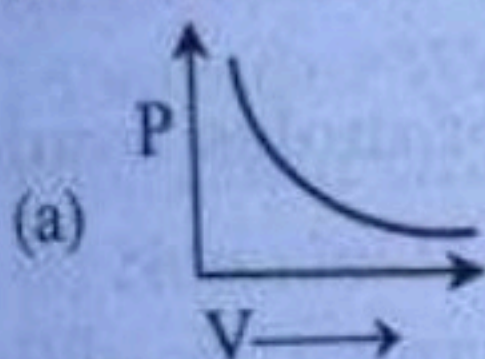
- (a) Boyle's law                      (b) Charles law  
(c) Dastons law                      (d) Gay lussac's law



(82) Containers A and B have same gases, pressure, volume and temperature of A are all twice that of B. than the ratio of number of molecules of A and B are

- (a) 1 : 2                      (b) 2  
(c) 1 : 4                      (d) 4

(83) Which curve does not represents Boyle's law



(84) An ideal gas obeying Kinetic gas equation can be liquefied if

- (a) It cannot be liquefied at any value of P and T  
(b) Its temperature is more than Boyle's temperature  
(c) Its temperature is more than critical temperature  
(d) Its pressure is more than critical pressure

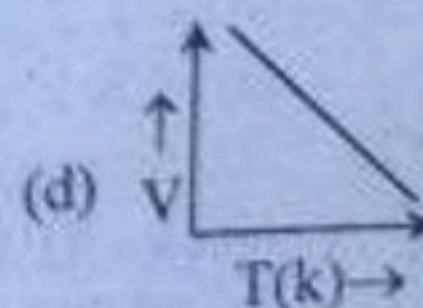
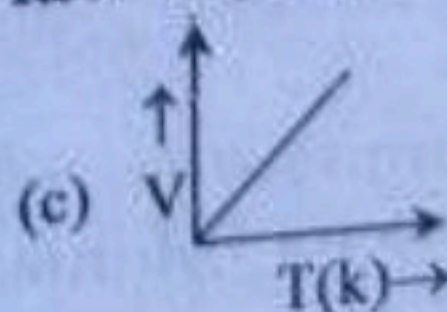
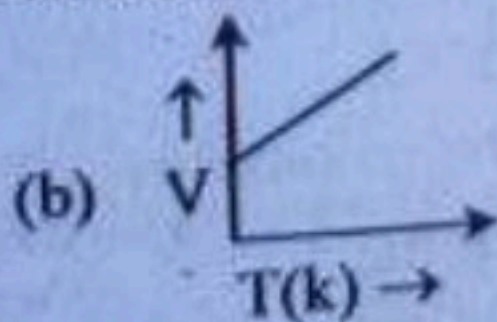
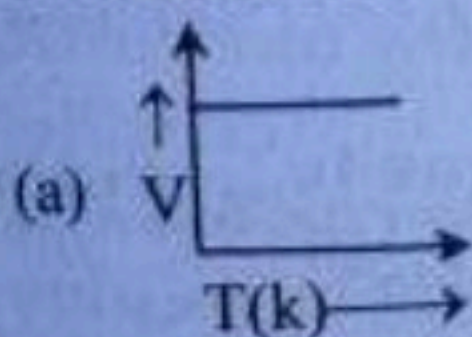
(85) Equal masses of methane and hydrogen are mixed in an empty container at 25°C. The fraction of the total pressure exerted by hydrogen is

- (a) 1/2                      (b) 8/9  
(c) 1/9                      (d) 16/17

(86) Helium atom is two times heavier than hydrogen molecules at 298 K the average kinetic energy of a helium atom is

- (a) same as that of hydrogen molecules  
(b) Half that of hydrogen molecules  
(c) two times that of hydrogen molecules  
(d) Four times that of hydrogen molecules

(87) The correct representation of Charles law is given



Answer Key

Question	80	81	82	83	84	85	86	87
Answer	c	b	b	c	a	b	a	c

- (109) Correct formula of Boyle's law.
- (a)  $PV = \text{constant}$  (b)  $P \propto \frac{1}{V}$  (constant = T)  
 (c)  $P_1V_1 = P_2V_2$  (d) All of them
- (110) If pressure of an ideal gas increases two times and temperature decreases two times than new volume.
- (a) Reduce to 1/2 (b) Increased two time  
 (c) reduce to 1/4 (d) Increased four times
- (111) With the increase of temperature the density of gas .
- (a) Increases (b) Remain same  
 (c) Decreases (d) Not predictable
- (112) A gas X has volume of  $20 \text{ dm}^3$  at STP at what temperature its volume will become  $40 \text{ dm}^3$  by keeping pressure constant.
- (a) 819 k (b)  $819^\circ\text{C}$  (c) 546 K (d)  $546^\circ\text{C}$
- (113) Which of the following has maximum average K.E at  $50^\circ\text{C}$ .
- (a)  $\text{N}_2$  (b)  $\text{CO}_2$  (c)  $\text{CH}_4$  (d) All have same
- (114) Absolute zero is equal to .
- (a) 0 K (b)  $-273^\circ\text{C}$  (c)  $-549.67^\circ\text{F}$  (d) All of these
- (115) Correct unit of ideal gas constant R at STP.
- (a)  $6400 \text{ NmK}^{-1} \text{ mol}^{-1}$  (b)  $0.082 \text{ atm dm}^3 \text{ K}^{-1} \text{ mol}^{-1}$   
 (c)  $8.314 \text{ atm dm}^3 \text{ K}^{-1} \text{ mol}^{-1}$  (d)  $1.98 \text{ Nm K}^{-1} \text{ mol}^{-1}$
- (116) Correct formula for molar mass of ideal gas is.
- (a)  $M = \frac{mRT}{PV}$  (b)  $M = \frac{RT}{PV}$  (c)  $M = \frac{PV}{mRT}$  (d)  $M = \frac{mv}{RT}$
- (117)  $1 \text{ dm}^3$  of  $\text{N}_2$ ,  $\text{H}_2$ ,  $\text{CH}_4$  and  $\text{O}_2$  has number of particles.
- (a)  $6.02 \times 10^{23}$  (b)  $2.68 \times 10^{22}$   
 (c)  $6.02 \times 10^{22}$  (d)  $3.01 \times 10^{23}$
- (118) Non ideal behaviour is maximum at.
- (a) Low P, Low T (b) Low P, High T  
 (c) High P, Low T (d) None o these
- (119) When temperature of 1 mole of ideal gas increases from  $27^\circ\text{C}$  to  $627^\circ\text{C}$  then kinetic energy increases by.
- (a) 2-times (b) 3-times (c) 4-times (d) 6-times
- (120) The temperature at which the molecular motion of gas molecule is ceased.
- (a)  $-273 \text{ K}$  (b)  $-459^\circ\text{F}$  (c)  $0^\circ\text{C}$  (d) All of these
- (121) Maximum density of gas is for .
- (a) He (b) Ne (c)  $\text{CO}_2$  (d)  $\text{N}_2$

## Answer Key

Question	109	110	111	112	113	114	115	116	117	118	119	120	121
Answer	d	c	c	c	d	d	b	a	b	c	b	b	

(a)

(123) If te  
abs

(a) C

(c) C

(124) The

(a) S

(c) S

(125) Cor

(a) V

(c) 4

(126) A c

(a) 1

(c) 3

(127) Str

(a)

(c)

Answer K

Question

Answer

Q.1 (d)

different u

Q.2 (a)

Joules The

Q.6 (c) I

in temper

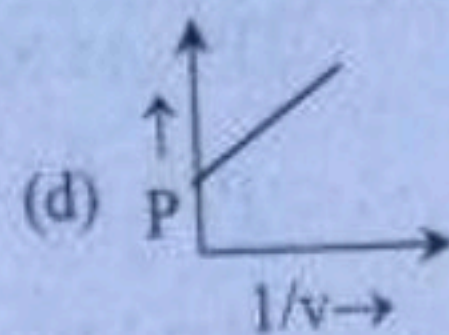
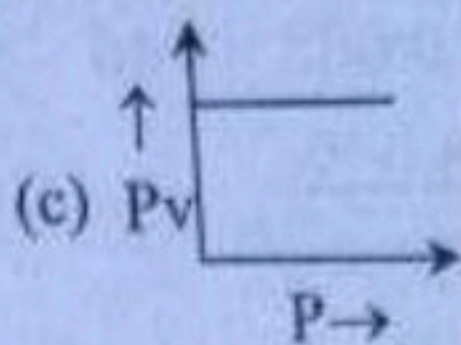
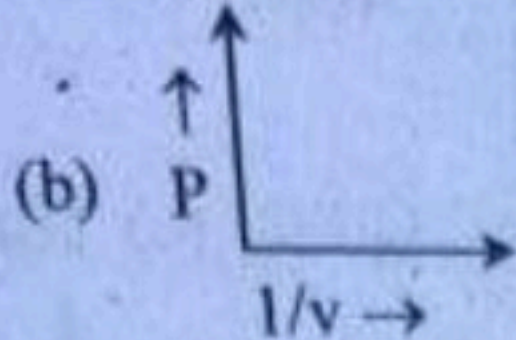
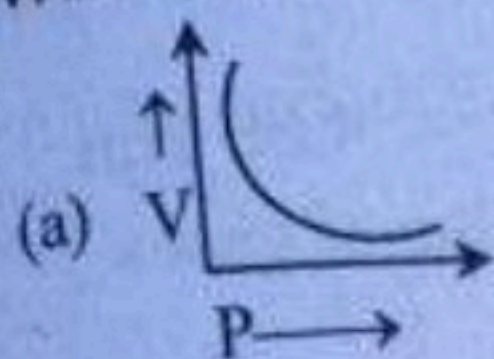
Q.7 (a) I

than ideal

Q.9 (d) I

NMDCAT P

(122) Which is not correct expression of Boyle's law .



(123) If temperature of one mole of gas at STP is increased by 1K then it will absorb — of energy.

- (a) 0.0821 dm<sup>3</sup> atm
- (c) 0.0821 J

- (b) 8314 Jk<sup>-1</sup>mol<sup>-1</sup>
- (d) 8.314 J

(124) The density of gas M will be higher at.

- (a) STP
- (c) 273°C, 1 atm

- (b) 273°C, 2atm
- (d) 0°C, 2atm

(125) Considering the initial volume V if pressure is increased by two and temperature is reduced by two the new volume would be.

- (a) V/4
- (c) 4V

- (b) V/2
- (d) 2V

(126) A container contains a gas at 1 atm pressure compressed to 1/3rd of its initial volume, the pressure applied is .

- (a) 1 atm
- (c) 3 atm

- (b) 2 atm
- (d) 6 atm

(127) Strength of H-boning is about — as that of covalent bond.

- (a) 1/20
- (c) 1/10

- (b) 1/3
- (d) 1/100

Answer Key

Question	122	123	124	125	126	127								
Answer	d	a	d	a	c	a								

**EXPLANATION**

Q.1 (d) R has different values in different units.

Q.2 (a) ideal gases does not show Joules Thomson effect.

Q.6 (c) Ideal gas do not show change in temperature on expansion.

Q.7 (a) Real gases show less pressure than ideal gas due to force of attraction.

Q.9 (d)  $PV = \frac{1}{3} MNC^2$

$$C = \sqrt{\frac{3PV}{M}} = \sqrt{\frac{3RT}{M}} = \sqrt{\frac{3P}{d}}$$

Sine  $V/m = d$

Q.10 (d) No, C<sub>2</sub>H<sub>6</sub> have same wt = 30

Q.11 (b) Except N<sub>2</sub> all are soluble in H<sub>2</sub>O

Q.12 (c) Because  $(P \propto n)$

Q.13 (a) Rate of diffusion of hydrogen is maximum

Q.14 (c) Gases show minimum deviation at low pressure and high T

Q.18 (b)  $PV = nRT$

$$P \times 44.8 = 2 \times 0.082 \times 546$$

$$P = \frac{2 \times 0.082 \times 546}{44.8}$$

$$P = 1.98 \text{ atm}$$

Q.19 (c) At constant pressure

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{10}{273} = \frac{V_2}{373} \Rightarrow V_2 = \frac{10 \times 373}{273}$$

$$V_2 = 13.66 \text{ litre}$$

Q.20 K.E =  $\frac{3}{2} nRT$

$$= \frac{3}{2} \times 2 \times 8.314 \times 300$$

$$= 7482.6 \text{ J}$$

Q.23 (c)  $\text{NH}_3$  is polar and polarity  $\times$  deviation

Q.30 (c)  $\text{CH}_4 : \text{He}$

$$\frac{16}{16} : \frac{16}{4}$$

$$1 : 4$$

Q.35 (c)  $PV : nRT$

$$V = \frac{nRT}{P}$$

$$V = \frac{nRT/2 \times 1/2}{P} = \frac{nRT/4}{P}$$

$$V = \frac{1}{4} \text{ th}$$

Q.38 (d)  $P \propto d$

Q.40 (d) Because  $\text{NH}_3$  and  $\text{HCl}$  react to form  $\text{NH}_4\text{Cl}$

Q.41 (c) By definition pressure is force per unit area.

Q.42 (d) It can not be liquified.

Q.44 (c)  $\text{KE} \propto T$  if  $T$  is same then  $\text{KE}$  is also same.

Q.48 (b)  $P = \frac{nRT}{V} = \frac{0.6 \times 0.082 \times 298}{3}$

$$= 4.89 \text{ atm}$$

Q.50 (a) Total moles of gases

$$= \frac{4}{32} + \frac{2}{2} = \frac{9}{8}$$

$$P = \frac{nRT}{V} = \frac{9 \times 0.082 \times 273}{8}$$

$$= 25.18 \text{ atm}$$

Q.51 (d)  $V = \frac{mRT}{MP}$

$$= \frac{9 \times 0.082 \times 300 \times 760}{28 \times 750}$$

$$= 8.022 \text{ L}$$

Q.53 (a) As we know

$$PV = nRT$$

$$\frac{P}{RT} = \frac{n}{V}$$

$$\frac{P}{RT} \text{ کو کمیشن کہتے ہیں جو برابر ہے } \frac{n}{V}$$

Q.54 (b)  $PV = nRT$

$$PV = \frac{m}{M} RT$$

$$1 \times 5.6 = \frac{7.5}{M} \times 0.082 \times 273$$

$$M = \frac{7.5 \times 0.82 \times 273}{1 \times 5.6}$$

$$M = 29.9 \text{ (NO = 14 + 16)}$$

$$= 30$$

Q.55 (d)  $Z = \frac{PV}{RT}$

$$V = \frac{ZRT}{P} = \frac{0.5 \times 0.082 \times 273}{100}$$

$$= 0.1119 \text{ L}$$

Q.56 (b)  $PV = nRT$

$$PV = \frac{m}{M} RT$$

$$2 \times 5.60 = \frac{4}{M} \times 0.08 \times 546$$

Ratio مول میں آئے گی

DHW ACADEMY

+923415268040

+923258206774

$M = 44 \text{ CO}_2$

Q.80 (c)  $PV = nRT$

$P = \frac{nRT}{V} = \frac{2 \cdot 0.0821 \cdot 546}{44.8}$

$P = 2 \text{ atm}$

Q.81 (b) For A  $P_1 = 2P$

$V_1 = 2V$

$T_1 = 2T$

For B  $P_2 = P$

$V_2 = V$

$T_2 = T$  then

$\frac{P_1 V_1}{n_1 R T_1} = \frac{P_2 V_2}{n_2 R T_2}$

$\frac{2P \cdot 2V}{n_1 R 2T} = \frac{PV}{R \cdot n_2 \times T}$

$\frac{2}{n_1} = \frac{1}{n_2}$

$\frac{n_2}{n_1} = 2 : 1$

Q.85 (a) Average Kinetic energy depends upon temperature and does not depend upon the nature of gas.

Q.88 (d)  $\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$

$\frac{P_1}{T_1} = \frac{P_2}{T_2}$

$\frac{1}{546} = \frac{P}{273} \Rightarrow P = \frac{1}{2} = 0.5$

Q.93 (a) Maximum ideal gas is that which have  $z = 1$  or close to one

Q.95 (c)  $C_{rms} = \sqrt{\frac{3RT}{M}}$

So  $C_{rms} \propto T$

Q.106 (b)  $V = \frac{RnT}{P}$   $P, T$  and  $R$  constant

then  $V \propto n$

Q.107(b)  $C_{rms} \propto \sqrt{\frac{3RT}{M}}$

جس کا مولر ماس زیادہ ہو گا اس کی  $C_{rms}$  کم ہوگی

Q.108 (d)

decrease کرے یا same time increase کرے تو  $P$  اور  $T$  کی فرق نہیں پڑے گا۔

Q.110 (c)

$T$  اور  $V \propto T$  کی طرح  $V$  سے  $T$  زیادہ ہو جائے گا  $V$  سے  $T$  کم ہو جائے گا  $V$  سے  $T$  برابر ہو جائے گا  $V$  سے  $T$  زیادہ ہو جائے گا

Q.112 (c)  $V \propto T$  کی طرح

273 K,  $T_2$  STP ہے اس کا بل کر دیں  $T_2 = 546K$

Q.113 (d)

same KE ہے  $T$  temperature same ہے

Q.116 (a)  $PV = nRT$

$PV = \frac{m}{M} RT$

$M = \frac{m}{PV} RT$

Q.117 (b)  $6.02 \times 10^{23}$  molecules = 22.414 dm<sup>3</sup>

$\frac{6.02 \times 10^{23}}{22.4} = 1 \text{ dm}^3$

$2.68 \times 10^{22}$

Q.119 (b)

$KE \propto T$  (Absolute temperature)

$KE$  کی تین گنا ہو جائے گی۔

$27 + 273 = 300 \text{ K}$

$627 + 273 = 900 \text{ K}$

Q.120 (b) At absolute zero motion of gas molecule is ceased.

Q.124(d)  $d = \frac{PM}{RT}$   $d \propto M = \frac{PM}{RT}$

density زیادہ ہوگی  $P$  اور  $T$  سے

Q.127 (a)

Effective 5% H.B Covalent bond کے ساتھ ہے

$\frac{1}{20} = 0.05$

Multiply = 100 سے  $0.05 \times 100 = 5\%$

$0.05 \times 100 = 5\%$

$$M = 64$$

$$Q.57 \text{ (c) } KE = \frac{3}{2} nRT$$

$$= \frac{1}{4} \times 4 \times 2 \times 400 = 480$$

$$Q.59 \text{ (a) } P_1 V_1 = P_2 V_2$$

$$V_2 = \frac{P_1 V_1}{P_2}$$

$$V_2 = \frac{730 \times 380}{760} = 365 \text{ mL}$$

$$Q.60 \text{ (a) } \frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$\frac{P \times 20}{300} = \frac{2P \times V_2}{600}$$

$$V_2 = 20 \text{ litre}$$

$$Q.61 \text{ (b) } P = \frac{nRT}{V}$$

$$= \frac{2 \times 0.082 \times 540}{44.8}$$

$$= 1.97 \approx 2 \text{ atm}$$

$$Q.63 \text{ (b) } r_1 = r_2 = \sqrt{16 : 1}$$

$$= 4 : 1$$

$$Q.65 \text{ (c) } n_{N_2} = \frac{56}{28} = 2 \quad n_{O_2} = \frac{96}{32} = 3$$

$$P_{N_2} = \frac{2}{5} \times 10 = 4 \text{ atm}$$

$$P_{O_2} = \frac{3}{5} \times 10 = 6 \text{ atm}$$

$$P_{O_2} = P_{N_2} = 6 : 4$$

$$Q.66 \text{ (b)}$$

کیونکہ  $NH_3$  کا مولر کم از کم اس کا Rate of diffusion زیادہ ہوگا۔

$$Q.68 \text{ (b) } V_{rms} \propto \sqrt{T}$$

In order to make  $V_{rms}$  doubled  $T$  is increased by four time

$$T = 4(50 + 273)$$

$$= 1292 \text{ K}$$

$$1292 - 273 = 1019^\circ C$$

$$Q.70 \text{ (c)}$$

جتنی اکی دلیجی زیادہ ہوگی اتنی attraction زیادہ ہوگی اور gas اتنی ہی جلدی liquify ہوگی۔

$$Q.71 \text{ (b) } AS = P = \frac{dRT}{M} \quad P \propto d \propto \frac{1}{M}$$

$$\frac{P_A}{P_B} = \frac{d_A}{d_B} = \frac{M_B}{M_A} = \frac{2}{1} \cdot \frac{2}{1} = \frac{4}{1}$$

$$Q.72 \text{ (b) } \text{As } d \propto P \text{ and } d \propto \frac{1}{T}$$

$$Q.74 \text{ (b) } \text{Follows Avogadro's law}$$

۔۔۔ same condition same condition same

$$Q.75 \text{ (a) } 6.4 \text{ g } SO_2 \text{ occupies } V = 2.242$$

$$64 \text{ g of } SO_2 \text{ occupies } V = 22.42$$

Now 1 mole of ideal gas at STP occupy

$$V = 22.4 \text{ so } SO_2 \text{ is ideal}$$

$$Q.77 \text{ (c) } \frac{PV}{T} = \frac{P'V'}{T'}$$

$$\text{Here } V = 2V$$

$$T = 2T$$

$$\frac{PV}{T} = \frac{P \times 2V}{2T} \text{ or } P = P$$

Pressure remain same.

$$Q.78 \text{ (a) } \text{Moles of } H_2 : \text{Moles of } O_2$$

$$\frac{3}{2} : \frac{4}{32}$$

$$1.5 : \frac{1}{8}$$

$$\frac{1.5}{1/8} : \frac{1/8}{1/8}$$

$$12 : 1$$

$$Q.79 \text{ (c) } PV = nRT$$

$$PV = \frac{mRT}{M}$$

$$M \cdot PV = mRT$$

$$M = \frac{m}{V} \cdot \frac{RT}{P}$$

$$M = \frac{dRT}{p}$$

$$M = \frac{1.96 \times 10^{-3} \times 82.1 \times 273}{1}$$

$$M = 64$$

$$\begin{aligned} \text{Q.57 (c) } KE &= \frac{3}{2} nRT \\ &= \frac{1}{4} \times 4 \times 2 \times 400 = 480 \end{aligned}$$

$$\begin{aligned} \text{Q.59 (a) } P_1 V_1 &= P_2 V_2 \\ V_2 &= \frac{P_1 V_1}{P_2} \\ V_2 &= \frac{730 \times 380}{760} = 365 \text{ mL} \end{aligned}$$

$$\begin{aligned} \text{Q.60 (a) } \frac{P_1 V_1}{T_1} &= \frac{P_2 V_2}{T_2} \\ \frac{P \times 20}{300} &= \frac{2P \times V_2}{600} \\ V_2 &= 20 \text{ litre} \end{aligned}$$

$$\begin{aligned} \text{Q.61 (b) } P &= \frac{nRT}{V} \\ &= \frac{2 \times 0.082 \times 540}{44.8} \\ &= 1.97 \approx 2 \text{ atm} \end{aligned}$$

$$\begin{aligned} \text{Q.63 (b) } r_1 = r_2 &= \sqrt{16 : 1} \\ &= 4 : 1 \end{aligned}$$

$$\text{Q.65 (c) } n_{N_2} = \frac{56}{28} = 2 \quad n_{O_2} = \frac{96}{32} = 3$$

$$P_{N_2} = \frac{2}{5} \times 10 = 4 \text{ atm}$$

$$P_{O_2} = \frac{3}{5} \times 10 = 6 \text{ atm}$$

$$P_{O_2} = P_{N_2} = 6 : 4$$

Q.66 (b)

کیونکہ  $NH_3$  کے مولس کم اس کا Rate of diffusion زیادہ ہوگا۔

$$\text{Q.68 (b) } V_{rms} \propto \sqrt{T}$$

In order to make  $V_{rms}$  doubled T is increased by four time

$$T = 4(50 + 273)$$

$$= 1292 \text{ K}$$

$$1292 - 273 = 1019^\circ\text{C}$$

Q.70 (c)

جتنی a کی ویلیوز زیادہ ہوں گی اتنی attraction زیادہ ہوگی اور gas اتنی ہی جلدی liquify ہوگی۔

$$\text{Q.71 (b) } AS = P = \frac{dRT}{M} \quad P \propto d \propto \frac{1}{M}$$

$$\frac{P_A}{P_B} = \frac{d_A}{d_B} = \frac{M_B}{M_A} = \frac{2}{1} \cdot \frac{2}{1} = \frac{4}{1}$$

$$\text{Q.72 (b) } \text{As } d \propto P \text{ and } d \propto \frac{1}{T}$$

Q.74 (b) Follows Avogadro's law

۔ یعنی same condition, same  $P, V, T$  same  $n$

Q.75 (a) 6.4 g  $SO_2$  occupies  $V = 2.242$   
64 g of  $SO_2$  occupies  $V = 22.42$   
Now 1 mole of ideal gas at STP occupy

$V = 22.4$  so  $SO_2$  is ideal

$$\text{Q.77 (c) } \frac{PV}{T} = \frac{P'V'}{T'}$$

Here  $V = 2V$

$T = 2T$

$$\frac{PV}{T} = \frac{P \times 2V}{2T} \quad \text{or } P = P$$

Pressure remain same.

Q.78 (a) Moles of  $H_2$  : Moles of  $O_2$

$$\frac{3}{2} : \frac{4}{32}$$

$$1.5 : \frac{1}{8}$$

$$\frac{1.5}{1/8} : \frac{1/8}{1/8}$$

$$12 : 1$$

$$\text{Q.79 (c) } PV = nRT$$

$$PV = \frac{mRT}{M}$$

$$M \cdot PV = mRT$$

$$M = \frac{m}{V} \cdot \frac{RT}{P}$$

$$M = \frac{dRT}{p}$$

$$M = \frac{1.96 \times 10^{-3} \times 82.1 \times 273}{1}$$

# TOPIC 4 >>

## LIQUIDS

### MCQs

- (1) The strongest H - Bond is
- (a)  $\text{H} - \overset{-\delta}{\text{O}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{O}$  (b)  $\text{H} - \overset{-\delta}{\text{N}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{N}$   
 (c)  $\text{H} - \overset{-\delta}{\text{F}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{F}$  (d)  $\text{H} - \overset{-\delta}{\text{Cl}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{Cl}$
- (2) The strongest H-bonding is present.
- (a)  $\text{H} - \overset{-\delta}{\text{O}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{O}$  (b)  $\text{H} - \overset{-\delta}{\text{N}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{N}$   
 (c)  $\text{H} - \overset{-\delta}{\text{F}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{F}$  (d)  $\text{H} - \overset{-\delta}{\text{Cl}} \cdots \cdots \overset{+\delta}{\text{H}} - \text{Cl}$
- (3) Which of the following liquid has highest vapour pressure or is the most volatile
- (a) HF (b) NH<sub>3</sub> (c) C<sub>2</sub>H<sub>5</sub>OH (d) H<sub>2</sub>O
- (4) Hydrogen bonding is present in which pair of molecule.
- (a) H<sub>2</sub>O, C<sub>2</sub>H<sub>5</sub>OH (b) HCl, HI (c) C<sub>6</sub>H<sub>14</sub>, C<sub>6</sub>H<sub>6</sub> (d) CH<sub>4</sub>, SiH<sub>4</sub>
- (5) Chloroform and Acetone are soluble in each other due to
- (a) D.P-D.P (b) Debye force (c) Hydrogen bonding (d) All
- (6) The boiling point of water is maximum when external pressure is
- (a) 1489 torr (b) 700 torr (c) 23.7 torr (d) 323 torr
- (7) The boiling point of ethanol is higher than ethanal due to
- (a) Large size of molecules (b) Landon forces  
 (c) Hydrogen bonding (d) High molecular weight
- (8) Density of water is maximum at
- (a) 373 K (b) 273 K (c) 277 K (d) 177 K
- (9) The acetone can dissolve chloroform by hydrogen bonding and acetone is liquid at room temperature predominantly because of
- (a) Hydrogen bonding (b) Landon forces (c) Debye forces (d) Dipole-Dipole forces
- (10) The average possible number of H-bonds an NH<sub>3</sub> molecules can form is
- (a) 1 (b) 3 (c) 2 (d) 4
- (11) The lowest vapour pressure is of
- (a) H<sub>2</sub>O (b) HCl (c) CH<sub>3</sub>COCH<sub>3</sub> (d)  $\begin{array}{c} \text{CH}_2 - \text{CH}_2 \\ | \quad | \\ \text{OH} \quad \text{OH} \end{array}$
- (12) The H<sub>2</sub>O cannot make H - bonding with
- (a) HF (b) CH<sub>4</sub> (c) NH<sub>3</sub> (d) CH<sub>3</sub> - CH<sub>2</sub> - OH

### Answer Key

Question	1	2	3	4	5	6	7	8	9	10	11	12
Answer	c	a	b	a	c	a	c	c	d	a	d	b

- (13) London dispersion forces are very significant for  
 (a) Non-polar molecules (b) Both A and C  
 (c) Polar molecules (d) Neither A nor B
- (14) During of evaporation of liquid  
 (a) Temperature of liquid remains uneffected  
 (b) Temperature of liquid will rise  
 (c) Temperature may rise or fall  
 (d) Temperature of liquid will fall
- (15) In which of the following hydrogen bonding does not play any role  
 (a) water at 4°C (b) HCl in water  
 (c) secondary structure of proteins (d) double helix structure of DNA
- (16) Which of the following is/are application of boiling point of liquid?  
 (a) Use of pressure cooker (b) Application in vacuum distillation  
 (c) Both A and B (d) Neither A nor B
- (17) Vapour pressure of liquid is an intensive property. All of the factors do not affect vapour pressure of liquid except:  
 (a) Amount of liquid (b) Volume of container  
 (c) Surface area (d) intermolecular force
- (18) Hydrogen bonding is important in  
 (a) DNA structure (b) The liquid properties of water  
 (c) Liquid HF (d) Liquid CH<sub>4</sub>
- (19) Which of the following is the most accurate method to measure the vapour pressure of liquid?  
 (a) Manometric method (b) Barometric method  
 (c) both a and b (d) Difficult to predict
- (20) With the increase of Carbon atom in class of organic compound all of the following properties increases except  
 (a) Density (b) Melting and Boiling point  
 (c) Vapour pressure (d) Intermolecular forces
- (21) Arrange the following compound in order of increasing vapour pressure. C<sub>3</sub>H<sub>7</sub>OH (propanol) and C<sub>3</sub>H<sub>8</sub> propane.  
 (a) C<sub>3</sub>H<sub>8</sub> > C<sub>3</sub>H<sub>7</sub>OH (b) C<sub>3</sub>H<sub>7</sub>OH > C<sub>3</sub>H<sub>8</sub>  
 (c) C<sub>3</sub>H<sub>8</sub> < C<sub>3</sub>H<sub>7</sub>OH (d) C<sub>3</sub>H<sub>8</sub> = C<sub>3</sub>H<sub>7</sub>OH
- (22) Which one is false for evaporation. It is a/an  
 (a) Surface phenomenon (b) Continuous process  
 (c) Endothermic process (d) Cause cooling
- (23) Aqueous solution of NaCl shows conductivity due to  
 (a) Free electrons (b) Translatory motion of ions  
 (c) Loose packing (d) Free electrons and ions

## Answer Key

Question	13	14	15	16	17	18	19	20	21	22	23
Answer	a	d	b	c	d	d	a	c	c	c	b

- (24) Landon forces are very significant in  
 (a) Sulphur (b) Phosphorus  
 (c) Argon (d) Sugar
- (25) Which type of forces are present in gasoline  
 (a) Dipole-Dipole forces (b) Landon dispersion forces  
 (c) Dipole-induced dipole forces (d) Hydrogen bonding
- (26) Which of the following has highest vapour pressure  
 (a) Water (b) Diethyl ether  
 (c) Ethanol (d) Propanone
- (27) In which of the following pair Landon dispersion forces are significant  
 (a)  $H_2O$ ,  $HCl$  (b)  $O_2$ ,  $H_2O$   
 (c)  $I_2$ ,  $Cl_2$  (d)  $CH_3OH$ ,  $H_2O$
- (28) Evaporation is not a process  
 (a) Surface (b) continuous  
 (c) Natural (d) Exothermic
- (29) Correct order for intermolecular forces  
 (a)  $H_2O < NH_3$  (b) n-pentane > iso-pentane  
 (c)  $He > Ne$  (d)  $C_6H_{14} < C_4H_{10}$
- (30) Correct order of boiling point is  
 (a)  $HF > NH_3 > H_2O$  (b)  $H_2O > HF > NH_3$   
 (c)  $NH_3 > HF > H_2O$  (d)  $H_2O > HF > NH_3$
- (31) Which one is least volatile  
 (a)  $H_2O$  (b)  $H_2Te$  (c)  $H_2S$  (d)  $H_2Se$
- (32) Hydrogen bonding is not present between the molecules of  
 (a)  $NH_3$  (b)  $HI$  (c)  $HF$  (d)  $H_2O$
- (33) Force of attraction which is present in all types of molecules are  
 (a) Dipole-Dipole forces (b) Ion-dipole  
 (c) Dipole-induced dipole (d) Landon dispersion force
- (34) Dipole-Dipole is \_\_\_\_\_ as effective as Covalent bond  
 (a) 20 % (b) 100 % (c) 10 % (d) 1 %
- (35) Strongest hydrogen bond is present in  
 (a)  $NH_3$  (b)  $H_2O$  (c)  $HF$  (d)  $CH_3OH$
- (36) Water has maximum density at  
 (a)  $-4^\circ C$  (b)  $4^\circ C$  (c)  $0^\circ C$  (d)  $277^\circ C$
- (37) The boiling point of water at Mount Everest is  
 (a)  $120^\circ C$  (b)  $25^\circ C$  (c)  $98^\circ C$  (d)  $69^\circ C$
- (38) Each oxygen atom of  $H_2O$  is attached to \_\_\_\_\_ in crystal lattice of ice  
 (a) one - H - atoms (b) Two - H - atoms  
 (c) Three - H - atoms (d) Four - H - atoms

## Answer Key

Question	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Answer	c	c	b	c	d	b	d	a	b	d	d	c	b	d	d

- (39) Hydrogen bond is stronger than i-Dipole-dipole ii-Covalent bond  
iii-ionic bond iv-London dispersion forces  
(a) I, IV (b) I, III (c) I, III, II (d) I, II, III, IV
- (40) Maximum rate of evaporation is for  
(a) Glycerine (b)  $\text{CH}_4$  (c)  $\text{H}_2\text{O}$  (d) HF
- (41) Water will boil at  $25^\circ\text{C}$  when external pressure will be  
(a) 23.7 torr (b) 700 torr (c) 700 torr (d) 1489 torr
- (42) Which of the following has highest boiling point?  
(a)  $\text{CH}_4$  (b)  $\text{C}_2\text{H}_6$  (c)  $\text{C}_3\text{H}_8$  (d)  $\text{C}_4\text{H}_{10}$
- (43) Debye forces of attraction present between the molecules of  
(a)  $\text{O}_2$ , HCl (b)  $\text{N}_2$ ,  $\text{H}_2$  (c)  $\text{H}_2\text{O}$ , HCl (d)  $\text{CH}_4$ ,  $\text{C}_6\text{H}_{14}$
- (44) Boiling point of liquid is  
(a) low at higher altitude (b) inversely proportional of V.P  
(c) Maximum at sea level (d) All of these
- (45) Evaporation is inversely related to  
(a) London Dispersion of area (b) Temperature  
(c) Surface area (d) Both B and C
- (46) Molar heat of vapourization of water is  
(a)  $40.6 \text{ KJmol}^{-1}$  (b)  $40.06 \text{ KJmol}^{-1}$   
(c)  $406 \text{ kJmol}^{-1}$  (d)  $0.46 \text{ kJmol}^{-1}$
- (47) Correct order of boiling point of group VA hydrides  
(a)  $\text{NH}_3 > \text{PH}_3 > \text{AsH}_3 > \text{SbH}_3$  (b)  $\text{SbH}_3 > \text{AsH}_3 > \text{PH}_3 > \text{NH}_3$   
(c)  $\text{SbH}_3 > \text{NH}_3 > \text{PH}_3 > \text{AsH}_3$  (d)  $\text{SbH}_3 > \text{NH}_3 > \text{AsH}_3 > \text{PH}_3$
- (48) Among the following hydrides which one has lowest boiling point  
(a) HF (b) HI (c) HCl (d) HBr
- (49) Hydrogen bonding is not present in one of the following mixture  
(a) Ethanol and water (b) Chloroform and acetone  
(c) Carboxylic acid and water (d) Hydrocarbons and water
- (50) Which one shows highest boiling point  
(a) n-propane (b) n-pentane  
(c) iso-pentane (d) iso-butane
- (51) London dispersion forces are present between the molecules of  
(a)  $\text{H}_2\text{O}$  (b)  $\text{NH}_3$  (c)  $\text{CH}_4$  (d) All of the above
- (52) Force of attraction present between the chloroform molecule is  
(a) Dipole-Dipole (b) Hydrogen bonding  
(c) Dipole-induced dipoles (d) ion-dipole forces

## Answer Key

Question	39	40	41	42	43	44	45	46	47	48	49	50	51	52
Answer	a	b	a	d	a	d	a	a	d	c	d	b	d	a

- (53) Correct the order of strength  
 (a) Dipole-Dipole > Hydrogen bonding > Dipole-induced dipole > Landon dispersion  
 (b) Landon forces > dipole-induced dipole > dipole-dipole > Hydrogen bonding  
 (c) Hydrogen bonding > Dipole-Dipole > Dipole-induced dipole > Landon forces  
 (d) Hydrogen bonding > Landon forces > dipole-dipole > dipole-induced dipole
- (54) Vapour pressure of diethyl ether at its boiling point is equal to  
 (a) 0 torr (b) 200 torr (c) 4.8 torr (d) 760 torr

Question	53	54												
Answer	c	d												

**Explanation**

Q.1(c) H-bonding زیادہ مضبوط HF میں ہے کیونکہ ان دونوں میں EN کا فرق سب سے زیادہ ہے۔ اگر H-bond کی جگہ H-bonding آجائے تو دو واٹر میں زیادہ strong ہیں کیونکہ per molecule دو ہیں۔

Q.3 (b) سب سے زیادہ V.P اس کا ہوگا جس میں فور سب سے weak ہیں اور جس کا B.P سب سے کم ہے۔

Q.8(c) Density is maximum at 4°C  
 $4^{\circ}\text{C} + 273 = 277\text{ K}$

Q.10 (a) سنٹرل ایٹم کے گرد باہر والے اور lone pair دونوں گھنے ہیں جو تعداد میں کم ہوتے ہی H-bond بنائے گا۔

Q.11 (d) Intermolecular force  $\propto \frac{1}{V.P}$   
 Ethylene glycol کیونکہ اس میں Hydrogen بانڈنگ کے علاوہ London فور سب بھی ہوتی ہیں۔

Q.15 (b) There is no hydrogen bonding in HCl and water

Q.20 ©  $V.P \propto \frac{1}{M.P., B.P}$  کیونکہ

Q.26(b) جس کا B.P کم ہوگا اس کا V.P زیادہ ہوگا

Q.29 (b) جس کا B.P زیادہ ہوگا وہاں Intermolecular force بھی زیادہ ہوگی

اور Straight chain کا B.P زیادہ ہوتا ہے Branched chain سے۔

Q.30(d)  $\text{H}_2\text{O}$  B.P =  $100^{\circ}\text{C}$   
 HF B.P =  $19.9^{\circ}\text{C}$   
 $\text{NH}_3$  B.P =  $-33^{\circ}\text{C}$

Q.31 (a) جس کا B.P زیادہ ہوگا وہ least volatile ہوگا اور  $\text{H}_2\text{O}$  میں H.B ہے جس کی وجہ سے وہ least volatile ہے۔

Q.33 (d) London forces are present among all types of molecules but prominent in non polar molecules.

Q.35 (c) Strongest hydrogen bonds depends upon difference of electronegativity.

Q.36 (b) Water has maximum density at  $4^{\circ}\text{C}$   
 Q.40 (b)

جس کا B.P کم ہوگا اس کا rate of evaporation زیادہ ہوگا۔  
 Q.42(d) سائز آف ایٹم بڑھتا جاتا ہے تو B.P بھی زیادہ ہوگا۔

Q.43 (a) Deby forces پورے اور تمام پولر میں ہوتی ہیں  $\text{O}$  اور  $\text{H}$  میں پورے HCl پورے۔

Q.50 (b) Straight chain اور long chain والے compound کا B.P سب سے زیادہ ہوتا ہے۔

Q.51(d) London forces are present in all types of molecules but prominent in non polar.

Q.54 (d) B.P، V.P اور external pressure کے جوڑے 760 torr ہے۔

# TOPIC 5 >>

## SOLIDS

### MCQs

- (1) Which of the following is <sup>not</sup> features of solid  
 (a) definite mass and volume (b) Frequent fluidity  
 (c) Rigidity (d) Define shape
- (2) Which of following is not characteristics of amorphous solid  
 (a) Have sharp melting point  
 (b) Have non-orderly or very short range orderly arrangement  
 (c) Show isotropy  
 (d) Have tendency to undergo cleavage irregular
- (3) Which of the following is not property of crystalline solids  
 (a) Show isotropy (b) have sharp melting point  
 (c) have anisotropic nature (d) have long range orderly arrangement
- (4) Which of following a non-crystalline solids pair  
 (a) Diamond, wood (b) glass, table salt  
 (c) wood, glass (d) sucrose, glass
- (5) Which of the following is molecular solid  
 (a) I<sub>2</sub> (b) wax (c) ice (d) all of these
- (6) Which types of solids are generally conductor of electricity  
 (a) Metallic (b) Covalent (c) Ionic (d) Molecular
- (7) Among the following which is not crystalline solid  
 (a) glass (b) NaCl (c) KBr (d) both b and c
- (8) Which of the following has hexagonal structure  
 (a) Diamond (b) NaCl (c) Graphite (d) both b and c
- (9) The total no. of crystal system and number of bravis lattice are respectively  
 (a) 7, 7 (b) 7, 14 (c) 14, 14 (d) 9, 16
- (10) Out of seven crystal system how many can have body centred unit cell  
 (a) 4 (b) 2 (c) 3 (d) 5
- (11) Among the following unit cell given below, which can has the highest symmetry  
 (a) Cubic (b) Monoclinic (c) Hexagonal (d) Orthorhombic
- (12) Total elements of symmetry in cube are  
 (a) 23 (b) 14 (c) 25 (d) 16

### Answer Key

Question	1	2	3	4	5	6	7	8	9	10	11	12
Answer	b	a	a	c	d	a	a	c	b	c	a	a

- (13) IF A, B, C are an equal and  $\alpha, \beta, \gamma$  are unequal and  $90^\circ$  it represents  
 (a) Triclinic system (b) Tetragonal  
 (c) Monoclinic (d) Orthorhombic
- (14) The empty space left in hexagonal close packing of sphere in three dimension is.  
 (a) 64 % (b) 26 % (c) 14 % (d) 52 %
- (15) What is contribution of atom present at the edge corner to unit cell  
 (a) 1/8 (b) 1/2 (c) 1/4 (d) 1/3
- (16) ZnS is  
 (a) Ionic crystal (b) covalent crystal  
 (c) metallic crystal (d) Vander Waal's crystal
- (17) Each unit cell of NaCl Consists of 4 chloride ion and  
 (a) 13 Na atom (b) 4 Na atom  
 (c) 6 Na atom (d) 8 Na atom
- (18) Which pair shows isomorphism  
 (a)  $\text{KNO}_3, \text{NaNO}_3$  (b)  $\text{Cr}_2\text{O}_3, \text{Fe}_2\text{O}_3$   
 (c) Both a and b (d) None
- (19) The number of molecules of NaCl in unit cell of its crystal is  
 (a) 2 (b) 4 (c) 6 (d) 8
- (20) A match box shows geometry  
 (a) cubic (b) monoclinic (c) orthorhombic (d) Tetragonal
- (21) Which crystal is expected to be soft and have low melting point  
 (a) Covalent (b) Metallic (c) Molecular (d) Ionic
- (22) Number of atoms per unit cell for body centred cubic system is  
 (a) Six (b) Four (c) Two (d) One
- (23) Metallic crystalline solids  
 (a) Have low melting and boiling points (b) are bad conductors  
 (c) good conductor of heat and electricity (d) Only conduct heat
- (24) In crystal structure of NaCl, the arrangement of  $\text{Cl}^-$  ions is  
 (a) FCC (b) BCC (c) Both FCC and BCC (d) None
- (25) NaCl structure consists of  
 (a) Na and Cl atoms (b)  $\text{Na}^+$  and Cl atoms  
 (c) Na atoms and  $\text{Cl}^-$  ion (d)  $\text{Na}^+$  and  $\text{Cl}^-$  ion
- (26) The number of atoms contained with in FCC cells is  
 (a) 1 (b) 2 (c) 3 (d) 4
- (27) The number of atoms contained with in a body centred cubic cell is .  
 (a) 1 (b) 2 (c) 3 (d) 4

## Answer Key

Question	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Answer	a	b	c	a	b	b	b	c	c	c	c	a	d	d	a

- (28) Diamond is an allotropic form of carbon. It shows all the following properties except.  
 (a) It shows face centered cubic structure  
 (b) It is non conductor  
 (c) It has  $sp^3$  orbital hybridization  
 (d) It shows two dimension structure
- (29) In crystal lattice of ice, each O-atom of water molecules is attracted to.  
 (a) Four H-atom (b) Two H-atom (c) One H-atom (d) Three H-atom
- (30) Amorphous solids.  
 (a) Have sharp melting point  
 (b) Undergo clean cleavage when cut with knife  
 (c) Have perfect arrangement of atoms  
 (d) Can process small region of orderly arrangement of atoms
- (31) Iodine exists in solid state. It has all of two following Except  
 (a) It shows face centered cubic (FCC) structure  
 (b) It is soft as compared to covalent solids  
 (c) It has low melting and boiling point  
 (d) It is soluble in polar and non-polar solvents
- (32) Molecular solids have all of the following types of bonding Except.  
 (a) London dispersion forces (b) Coordinate covalent bonds  
 (c) Dipole-Dipole forces (d) Hydrogen bonding
- (33) The crystal of sugar has hydrogen bonding as well as covalent bond. So it belongs to .  
 (a) Covalent solids (b) Metallic solids  
 (c) Ionic solids (d) Molecular solids
- (34) Solidified noble gases are the example of solids.  
 (a) Covalent (b) Ionic (c) Molecular (d) Atomic
- (35) In cubic close packing of atoms. Each layer of atom repeats after .  
 (a) One layer (b) Two layers (c) Three layers (d) Four layers
- (36) In hexagonal close packing of atoms, each layer of atoms repeats after.  
 (a) One layer (b) Two layers (c) Three layers (d) Four layers
- (37) In a crystal the cations and anions are held together by.  
 (a) Vander Waal forces (b) Electrostatic forces  
 (c) Covalent bonds (d) All of these
- (38) I - I bond distance difference between  $I_2(g)$  and  $I_2(s)$  is .  
 (a) 271.5 pm (b) 4.9 pm (c) 266.6 pm (d) 9.6 pm
- (39) Which of the following are conductors of electricity.  
 (a) Ionic solids (b) Metallic solids  
 (c) Covalent solids (d) Both (a) and (b)

Answer Key

Question	28	29	30	31	32	33	34	35	36	37	38	39
Answer	d	a	d	d	b	d	c	d	c	b	b	b

- (40) Which of the following is covalent solid.  
 (a) Iodine (b) Diamond (c) Sodium chloride (d) copper
- (41) The melting points of ionic solids are usually.  
 (a) Low (b) Very high  
 (c) High (d) Moderate to high
- (42) Solid neon is an example of.  
 (a) Covalent solid (b) Ionic solid  
 (c) Metallic solid (d) Molecular solid
- (43) Silica is an example of.  
 (a) Covalent solid (b) Ionic solid  
 (c) Molecular solid (d) metallic solid
- (44) The weakest bond among the following is.  
 (a) Ionic bond (b) covalent bond  
 (c) Metallic bond (d) Hydrogen bond
- (45) A crystalline solid lattice of ice is mainly formed due to.  
 (a) Ionic bond (b) Metallic bond  
 (c) Hydrogen bond (d) dative bond
- (46) Which of the following is correct statement.  
 (a) Hexagonal close packing shows 1,2,3-1,2,3 arrangement  
 (b) Cubic close packing shows 1212 arrangement  
 (c) Na and K show body centred cubic structure  
 (d) Zn, Ca, Cd shows hexagonal close packing structure
- (47) A unit cell which lattice points at the corners is called.  
 (a) Simple unit cell (b) Body centred unit cell  
 (c) Face centred unit cell (d) End centred unit cell
- (48) All of the following statement are correct about NaCl except.  
 (a) Independent molecules of NaCl do not exist in vapour phase  
 (b) Every  $\text{Na}^+$  ions is surrounded by six  $\text{Cl}^-$  ions and vice versa  
 (c) Number of formula unit per NaCl is 4  
 (d) Solid NaCl exists in crystal lattice form
- (49) Which of the following sets of solid element A, B, C includes a metallic structures a macromolecular structure and a simple molecular structure.  
 (a) Na, Mg, Al (b) Al, Si, S (c) C, Si, Sn (d) Al, S, Si
- (50) The most important characteristics of solid through which it is identified as crystalline solid.  
 (a) Geometrical arrangement of particle (b) Sharp melting point  
 (c) Definite shape (d) Definite volume

## Answer Key

Question	40	41	42	43	44	45	46	47	48	49	50
Answer	b	b	d	a	d	c	c	a	a	b	b

- (51) Which of the following properties of solid is not shown by solids.  
 (a) They have definite shape (b) They have definite volume  
 (c) They have only vibrational and rotational motion  
 (d) They are rigid and hard
- (52) The structure of ionic crystal depends upon.  
 (a) Ratio of charge of cation and anions  
 (b) Ratio of charge density of cations and anions  
 (c) Radius ratio of cations and anions (d) Nature of cations and anions
- (53) Which of following is incorrect about allotropy.  
 (a) Element exists in more than one crystalline form  
 (b) Different physical properties  
 (c) They show different crystalline form  
 (d) They show different chemical properties
- (54) The temperature at which two crystalline form of the same substance can exist in equilibrium with each other is called.  
 (a) Transition temperature (b) Absolute temperature  
 (c) Optimum temperature (d) Absolute zero
- (55) Which of the following crystals is expected to be soft and have low melting point.  
 (a) Ionic (b) Covalent (c) Molecular (d) Metallic
- (56) Ionic solids are mostly of high density due to.  
 (a) Chemical bonding (b) close packing  
 (c) Structure (d) None of these
- (57) Solid  $\text{CO}_2$  is the example of.  
 (a) Metallic solid (b) Molecular solid (c) Covalent solid (d) Ionic solid
- (58) Structure of ice is just like.  
 (a) Graphite (b) Sugar (c) Tin (d) Diamond
- (59) Which of following effects the shape of ionic crystal.  
 (a) Electrostatic force of attraction (b) Poor conductivity  
 (c) similar radius ratio (d) All of these
- (60) Which type of Solid sublime easily.  
 (a) Ionic (b) covalent (c) Molecular (d) metallic
- (61) Ionic solids have.  
 (a) Very high m-point (b) low to high melting point  
 (c) Moderate to very high m-p (d) low m.p
- (62) Ice is ——— crystal.  
 (a) Metallic (b) Molecular (c) Covalent (d) Ionic
- (63) Which of following is example of crystalline solid.  
 (a) Glass (b) Plastic (c) Rubber (d) Ice

## Answer Key

Question	51	52	53	54	55	56	57	58	59	60	61	62	63
Answer	c	c	d	a	b	b	b	d	d	e	c	b	d

- (64) Lattice energy of ionic compounds.  
 (a) Decreases with increase in size of cation  
 (b) Increases with increase in size of cation  
 (c) Increases with increase in size of anion  
 (d) both a and b
- (65) Electron gas theory was proposed to explain the bonding in — solids.  
 (a) Molecular (b) Covalent (c) Ionic (d) Metallic
- (66) Lattice energy of an ionic crystal is the enthalpy.  
 (a) Combustion (b) Dissolution (c) Dissociation (d) Formation
- (67) Lattice energy is maximum for .  
 (a) NaCl (b) NaI (c) NaBr (d) NaF
- (68) Which of the following is anisotropic property.  
 (a) Electrical conductivity (b) Refractive index  
 (c) Brittleness (d) Both A and B
- (69) Ionic solids are made up of.  
 (a) Atoms (b) Molecules (c) Ions (d) All
- (70) Existence of compound in more than one crystalline form is called.  
 (a) Allotropy (b) Polymorphism  
 (c) Isomorphism (d) Anisotropy
- (71) When 10% urea is added in solution of NaCl as impurity then it form crystal like.  
 (a) Hexagonal (b) Cubic (c) Ortho rhombic (d) Needle
- (72) Which solid has highest melting point among the following.  
 (a) Covalent (b) Ionic (c) Molecular (d) Metallic
- (73) Examples of non-polar molecular solid except.  
 (a) CO<sub>2</sub> (b) C<sub>6</sub>H<sub>12</sub>O<sub>6</sub> (c) I<sub>2</sub> (d) Sulphur
- (74) Dry ice is molecular solid. The force of attraction between its molecules are.  
 (a) Ionic bond (b) London dispersion forces  
 (c) Covalent bond (d) Metallic bond
- (75) Which type of attractive force is present between acetone and chloroform.  
 (a) London forces (b) Hydrogen bonding  
 (c) Ion-dipole (d) Debye
- (76) Crystal formed due to London dispersion forces .  
 (a) Ionic (b) Covalent (c) Molecular (d) Metallic
- (77) Which of the following is property of molecular solid .  
 (a) Hardness and rigidity (b) High melting point  
 (c) Volatile nature (d) Good conductors of electricity

## Answer Key

Question	64	65	66	67	68	69	70	71	72	73	74	75	76	77
Answer	a	d	c	d	d	c	b	d	a	b	b	b	c	c

(78) In NaCl structure, ions at the corner of cubic unit cell contributes the unit cell.  
(a) 1/6 part (b) 1/2 part (c) 1/4 part (d) 1/8 part

Answer Key

Question	78																		
Answer	d																		

Explanation

Q.10 (c) Simple, primitive, monoclinic and orthorhombic have BBC unit cell

Q.17 (b) Each unit cell of NaCl has 4Na<sup>+</sup> ions and 4Cl<sup>-</sup> ions coordination number 6 : 6

Q.20 (c) Orthorhombic geometry has a # b # c and  $\alpha = \beta = \gamma = 90^\circ$  so match box obey that geometry

Q.26 (d) The FCC consists of 8 atoms at the corner and 1 atom of each of face  
 $n = 8 \times 1/8 + 6 \times 1/2 = 4$

Q.27 (a) The cubic unit cell has atoms at 8 corner. Each atom is shared by 8 unit cells

$n = 8 \times 1/8 = 1$

Q.33 (d) Due to hydrogen bonding it is molecular solid

Q.35 (d) A, B, C, A, B, C OR 1, 2, 3 1,2,3 Fourth layer

Q.38 (b)

$I_2(s) = 271.5$   
 $I_2(g) = 266.6$  Difference 4.9 pm

Q.42 (d)

کسی بھی گیس کو solidify کریں تو وہاں کیلئے سولڈ ہوگا۔

Q.48 (a) Al metallic structure  
Si Macromolecular structure  
S Simple molecular structure

Q.59 (d) Molecular solids are volatile have low m.p and b.p

Q.66 (c) lattice energy depends upon charge size

charge size کم ہو گا جتنی Lattice E زیادہ ہو گی F کا سائز ب سے چھوٹا ہے۔

Q.67 (d)

depend  $\zeta$  Direction  $\neq$  Anisotropic property

# TOPIC 6 >>

## CHEMICAL EQUILIBRIUM

**MCQs**

- (1) For a reversible reaction if the concentration of the reaction is doubled at constant temperature the  $K_c$  will be.
  - (a) One fourth
  - (b) Halved
  - (c) Doubled
  - (d) The same
- (2) The value of  $K_p$  in the reaction  $MgCO_3(s) \rightleftharpoons MgO(s) + CO_2(g)$  is.
  - (a)  $K_p = P(CO_2)$
  - (b)  $K_p = \frac{pMgCO_3}{pCO_2 \cdot pMgO}$
  - (c)  $K_p = \frac{pMgO \cdot pCO_2}{pMgCO_3}$
  - (d) None
- (3) In the reaction  $BaO_2(s) \rightleftharpoons BaO(s) + O_2$   $\Delta H = +ve$  in equilibrium condition the pressure of  $O_2$  depends on.
  - (a) Increase mass of  $BaO_2$
  - (b) Increase mass of  $BaO$
  - (c) Temperature of equilibrium
  - (d) Mass of  $BaO_3$ , and  $BaO$  both
- (4)  $A_2 + B_2 \rightleftharpoons 2AB$   $\Delta H = +ve$  it.
  - (a) Increase by pressure
  - (b) It occurs at 1000 atm pressure
  - (c) it occurs at high temperature
  - (d) it occurs at high pressure and temperature
- (5)  $2SO_2 + O_2 \rightleftharpoons 2SO_3$ . In the above reaction  $K_p$  and  $K_c$  are related as.
  - (a)  $K_p = K_c(RT)$
  - (b)  $K_p = K_c(RT)^{-1}$
  - (c)  $K_c = K_p(RT)^2$
  - (d)  $K_p = K_c(RT)^{-2}$
- (6) Which of the following change will shift the reaction in the forward direction  $I_2 \rightleftharpoons 2I$   $\Delta H = 150 kJ$ .
  - (a) Increase in concentration of  $I$
  - (b) Increase in total pressure
  - (c) Decrease in concentration of  $I_2$
  - (d) Increase in temperature
- (7) In what manners will increase of pressure affect the following equation  $C(s) + H_2O(g) \rightleftharpoons CO(g) + H_2(g)$ .
  - (a) Shift in the reverse direction
  - (b) Shift in the forward direction
  - (c) Increase in the yield of hydrogen
  - (d) No effect
- (8) The equilibrium b/w water and its vapour in an open vessel.
  - (a) Can be achieved
  - (b) Depends upon pressure
  - (c) Cannot be achieved
  - (d) Depends upon temperature

**Answer Key**

Question	1	2	3	4	5	6	7	8
Answer	d	a	c	c	b	d	a	c

- (9) Which of the following equilibrium in gaseous phase would be unaffected by a increase in pressure.
- (a)  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  (b)  $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$   
 (c)  $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$  (d)  $\text{CO}_2 + 1/2\text{O}_2 \rightleftharpoons 2\text{CO}_2$
- (10) Amongst the following hydroxides, the one which has the lowest value of  $K_{sp}$  at ordinary temperature about  $25^\circ\text{C}$  is.  
 (a)  $\text{Mg}(\text{OH})_2$  (b)  $\text{Ca}(\text{OH})_2$   
 (c)  $\text{Ba}(\text{OH})_2$  (d)  $\text{Be}(\text{OH})_2$
- (11) When two reactants A and B are mixed to give product C and D the reaction quotient  $Q$ , at the initial stage of reaction is.  
 (a) Is zero (b) Decreases with time  
 (c) Is independent of time (d) Increase with time
- (12) When a catalyst is added to reversible reaction in equilibrium state, the value of equilibrium constant.  
 (a) Increases (b) Decreases  
 (c) Does not change (d) Becomes zero
- (13) In a reversible reaction the catalyst.  
 (a) Decreases the activation energy of forward reaction  
 (b) Increases the activation energy of backward reaction  
 (c) Decreases the energy of activation for both forward and backward  
 (d) none
- (14) The solubility product of  $\text{AgCrO}_4$  is  $3.2 \times 10^{-2}$  at  $25^\circ\text{C}$  the solubility of the compound is.  
 (a)  $2.0 \times 10^{-1} \text{ mol dm}^{-3}$  (b)  $1.50 \times 10^{-1} \text{ mol dm}^{-3}$   
 (c)  $2.0 \times 10^{-2} \text{ mol dm}^{-3}$  (d)  $1.866 \times 10^{-1} \text{ mol dm}^{-3}$
- (15) Which one of the following is correct solubility product expression for sparingly soluble compound  $\text{AgCl}$ .  
 (a)  $K_{sp} = \frac{[\text{Ag}^+][\text{Cl}^-]}{[\text{AgCl}]}$  (b)  $K_{sp} = [\text{Ag}^+][\text{Cl}^-]$   
 (c)  $K_{sp} = [\text{Ag}^+] + [\text{Cl}^-]$  (d)  $K_{sp} = [\text{AgCl}]$
- (16) Units of  $K_c$  for the Following reaction  $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ .  
 (a)  $\text{mol}^2 \text{ dm}^{-6}$  (b) No unit  
 (c)  $\text{mol dm}^{-3}$  (d)  $\text{mol}^{-2} \text{ dm}^6$
- (17) Precipitation occurs when the product of ionic concentration is.  
 (a) Greater than  $K_{sp}$  (b) Less than  $K_{sp}$   
 (c) Equal than  $K_{sp}$  (d) Equal to unity

## Answer Key

Question	9	10	11	12	13	14	15	16	17
Answer	b	d	d	c	c	a	b	a	a

- (18) Which of the following change will decrease the amount of steam  
 $2\text{H}_2\text{O} \rightleftharpoons 2\text{H}_2 + \text{O}_2$   $\Delta H = +241.7 \text{ kJ}$   
 (a) Addition Pt catalyst  
 (b) Increase the pressure at constant temperature  
 (c) Addition of more oxygen  
 (d) Increasing the temperature at constant pressure
- (19) The  $\text{pK}_w$  value at  $25^\circ\text{C}$  is.  
 (a)  $1.00 \times 10^{-14}$  (b)  $3.00 \times 10^{-14}$  (c) 14 (d)  $7.5 \times 10^{-14}$
- (20) In the following homogenous equilibrium when the pressure is increased at  $25^\circ\text{C}$ , what would be the direction of reaction for  
 $2\text{O}_3 \rightleftharpoons 3\text{O}_2$   $K_c = 10^{55}$   
 (a) Forward (b) No effect (c) backward (d) Unpredictable
- (21) Silver nitrate is added to aqueous barium chloride is removed by filtration. What are main ions in filtrate.  
 (a)  $\text{Ag}^{+1}$  and  $\text{NO}_3^{-1}$  only (b)  $\text{Ba}^{+2}$  and  $\text{NO}_3^{-1}$  only  
 (c)  $\text{Ag}^{+1}$ ,  $\text{Ba}^{+2}$ ,  $\text{NO}_3^{-1}$  (d)  $\text{Ba}^{+2}$ ,  $\text{NO}_3^{-1}$  and  $\text{Cl}^{-1}$
- (22) The  $\text{pK}_a$  values of  $\text{CH}_3\text{COOH}$  is 4.74, the pH of equimolar solution of acetic acid and sodium acetate is.  
 (a) 13 (b) 7.2 (c) 4.7 (d) 4.74
- (23) Hydrolysis of  $\text{R}_3\text{CBr}$  proceeds in two steps  
 $\text{R}_3\text{CBr} \longrightarrow \text{R}_3\text{C}^+ + \text{Br}^-$  (Slow)  
 $\text{R}_3\text{C}^+ + \text{OH}^- \longrightarrow \text{R}_3\text{COH}$  fast which of the following is the rate equation consistence to the mechanism  
 (a)  $\text{Rate} = K [\text{R}_3\text{CBr}] [\text{H}_2\text{O}]$  (b)  $\text{Rate} = K [\text{R}_3\text{CBr}]^2$   
 (c)  $\text{Rate} = K[\text{R}_3\text{CBr}]$  (d)  $\text{Rate} = K [\text{R}_3\text{C}^+] \text{OH}^-$
- (24) According to Lowry-Bronsted concept  $\text{H}_2\text{O}$  is.  
 (a) Base (b) A salt  
 (c) An amphoteric (d) An acid
- (25) By increasing the temperature of water, its pH will.  
 (a) Increase and water will be acidic  
 (b) Decrease and water will remains neutral  
 (c) Decrease and water will be more acidic  
 (d) No effect of temperature on pH
- (26) Which is correct relationship.  
 (a)  $K_p = K_c(\text{RT})^{\Delta n}$  (b)  $K_p = K_c(\text{RT})^n$   
 (c)  $K_c = K_p(\text{RT})^{\Delta n}$  (d)  $K_p = K_c(\text{RT})^{\Delta n}$

## Answer Key

Question	18	19	20	21	22	23	24	25	26
Answer	d	c	c	b	d	c	c	b	d

- (27) Strength of an acid is directly proportional to all except.  
 (a) Dissociation constant of acid (b) Percentage ionization of acid  
 (c) pH of the acid (d) pOH of the acid
- (28) Equimolar aqueous solution would have the same hydrogen ions concentration as.  
 (a) HCl (b)  $\text{H}_2\text{SO}_4$  (c)  $\text{HNO}_3$  (d)  $\text{CH}_3\text{COOH}$
- (29) Calculate the pH of buffer solution 0.1 M  $\text{CH}_3\text{COOH}$  and 0.1 M  $\text{CH}_3\text{COONa}$  if  $\text{pK}_a$  is 4.74.  
 (a) 4.74 (b) 3.74 (c) 2.74 (d) 5.74
- (30) The pOH of  $1.0 \text{ mol dm}^{-3}$  of  $\text{NH}_4\text{OH}$  which is only 1% dissociated is.  
 (a) 1 (b) 12 (c) 2 (d) 13
- (31) If for a reaction  $\text{A} + \text{B} \xrightleftharpoons[\text{K}_r = 0.5]{\text{K}_f} \text{C} + \text{D}$   $\text{K}_c = 2.0$  then rate constant for forward reaction would be.  
 (a) 1.0 (b) 2.0 (c) 0.5 (d) 2.5
- (32) The solubility of  $\text{AgI}$  in  $\text{NaI}$  solution is less than in pure water due to.  
 (a) Common ion effect (b) Temperature decreases  
 (c)  $\text{AgI}$  forms complex with  $\text{NaI}$  (d)  $\text{K}_{sp}$  of  $\text{AgI}$  is more than that of  $\text{NaI}$
- (33) For  $2\text{A} + \text{B} \longrightarrow \text{product}$ . If  $[\text{A}] = 2.0 \text{ M}$  and  $[\text{B}] = 2.0 \text{ M}$  rate of reaction is  $16 \text{ mol dm}^{-3} \text{ sec}^{-1}$ . Then the rate constant would be.  
 (a) 8 (b) 64 (c) 2 (d) 4
- (34) Which statement is incorrect.  
 (a) Unit of rate is independent of the order of reaction  
 (b) Rate constant depends upon the temperature  
 (c) The slowest step is rate determining step  
 (d) Unit of rate constant for zero order reaction is  $\text{s}^{-1}$
- (35) Half life of third order reaction is related as.  
 (a)  $[\text{T}_{1/2}] \propto a$  (b)  $[\text{T}_{1/2}] \propto a^0$  (c)  $[\text{T}_{1/2}] \propto a^{-1}$  (d)  $[\text{T}_{1/2}] \propto \frac{1}{a^2}$
- (36) The activation energy for forward reaction  $(E_a)_f$  is  $75 \text{ kJ mol}^{-1}$  and activation energy of reverse reaction  $(E_a)_r$  is  $50 \text{ kJ mol}^{-1}$ . What will be the enthalpy change for this reaction.  
 (a)  $+25 \text{ kJ mol}^{-1}$  (b)  $+125 \text{ kJ mol}^{-1}$   
 (c)  $-25 \text{ kJ mol}^{-1}$  (d)  $-125 \text{ kJ mol}^{-1}$
- (37) The equilibrium constant of the following equilibrium change with  $\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$ .  
 (a) Catalyst (b) temperature (c) Pressure (d) Conc. Of  $\text{H}_2\text{O}_4$

## Answer Key

Question	27	28	29	30	31	32	33	34	35	36	37
Answer	c	c	a	c	a	a	c	d	d	a	B

CHEMICAL EQUILIBRIUM

Zaman Publisher

- 100) For which equilibrium reaction  $K_p > K_c$  ,  
 (a)  $H_2 + F_2 \rightleftharpoons 2HF$  (b)  $N_2 + 3H_2 \rightleftharpoons 2NH_3$   
 (c)  $N_2O_4 \rightleftharpoons 2NO_2$  (d)  $PCl_5 + Cl_2 \rightleftharpoons PCl_3$
- 101) Increase in temperature the equilibrium reaction is ,  
 (a) Alters the  $K_c$  (b) Changes the  $K_p$   
 (c) Varies average molecular speed (d) All of these
- 102)  $K_c$  value indicates the chemical reaction reaches earlier to completion.  
 (a)  $10^{-5}$  (b)  $10^{15}$  (c)  $10^1$  (d)  $10^{10}$
- 103) Which is the correct rate equation deduced from the data in the table.

Sl. No	X	Y	Initial rate
1	0.1	0.1	0.02
2	0.1	0.2	0.04
3	0.2	0.1	0.04
4	0.2	0.2	0.08

- (a) Rate =  $K[X]^2$  (b) rate =  $K[X][Y]^2$   
 (c) Rate =  $K[X][Y]$  (d) rate =  $K[X]^2[Y]$
- 104) For a reaction  $2X + Y \rightarrow M + N$  the rate law is rate =  $K[X]^2[Y]$ . If concentration of  $[Y]$  is constant and  $[X]$  is tripled, the change in the rate of reaction will be  
 (a) 3 times (b) 6 times (c) 9 times (d) 27 times
- 105) In the reaction  $S + T \rightarrow$  product, if T is taken in excess, then it is an example of.  
 (a) First order (b) Pseudo first order  
 (c) Zero order (d) Second order
- 106)  $K_a$  value of HCl,  $CH_3COOH$ , HF and  $H_2SO_4$  are  $10^{-7}$ ,  $1.85 \times 10^{-5}$ ,  $6.67 \times 10^{-5}$  and  $10^{-2}$  respectively, the decreasing order of acidic strength is.  
 (a)  $HCl > H_2SO_4 > HF > CH_3COOH$  (b)  $CH_3COOH > HF > H_2SO_4 > HCl$   
 (c)  $HCl > HF > H_2SO_4 > CH_3COOH$  (d)  $HCl > CH_3COOH > HF > H_2SO_4$
- 107) Mark the incorrect statement about chemical equilibrium.  
 (a) It is established in closed system (b) It is macroscopic property  
 (c) It can establish from either side (d) it is dynamic as well as static
- 108) When a system is in equilibrium is altered by any way, the direction of the system changes so as to undo the effect of change, this is accordance with.  
 (a) law of mass action (b) Lechatlier's principle  
 (c) Equilibrium law (d) Rate law
- 109) All of the following factors do not effect the value of  $K_c$  except .  
 (a) Change in conc. (b) Change in pressure  
 (c) Effect of catalyst (d) Change in temperature

Answers	c	d	b	d	c	b	a	d	b	d
---------	---	---	---	---	---	---	---	---	---	---

- (48) Units of  $K_c$  for following reaction is  $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ .  
 (a)  $\text{mol}^2 \text{dm}^{-6}$  (b) No unit (c)  $\text{mol dm}^{-3}$  (d)  $\text{mol}^{-2} \text{dm}^{-3}$
- (49) Mark the incorrect statement.  
 (a) Chemical equilibrium is always dynamic in nature but physical equilibrium may or may not  
 (b) No effect of catalyst on  $K_c$  and  $K_p$  values  
 (c) Addition of inert gas to system at constant value has no effect on  $K_c$   
 (d) If product is in gaseous state escapes even then the equilibrium state is established.
- (50) With the increase of temperature the value of  $K_w$ .  
 (a) Increases (b) Remains constant  
 (c) Decreases (d) May increase or decreases
- (51) Which statement about the following equilibrium is correct  
 $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3 \quad \Delta H = -188.3 \text{ kJmol}^{-1}$   
 (a) The value of  $K_p$  Falls with rise in temperature  
 (b) The value of  $K_p$  falls with decreases in temperature  
 (c) Adding  $\text{V}_2\text{O}_5$  catalyst increases the yields of  $\text{SO}_3$   
 (d) The value of  $K_p$  is equal to  $K_c$
- (52) In Haber process for  $\text{NH}_3$  nitrogen is taken from.  
 (a) Proteins (b) Minerals of nitrate  
 (c) Ammonium salt industrially (d) air
- (53) The  $\text{p}K_b$  value for aqueous ammonia at  $25^\circ\text{C}$  is 4.8. What is the correct  $\text{p}K_a$  value for the ammonium ions at this temperature.  
 (a) -4.8 (b) 2.2 (c) 4.8 (d) 9.2
- (54) Which of the following is weakest base.  
 (a)  $\text{NaOH}$  (b)  $\text{NH}_4\text{OH}$  (c)  $\text{CsOH}$  (d)  $\text{Ca}(\text{OH})_2$
- (55)  $\text{pH}$  of  $10^{-4} \text{ mol dm}^{-3}$  of  $\text{Ba}(\text{OH})_2$  is.  
 (a) 0.1 (b) 10.3 (c) 10.2 (d) 10.4
- (56) Which of the following is incorrect formula.  
 (a)  $K_a + K_b = K_w$  (b)  $\text{pH} + \text{pOH} = 14$   
 (c)  $\text{p}K_a + \text{p}K_b = 14$  (d)  $\text{pH} = \text{p}K_a + \frac{[\text{acid}]}{[\text{acid}]}$
- (57) The  $\text{pH}$  of our blood is.  
 (a) 6.7 - 8 (b) 7.5 (c) 7.9 (d) 7.35 - 7.4
- (58) The value of  $K_w$  in an acidic solution at 295 K is.  
 (a)  $> 10^{-14}$  (b)  $\geq 10^{14}$  (c)  $< 10^{-14}$  (d)  $10^{-14}$

## Answer Key

Question	48	49	50	51	52	53	54	55	56	57	58
Answer	b	b	a	a	d	d	c	c	d	d	d

- (59) In each of the following reversible reaction. The effect of increases in pressure on the equilibrium position shifts in backward reaction.
- (a)  $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$  (b)  $\text{CO} + \text{H}_2\text{O} \rightleftharpoons \text{CO}_2 + \text{H}_2$   
 (c)  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  (d)  $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$
- (60) During contact process for  $\text{H}_2\text{SO}_4$ , the following reaction occurs  
 $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3 \quad \Delta H = -96 \text{ kJmol}^{-1}$   
 Which step is used to increase the yield of  $\text{SO}_3$
- (a) Temperature is increased to high degree  
 (b)  $\text{SO}_3$  formed is not removed  
 (c) Both temperature and pressure are kept very low  
 (d) An excess of air is used to drive the equilibrium to right side
- (61) For which of the following reaction  $K_p > K_c$ .
- (a)  $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$  (b)  $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$   
 (c)  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  (d)  $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$
- (62) In which of the following reactions, the effect of increase in pressure will shift the reaction in the forward direction.
- (a)  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  (b)  $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$   
 (c)  $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$  (d)  $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$
- (63) Which one of the following is not application of  $K_c$ .
- (a) It is used to find direction of reaction  
 (b) used to find extent of reaction  
 (c) It tells about the effect of change in conc, temperature and pressure  
 (d) It tells about rate of reaction
- (64) Consider the following equilibrium  $\text{ice} \rightleftharpoons \text{water}$  as increase in pressure.
- (a) More ice is formed (b) More water is formed  
 (c) Less amount of water is left (d) No effect of change in pressure
- (65) Which of the following is strongest acid.
- (a)  $\text{H}_2\text{O}$  (b)  $\text{C}_2\text{H}_2$  (c)  $\text{C}_2\text{H}_6$  (d)  $\text{NH}_3$
- (66) In order to get maximum yield of  $\text{SO}_3$  following are optimum conditions except.
- (a) Low pressure (b) Low temperature  
 (c) Continuous with drawl of  $\text{SO}_3$  (d)  $\text{V}_2\text{O}_5$  is used as catalyst
- (67) pH of grape fruit at  $25^\circ\text{C}$  is.
- (a) 3.4 (b) 3.2 (c) 3.1 (d) 2.0
- (68) The pH of  $10^{-3} \text{ mol dm}^{-3}$  of an aqueous solution of  $\text{H}_2\text{SO}_4$  is.
- (a) 3.0 (b) 2.7 (c) 1.5 (d) 2.0
- (69) If  $K_a$  value is  $10^{-6}$  then  $K_b$  value.
- (a)  $10^{-4}$  (b)  $10^{-8}$  (c)  $10^{-6}$  (d)  $10^{-10}$

Answer Key		59	60	61	62	63	64	65	66	67	68	69
Question		59	60	61	62	63	64	65	66	67	68	69
Answer		a	d	a	a	d	b	a	a	c	b	b

- (70) The best buffer solution is prepared by taking .  
 (a) Equal concentration of salt and acid  
 (b) Higher concentration of salt and lower concentration of acid  
 (c) Lower concentration of salt higher concentration of acid  
 (d) Lower concentration of very lower concentration of acid
- (71) If a buffer solution of  $\text{CH}_3\text{COOH}$  and  $\text{CH}_3\text{COONa}$  has  $0.1 \text{ mol dm}^{-3}$ . Concentration of each what is the pH of buffer solution if  $\text{pK}_a$  value is 4.0  
 (a) 3.0 (b) 5 (c) 4.0 (d) 2
- (72) The catalyst used in Haber's process is.  
 (a) Aluminium oxide (b) Iron catalyst with metal oxide promoters  
 (c) magnesium oxide (d) Silicon oxide
- (73) pH of soft drink at  $25^\circ\text{C}$ .  
 (a) 3.0 (b) 4.0 (c) 3.5 (d) 4.5
- (74) Which of the following is weaker acid .  
 (a)  $\text{HClO}_4$  (b)  $\text{H}_2\text{SO}_4$  (c)  $\text{HBr}$  (d)  $\text{HNO}_3$
- (75) In equilibrium  $2\text{NO}_2 \rightleftharpoons \text{N}_2\text{O}_4 + 14.6 \text{ J}$  increase in temperature would.  
 (a) Favour the formation of  $\text{N}_2\text{O}_4$  (b) Stop reaction  
 (c) favour decomposition of  $\text{N}_2\text{O}_4$  (d) no alter the equilibrium
- (76) Which of the following favours the backward reaction in a chemical equilibrium.  
 (a) Increasing the concentration of one of the both reactant  
 (b) Increasing the concentration of one of the reactant  
 (c) Increasing the concentration of one or more of the products  
 (d) removal of at least one of the products at regular intervals
- (77) If an inert gas is added in the reaction  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  at constant volume then its equilibrium  
 (a) remains unaffected (b) favour the backward reaction  
 (c) Favour the forward reaction (d) Increases the dissociation of reactant
- (78) In the reaction  $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$  at equilibrium some  $\text{I}_2$  is added what happens to the equilibrium  
 (a) It gets shifted to right (b) it remains unchanged  
 (c) It gets shifted to left (d) First b and then c
- (79) The rate of catalyst in a reversible reaction is to.  
 (a) Alter the equilibrium constant of the reaction  
 (b) Increase the rate of forward reaction  
 (c) Allowed the equilibrium to be achieved quickly  
 (d) Decrease the rate of backward reaction

## Answer Key

Question	70	71	72	73	74	75	76	77	78	79
Answer	a	c	c	a	d	c	c	a	a	c

- (80) Which of the following reaction is favoured at low pressure.
- (a)  $N_2 + 3H_2 \rightleftharpoons 2NH_3$  (b)  $H_2 + I_2 \rightleftharpoons 2HI$   
 (c)  $PCl_5 \rightleftharpoons PCl_3 + Cl_2$  (d)  $N_2 + O_2 \rightleftharpoons 2NO$
- (81) At constant temperature the equilibrium constant ( $K_p$ ) for the decomposition reaction  $N_2O_4 \rightleftharpoons 2NO_2$  is expressed by  $K_p = (4x^2/P)(1-x^2)$  which of the following statement is true
- (a)  $K_p$  increases with increase of P  
 (b)  $K_p$  remains constant with change in P and x  
 (c)  $K_p$  increases with decrease of x  
 (d)  $K_p$  remains constant with change in P and x
- (82) For reaction  $PCl_5 \rightleftharpoons PCl_3 + Cl_2$  the forward reaction at constant temperature is favoured by
1. Introducing an inert gas at constant volume
  2. Introducing chlorine gas at constant volume
  3. Introducing an inert gas at constant pressure
  4. Increasing the volume of the container
  5. Introducing  $PCl_5$  at constant volume
- (a) 1, 2, 3 (b) 4, 5 (c) 2, 3, 5 (d) 3, 4, 5
- (83) At given temperature equilibrium amount of  $CO_2$  can be increased by.
- (a) Adding suitable catalyst (b) Adding an inert gas  
 (c) Decreasing the volume of container  
 (d) increasing the amount of CO
- (84) In reaction  $A_2 + 4B_2 \rightleftharpoons 2AB_4$   $\Delta H < 0$  the formation of  $AB_4$  will be favoured by.
- (a) Low temperature and high pressure (b) High temperature and high pressure  
 (c) Low temperature low pressure (d) High temperature and low pressure
- (85) In what manner will increase of pressure affect the following equation
- $$C(s) + H_2O(g) \rightleftharpoons CO(g) + H_2(g).$$
- (a) Shift in the reverse direction (b) Shift in the forward direction  
 (c) Increase in the yield of hydrogen (d) No effect
- (86) In which of the following cases does the reaction go farthest to completion.
- (a)  $K = 1$  (b)  $K = 10$  (c)  $K = 10^{-2}$  (d)  $K = 10^2$
- (87) Reaction quotient for reaction  $N_2 + 3H_2 \rightleftharpoons 2NH_3$  is given
- $$Q = \frac{[NH_3]^2}{[N_2][H_2]^3}$$
- The reaction will proceed from right to left if K is equilibrium constant
- (a)  $Q < K_c$  (b)  $Q = 0$  (c)  $Q > K_c$  (d)  $Q = K_c$

## Answer Key

Question	80	81	82	83	84	85	86	87
Answer	c	d	b	d	a	a	a	c

- (88) For the reaction  $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ , the equilibrium concentration of  $\text{H}_2$ ;  $\text{I}_2$  and  $\text{HI}$  are 8.3 and 28 mol L<sup>-1</sup>. Equilibrium constant of the reaction is  
 (a) 32.67 (b) 31.67 (c) 34.67 (d) 36.67
- (89) In which of the following case the value of  $K_p$  is less than  $K_c$ .  
 (a)  $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$  (b)  $\text{H}_2 + \text{Cl}_2 \rightleftharpoons 2\text{HCl}$   
 (c)  $2\text{SO}_2 + \text{O}_2 \rightleftharpoons 2\text{SO}_3$  (d)  $\text{PCl}_5 \rightleftharpoons \text{PCl}_3 + \text{Cl}_2$
- (90) The equilibrium constant of a reaction is 300. If the volume of reaction flask is tripled. The equilibrium constant is.  
 (a) 300 (b) 600 (c) 900 (d) 100
- (91) In the reaction  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ . When 100 ml of  $\text{N}_2$  has reacted the volume of  $\text{H}_2$  and  $\text{NH}_3$  are.  
 (a) 300 ml of  $\text{H}_2$  and 300 ml of  $\text{NH}_3$  (b) 100 ml of  $\text{H}_2$  and 200 ml of  $\text{NH}_3$   
 (c) 300 ml of  $\text{H}_2$  and 200 ml of  $\text{NH}_3$  (d) 100 ml of  $\text{H}_2$  and 100 ml of  $\text{NH}_3$
- (92) If a mixture of 3 moles of hydrogen and 1 mole of nitrogen is converted into  $\text{NH}_3$  completely. The ratio of volume of reactant and products at the same temperature and pressure.  
 (a) 2 : 1 (b) 1 : 2 (c) 1 : 3 (d) 3 : 1
- (93) Equilibrium constant for reaction  $2\text{A} \rightleftharpoons \text{B} + \text{C}$  at 780 and 10 atm pressure is 3.52. The equilibrium constant of this reaction at 780 and 20 atm pressure is.  
 (a) 5.72 (b) 11.44 (c) 28.6 (d) 3.52
- (94) The ratio of  $K_p / K_c$  for the reaction  $\text{CO} + 1/2\text{O}_2 \rightleftharpoons \text{CO}_2$  is.  
 (a) 1 (b)  $RT$  (c)  $(RT)^{1/2}$  (d)  $(RT)^{-1/2}$
- (95) For the reaction  $\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ . The rate constant for the forward and backward reaction are found to be  $4.2 \times 10^{-2}$  and  $3.36 \times 10^{-3}$  mol L<sup>-1</sup> sec<sup>-1</sup>. What is the equilibrium constant for the reaction.  
 (a) 11.3 (b) 12.5 (c) 8.0 (d) 6.0
- (96) In the reaction  $2\text{H}_2\text{S} \rightleftharpoons 2\text{H}_2 + \text{S}_2$ . The concentration of  $\text{H}_2\text{S}$  is 0.5 mol L<sup>-1</sup> and concentration of  $\text{H}_2$  is 0.1 mol L<sup>-1</sup>. What concentration of  $\text{S}_2$  is 0.4 mol L<sup>-1</sup> in on litre vessel. The value of equilibrium constant of the reaction is.  
 (a) 0.016 (b) 0.013 (c) 0.020 (d) 0.030
- (97) For the reaction  $2\text{A} + \text{B} \rightleftharpoons \text{C} + \text{D}$ . The partial pressure of A, B, C and D at equilibrium are 0.5, 0.8, 0.7 and 1.2 atm. The value of  $K_p$  for this reaction is.  
 (a) 2.4 atm (b) 6.2 atm<sup>-2</sup> (c) 4.2 atm<sup>-1</sup> (d) 8.4 atm<sup>-3</sup>
- (98) For the reaction  $\text{C}(\text{s}) + \text{CO}_2(\text{g}) \rightleftharpoons 2\text{CO}(\text{g})$  the partial pressure of  $\text{CO}_2$  and  $\text{CO}$  are 4 and 8 atm respectively, the value of  $K_p$  is.  
 (a) 14 atm (b) 16 atm (c) 18 atm (d) 12 atm

## Answer Key

Question	88	89	90	91	92	93	94	95	96	97	98
Answer	a	c	a	c	a	d	d	b	a	c	b

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

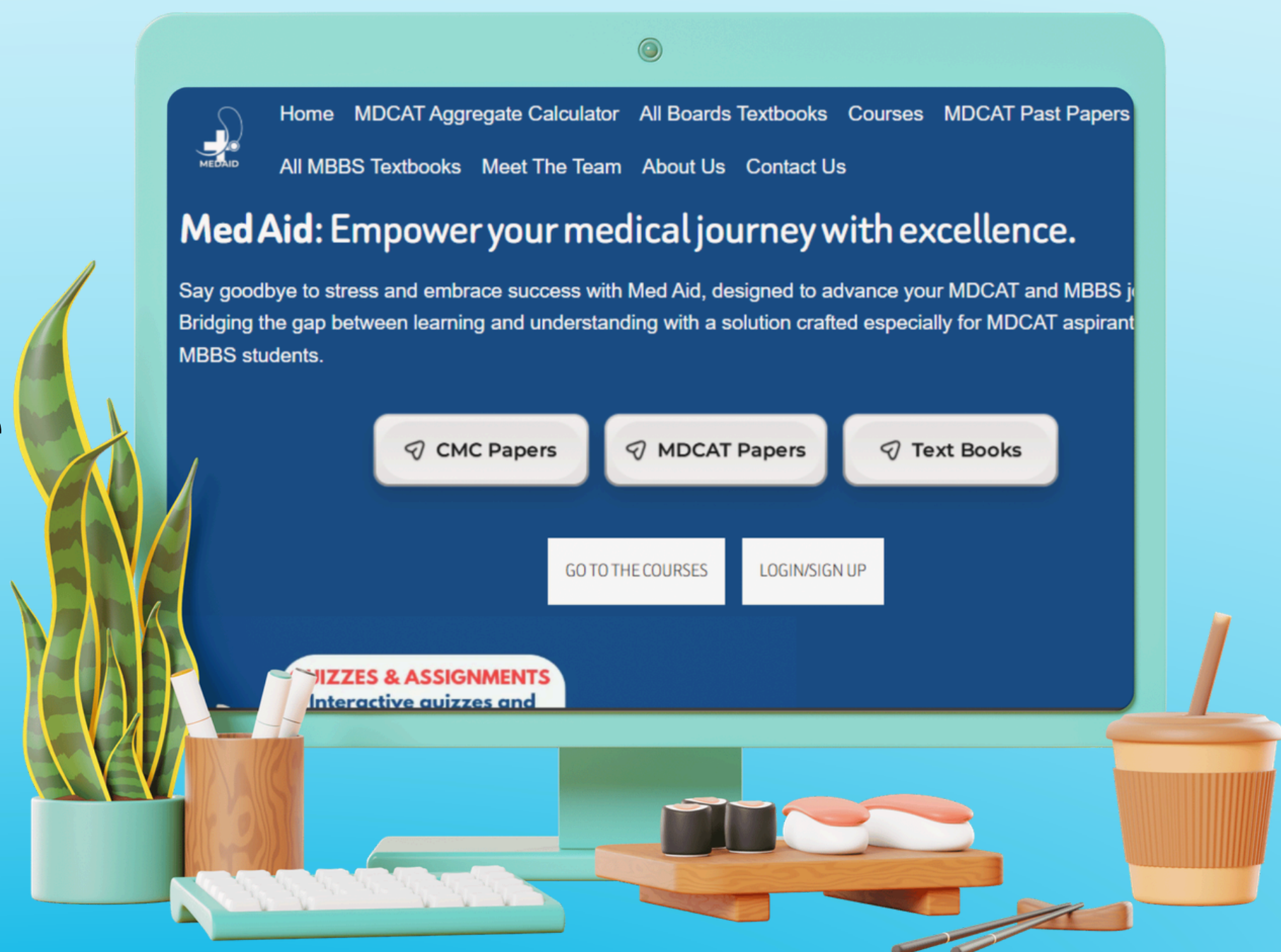
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



Join MedAid  
Whatsapp  
Community



**CLICK HERE MEDAIDPK.COM**



MEDAID.CONTACT@GMAIL.COM



+92 333 1617207

- (99) In which of the following reaction  $K_b$  and  $K_c$  have same value.  
 (a)  $2HI \rightleftharpoons H_2 + I_2$  (b)  $N_2 + 3H_2 \rightleftharpoons 2NH_3$   
 (c)  $2SO_2 + O_2 \rightleftharpoons 2SO_3$  (d)  $PCl_5 \rightleftharpoons PCl_3 + Cl_2$
- (100) The ratio of  $K_p/K_c$  for the reaction is  $SO_2 + 1/2O_2 \rightleftharpoons SO_3$  is.  
 (a)  $(RT)^{-1/2}$  (b)  $(RT)^{1/2}$  (c)  $RT$  (d) 1
- (101) If  $K_p$  of reaction  $A + 2B \rightleftharpoons 2C + D$  is 0.05 at 1000k then the value of  $K_c$  of the reaction is.  
 (a) 200.00 R (b) 0.02 R (c)  $5 \times 10^{-5} / R$  (d)  $5 \times 10^{-5} R$
- (102) The reaction  $PCl_5 \rightleftharpoons PCl_3 + Cl_2$  is an equilibrium if the concentration of  $PCl_3$  is doubled. The concentration of  $Cl_2$  become.  
 (a)  $\frac{1}{2}$  of its initial value (b)  $\frac{1}{4}$  of its initial value  
 (c) four times of its initial value (d) Two times of its initial value
- (103)  $H_2O + CO \rightleftharpoons H_2 + CO_2$   $K_c$  is 81. If the velocity constant of forward reaction is 162 litre  $mol^{-1} sec^{-1}$ . What is the velocity constant in  $L mol^{-1} sec^{-1}$  for the backward reaction.  
 (a) 13122 (b) 2 (c) 261 (d) 243
- (104) One mole of A is heated to  $300^\circ C$  in closed one litre till the following equilibrium is reached  $A \rightleftharpoons B$ .  
 (a) 0.2 (b) 0.6 (c) 0.8 (d) 0.1
- (105) In the reaction  $PCl_5 \rightleftharpoons PCl_3 + Cl_2$  the equilibrium concentration of  $PCl_5$  and  $PCl_3$  are 0.4 and 0.2 mol/litre respectively. If the value of  $K_c$  is 0.5. What is concentration of  $Cl_2$  in mol/litre.  
 (a) 2.0 (b) 1.5 (c) 1.0 (d) 0.5
- (106) Solubility product depends on.  
 (a) Nature of salt (b) Solvent (c) Temperature (d) All
- (107) Units of  $K_{sp}$  are .  
 (a)  $mol/dm^3$  (b)  $mol^2/dm^6$  (c)  $mol^3/dm^9$  (d) Not fixed
- (108) The solubility of  $KClO_3$  is decreased by adding.  
 (a)  $CaCO_3$  (b)  $NaCl$  (c)  $NaClO_4$  (d)  $KCl$
- (109) The solubility of  $AgCl$  is  $20^\circ C$  is  $1.435 \times 10^{-5} g L$ .  $K_{sp}$  will be.  
 (a)  $10^{-10}$  (b)  $10^{-12}$  (c)  $10^{-14}$  (d) None
- (110) If  $K_{sp}$  value of large, salt in water — soluble .  
 (a) Less (b) More (c) Moderate (d) None
- (111) Common ion affect finds extension application in analysis.  
 (a) Qualitative (b) Quantitative (c) Spectroscopic (d) All
- (112)  $K_c$  for reaction  $A + B \rightarrow C$  is 4.3 at  $20^\circ C$ . if conc. Of A and B and C is 0.5, 0.5 and 2 mole respectively. Then what is the direction of reaction at that stage.  
 (a) Forward (b) Reverse (c) Equilibrium (d) None

Answer Key

Question	99	100	101	102	103	104	105	106	107	108	109	110	111	112
Answer	a	a	c	a	b	c	c	d	d	d	c	b	a	a

## Topic 6

## CHEMICAL EQUILIBRIUM

- (113) Which of the following is correct for the initial stage of reaction.  
 (a)  $Q_c = K_c$  (b)  $Q_c > K_c$  (c)  $Q_c < K_c$  (d) None
- (114) For reversible reaction, when the reaction is almost complete in forward direction then the value of  $K_c$  at that time.  
 (a) Very large (b) small (c) Intermediate (d) predictable
- (115) Determine the value of equilibrium constant  $K_c$  for the reaction  
 $A_2 + B_2 \rightleftharpoons 2AB$ . If 10 moles of  $A_2$ , 15 moles of  $B_2$  and 5 moles of  $AB$  are placed in 2 litre vessel and allowed to come to equilibrium the final concentration of  $AB$  is 7.5M.  
 (a) 4.5 (b) 1.5 (c) 0.6 (d) None of these
- (116) When  $CO_2$  dissolves in water, the following equilibrium is established  
 $CO_2 + 2H_2O \rightleftharpoons H_3O^+ + CO_3^{2-}$ . The equilibrium constant is  $3.8 \times 10^{-7}$  and  $pH = 6.0$ . The rate  $\frac{[HCO_3^-]}{[CO_2]}$  will be  
 (a)  $3.8 \times 10^{-13}$  (b)  $3.8 \times 10^{-1}$  (c) 6.0 (d) 13.4
- (117) Formation of  $NH_3$  is reversible and exothermic process what will happen on cooling.  
 (a) More reactant will formed (b) More  $H_2$  will be formed  
 (c) More  $N_2$  will be formed (d) More product  $NH_3$  will be formed
- (118) In  $AgCl$  solution. Some salt of  $NaCl$  is added  $AgCl$  will be precipitated due to  
 (a) Solubility (b) Unsaturation effect  
 (c) Electrolyte (d) Common ion effect
- (119) A buffer solution which tend to resist the change in its  $pH$ .  
 (a)  $pOH$  (b)  $pH$  (c)  $pK_a$  (d)  $pK_b$
- (120) The value of equilibrium constant ( $K_c$ ) for reaction  
 $2HF \rightleftharpoons H_2 + F_2$  is  $10^{-13}$  at  $2000^\circ C$  calculate the value of  $K_p$  for reaction.  
 (a)  $2 \times 10^{-13}$  (b)  $1.86 \times 10^{-13}$  (c)  $10^{-13}$  (d)  $3.48 \times 10^{-9}$
- (121) What will be the  $pH$  of solution into concentration of  $10^{-3} M$ .  
 (a) 3 (b) 14 (c) 11 (d) 7
- (122) What is the correct relation between  $pH$  and  $pK_a$ .  
 (a)  $pH = pK_a + \log \frac{[Acid]}{[Base]}$  (b)  $pH = pK_a - \log \frac{[Base]}{[Acid]}$   
 (c)  $pH = pK_a - \log \frac{[Acid]}{[Base]}$  (d)  $pH = pK_a - \log \frac{[Base]}{[Salt]}$

## Answer Key

Question	113	114	115	116	117	118	119	120	121	122
Answer	c	a	a	b	d	d	b	b	c	c

(123) Which of the following is correct representation for K.S.P  
 $\text{AgCl} \rightarrow \text{Ag}^+ + \text{Cl}^-$ .

(a)  $K.S.P = \frac{[\text{AgCl}]}{[\text{Ag}^+][\text{Cl}^-]}$

(c)  $K.S.P = [\text{Ag}^+][\text{Cl}^-]$

(b)  $K.S.P = \frac{[\text{Ag}^+][\text{Cl}^-]}{[\text{AgCl}]}$

(d)  $K.S.P = [\text{AgCl}]$

(124) At equilibrium, the concentration of reactants and products are.

(a) Constant

(b) different

(c) maximum

(d) equal

(125) 1 mole of ethyl alcohol was treated with one mole of acetic acid at 25°C  
 1/3<sup>rd</sup> of acetic acid change into ester. The equilibrium constant will be.

(a) 4

(b) 0.25

(c) 0.7

(d) 1

(126) If Kc value is small then equilibrium position will shift.

(a) Towards left

(c) remain unchanged

(b) Towards right

(d) It is always constant value

(127) In Haber process, equilibrium mixture contains ..... NH<sub>3</sub> by.

(a) 20%

(b) 70%

(c) 55%

(d) 35%

(128) The pK<sub>a</sub> value of three acid A, B, C are 4.3, 3.3 and 5.5 respectively.  
 Which represent the correct order of strength.

(a) A > B > C

(b) B > A > C

(c) C > A > B

(d) C > B > A

(129) Which of the following base has highest K<sub>b</sub> value.

(a) NH<sub>4</sub>OH

(b) NaOH

(c) Ca(OH)<sub>2</sub>

(d) CH<sub>3</sub>NH<sub>2</sub>

(130) The pH of 10<sup>-2</sup>M. aqueous solution of NaOH is.

(a) 12

(b) 14

(c) 13

(d) 10

### Answer Key

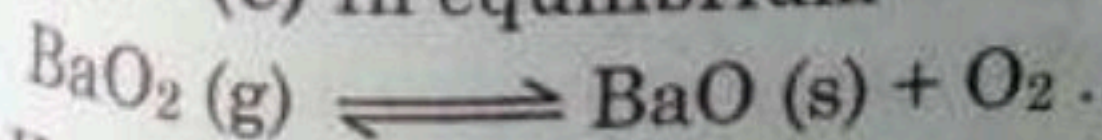
Question	123	124	125	126	127	128	129	130					
Answer	c	a	b	b	d	b	b	a					

## EXPLANATION

Q.1 (d) K<sub>c</sub> only depends on temperature.

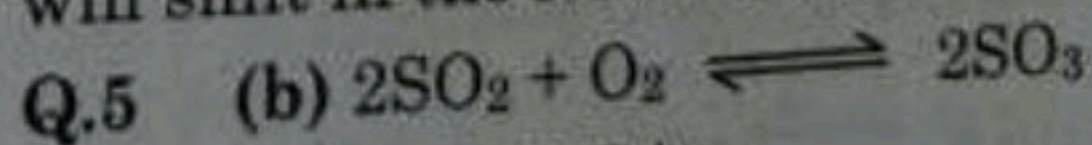
Q.2 (a) Active mass of solid is always unity. It cannot be included in the expression.

Q.3 (c) In equilibrium



K<sub>p</sub> = P(O<sub>2</sub>) equilibrium is based on partial pressure of O<sub>2</sub>, and it is based on

increasing of temperature the reaction will shift in the forward direction.



$$K_p = K_c(RT)^{\Delta n}$$

$$K_p = K_c(RT)^{2-3} \Rightarrow K_p = K_c(RT)^{-1}$$

Q.6 (d) Endothermic reactions are favourable at high temperature.

Q.9 (b) Because np = nR

Q.10 (d) Solubility of group 2 element increases down the group therefore

Topic 6

Be(OH)<sub>2</sub> has lowest solubility and lowest K<sub>sp</sub>

Q.11 (d) Conc. Of product increases with time the reaction quotient Q will increase with time

$$Q = \frac{[C][D]}{[A][B]}$$

Q.12 (c) K<sub>c</sub> only depends upon temperature.

Q.14 (a)

K<sub>sp</sub> = S<sup>2</sup> جب دو آئن پیدا ہو

K<sub>sp</sub> = 4s<sup>3</sup> جب تین آئن پیدا ہو

K<sub>sp</sub> = 27s<sup>4</sup> جب چار آئن پیدا ہو

$$3.2 \times 10^{-2} = 4s^3$$

$$32 \times 10^{-3} = 4s^3$$

$$\frac{32 \times 10^{-3}}{4} = s^3 \Rightarrow 8 \times 10^{-3} = s^3$$

$$s = 2.1 \times 10^{-1}$$

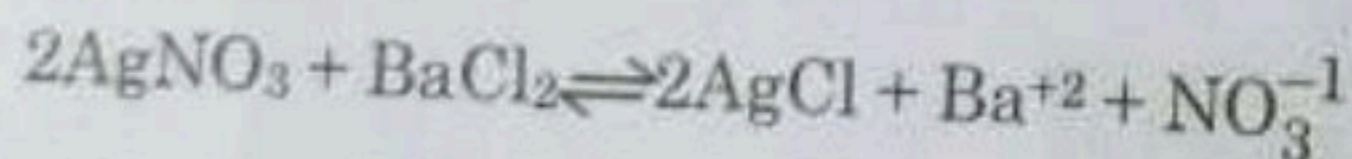
Q.17 (a) If ionic product = K.S.P

The solution is saturated

If ionic product < K.s.p the solution is unsaturated

If ionic product > K.s.p the solution is super saturated.

Q.21 (b)



Q.25 (b) Then T↑ [H<sup>+</sup>]↑, [OH<sup>-</sup>]↑, Kw↑  
pH ↓ pOH ↓ pKw ↓

Q.27 (c) K<sub>a</sub> ∝ Acid strength

% of ionization of acid ∝ strength

pH of acid ∝  $\frac{1}{\text{strength}}$

pOH ∝ strength of acid

Q.29 (a)

اگر Acid اور سالتس کی concentration برابر ہو تو pOH اور pKa برابر ہوتے۔

Q.30 (c) 1% dissociated

$$1 \propto \frac{1}{100} = \frac{1}{10^2} = 10^{-2}$$

pOH = 2

Q.31 (a) K<sub>c</sub> =  $\frac{K_f}{K_r}$

$$2.0 = \frac{K_f}{0.5}$$

$$K_f = 2.0 \times 0.5 = 1.0$$

Q.33 (c) Rate = K[A]<sup>2</sup>[B]

$$K = \frac{R}{[A]^2[B]} = \frac{16}{4 \times 2}$$

$$K = 2$$

Q.38 (c)

K<sub>p</sub> = K<sub>c</sub> اگر Reactant اور Product کے مولز برابر ہوں تو

اگر Reactant کے مولز زیادہ ہوں تو K<sub>p</sub> زیادہ ہوگا اور اگر Reactant کے مولز

زیادہ ہوں تو K<sub>c</sub> زیادہ ہوگا

Q.40 (b) K<sub>c</sub> =  $\frac{[P]}{[R]}$

K<sub>c</sub> کی دہلیجز زیادہ ہوں گی تو [P] کی کنسنٹریشن زیادہ ہوگی۔

Q.41 (c)

X کو ڈبل کیا rate ڈبل ہو گیا پھر y کو ڈبل کیا rate پھر ڈبل ہو گیا تو rate

دونوں X اور y depend کر رہا ہے۔

Q.42 (c) Rate = K[x]<sup>2</sup>[y]

$$\text{Rate} = K [3]^2 [\text{constant}]$$

$$\text{Rate} = 9$$

Q.47 (d) K<sub>c</sub> only depends on temperature

Q.49 (b) Formation of NH<sub>3</sub> is exothermic and exothermic reactions are favourable at low temperature.

Q.53 (d) pK<sub>a</sub> + pK<sub>b</sub> = pK<sub>w</sub>

$$pK_a + 4.8 = 14$$

$$pK_a = 14 - 4.8$$

$$pK_a = 9.2$$

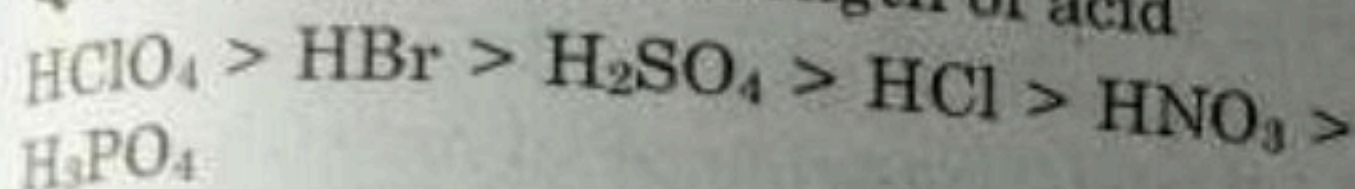
Q.61 (a)

اگر پراڈکٹ کے مول زیادہ ہو Reactant سے تو  $K_p$  بڑا اور اگر  
 Reactant کے مول زیادہ ہو Product سے تو  $K_c$  بڑا ہوگا  
 $K_p = K_c$  کے برابر ہوگا۔

Q.64 (b)

برف کا والیوم زیادہ ہوتا ہے پانی سے لہذا یہ یشر بڑھانے سے ریکیشن کم والیوم کی طرف  
 shift ہوگا یعنی پانی اور برف کا۔

Q.74 (d) Order of strength of acid



Q.75 (c) The reaction is exothermic so  
 increase in temperature will favour  
 backward direction.

Q.77 (a) Inert gas is unable to change  
 molar concentration of reactant and  
 products so state of equilibrium is  
 unaffected

Q.81 (d)  $K_p$  does not change with  
 pressure it only change by changing  
 temperature.

Q.84 (a)  $\Delta H < 0$  means the reaction is  
 exothermic and exothermic reactions are  
 favourable at low temperature.

Q.85 (a)

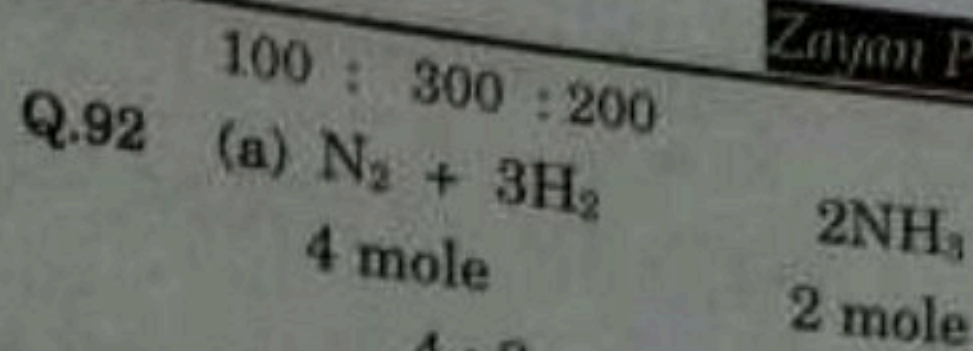
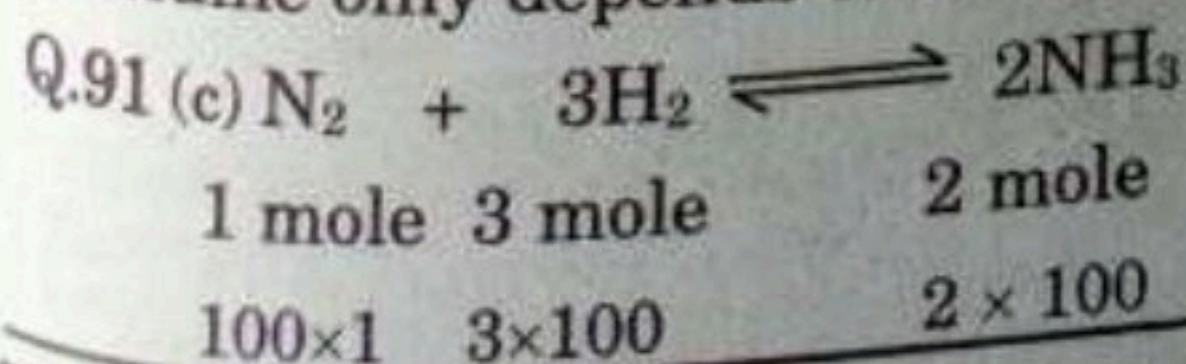
اس میں کاربن solid ہے اور solid کا والیوم ہوتا ہے گیس کے مقابلے  
 میں لہذا یہ یشر بڑھانے سے ریکیشن کم والیوم کی طرف جائے گا۔

$$Q.88 (a) K_c = \frac{[HI]^2}{[H_2][I_2]} = \frac{(28)^2}{(8)(3)} = 32.67$$

Q.89 (c)

اگر پراڈکٹ کے مول زیادہ ہو ریکیشن سے تو  $K_p$  زیادہ ہوگا  $K_c$  سے ورنہ  
 کم ہوگا  $K_c$  سے۔

Q.90 (a)  $K_c$  does not depend upon conc.  
 or volume only depends on Temperature.



Q.93 (d) As temperature is same  
 equilibrium constant is same.

Q.94 (d)  $K_p = K_c(RT)^{\Delta n}$

$$\frac{K_p}{K_c} = (RT)^{\Delta n} \quad \Delta n = n_2 - n_1$$

$$1 - 3/2 = -1/2$$

$$\frac{K_p}{K_c} = (RT)^{-1/2}$$

$$Q.95 (d) K_c = \frac{K_f}{K_r} = \frac{4.42 \times 10^{-2}}{3.36 \times 10^{-3}} = 12.5$$

$$Q.96 (a) K_c = \frac{[H_2][S_2]}{[H_2S]^2} = \frac{(0.1)^2(0.4)}{(0.5)^2}$$

$$= 0.016$$

$$Q.98 (b) K_p = \frac{(p_{CO})^2}{p_{CO_2} \cdot p_c} = \frac{(8)^2}{4 \times 1}$$

$$= \frac{64}{4} = 16 \text{ atm}$$

جو چیز سولڈ ہوتی ہے اس کا partial پریشر کو ایک لکھتے ہیں۔

Q.100  $K_b = K_c (RT)^{\Delta n}$

$$K_c = \frac{K_p}{(RT)^{\Delta n}}$$

$$K_c = \frac{K_p}{(RT)^{2-3/2}} = \frac{K_p}{(RT)^{-1/2}}$$

$$\frac{K_p}{K_c} = (RT)^{-1/2}$$

$$Q.101 (c) K_c = \frac{K_p}{(RT)^{\Delta n}} = \frac{0.05}{(1000R)}$$

$$K_c = \frac{0.05}{1000R} = \frac{5}{10000R}$$

$$= 5 \times 10^{-5}/R$$

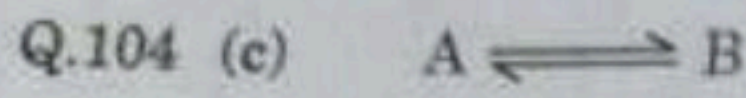
$$Q.102 (a) K_c = \frac{[PCl_3][Cl_2]}{[PCl_5]}$$

Volume of  $PCl_5$  is 1. Due to its solid form  
 $K_c = [PCl_3][Cl_2]$  so when the concentration  
 of  $PCl_3$  is doubled the conc. of  $Cl_2$  will become  
 $1/2$  to maintain equilibrium constant.

Q.103 (b)  $K_c = \frac{K_f}{K_r}$

$81 = \frac{162}{K_r}$

$K_r = \frac{162}{81} = 2$



1            0

1 - x        x

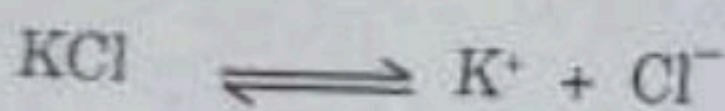
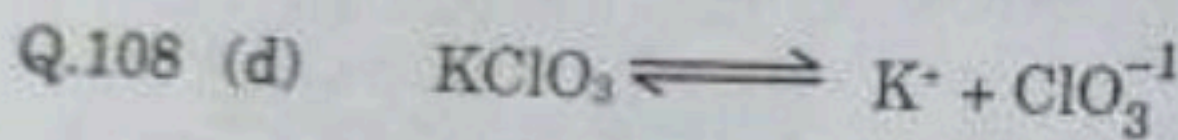
$K_c = \frac{[B]}{[A]} \Rightarrow \frac{4}{1} = \frac{(x)}{(1-x)}$

$x = 4 - 4x$

$x + 4x = 4$

$5x = 4/5$

$x = 4/5 = 0.8$



Due to common ion effect

Q.109 (d) Molar solubility =  $\frac{m}{M}$

$= \frac{1.435 \times 10^{-3}}{143.5}$

$S = 10^{-7} \text{ mol/l}$

For AgCl K.s.p is

$K.S.P = (1)^1 (1)^1 (s)^2$

$K.s.p = s^2$

$K.s.p = (10^{-7})^2 = 10^{-14}$

Q.110 (b) K.s.p  $\propto$  solubility

K.S.p more solubility more

Q.112 (a)  $Q_c = \frac{[C]}{[A][B]} = \frac{2}{0.5 \times 0.5}$

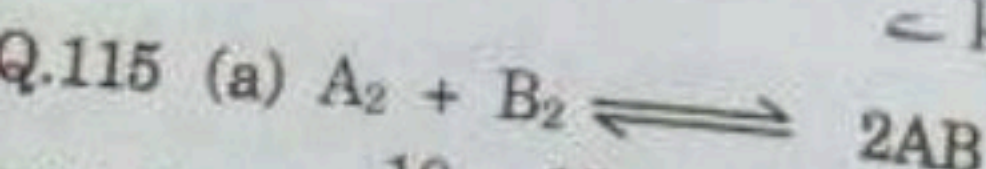
$Q_c = 8 \quad Q_c > K_c$

So reaction is forward direction

Q.113 (c)  $Q_c = \frac{[P]}{[R]}$

شروع میں product ہے reactant ہے اس لئے

$Q_c < K_c$  ہے



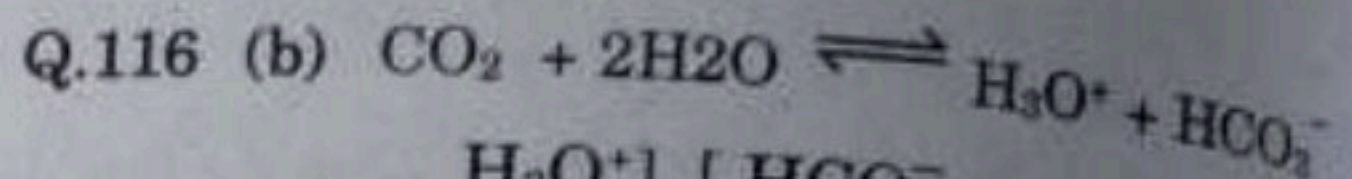
initial conc.  $\frac{10}{2} \quad \frac{15}{2} \quad \frac{5}{2}$

At eq 5 - x        7.5 - x        2.5 + 2x

As  $2.5 + 2x = 7.5$

$x = 2.5$

$K_c = \frac{(7.5)^2}{(2.5)(2.5)} = 4.5$



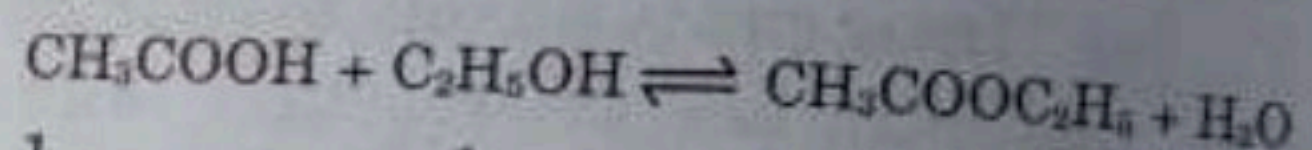
$K_a = \frac{[H_3O^+][HCO_3^-]}{[CO_2]}$

$= \frac{[HCO_3^-]}{[CO_2]} = \frac{K_a}{[H_3O^+]}$

$\frac{3.8 \times 10^{-7}}{10^{-6}} \quad \text{As pH} = 6$

$= 3.8 \times 10^{-1}$

Q.125



1	1	0	0
$1 - \frac{1}{3}$	$1 - \frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$
$\frac{2}{3}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{3}$

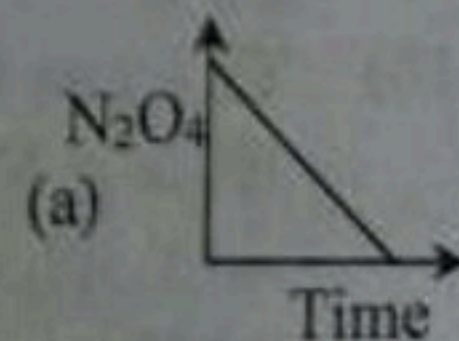
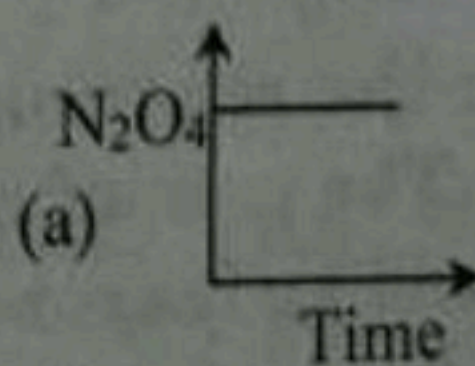
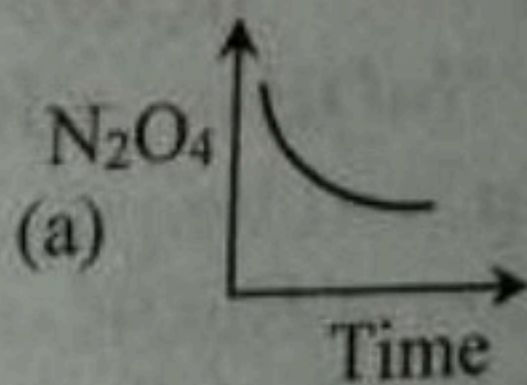
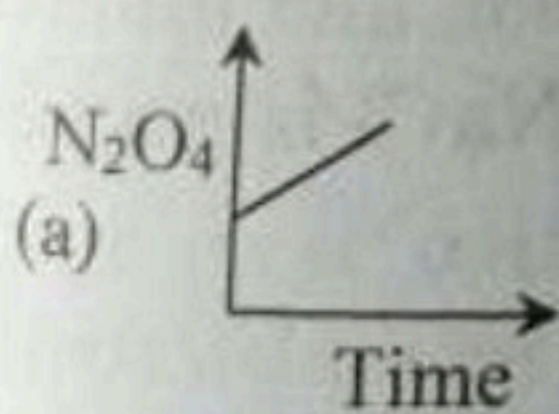
$K_c = \frac{[\frac{1}{3}][\frac{1}{3}]}{[\frac{2}{3}][\frac{2}{3}]} \Rightarrow \frac{1}{6} \times \frac{6}{4} = \frac{1}{4} = 0.25$

# TOPIC 7 >>

## REACTION KINETICS

### MCQs

- (1) The unit of specific rate constant for first order reaction of the concentration is expressed in molarity would be  
 (a)  $S^{-1}$  (b)  $\text{mols}^{-1}$   
 (c)  $\text{mol L}^{-1} S^{-1}$  (d)  $\text{mol L}^{-1}$
- (2) The activation energy for simple chemical reaction  $A \rightarrow B$  is  $E_a$ . in the forward direction. The activation energy for reverse reaction  
 (a) Can be lesser more than  $E_a$ . (b) is always less than  $E_a$ .  
 (c) is negative of  $E_a$ . (d) is always less than  $E_a$ .
- (3)  $3A \rightarrow B + C$ . It would be zero order reaction. When  
 (a) Rate  $\propto (A)^2$   
 (b) Rate reaction remains a at any concentration of A  
 (c) The rate of reaction unchanged at any concentration of B and C  
 (d) The rate reaction double if the concentration is increased to double
- (4) The rate of reaction depends upon  
 (a) Atomic mass (b) Molar concentration  
 (c) Equivalent mass (d) None
- (5) For first order reaction the half life period is independent of.  
 (a) cube root of initial concentration  
 (b) first power of initial concentration  
 (c) square root of final concentration  
 (d) Initial concentration
- (6) Which of these graphs best describes the rate at which  $N_2O_4$  decomposes to  $NO_2$ . If the reaction is of first order



- (7) Activation Energy of chemical reaction can be determined by  
 (a) Evaluating the rate constant at standard temperature  
 (b) Evaluating the molecules of reaction at two different temperature  
 (c) Evaluating the rate constant at two different temperature  
 (d) Changing the concentration of reactant

### Answer Key

Question	1	2	3	4	5	6	7
Answer	a	a	a	b	d	d	c

- (8) The first order rate constant of for decomposition of  $N_2O_5$   $6.2 \times 10^{-4} s^{-1}$ . The half life for decomposition.  
 (a) 1177.7 s (b) 1117.7 s (c) 6.0775 s (d) 110.77
- (9) If the rate of reaction is equal to the rate constant then the order of reaction is  
 (a) 3 (b) 0 (c) 1 (d) 2
- (10) Which of the following best explain the effect of catalyst on the rate of reversible reaction.  
 (a) It decreases the rate of reverse reaction  
 (b) It decreases the kinetic energy of reacting molecules  
 (c) It moves the equilibrium position to the right  
 (d) It provides the new reaction path with lower activation energy
- (11) For a chemical reaction  $A \rightarrow B$  the rate of reaction doubled when the concentration of A is increased four times. The order of reaction for A is  
 (a) zero (b) one (c) two (d) half
- (12) The unit of second order rate constant is  
 (a)  $L^{-1} mol^{-1} s^{-1}$  (b)  $L^2 mol^{-2} s^{-1}$  (c)  $L mol^{-1} s^{-1}$  (d)  $s^{-1}$
- (13) Among which of the following factor the specific reaction rate of first order reaction depends on  
 (a) temperature (b) concentration of reactant  
 (c) pressure (d) volume
- (14) The molecularity 1 of reaction is  
 (a) Always two (b) same as its order  
 (c) different than order  
 (d) may be same or different as compared to order
- (15) If I is the intensity of Absorbed light and C is the concentration of AB for photochemical process.  $AB + hv \rightarrow AB^{\circ}$ . the rate of formation of AB is directly proportional to  
 (a) C (b) I (c)  $I^2$  (d) concentration and intensity
- (16) The rat law for the reaction  $RCl + NaOH \rightarrow ROH + NaCl$  is given  $Rate = K[RCl]$ . The rate of reaction will be  
 (a) Double on doubling the concentration of NaOH  
 (b) Halved on reducing the concentration of alkyl Halides  
 (c) Decreased on increasing the temperature of reaction  
 (d) Unaffected by increasing the temperature of reaction
- (17) For an endothermic reaction where  $\Delta H$  represents the enthalpy of reaction in  $KJmol^{-1}$ . The minimum value for energy of activation will be  
 (a) Less than  $\Delta H$  (b) Zero (c) More than  $\Delta H$  (d) equal to  $\Delta H$

Answer Key

Question	8	9	10	11	12	13	14	15	16	17
Answer	a	c	d	d	c	a	d	b	b	c

- (18) The rate constant of reaction depends on  
 (a) Extent of reaction (b) time of reaction  
 (c) temperature (d) initial concentration of reactant
- (19) The function of catalyst in a chemical reaction is to  
 (a) increase the product (b) decrease the product  
 (c) accelerate the rate of reaction (d) increasing the reactant
- (20) For a chemical reaction which can never be fractional number  
 (a) order (b) Half-life (c) Molecularity (d) Rate constant
- (21) Which of the following relation is correct for a first order reaction  
 ( $K =$  rate constant) ( $t_{1/2} =$  Half-life)  
 (a)  $t_{1/2} = 0.693K$  (b)  $K \cdot t_{1/2} = 1/0.693$   
 (c)  $K \cdot t_{1/2} = 0.693$  (d)  $6.93 \propto K \propto t_{1/2} = 1$
- (22) Which of the following relation is correct for first order reaction  
 ( $K =$  rate constant),  $r =$  rate of reaction  $c =$  concentration of reactant.  
 (a)  $K = r \times c^2$  (b)  $K = rx$  (c)  $K = c/r$  (d)  $K = r/c$
- (23) The rate of reaction was found to be equal to its rate constant at any  
 concentration of the reactant the order of reaction is  
 (a) Zero order (b) First order (c) Second-order (d) Third-order
- (24) For a reaction  $H_2 + Cl_2 \xrightarrow{\text{Sunlight}} 2HCl$  the order of reaction  
 (a) 0 (b) 1 (c) 2 (d) 3
- (25) The half life of a substance first order reaction is 15 minutes. The rate  
 constant is  
 (a)  $2.46 \times 10^2 \text{ min}^{-1}$  (b)  $4.62 \times 10^{-2} \text{ min}^{-1}$   
 (c)  $3 \times 10^{-5} \text{ min}^{-1}$  (d)  $3 \times 10^{-9} \text{ min}^{-1}$
- (26) The rate of certain hypothetical reaction  $A + B + C \rightarrow$  Products is  
 given by  $r = \frac{-d[a]}{dt} = K [A]^{1/2} [B]^{1/3} [C]^{1/4}$  the order is  
 (a)  $\frac{13}{2}$  (b)  $\frac{13}{14}$  (c)  $\frac{12}{13}$  (d)  $\frac{13}{11}$
- (27) For first order reaction  $A \rightarrow B$  reactant concentration is 0.01M is  
 formed to be  $2.0 \times 10^{-5} \text{ mol}^{-1} \text{ s}^{-1}$ . The half life period of the reaction is  
 (a) 220 s (b) 30 s (c) 300 s (d) 347 s
- (28) In a chemical reactions two reactant take part. The rate of reaction is  
 directly proportional to concentration of one of them and inversely  
 proportional to the concentration of the other the order of reaction is  
 (a) 0 (b) 1 (c) 2 (d) 4

## Answer Key

Question	18	19	20	21	22	23	24	25	26	27	28
Answer	c	c	c	c	d	a	a	b	a	d	a

Topic 7

- (29) The half life of chemical reaction at particular concentration is 50 minute. When the concentration of reaction is doubled. The half life becomes 100 times. Find the order  
 (a) Zero (b) First (c) Second (d) Third
- (30) The rate constant of first order reaction is  $10^{-2} \text{ min}^{-1}$  the half life period of reaction is  
 (a) 693 min (b) 69.3 mint (c) 6.93 mint (d) 0.693 mint
- (31) Which of the following is in correct for  $E_a$ .  
 (a)  $E_a$  of exothermic reaction in the forward reaction is less than that of reverse reaction  
 (b)  $E_a$  of the endothermic reaction in the forward direction is greater than that of reverse reaction  
 (c)  $E_a$  is independent of temperature (d)  $E_a$  is directly proportional to K
- (32) Which statement about the effect of catalyst on reversible reaction is correct  
 (a) It increase, the equilibrium constant for forward reaction  
 (b) It increase the yield of product in equilibrium  
 (c) It increase the rate constant for forward and reverse reaction  
 (d) It increase the rate constant for forward reaction only
- (33) With the increase of  $10^\circ\text{C}$  temperature, the rate of reaction double this increase in rate of reaction is due to  
 (a) Decrease in activation energy  
 (b) Decrease in number of collision between reactant molecules  
 (c) Increase in activation energy of reactants  
 (d) number of effective collision
- (34) All of the following statement are correct except  
 (a)  $n = 1$  First order (b)  $n = 1$  First order  
 (c)  $n = 2$  2<sup>nd</sup> order (d)  $n > 73$  third order
- (35) The rate constant of a reaction has units and its unit-depends upon the following except  
 (a) Unit in which time is measured  
 (b) The unit in which concentration is measured  
 (c) The order of reaction (d) Molecularity of reaction
- (36) The reaction in which product act as catalyst is called  
 (a) Negative catalysis (b) Heterogeneous catalysis  
 (c) Activation of catalyst (d) Auto-catalyst

Answer Key

Question	29	30	31	32	33	34	35	36
Answer	a	b	d	c	d	d	d	d

- (37) All of the following reactions have molecularity  $\geq 2$  but the order of reaction
- (a) Decomposition of  $N_2O_5$  (b) Formation of ester  
(c) Hydrolysis of ester (d) Hydrolysis of cane sugar
- (38) Radio active decay follows — order of reaction.
- (a) Zero order (b) 1st order (c) 3rd order (d) 2nd order
- (39) The experimental relationship between rate of reaction and concentration of reaction is called.
- (a) Law of conservation of energy (b) Rate law  
(c) Equilibrium law (d) Law of mass action
- (40) For reaction  $2NO + O_2 \rightleftharpoons 2NO_2$ , the rate equation of reverse reaction is.
- (a) Rate =  $K [NO] [O_2]$  (b) Rate =  $K [NO_2]^2$   
(c) Rate =  $K [NO]^2 [O_2]$  (d) Rate =  $K [NO_2]$
- (41) In which of the following condition the molecules have greater energy.
- (a) Reactant (b) Products  
(c) Transition state (d) All have same value
- (42) In zero order reaction, the rate is independent of.
- (a) Temperature of reaction (b) Concentration of reactant  
(c) Concentration of products (d) Concentration of catalyst
- (43) The half life of  $N_2O_5$  at  $0^\circ C$  is 24 minutes. How long will it take for sample of  $N_2O_5$  to decay to 25% of its original concentration.
- (a) 24 minutes (b) 120 minutes  
(c) 48 minutes (d) 72 minutes
- (44)  $2A + B \longrightarrow$  product if reactant B is in excess. The order of reaction with respect to A in given rate law  $Rate = K [A]^2 [B]$  is.
- (a) 2nd order (b) Psuedo first order (c) 1st order (d) third order
- (45) If radioactive decay of radioactive isotope decreases from 200 coulombs per minute to 25 count per minutes after 24 hours. What is half life.
- (a) 3 hours (b) 6 hours (c) 8 hours (d) 2 hours
- (46) The rate equation for reaction by rate =  $K [A][B]$  concentration units are  $mol\ dm^{-3}$ . What are the possible units of the rate constant K.
- (a)  $mol\ dm^{-3}\ sec^{-1}$  (b)  $mol^{-1}\ dm^3\ sec^{-1}$   
(c)  $mol^{-2}\ dm^3\ sec^{-1}$  (d)  $mol^{-1}\ s^{-1}$
- (47) According to collision theory of bimolecular reactions in gas phase, minimum amount of energy required for effective collision is known as.
- (a) Heat of reaction (b) Rate of reaction  
(c) Has no effect on reaction (d) Energy of activation

## Answer Key

Question	37	38	39	40	41	42	43	44	45	46	47
Answer	a	b	b	b	c	b	c	a	c	b	d

- (a) Increases as the reaction proceeds  
 (b) Remains same as the reaction proceeds  
 (c) Decrease as the reaction proceeds  
 (d) may increase or decrease as the reaction proceeds

(49) Consider the reaction  $2A + B \longrightarrow$  Product rate of reaction =  $k[A]^2[B]$ . If the molar concentration of A and B is increased two times then the rate of reaction increases.

- (a) 8 times (b) 2 times (c) 4 times (d) 6 times

(50) All of the following factors do not affect velocity constant except.

- (a) Concentration of reactant (b) temperature  
 (c) Light (d) Surface area

(51) The order of reaction may be.

- (a) Zero (b) Fractional (c) Negative (d) All

(52) The half life of zero order reaction is mathematically expressed.

- (a)  $[t_{1/2}]_2 \propto \frac{1}{a^2}$  (b)  $[t_{1/2}]_1 \propto \frac{1}{a}$  (c)  $[t_{1/2}]_0 \propto a$  (d)  $[t_{1/2}]_3 \propto \frac{1}{a^2}$

(53) The half life period for the decomposition of  $N_2O_5$  at  $45^\circ C$  is.

- (a) 24 mint (b) 12 mint (c) 48 mint (d) 36 mint

(54) If rate for reaction  $2A + B \longrightarrow$  products then Rate =  $k[A]^2[B]$ . If A is present in large excess then order of reaction is.

- (a) 1 (b) 3 (c) 2 (d) 1.5

(55) According to collision theory a reaction will speed up if.

- (a) The frequency of collision increases  
 (b) The proportion of particles with energy greater than the  $E_a$  increases  
 (c) Both A and B (d) Difficult to predict

(56) Homogenous catalysis is observed by.

- (a) Haber's process (b) preparation of vegetable ghee  
 (c) Hydrolysis of ester (d) Contact process

(57) The rate constant K is  $0.693 \text{ mint}^{-1}$ . The half life for the first order reaction will be.

- (a) 1 mint (b)  $0.693 \text{ mint}$  (c) 2 mint (d) 4 mint

(58) The overall kinetics of reaction is governed by.

- (a) The main reaction (b) The fastest step in the reaction mixture  
 (c) Slowest step in the reaction mixture  
 (d) The step involving the maximum number of reaction species

(59) The unit of specific rate constant depends on .

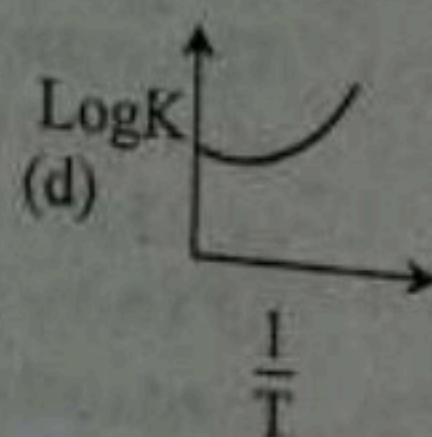
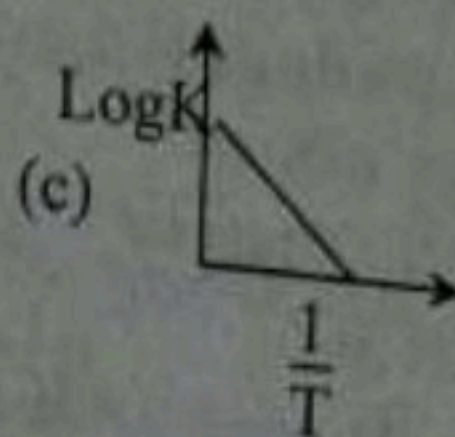
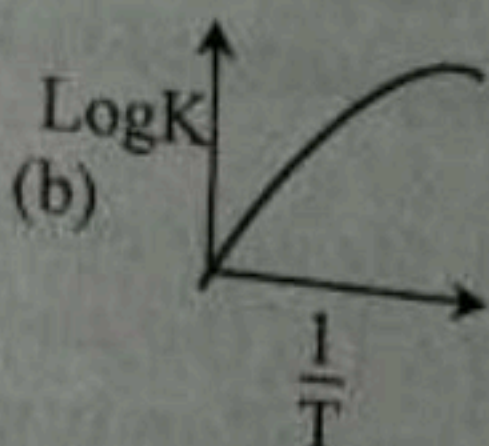
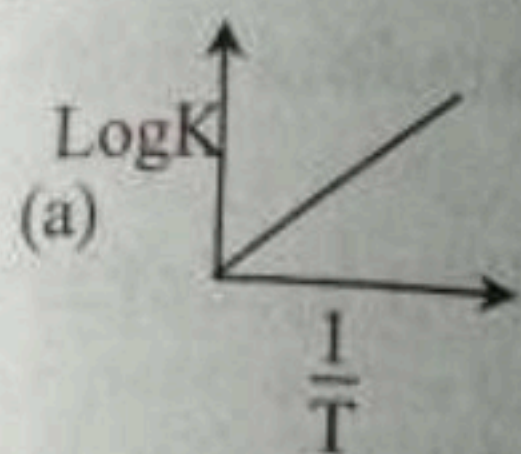
- (a) Molecularity (b) Concentration of reactants  
 (c) Concentration of products (d) order of reaction

### Answer Key

Question	48	49	50	51	52	53	54	55	56	57	58	59
Answer	c	a	b	d	c	a	a	c	c	a	c	d

(60) In photosynthesis the order of reaction is

- (61) By considering Arrhenius equation the graph between  $1/T$  and  $\log K$  gives a curve of the type



- (62) The Arrhenius equation expressing the effect of temperature on the rate constant of reaction is
- (a)  $K = \frac{E_a}{RT}$  (b)  $K = A \cdot e^{-E/RT}$   
 (c)  $K = \log_e \frac{E_a}{RT}$  (d)  $K = e^{-E/RT}$
- (63) In a reaction, the rate expression is  $\text{Rate} = K[A][B]^{2/3}[C]^6$  the order of reaction is
- (a) 1 (b) 2 (c)  $23/3$  (d) zero
- (64) Time required to complete a definite fraction of reaction varies inversely to the concentration of reactant, the order is
- (a) zero (b) 1 (c) 3 (d) 2
- (65) If "a" is the initial concentration, the time required to decompose half of the substance for nth order is inversely proportional to
- (a)  $a^n$  (b)  $a^{n-1}$  (c)  $a^{1-n}$  (d)  $a^{n-2}$
- (66) Select the intermediate in the following reaction mechanism  
 $O_3 \rightleftharpoons O_2 + O$ ;  $O + O_3 \rightleftharpoons 2O_2$
- (a)  $O_3$  (b)  $O$  (c)  $O_2$  (d) None of these
- (67) The sum of the power to which the concentration of substance appears in the expression is known as
- (a) Rate of reaction (b) Molecularity of reaction  
 (c) Order of reaction (d) None
- (68) The rate of reaction,  $A + B + C \rightarrow p$  is give by  $r = \frac{d[A]}{dt} = K[A]^{1/2}[B]^{1/2}[C]^{1/2}$  the order of reaction is
- (a) 1 (b) 2 (c)  $\frac{1}{2}$  (d)  $\frac{3}{2}$
- (69) The equation for that half life period in first order reaction is
- (a)  $t_{1/2} = 0.602/K$  (b)  $t_{1/2} = 0.693/K$   
 (c)  $t_{1/2} = K/0.693$  (d)  $t_{1/2} = K/0.602$

Answer Key

Question	60	61	62	63	64	65	66	67	68	69
Answer	b	c	b	c	d	c	b	c	d	b

Topic 7

- (70) The enzyme catalyzed reactions are faster than metal catalyzed reaction because its activation energy is  
 (a) Greater (b) Lower (c) Same (d) None
- (71) The number of molecules of the reactants of taking part in a single step of reaction tells about  
 (a) Molecularity of reaction (b) Mechanism of reaction  
 (c) Order of reaction (d) All of the above
- (72) A reaction  $A_2 + B_2 \rightarrow 2AB$  occurs by following mechanism  
 $A_2 \rightarrow A + A$  ..... (slow)  
 $A + B_2 \rightarrow AB + B$  ..... (fast)  
 $A + B \rightarrow AB$  ..... (fast) its order would be  
 (a) 3/2 (b) 1 (c) Zero (d) 2
- (73) Following mechanism has been proposed for a reaction  
 $2A + B \rightarrow D + E \Rightarrow A + B \rightarrow C + D$  .....(Slow)  
 $A + B \rightarrow E$  ..... (fast)  
 The rate law expression for the reaction is  
 (a)  $r = k[A]^2 [B]$  (b)  $r = k[A][B]$  (c)  $r = k[A]^2$  (d)  $r = k[A][C]$
- (74) If the first order reaction involves gaseous reactants and gaseous products. The unit of its rate is.  
 (a) atm (b) atm sec (c)  $\text{atm sec}^{-1}$  (d)  $\text{atm}^2.\text{sec}^2$
- (75) The rate constant of an exothermic reaction follows.  
 (a) Exponential increase with the increase of temperature  
 (b) Exponential decrease with the increase of temperature  
 (c) Linear increase with the increase of temperature  
 (d) Linear decrease with the increase of temperature
- (76) A first order reaction has half life period of 69.3 sec at 0.10 mol litre<sup>-1</sup> reactant concentration, rate will be.  
 (a)  $10^{-4} \text{ M sec}^{-1}$  (b)  $10^{-3} \text{ M sec}^{-1}$   
 (c)  $10^{-1} \text{ M sec}^{-1}$  (d)  $6.93 \times 10^{-1} \text{ M sec}^{-1}$
- (77) The rate of the reaction  $A + 2B \rightarrow \text{product}$  is given by  $d[\text{product}]/dt = k[A]^2[B]$ . If B is taken in large excess, the order of reaction will be.  
 (a) Zero (b) 1 (c) 2 (d) 3
- (78) The rate of reaction  $A + B + C \rightarrow \text{product}$  is given  
 Rate =  $k [A]^{1/2}[B]^{1/3} [C]$ . The order of reaction is.  
 (a) 1 (b) 3 (c) 5/6 (d) 11/6
- (79) What is order of reaction which has rate expression rate =  $k[A]^{3/2}[B]^{-1}$ .  
 (a) 3/2 (b) 1/2 (c) Zero (d) None

Answer Key

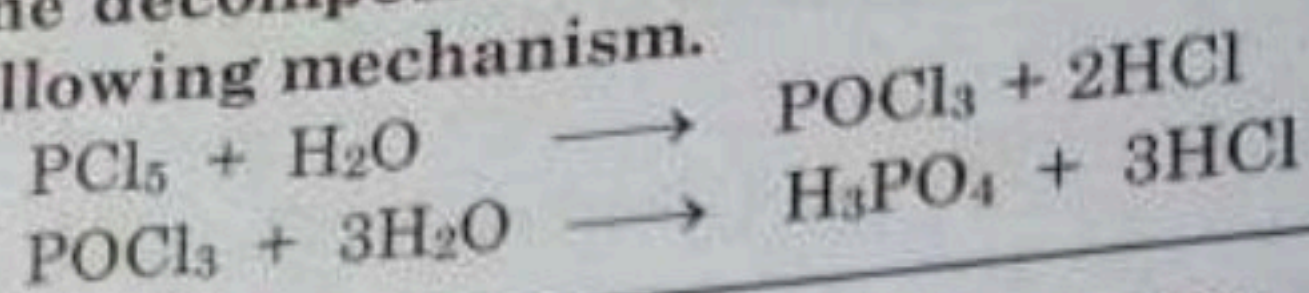
Question	70	71	72	73	74	75	76	77	78	79
Answer	b	a	b	b	c	a	b	b	d	b

- (80) For reaction  $\text{N}_2\text{O}_5 \longrightarrow 2\text{NO}_2 + \frac{1}{2}\text{O}_2$ ,  $t_{1/2} = 24$  min, starting with 10g of  $\text{N}_2\text{O}_5$  how many grams of  $\text{N}_2\text{O}_5$  will remain after period of 72 minutes.  
 (a) 0.063 g (b) 0.50 g (c) 1.77 g (d) 1.25 g
- (81) The rate constant of reaction is  $3 \times 10^{-3} \text{ mol dm}^{-3} \text{ sec}^{-1}$ . The order is.  
 (a) 1 (b) 2 (c) 3 (d) Zero
- (82) If  $E_f$  and  $E_r$  are activation energies of forward and reverse reaction, the reaction is known to be exothermic then.  
 (a)  $E_f > E_r$  (b)  $E_f < E_r$  (c)  $E_f = E_r$  (d) None
- (83) For reaction  $\text{A} + \text{B} \longrightarrow \text{C} + \text{D}$  doubling the concentration of both the reactants increases the reaction rate by 8 times and doubling the initial concentration of only B simply doubles the reaction rate. The rate law is given.  
 (a)  $\text{Rate} = k[\text{A}][\text{B}]^2$  (b)  $\text{Rate} = k[\text{A}][\text{B}]$   
 (c)  $\text{Rate} = k[\text{A}]^{1/2}[\text{B}]^2$  (d)  $\text{Rate} = k[\text{A}]^2[\text{B}]$
- (84) In the reaction  $\text{A} + \text{B} \longrightarrow \text{product}$  by doubling of [A], increase the reaction rate four times but by doubling of [B] has no effect on rate. The rate expression is.  
 (a)  $\text{Rate} = k[\text{A}]^2[\text{B}]^0$  (b)  $\text{Rate} = k[\text{A}]$   
 (c)  $\text{Rate} = k[\text{A}]^2[\text{B}]^2$  (d)  $\text{Rate} = k[\text{A}][\text{B}]$
- (85) If energy of activated complex is close to energy of reactant. It means the rate of reaction is.  
 (a) Fast (b) Moderate (c) Slow (d) very slow
- (86) If energy of activation of chemical reaction is very low, the rate of that chemical reaction I observed to be very high because.  
 (a) Concentration of reactant becomes irrelevant  
 (b) Number of fruitful collision increases  
 (c) Reaction proceed without any transition state  
 (d) Molecules of reactants move slowly
- (87) For which change of temperature, the rate of reaction becomes approximately double at.  
 (a) 293 K (b) 283 K (c) 20°C (d) 10°C
- (88) Rate of first order depends on.  
 (a) Concentration of one reactant (b) Concentration of two reactants  
 (c) Concentration of three reactants (d) Independent of initial concentration

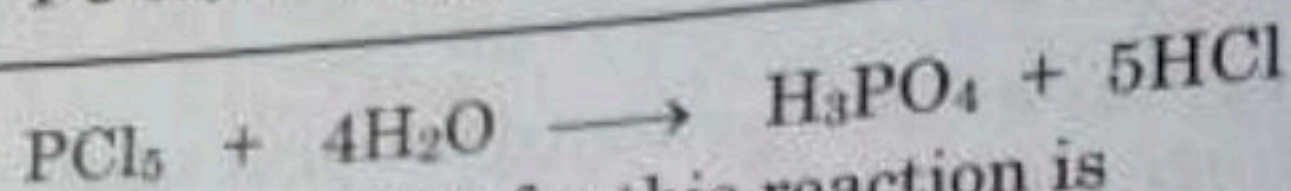
## Answer Key

Question	80	81	82	83	84	85	86	87	88
Answer	d	d	b	d	a	a	b	d	a

(89) The decomposition of  $\text{PCl}_5$  in the presence of moisture takes place by following mechanism.



Slow steps  
Fast step



The rate equation for this reaction is

(a)  $\text{Rate} = k[\text{PCl}_5][\text{H}_2\text{O}]$   
(c)  $\text{Rate} = k[\text{PCl}_3][\text{H}_2\text{O}]$

(b)  $\text{Rate} = k[\text{PCl}_3][\text{HCl}]$

(d)  $\text{Rate} = k[\text{POCl}_3][\text{H}_2\text{O}]^3$

(90) If a reaction with  $t_{1/2}$  69.3 second, has rate constant  $10^{-2}$  per second the order is.

(a) Zero

(b) 1

(c) 2

(d) 3

(91) For the reaction  $4\text{A} + \text{B} \longrightarrow 2\text{C} + 2\text{D}$  which of the following statement is not correct.

(a) The rate of disappearance of B is one fourth of rate of disappearance of A

(b) The rate of formation of C is one half of the rate of consumption of A

(c) The rate of appearance of D is half of the rate of disappearance of B

(d) The rate of formation of C and D are equal

(92) Which of following is true for order of reaction.

(a) Rate law expression cannot be written from stoichiometric equation

(b) It is always whole number

(c) It is never zero

(d) It can be determined theoretically

(93) The rate constant of reaction is  $2.5 \times 10^{-2} \text{ minutes}^{-1}$ . The order of the reaction is.

(a) One

(b) Two

(c) Zero

(d) Three

(94) If initial concentration is doubled the times for half of reaction is also doubled. The order of reaction is.

(a) Zero

(b) First

(c) Second

(d) Third

(95) Increase the concentration of reactants leads to the change in.

(a) Heat of reaction

(b) Activation energy

(c) Collision frequency

(d) Threshold energy

(96) The rate of reaction increases with increase of temperature because.

(a) Activation energy barrier is lowered

(b) The average energy of product increases

(c) Threshold energy changes

(d) Activation of energy is lowered

(97) Which of the following does not effect the rate of reaction.

(a) Amount of reactant taken

(b) Physical state of reaction

(c)  $\Delta H$  of a reaction

(d) Size of vessel

### Answer Key

Question	89	90	91	92	93	94	95	96	97
Answer	c	b	c	a	a	b	c	d	c

- (98) The activation energy of reaction is zero the rate constant of reaction.
- Increases with increase of temperature
  - Decreases with increase of temperature
  - Decreases with decrease of temperature
  - Is nearly independent of temperature
- (99)  $3A \longrightarrow B + C$ . it would be zero order reaction when.
- The rate of reaction is proportional to sequence of concentration of A
  - The rate of reaction remains the same at any concentration of A
  - The rate of reaction unchanged at any concentration of B and C
  - The rate of reaction double if concentration of B is increased to double
- (100) The rate of first order reaction is  $1.5 \times 10^{-2} \text{ mol L}^{-1} \text{ min}^{-1}$  at 0.5 M concentration of reactant. The half life of reaction is.
- 0.383 min
  - 23.1 min
  - 8.73 min
  - 7.53 min
- (101) For reaction  $A + 2B \longrightarrow C$  rate is given by  $R = [A][B]^2$  then the order of reaction is.
- 3
  - 6
  - 5
  - 7
- (102) In the equation  $K = A.e^{-E_a/RT}$  is chemical kinetic which statement is correct.
- K is equilibrium constant
  - A is absorption constant
  - $E_a$  is energy of activation
  - R is Rydberg constant
- (103)  $2NO + O_2 \longrightarrow 2NO_2$ . Volume is suddenly reduced to half its value by increasing the pressure on it. If the reaction is of first order with respect to  $O_2$  and second order with respect to  $NO$ . The ratio of reaction will
- Diminish to one fourth of initial value
  - Diminishes to one eighth of its initial rate
  - Increases to eight times of its initial rate
  - Increases to four times of its initial rate
- (104) A reaction involving two different reactants can never be.
- Unimolecular reaction
  - First order reaction
  - Second order reaction
  - bimolecular reaction
- (105) Consider an endothermic reaction  $X \longrightarrow Y$  with the activation energy  $E_b$  and  $E_f$  for the backward and forward reaction respectively, in general.
- $E_b < E_f$
  - $E_b > E_f$
  - $E_b = E_f$
  - There is not definite reaction b/w  $E_b$  and  $E_f$

## Answer Key

Question	98	99	100	101	102	103	104	105
Answer	d	b	b	a	c	c	a	a

Topic 7

- (106) A reaction was found to be second order with respect to the concentration of carbon monoxide, if the concentration of carbon monoxide is doubled with every thing else kept same the rate of reaction will be.  
 (a) Remains unchanged (b) Tripled  
 (c) Increased by factor of 4 (d) doubled
- (107) Consider the reaction  $2A + B \rightarrow$  products, when the concentration of B alone was doubled. The half life did not change when the concentration of A is doubled. The rate is increased by two times the unit of rate constant.  
 (a)  $S^{-1}$  (b)  $L mol^{-1} sec^{-1}$  (c) No unit (d)  $mol L^{-1} Sec^{-1}$
- (108) The rate of a chemical reaction doubles for every rise of  $10^{\circ}C$  rise of temperature. If temperature is raised by  $50^{\circ}C$ . the rate of reaction increases by about.  
 (a) 10 times (b) 24 times (c) 32 times (d) 64 times
- (109) 2nd order reaction becomes first order when.  
 (a) One of reactant is large excess (b) None of reactant is in large excess  
 (c) Both reactants are in large excess (d) None
- (110) For chemical reaction  $A \rightarrow B$  the rate of reaction doubles when the concentration of A is increased four times the order of reaction for A is.  
 (a) Zero (b) One (c) Two (d) Half
- (111) In first order reaction, the concentration of reactant is reduced to 25% in one hour. The half life period of reaction is.  
 (a) 120 mint (b) 60 mint (c) 30 mint (d) 15 mint

Answer Key

Question	106	107	108	109	110	111
Answer	c	b	c	a	d	b

Explanation

Q.1 (a)  $K = \frac{\text{Rate}}{[A]} = \frac{\text{mol } L^{-1}S^{-1}}{\text{mol}L^{-1}} = S^{-1}$

Q.3 (a) For zero order rate of reaction is independent of any of reactant.

Q.6 (d) For first order rate of decomposition is directly proportional to time

Q.8 (a)  $t_{1/2} = \frac{0.693}{K} = \frac{0.693}{6.2 \times 10^{-4}S^{-1}} = 1117.7 \text{ second}$

Q.10 (d) Catalyst decreases the energy of activation.

Q.15 (b) The rate of formation AB is directly proportional to the intensity of incident light.

Q.16 (b) It is pseudo first order reaction since  $r \propto RCl$ , So the rate is halved when the concentration of RCl is halved.

Q.17 (c) For endothermic reaction  $E_a$  will be more than  $\Delta H$ . While for

exothermic reaction  $E_a$  will be less than  $\Delta H$ .

Q.22 (d) rate = k (conc)<sup>n</sup>

For first order

Rate = k [conc]<sup>1</sup>

$K = \frac{\text{Rate}}{C}$  or  $K = \frac{r}{c}$

Q.23 (a) Rate = K (conc)<sup>n</sup>

For zero order n = 0

Rate = k (conc)<sup>0</sup>

rate = K

Q.25 (b)  $K = \frac{0.693}{t_{1/2}} = \frac{0.693}{15}$

=  $4.62 \times 10^{-2} \text{ min}^{-1}$

Q.26 (a) Order =  $\frac{1}{2} + \frac{1}{3} + \frac{1}{4}$

$\frac{6+4+3}{12} = \frac{13}{12}$

Q.27 (d) Rate = K [A]

$K = \frac{r}{[A]}$

$K = \frac{2.0 \times 10^{-5}}{0.01} = 2 \times 10^{-3} \text{ S}^{-1}$

$t_{1/2} = \frac{0.693}{K} = \frac{0.693}{2 \times 10^{-3}} = 347.5$

Q.29 (a) For zero order n = 0

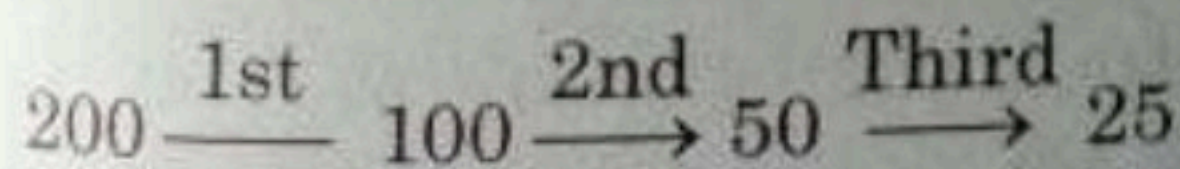
$t_{1/2} \propto \frac{1}{a^{-1}} \Rightarrow t_{1/2} \propto a$

Q.30 (b)  $t_{1/2} = \frac{0.693}{k} = \frac{0.693}{10^{-2}}$

= 69.3 min

Q.45 (c)  $t_{1/2} = \frac{\text{total time}}{\text{No. of halves life}} = \frac{24}{3}$

= 8



Q.46 (b) Rate = k[A][B]

$K = \frac{\text{Rate}}{[A][B]} = \frac{\text{mol dm}^{-3} \text{ sec}^{-1}}{\text{mol dm}^{-3} \cdot \text{mol dm}^{-3}}$

$K = \text{mol}^{-1} \text{ dm}^3 \text{ sec}^{-1}$

Q.57 (a)  $t_{1/2} = \frac{0.693}{K} = \frac{0.693}{0.693}$

= 1 min

Q.63 (c) Rate = k [A][B]<sup>2/3</sup>[C]<sup>0</sup>

Order of reaction =  $\frac{1}{1} + \frac{2}{3}$

$\frac{3+2}{3} = \frac{5}{3}$

Q.64 (d)  $[t_{1/2}] \propto \frac{1}{a^{2-1}}$

$[t_{1/2}]_2 \propto \frac{1}{a}$

Q.66 (b) Intermediate is one which is formed and used as during the course of reaction.

Q.72 (b) Rate = k[A<sub>2</sub>] from slowest step

Q.73 (b) Rate of reaction is derived from slowest step.

Q.74 (c) For gaseous the unit of concentration is replaced by atm.

Q.75 (a) Rate constant  $K = A \cdot e^{-E_a/RT}$

K shows exponential increase with the increase in temperature.

Q.76 (b)  $K = \frac{0.693}{69.3} = 10^{-2} \text{ sec}^{-1}$

$r = k[A] \Rightarrow 10^{-2} \times 6.1 = 10^{-3} \text{ M} \cdot \text{sec}^{-1}$

Q.77 (b) For excess reactant order is zero

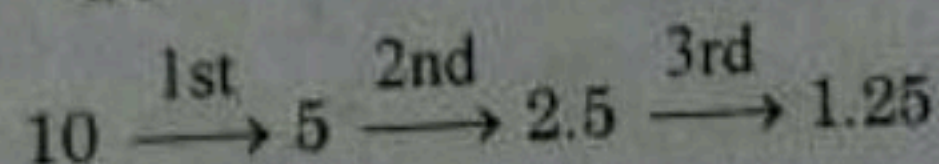
Q.78 (d) Order =  $\frac{1}{2} + \frac{1}{3} + 1 = \frac{11}{6}$

Q.79 (b) Order =  $\frac{3}{2} - \frac{1}{1}$

=  $\frac{3-2}{2} = \frac{1}{2}$

Q.80 (d) No. of half life =  $\frac{\text{Total time}}{\text{Half life}}$

=  $\frac{72}{24} = 3$



Q.81 (d) Units =  $(\text{mol dm}^{-3})^{1-n} \text{ sec}^{-1}$

$(\text{mol dm}^{-3})^{1-n} \text{ sec}^{-1} = \text{mol dm}^{-3} \text{ sec}^{-1}$

Topic 7

Q.83 (d) Overall third order second order with respect to A and first order with respect to B.

Q.90 (b) Per second unit shows that it is first order.

Q.91 (c) The rate of appearance of D is double the rate of disappearance of B.

Q.94 (b) for zero order  $t_{1/2} \propto a$

Q.98 (d) If  $E_a = 0$  then

$$K = A \cdot e^{-E_a/RT} = A e^0 = A$$

Hence independent of temperature.

Q.99 (b) The rate of reaction is independent of concentration of reactants.

Q.100 (b) Rate =  $k[A]$

$$K = \frac{\text{Rate}}{[A]} = \frac{1.5 \times 10^{-2}}{0.5}$$

$$K = 3 \times 10^{-2} \text{ mint}^{-1}$$

$$t_{1/2} = \frac{0.693}{K} = \frac{0.693}{2.0 \times 10^{-3}} = 200 \times 10^{-3} \text{ sec}^{-1}$$

Q.101 (a) Rate =  $[A]^1[B]^2 = 1 + 2 = 3$

Q.103 (c) Initial rate =  $k[\text{NO}_2]^2[\text{O}_2]$

Final rate =  $k[2\text{NO}_2]^2[2\text{O}_2]$

$$8k [\text{NO}_2][\text{O}_2]$$

Q.105 (a)  $E_f - E_b = \Delta H$

For endothermic  $\Delta H = +ve$

Hence  $E_f > E_b$

Q.106 (c) rate  $\propto [\text{CO}]^2$

So rate will increase by factor of 4

Q.107 (b) When B is doubled and half life is not changed so the reaction is first order w.r.t. to B again when concentration of A is doubled rate also doubled which means reaction is 1st order w.r.t. to A. Overall order =  $1 + 1 = 2$

$$\text{Units} = \text{mol}^{1-2} \text{ liter}^{2-1} \text{ sec}^{-1}$$

$$= \text{mol}^{-1} \text{L sec}^{-1}$$

Q.108 (c)  $2^{50/10} 2^{50/10} = 2^5 = 32$

Q.110 (d) Rate =  $(\text{conc})^n$

$$\text{Rate} = (A)^n$$

$$2 = (4)^n$$

$$2 = (2)^{2n}$$

$$2n = 1$$

$$n = 1/2$$

Q.111 (b)  $t_{1/2} = \frac{\text{Total time}}{\text{No. of halves life}}$

$$= \frac{60}{2} = 30 \text{ mint}$$

$$100 \xrightarrow{1\text{st}} 50 \xrightarrow{2\text{nd}} 25$$

**MCQs**

- (1) Which of the following changes in enthalpy in Born-Haber cycle may be negative.  
 (a)  $H_{LE}$  (b)  $H_{at}$  (c)  $H_{E.A}$  (d)  $H_{diss}$
- (2) Which of the following is incorrect about enthalpy of neutralization.  
 (a) Its maximum value is  $57.5 \text{ kJ mol}^{-1}$  (b) Energy is absorbed  
 (c) It is less than  $57.5 \text{ kJ mol}^{-1}$  when one of the acid or base is weaker  
 (d) it is equal to enthalpy of formation of water from ions
- (3) Standard enthalpy of  $\text{Al}_2\text{O}_3$  cannot be measured because.  
 (a) It does not catch fire (b) It reacts with  $\text{CO}_2$   
 (c) It require catalyst (d) Protective layer of oxide covers the surface
- (4) The dissolution of  $\text{NH}_4\text{Cl}$  in water is a/an.  
 (a) Endothermic (b) spontaneous  
 (c) Both a and b (d) Exothermic
- (5) For an endothermic reaction the value of  $\Delta H$  is denoted by.  
 (a) Positive sign (b) Negative sign  
 (c) Has no sign (d) Nature of reaction
- (6) Which is used to measure enthalpy of combustion.  
 (a) Glass calorimeter (b) Bomb calorimeter  
 (c) Copper calorimeter (d) All
- (7) A non spontaneous reaction is.  
 (a)  $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$  (b)  $2\text{KClO}_3 \longrightarrow 2\text{KCl} + 3\text{O}_2$   
 (c)  $\text{Na}_2\text{CO}_3 + \text{H}_2\text{SO}_4 \longrightarrow 2\text{Na}_2\text{SO}_4 + \text{H}_2\text{CO}_3$   
 (d)  $\text{AgNO}_3 + \text{KCl} \longrightarrow \text{AgCl} + \text{NaNO}_3$
- (8) When  $\text{NH}_4\text{Cl}$  is warmed with  $\text{NaOH}$  in a test tube it is case of.  
 (a) Open system (b) Closed system  
 (c) Isolated system (d) Both a, c
- (9) The enthalpy change of a reaction does not depend on.  
 (a) Initial and final enthalpy change of reaction  
 (b) State of reactants and products  
 (c) Different intermediate reactants (d) Nature of reactants and products
- (10) For an ideal gas Joule-Thomsen effect is.  
 (a) Positive (b) Negative (c) Zero (d) depend on molecular weight

**Answer Key**

Question	1	2	3	4	5	6	7	8	9	10
Answer	c	d	d	c	a	b	b	a	c	c

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

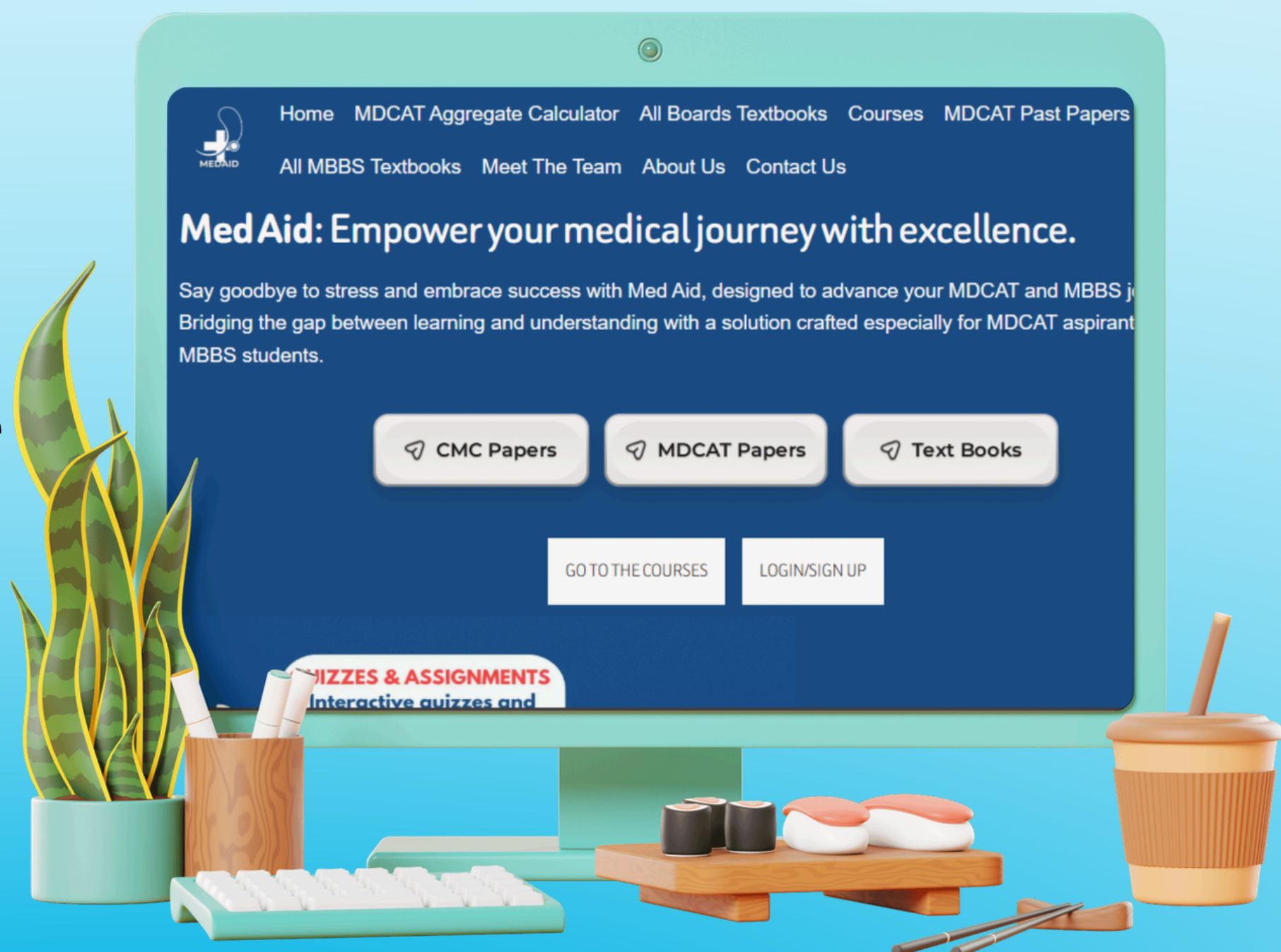
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



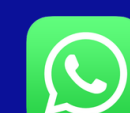
Join MedAid  
Whatsapp  
Community



**CLICK HERE MEDAIDPK.COM**



MEDAID.CONTACT@GMAIL.COM



+92 333 1617207

## Topic 8

(11) If value of  $\Delta H$  in a reaction is positive then the reaction is called.

- (a) Exothermic (b) Endothermic (c) Polymorphic (d) None

(12) If a gas at constant temperature and pressure expands then its.

- (a) Internal energy decreases (b) Entropy increases and then decreases  
(c) Internal energy increases (d) Internal energy remains constant

(13) If a gas absorbs 200 J of heat and expands by  $500 \text{ cm}^3$  against a constant pressure of  $2 \times 10^6 \text{ Nm}^{-2}$ . Then change in internal energy is.

- (a) -200J (b) -100 J (c) +100 J (d) +300 J

(14) Which of following statement is false.

- (a) Temperature is state function (b) Work is state function  
(c) Change in state depends upon initial and final states  
(d) Work appears at the boundary of the system

(15) The internal energy of a substance does not depend upon .

- (a) Translational energy (b) Vibrational energy  
(c) Energy due to gravitational pulls (d) Rotational energy

(16) Which of the following pairs of chemical reaction is certain to result in a spontaneous reaction.

- (a) Exothermic and increasing disorder (b) Exothermic and decreasing disorder  
(c) Endothermic and increasing disorder  
(d) Endothermic and decreasing disorder

(17) Assume each reaction is carried out in open container for which reaction  $\Delta H = \Delta E$ .

- (a)  $\text{PCl}_5 \longrightarrow \text{PCl}_3 + \text{Cl}_2$  (b)  $2\text{CO} + \text{O}_2 \longrightarrow 2\text{CO}_2$   
(c)  $\text{H}_2 + \text{Br}_2 \longrightarrow 2\text{HBr}$  (d)  $\text{C} + 2\text{H}_2\text{O} \longrightarrow 2\text{H}_2 + \text{CO}_2$

(18) Standard molar enthalpy of formation of  $\text{CO}_2$  is equal to.

- (a) Standard molar enthalpy of combustion of carbon (graphite)  
(b) Standard molar enthalpy of combustion of gaseous carbon  
(c) Sum of the standard molar enthalpy has of formation of C and  $\text{O}_2$   
(d) Zero

(19) Which of the following has  $\Delta S^\circ$  (Entropy) greater than zero.

- (a)  $\text{CaO(s)} + \text{CO}_2(\text{g}) \rightleftharpoons \text{CaCO}_3(\text{s})$   
(b)  $\text{NaCl(aq)} \rightleftharpoons \text{NaCl(s)}$   
(c)  $\text{NaNO}_3(\text{s}) \rightleftharpoons \text{Na}^+(\text{aq}) + \text{NO}_3^-(\text{aq})$   
(d)  $\text{N}_2(\text{g}) + 2\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g})$

(20) Which of the following is not an endothermic reaction.

- (a) Combustion of methane (b) Decomposition of water  
(c) Dehydrogenation of ethane, ethylene  
(d) conversion of graphite to diamond

## Answer Key

Question	11	12	13	14	15	16	17	18	19	20
Answer	b	d	c	b	c	a	b	a	c	a

- (21) Molar heat capacity of water in equilibrium with ice at constant pressure is.  
 (a) Zero (b) Infinity (c)  $40.45 \text{ Jk}^{-1} \text{ mol}^{-1}$  (d)  $75.48 \text{ Jk}^{-1} \text{ mol}^{-1}$
- (22) The amount of heat required to raise the temperature of one mole of substance through 1K is called its.  
 (a) Molar heat (b) entropy (c) Thermal capacity (d) Specific heat
- (23) The molar heat capacity of water at constant pressure  $C$  is  $75 \text{ Jk}^{-1} \text{ mol}^{-1}$  when 1.0 kJ of heat is supplied to 100g of water which is free to expand, the increase in temperature of water is.  
 (a) 4.8 K (b) 6.6 K (c) 1.2 K (d) 2.4 K
- (24) For a reaction  $\text{C}_3\text{H}_8 + 5\text{O}_2 \longrightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$  at constant temperature  $\Delta H - \Delta E$  is.  
 (a)  $+3RT$  (b)  $-RT$  (c)  $+RT$  (d)  $-3RT$
- (25) The absolute enthalpy of neutralization of reaction  $\text{MgO} + 2\text{HCl} \longrightarrow \text{MgCl}_2 + \text{H}_2\text{O}$ .  
 (a)  $-57.33 \text{ k J mol}^{-1}$  (b)  $> -57.33 \text{ k J mol}^{-1}$   
 (c)  $< -57.33 \text{ k J mol}^{-1}$  (d)  $+57.33 \text{ k J mol}^{-1}$
- (26) Work done by a system is 10 Joule, when 40 Joule heat is supplied to it, what is the increase in internal energy of the system.  
 (a) 30 J (b) 50 J (c) 40 J (d) 20 J
- (27) Identify the state function among the following.  
 (a)  $Q$  (b)  $Q - W$  (c)  $Q/W$  (d)  $Q + W$
- (28) The increase in internal energy of the system is 100 J when 300 J of heat is supplied to it. What is the amount of work done by the system.  
 (a)  $-200 \text{ J}$  (b)  $+200 \text{ J}$  (c)  $-300 \text{ J}$  (d)  $-400 \text{ J}$
- (29) Correct representation of  $\Delta H_f^\circ$  of  $\text{NH}_3$  is  
 (a)  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$  (b)  $1/2\text{N}_2 + 3/2\text{H}_2 \rightleftharpoons \text{NH}_3$   
 (c)  $\text{NH}_4\text{Cl} \rightleftharpoons \text{NH}_3 + \text{HCl}$  (d)  $\text{N}_2\text{O} + 4\text{H}_2 \rightleftharpoons 2\text{NH}_3 + \text{H}_2\text{O}$
- (30) Internal energy is a sum of kinetic and potential energy if internal energy of the system increases, then all of the following changes may takes place except.  
 (a) State of system may change (b) Chemical reaction take place  
 (c) Route of the system may change (d) Temperature of the system may change
- (31) Which of the following has higher value of  $\Delta H$  lattice  $\text{kJ mol}^{-1}$ .  
 (a) LiCl (b) NaCl (c) CsCl (d) KCl
- (32) When strong base is treated with weak acid then  $\Delta H_n$  is.  
 (a)  $54.4 \text{ kJ mol}^{-1}$  (b) Greater than  $57.4 \text{ kJ mol}^{-1}$   
 (c) Less than  $57.4 \text{ kJ mol}^{-1}$  (d)  $57.4 \text{ kJ mol}^{-1}$

## Answer Key

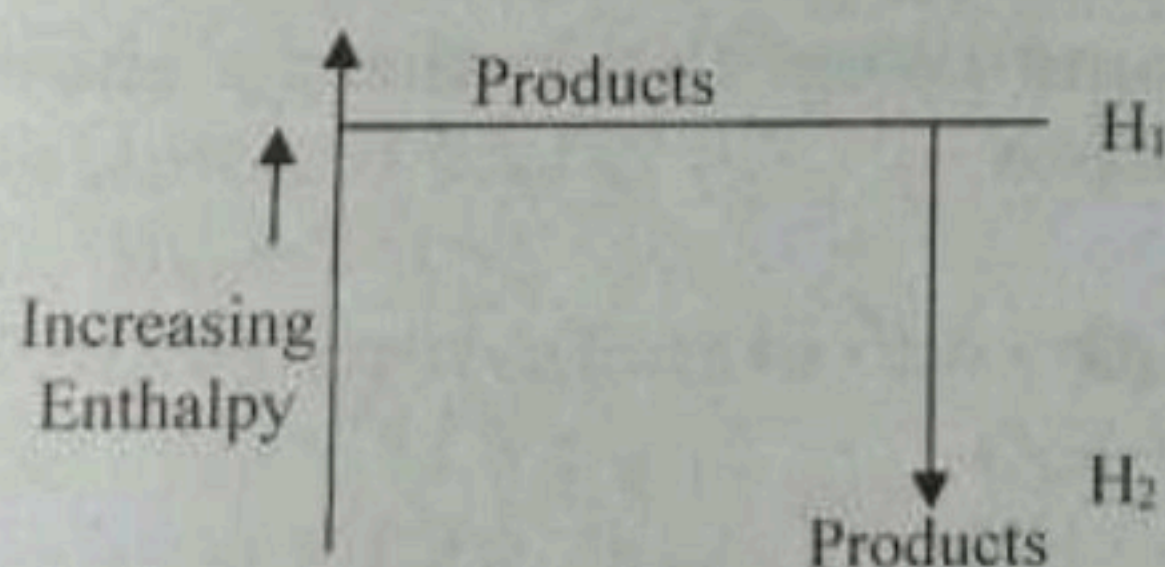
Question	21	22	23	24	25	26	27	28	29	30	31	32
Answer	b	a	d	d	c	a	d	b	b	c	a	c

- (33) The enthalpy change remains the same either the reaction takes place in one step or in more than one step thus it is in accordance of.  
 (a) Law of mass action (b) Hess's law  
 (c) Joule's law (d) First law of thermodynamics
- (34) Which of the following is extensive property.  
 (a) Density (b) Temperature (c) Pressure (d) Enthalpy
- (35) Enthalpy of formation of compound is.  
 (a) Always  $> 0$  (b) Always  $< 0$   
 (c) Can be  $> 0$  (d)  $= 0$  at standard state
- (36) Lattice energy is very useful in discussing the.  
 (i) Strength of ionic compound  
 (ii) Properties of ionic compound  
 (iii) Structure of ionic compound  
 Which of the following is correct statement  
 (a) I only (b) II only (c) I and III only (d) I, II and III
- (37) Glass calorimeter is used to find the enthalpy of.  
 (a) Solution (b) Atomization (c) Neutralization (d) All
- (38) Heat of formation of  $\text{CO}_2$  is.  
 (a)  $-390 \text{ kJ mol}^{-1}$  (b)  $+394 \text{ kJ mol}^{-1}$   
 (c)  $-394 \text{ kJ mol}^{-1}$  (d)  $-294 \text{ kJ mol}^{-1}$
- (39) Born Haber cycle is an application .  
 (a) Raoult's law (b) Hess's law  
 (c) Law of mass action (d) None
- (40) In Hess's law sum of enthalpy change of close cycle is equal to.  
 (a) Zero (b) Greater than zero  
 (c) Less than zero (d) None
- (41) Born Haber cycle is used to find out the enthalpy of.  
 (a) Atomization (b) neutralization  
 (c) Solution (d) Lattice energy
- (42) Which of the following is state function.  
 (a) H (b) C (c) E (d) All
- (43) Which of the following greater bond energy.  
 (a)  $\text{N} \equiv \text{N}$  (b)  $\text{C} = \text{O}$  (c)  $\text{C} \equiv \text{C}$  (d)  $\text{C} = \text{C}$
- (44) In exothermic reaction, the heat contents of.  
 (a) Products are more than that of reactants (b) Reactants  $\geq$  Products  
 (c) Reactants are more than that of products (d) Reactants = products
- (45) All of the following are state function except.  
 (a) H (b) W (c) C (d) E

## Answer Key

Question	33	34	35	36	37	38	39	40	41	42	43	44	45
Answer	b	d	c	d	c	c	b	a	d	d	c	c	b

- (46) All of the following are exothermic except.  
 (a) The combustion of fuel (b) Oxidation of carbohydrates  
 (c) Reaction of sodium with  $H_2O$  (d) Photosynthesis
- (47) Calorie is equivalent to.  
 (a) 0.4184 J (b) 4.184 J (c) 40.18 J (d) 418.4 J
- (48) Which of the following is exothermic.  
 (a) Evaporation (b) Sublimation (c) respiration (d) Boiling
- (49) The work done by expansion of gas against constant pressure.  
 (a)  $P\Delta V$  (b)  $-P\Delta V$  (c)  $PV$  (d)  $\Delta PV$
- (50) All are exothermic except.  
 (a) Freezing of water (b) Condensation  
 (c) Evaporation (d) Combustion
- (51) A spontaneous process is.  
 (a) Unidirectional and irreversible (b) Unidirectional and real  
 (c) Irreversible and real (d) All of the above
- (52)  $\Delta H$  will be given positive sign in.  
 (a) Dissociation reaction (b) Decomposition reaction  
 (c) Endothermic reactions (d) All
- (53) Reaction of water with quick lime results in rise in temperature of the system using concentration change indicate the nature of reaction.  
 (a) Third order (b) Endothermic  
 (c) Non spontaneous (d) Exothermic reaction
- (54) Which of the following enthalpy change is always exothermic.  
 (a) Enthalpy of solution (b) Enthalpy of formation  
 (c) Enthalpy of combustion (d) Enthalpy of atomization
- (55) When one mole of  $H^+$  from acid and one mole of  $OH^-$  from base react together to form mole of water is called enthalpy of.  
 (a) Atomization (b) neutralization (c) Formation (d) Solution
- (56)



The diagram shows enthalpy changes during chemical reaction this diagram represents

- (a) An endothermic reaction (b) An exothermic reaction  
 (c) A non spontaneous process (d) An isothermic process

### Answer Key

Question	46	47	48	49	50	51	52	53	54	55	56
Answer	d	b	c	b	b	d	d	d	c	b	b

## Topic 8

- (57) Heat of formation of MgO is given  $\text{Mg} + 1/2\text{O}_2 \rightarrow \text{MgO} \quad \Delta H = -692 \text{Jmol}^{-1}$ .  
 (a) The product is very stable (b) The reaction is endothermic  
 (c) The product is highly unstable (d) The reactants are very stable
- (58) When one mole of gaseous hydrogen ions are dissolved in water to form infinitely dilute solution. The amount of heat liberated is.  
 (a)  $-1075 \text{ kJ/mole}$  (b)  $-499 \text{ kJ / mole}$   
 (c)  $-1891 \text{ kJ/moles}$  (d)  $-1562 \text{ kJ mol}^{-1}$
- (59)  $2\text{H}_2 + \text{O}_2 \rightleftharpoons 2\text{H}_2\text{O} \quad \Delta H = 205.5 \text{ kJ mol}^{-1}$  what will be the enthalpy change in the above reaction.  
 (a)  $205.5 \text{ kJ mol}^{-1}$  (b)  $-205.5 \text{ kJ mol}^{-1}$   
 (c) Zero  $\text{kJ mol}^{-1}$  (d)  $1 \text{ kJ mol}^{-1}$
- (60) The equation that represents enthalpy of atomization of hydrogen is.  
 (a)  $1/2\text{H}_2\text{O} \rightarrow \text{H}_2 + 1/2\text{O}_2 + 218 \text{ kJ mol}^{-1}$   
 (b)  $1/2\text{H}_2\text{O} \rightarrow \text{H}_2 + 1/2\text{O}_2 - 218 \text{ kJ mol}^{-1}$   
 (c)  $1/2\text{H}_2 \rightarrow \text{H} + 218 \text{ kJ mol}^{-1}$  (d)  $1/2\text{H}_2 \rightarrow \text{H} - 218 \text{ kJ mol}^{-1}$
- (61)  $1/2\text{H}_2 \rightarrow \text{H} \quad \Delta H = 218 \text{ kJ mol}^{-1}$  in this reaction  $\Delta H$  will be called.  
 (a) Enthalpy of atomization (b) enthalpy of formation  
 (c) Enthalpy of decomposition (d) Enthalpy of dissociation
- (62)  $\text{Mg} + 1/2 \text{O}_2 \rightarrow \text{MgO} + -692 \text{ kJmol}^{-1}$  at STP enthalpy of above reaction will be  
 (a)  $\Delta H_{\text{n}}^{\circ}$  (b)  $\Delta H_{\text{soln}}^{\circ}$  (c)  $\Delta H_{\text{at}}^{\circ}$  (d)  $\Delta H_{\text{f}}^{\circ}$
- (63) Enthalpy is measured at.  
 (a) 300 K and 2 atm (b) 298 K and 1 atm  
 (c) 300 K and 1 atm (d) 295 K and 1 atm
- (64) For given reaction  $\text{CH}_3\text{COOH} + \text{NaOH} \rightarrow \text{CH}_3\text{COONa} + \text{H}_2\text{O}$  the change in the enthalpy under standard condition is called.  
 (a) Enthalpy of solution (b) Enthalpy of hydration  
 (c) Enthalpy of Neutralization (d) Enthalpy of formation
- (65) Which of the following show the same twice the enthalpy change of neutralization as the following equation  
 $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O}$   
 (a)  $\text{H}_2\text{SO}_4 + \text{Mg}(\text{OH})_2 \rightarrow \text{MgSO}_4 + 2\text{H}_2\text{O}$   
 (b)  $\text{MgCO}_3 + 2\text{HCl} \rightarrow \text{MgCl}_2 + \text{CO}_2 + \text{H}_2\text{O}$   
 (c)  $\text{NH}_4\text{Cl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{NH}_3$   
 (d)  $\text{KOH} + \text{HCl} \rightarrow \text{KCl} + \text{H}_2\text{O}$
- (66) Lattice energy of an ionic crystal is the enthalpy of.  
 (a) Combustion (b) Dissolution  
 (c) Dissociation (d) Formation

## Answer Key

Question	57	58	59	60	61	62	63	64	65	66
Answer	a	a	b	c	a	d	b	c	a	d

- (67) Combustion of graphite to form  $\text{CO}_2$  can be done. Two ways reactions are given as follow.
- $$\text{C} + \text{O}_2 \longrightarrow \text{CO}_2 \quad \Delta H = -393.7 \text{ kJ mol}^{-1}$$
- $$\text{C} + 1/2\text{O}_2 \longrightarrow \text{CO}_2 \quad \Delta H_1 = ?$$
- $$\text{CO} + 1/2\text{O}_2 \longrightarrow \text{CO}_2 \quad \Delta H_2 = -283 \text{ kJ mol}^{-1}$$
- (a)  $-676 \text{ kJ mol}^{-1}$  (b)  $-110 \text{ kJ mol}^{-1}$   
 (c)  $+110 \text{ kJ mol}^{-1}$  (d)  $676 \text{ kJ mol}^{-1}$
- (68) With the increase in the size of anion which of following ionic compound has minimum lattice energy.  
 (a) NaCl (b) NaF (c) NaI (d) NaBr
- (69) Which of the following reaction does the value of  $\Delta H^\circ$  shows both  $\Delta H_c^\circ$  (Combustion)  $\Delta H_f^\circ$ .  
 (a)  $\text{C (s)} + \text{O(g)} \longrightarrow \text{CO}_2 \text{ (g)}$  (b)  $2\text{C (g)} + \text{O}_2 \text{ (g)} \longrightarrow 2\text{CO (g)}$   
 (c)  $\text{CO (g)} + 1/2\text{O}_2 \longrightarrow \text{CO}_2 \text{ (g)}$  (d)  $\text{C (g)} + \text{O}_2 \text{ (g)} \longrightarrow \text{CO}_2 \text{ (g)}$
- (70) The enthalpy change of formation of gaseous ethene and ethane are  $52 \text{ kJ mol}^{-1}$  and  $-85 \text{ kJ mol}^{-1}$  at  $298 \text{ K}$  what is enthalpy change of reaction at  $298 \text{ K}$  for following process.  
 $\text{C}_2\text{H}_4 + \text{H}_2 \longrightarrow \text{C}_2\text{H}_6 - \Delta H_f = ?$   
 (a)  $-137 \text{ kJ mol}^{-1}$  (b)  $-33 \text{ kJ mol}^{-1}$   
 (c)  $33 \text{ kJ mol}^{-1}$  (d)  $137 \text{ kJ mol}^{-1}$
- (71) The energy of reactant is not equal to energy of product thus difference of energy is in the form of.  
 (a) Heat energy (b) Light energy  
 (c) Chemical energy (d) Any form of energy
- (72) Heat of reaction can be measured by.  
 (a) Polarimeter (b) Calorimeter (c) refractrometer (d) All
- (73) When a system undergoes a change which property remains unchanged  
 (a) Moles (b) Molecule (c) Atom (d) Activation energy
- (74) Which is not state function .  
 (a) Internal energy (b) Volume  
 (c) Heat (d) Enthalpy
- (75) Energy equivalent to one erg, one joule, and one calorie are in order.  
 (a)  $1 \text{ erg} > 1 \text{ J} > 1 \text{ cal}$  (b)  $1 \text{ erg} > 1 \text{ cal} > 1 \text{ J}$   
 (c)  $1 \text{ cal} > 1 \text{ J} > 1 \text{ erg}$  (d)  $1 \text{ J} > 1 \text{ cal} > 1 \text{ erg}$
- (76) Work done by system in cyclic process is equal to.  
 (a) zero (b)  $\Delta E$  (c)  $\Delta H$  (d) q

## Answer Key

Ques. no.	67	68	69	70	71	72	73	74	75	76
Answer	b	c	a	a	d	b	b	c	c	d

- (77) An equation which indicates physical states of the reactants and products in addition to numerical value of heat of reaction is called.  
 (a) Chemical equation  
 (b) Thermochemical equation  
 (c) Ionic equation  
 (d) Skeletal equation
- (78) In which change  $\Delta H$  is negative.  
 (a)  $\text{Na (s)} \rightarrow \text{Na (g)}$   
 (b)  $\frac{1}{2} \text{Cl}_2 \rightarrow \text{Cl}$   
 (c)  $\text{Na (g)} \rightarrow \text{Na}^+ \text{(g)} + 1e^-$   
 (d)  $\text{Cl} + 1e^- \rightarrow \text{Cl}^-$
- (79) Which of the following is not standard condition for the thermochemical measurement.  
 (a) A pressure of atmosphere  
 (b) A temperature of zero K  
 (c) Substance for their normal physical states for these condition  
 (d) Concentration of unit (effectively 1.0M)
- (80) Internal energy of an ideal gas depends on.  
 (a) Pressure  
 (b) Temperature  
 (c) Volume  
 (d) none of these
- (81) Heat given to a system under isochoric process is equal to.  
 (a) W  
 (b) q  
 (c)  $\Delta E$   
 (d)  $\Delta H$
- (82) An example of extensive property is.  
 (a) Temperature  
 (b) Internal energy  
 (c) Viscosity  
 (d) Surface tension
- (83) All of the following enthalpy changes have positive or negative value except.  
 (a)  $\Delta H_f^\circ$   
 (b)  $\Delta H_{\text{soln}}^\circ$   
 (c)  $\Delta H_{\text{Lattice E}}^\circ$   
 (d)  $\Delta H_n^\circ$
- (84) Which of the following is exothermic reaction.  
 (a) Combustion of ethane  
 (b) Electrolysis of molten NaCl  
 (c) Decomposition of  $\text{H}_2\text{O}$   
 (d) Conversion of graphite to Diamond
- (85) The heat changes in chemical reaction at constant pressure is.  
 (a)  $\Delta H$   
 (b)  $\Delta E$   
 (c)  $\Delta T$   
 (d)  $\Delta V$
- (86) Which of the following has same units.  
 (a) Work  
 (b) Heat  
 (c) Energy  
 (d) Entropy
- (87) Temperature and heat are.  
 (a) Extensive properties  
 (b) Intensive properties  
 (c) Extensive and intensive properties  
 (d) Intensive and extensive properties
- (88) Heat content of the system is called .  
 (a) E  
 (b) H  
 (c) G  
 (d) S
- (89) The value of  $\Delta H$  for the process represented by the equation  

$$\text{K (s)} \rightleftharpoons \text{K}^+ \text{(g)} + 1e^-$$
 is equal to.  
 (a)  $\Delta H_{1\text{st.IE}}^\circ$  of K  
 (b)  $\Delta H_v^\circ$  of K  
 (c)  $\Delta H_{1\text{st IE}}^\circ + \Delta H_{1\text{st E.A}}^\circ$  of K  
 (d)  $\Delta H_{\text{at}}^\circ + \Delta H_{1\text{st IE}}^\circ$  of K

Answer Key

Question	77	78	79	80	81	82	83	84	85	86	87	88	89
Answer	b	d	b	b	c	b	d	a	a	a	d	b	d

- (90) Which of the following is/are the application of first law of thermodynamics (which is also known as law of conservation of energy).  
 (a) To study process at constant volume ( $\Delta V = 0$ ) only  
 (b) To study process at constant Pressure ( $\Delta P = 0$ ) only  
 (c) Both a and b  
 (d) None
- (91) 24.0 g of graphite is burnt in a bomb calorimeter and temperature is recorder is 6K. Calculate the enthalpy of combustion  $\Delta H_C^\circ$  of graphite if the heat capacity of the calorimeter is 100 kJ mol<sup>-1</sup>.  
 (a) -300 k J mol<sup>-1</sup>  
 (b) -400 k J mol<sup>-1</sup>  
 (c) -350 k J mol<sup>-1</sup>  
 (d) -450 k J mol<sup>-1</sup>
- (92) Which of the following foods have greater calorific value.  
 (a) Milk  
 (b) Honey  
 (c) Egg  
 (d) Ghee
- (93) The internal energy of one mole of a gas is.  
 (a)  $3/2RT$   
 (b)  $\frac{KT}{2}$   
 (c)  $\frac{RT}{2}$   
 (d)  $\frac{3KT}{2}$
- (94) When solid changes in to liquid the entropy.  
 (a) Decreases  
 (b) Increases  
 (c) remains constant  
 (d) None
- (95) The matter has highest entropy in.  
 (a) Solid state  
 (b) Liquid state  
 (c) Gaseous state  
 (d) Equal in all
- (96) Human body is an example of.  
 (a) Open system  
 (b) closed system  
 (c) Isolated system  
 (d) None
- (97) An isothermal process is associated with a.  
 (a) Constant entropy  
 (b) Constant temperature  
 (c) Constant enthalpy  
 (d) large change in heat content
- (98) A system is provided 50 joule of heat and work done on the system is 10J. The change in internal energy during the process is.  
 (a) 40 J  
 (b) 60 J  
 (c) 80 J  
 (d) 50 J
- (99) The work done during the process when 1 mole of gas is allowed to expand of rely into vacuum is.  
 (a) Zero  
 (b) +ve  
 (c) -ve  
 (d) Either of these
- (100) An exothermic reaction.  
 (a) Takes place only on heating  
 (b) Is accompanied by flame  
 (c) Is accompanied by absorption of heat  
 (d) Is accompanied by evolution of heat
- (101) For which  $\Delta H \neq \Delta E$ .  
 (a)  $H_2 + I_2 \rightleftharpoons 2HI$   
 (b)  $HCl + NaOH \longrightarrow NaCl + H_2O$   
 (c)  $C + O_2 \rightleftharpoons CO_2$   
 (d)  $N_2 + 3H_2 \rightleftharpoons 2NH_3$

## Answer Key

Question	90	91	92	93	94	95	96	97	98	99	100	101
Answer	c	a	d	a	b	c	a	b	b	a	d	d

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

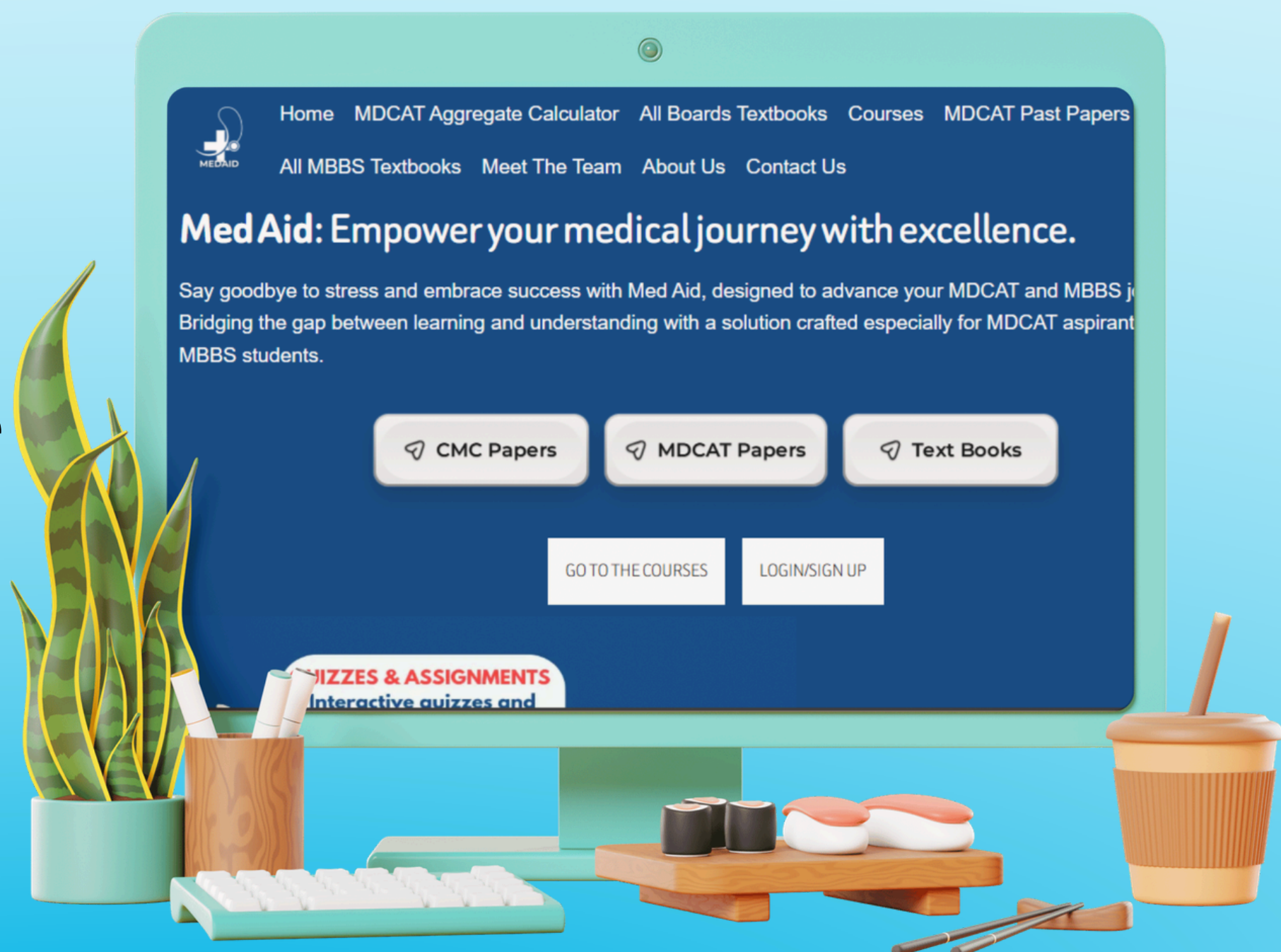
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



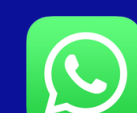
Join MedAid  
Whatsapp  
Community



**CLICK HERE MEDAIDPK.COM**



MEDAID.CONTACT@GMAIL.COM



+92 333 1617207

## THERMOCHEMISTRY

## Topic 8

- (102) The exchange of heat energy during chemical reaction at constant temperature and pressure occurs in the form of.  
 (a) Free energy (b) Internal energy  
 (c) Enthalpy (d) Bond energy
- (103) At constant P and T which statement is correct for the reaction  $\text{CO} + \text{CO} + \frac{1}{2}\text{O}_2 \rightarrow \text{CO}_2$ .  
 (a)  $\Delta H = \Delta E$  (b)  $\Delta H < \Delta E$  (c)  $\Delta H > \Delta E$   
 (d)  $\Delta H$  is independent for physical state of reactant
- (104) Which unit represents largest amount of energy.  
 (a) Calorie (b) Joule (c) Erg (d) Electron volt
- (105)  $\Delta H$  for the formation of  $\text{H}_2(\text{g})$  will be.  
 (a) Zero (b) +ve (c) -ve (d)  $\infty$
- (106) The heat changes for the reaction  $\text{H}_2\text{O}(\text{l}) \rightarrow \text{H}_2\text{O}(\text{g})$  is called.  
 (a) Heat of solution (b) Heat of fusion  
 (c) Heat of vaporization (d) Heat of formation
- (107) The word standard in standard molar enthalpy change implies.  
 (a) Temperature 298 K (b) Pressure 1 atm  
 (c) temperature 298 K and pressure 1 atm (d) Temperature and all pressures
- (108) Hess's law is used in determination of.  
 (a) Heat of reaction (b) heat of transition  
 (c) Heat of formation (d) All of these
- (109) For which of the following substance the standard heat enthalpy is zero.  
 (a)  $\text{C}_{\text{graphite}}$  (b)  $\text{C}_{\text{Diamond}}$  (c)  $\text{CO}_2$  (d)  $\text{O}_3$
- (110) The heat change in chemical reaction at constant volume is given.  
 (a)  $\Delta H$  (b)  $\Delta E$  (c)  $\Delta t$  (d)  $\Delta V$
- (111) The enthalpy change of a reaction does not depend on.  
 (a) State of reactants and products (b) Nature of reactants and products  
 (c) Different intermediate reactions  
 (d) Initial and final enthalpy change of a reaction
- (112) For the reaction  $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$  at constant temperature  $\Delta H - \Delta E$  is .  
 (a)  $+RT$  (b)  $-3RT$  (c)  $+3RT$  (d)  $-RT$
- (113) When ammonium chloride is dissolved in water, the solution becomes cold, the change is.  
 (a) Endothermic (b) Exothermic (c) Super cooling (d) None of these
- (114) The standard heat of formation of diamond is.  
 (a) Same as that of graphite (b) Greater than graphite  
 (c) Less than that of graphite (d) Taken as zero

## Answer Key

Answer	c	b	a	a	c	c	d	a	b	c	b	a	b
--------	---	---	---	---	---	---	---	---	---	---	---	---	---

- (115)  $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$   $\Delta H = -194 \text{ kJ}$ . In this reaction heat of formation of HCl is kJ is.  
 (a) +194 kJ (b) +97 kJ (c) -97 kJ (d) -194 kJ
- (116) In a reversible reaction entropy is negative.  
 (a)  $> 0$  (b)  $< 0$  (c)  $\geq 0$  (d)  $= 0$
- (117) In which changes entropy is negative.  
 (a) Expansion of gas at constant temperature  
 (b) Sublimation of solid to gas  
 (c)  $2\text{H} \longrightarrow \text{H}_2$   
 (d) Evaporation of water
- (118) A gas is allowed to expand in a well insulated container against a constant external pressure of 2 J atm from initial value 2.50 L to final value of 4.50 L. The change in internal  $\Delta E$  of the gas in Joule will be.  
 (a) 1136.25 J (b) -500J (c) -505 J (d) +505.4 kJ
- (119) Enthalpy change for the reaction is  
 $4\text{H} \longrightarrow 2\text{H}_2$  is -869.6 kJ the dissociation energy of H - H bond is.  
 (a) -434.8 kJ (b) -869.6 (c) +434.8 J (d) +217.4 kJ
- (120) The process in which entropy is negative.  
 (a) Dissociation of  $\text{CaSO}_4$  to  $\text{CaO}$  and  $\text{SO}_3$   
 (b) Synthesis of Ammonia from  $\text{N}_2 + 3\text{H}_2$   
 (c) Dissolution of iodine in water (d) Sublimation of dry ice
- (121) Temperature of system increases above surrounding in which reaction.  
 (a) Endothermic (b) Exothermic  
 (c) Both a and b (d) None of these
- (122) Total of all possible types of energies in chemical system is called.  
 (a) Kinetic energy (b) Internal energy  
 (c) Potential energy (d) Heat energy
- (123) The enthalpy change that occurs when moles of reactant as indicated by chemical equation react at STP is called.  
 (a) Enthalpy of formation (b) Enthalpy of atomization  
 (c) Standard enthalpy of reaction (d) Enthalpy of neutralization
- (124) Reactants having high energy than products in.  
 (a) Exothermic (b) Endothermic (c) Photochemical (d) All
- (125) Potential energy of a system is due to.  
 (a) Kinetic energy (b) Rotational K.E  
 (c) Vibrational KE (d) None of these
- (126) — is the study about energy of chemical reaction.  
 (a) Thermochemistry (b) Thermodynamics  
 (c) chemical kinetics (d) Stoichiometry

## Answer Key

115	116	117	118	119	120	121	122	123	124	125	126
c	d	c	c	c	b	b	b	c	a	d	a

## THERMOCHEMISTRY

## Topic 8

- (127) The environment in which a system is studied is .  
 (a) State function (b) Phase  
 (c) Surrounding (d) State
- (128) Any thing which depends upon the initial and final state of a system is.  
 (a) Environment (b) Surrounding  
 (c) State function (d) Enthalpy
- (129)  $\text{CuSO}_4 + \text{Zn} \longrightarrow \text{ZnSO}_4 + \text{Cu}$  is a.  
 (a) Spontaneous reaction (b) Non spontaneous reaction  
 (c) Endothermic (d) Exothermic
- (130) State function is the macroscopic property of a system depends upon.  
 (a) Path of reaction (b) Initial state  
 (c) Final state (d) Initial and final state
- (131) Which one of the following is state function.  
 (a) Pressure (b) temperature (c) Enthalpy (d) All of the above
- (132) Which of the following is state function.  
 (a) Pressure (b) temperature (c) Enthalpy (d) All of the above
- (133) Most of thermodynamics parameters are.  
 (a) System (b) Surrounding (c) Phase (d) State function
- (134) Change in enthalpy (H) of a system can be calculated by the following relationship.  
 (a)  $\Delta H = \Delta E + P\Delta V$  (b)  $\Delta H = \Delta E - PV$   
 (c)  $\Delta H = \Delta E + q$  (d)  $\Delta H = \Delta E - q$
- (135) Which of the following equation is correct equation.  
 (a)  $q_p > q_v$  (b)  $\Delta E < \Delta H$   
 (c)  $\Delta E > \Delta H$  (d) Both a, b
- (136) Two fundamental ways to transfer energy are.  
 (a) Pressure and temperature (b) Pressure and volume  
 (c) Heat and work (d) Heat and volume
- (137) If there is inter conversion of solid and liquid states then.  
 (a)  $\Delta V = 0$  (b)  $\Delta H = \Delta E$  (c)  $\Delta H > \Delta E$  (d) Both a and b

## Answer Key

Question	127	128	129	130	131	132	133	134	135	136	137
Answer	c	c	a	d	d	d	d	a	a	c	b

## Explanation

Q.1 (c) Heat is exothermic first value enthalpy of neutralization is always negative.

Q.7 (b) Thermal decomposition is endothermic

Q.10 (c) If a gas is ideal no force of attraction b/w its molecules hence expansion takes place without loss of energy.

Q.12 (d) The internal energy of a gas depends upon its temperature and pressure. So if gas expands at constant temperature and pressure, then internal energy remains constant.

Q.13 (c)  $Q = 200 \text{ J}$

$$W = P\Delta V$$

$$2 \times 10^{-6} \times 5 \times 10^4 \text{ m}^3$$

$$= 100 \text{ Nm} = 100 \text{ J}$$

$$\Delta E = Q - w$$

$$= 200 - 100 = 100 \text{ J}$$

Q.14 (b) Work is path dependent so it is not state function.

Q.16 (a) A spontaneous reaction

$$\Delta H = -ve$$

$$\Delta S = +ve$$

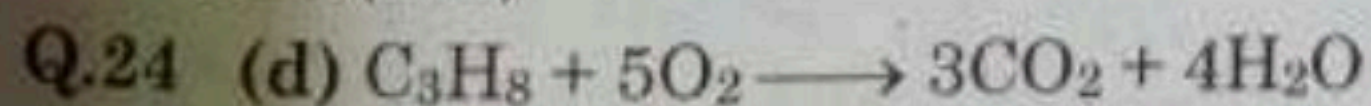
Spontaneity depends upon both critical minimum energy and maximum randomness

Q.17 (b) As  $\Delta n = 0$  then  $\Delta H = \Delta E$

Q.19 (c) From solid to liquid state entropy increases.

$$Q.23 (d) C = \frac{Q}{m(T_2 - T_1)}$$

$$75 = \frac{1000}{5.55 (175)} = 2.4 \text{ K}$$



$$\Delta n = n_p - n_R = 3 - 6 = -3$$

$$\Delta H = \Delta E + \Delta nRT$$

$$\Delta H - \Delta E = -3RT$$

Q.25 (c)  $MgO$  is oxide of weak base and we know that heat of neutralization of equivalent of strong acid with strong base is  $-57.33 \text{ kJ mol}^{-1}$

$\Rightarrow$  with weak base some heat is absorbed in dissociation of weak base.

$$Q.26 (a) \Delta E = \Delta Q - \Delta w$$

$$= 40 - 10 = 30 \text{ J}$$

Q.27 (d)  $\Delta E = Q + W$  as  $Q + w$  is a state function and it is equal to  $\Delta E$  which is state function.

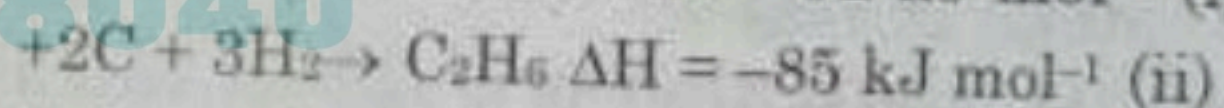
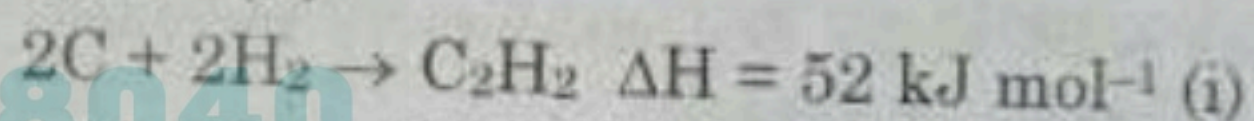
$$Q.28 (b) \Delta W = \Delta Q - \Delta E$$

$$300 - 100 = 200 \text{ J}$$

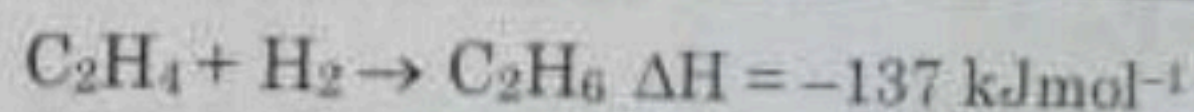
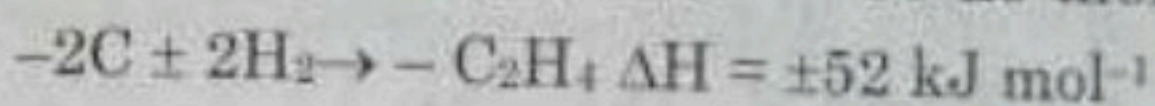
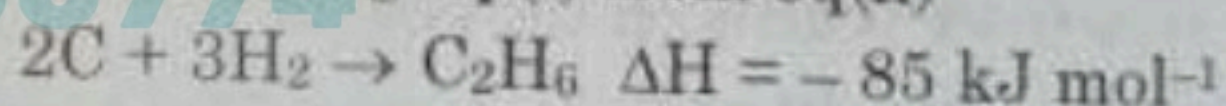
Q.29 (b) The amount of heat evolved or absorbed when one mole of compound is formed from its elements.

Q.34 (d) The property which depends upon the quantity of material in the system are called extensive property. Mass  $V$ ,  $E$ , enthalpy, free energy, entropy and heat capacity.

Q.70 (d)



Subtracting eq.(i) from eq.(ii)



Q.74 (c) Internal energy  $V$ , enthalpy,  $P$  entropy are state function. The function whose values depends on the state and not on the path by which the states has been derived.

Q.75 (c)  $1 \text{ Cal} = 4.18 \text{ J} = 4.18 \times 10^7 \text{ erg}$

Q.76 (d)  $\Delta E - W = q$  in cyclic process

$$\Delta E = 0$$

$$q = -w$$

Topic 8

Q.78 (d) First electron affinity is negative

Q.80 (b) Internal energy depends upon the temperature and not on P and V.

Q.81 (c) For isochoric process  $v = \text{constant}$

Thus  $\Delta V = 0$  from first law  $q = \Delta E - w$

Or  $\Delta E = q_v$

Q.82 (b) mass dependent property U, H, G

Q.85 (a)  $\Delta H = \Delta E + \Delta nRT$

Q.86 (a)  $q = \Delta E - W$  all have same unit

Q.87 (d) Temperature is measure of intensity of energy.

Where heat is measure of quantity of energy

Q.91 (a) Heat capacity =  $C = 100 \text{ kJ mol}^{-1}$

$$\Delta T = 6 \text{ K}$$

$$q = C \times \Delta t$$

$$= 100 \times 6 = 600 \text{ kJ}$$

$$\text{No. of moles of graphite} = \frac{24}{12} = 2$$

$$\Delta H_c \text{ of graphite} = \frac{600}{2} = 300$$

So heat evolved is =  $-300 \text{ kJ mol}^{-1}$

Q.94 (b) Liquid state is more random than solid state. So randomness increase and entropy increases.

Q.98 (b)  $q = \Delta E - W$  W is +ve

Because work is done on the system

$$q = 50 + 10 = 60$$

Q.99 (a)  $W = -P_{\text{ext}}(V_2 - V_1)$

Since  $P_{\text{ext}} = 0$

$$W = 0$$

Q.101 (d)  $\Delta H = \Delta E + \Delta nRT$

When  $\Delta n = 0$  then  $\Delta H = \Delta E$

And when  $\Delta n \neq 0$  then  $\Delta H \neq \Delta E$

Q.102 (c) Heat changes at constant pressure are  $\Delta H$ . Heat changes at constant volume are  $\Delta E$

Q.103 (b)  $\Delta H = \Delta E + \Delta nRT$

As  $\Delta n = -1/2$

Q.104 (a)  $1 \text{ cal} = 4.18 \text{ J} = 4.18 \times 10^7 \text{ erg}$

$$= \frac{4.18}{1.602} \times 10^{19} \text{ eV}$$

Q.105 (a) Enthalpy of formation of an element in its native state is zero.

Q.109 (a) Enthalpy of formation of an element in its native state is zero

Q.111 (c) According to Hess's law

Q.112 (b)  $\Delta H = \Delta E + \Delta nRT$

$$\text{Here } \Delta n = -3$$

$$\Delta H - \Delta E = -3RT$$

Q.113 (a) The solution is cold because  $\text{NH}_4\text{Cl}$  absorbs heat from surrounding

Q.114 (b)  $\Delta H^\circ$  the graphite is taken as zero for diamond its value is  $1.9 \text{ kJ mol}^{-1}$

Q.115 (c) Heat of formation for 1 mole

$$\text{Hence } \Delta H (\text{HCl}) = -194/2 = -9.7 \text{ kJ}$$

Q.116 (d) For reversible reaction

$$\Delta S_{\text{sys}} + \Delta S_{\text{surr}} = 0$$

Q.117 (c)

جب نمبروں کم ہوتے ہیں تو Entropy کم ہوتی ہے۔

Q.118 (c)  $\Delta E = q + w$  for insulated continue  $q = 0$

$$\Delta E = w \text{ and}$$

$$W = -P_{\text{ext}} \Delta V$$

$$W = -P_{\text{ext}} (V_2 - V_1)$$

$$W = -2.5 (4.5 - 2.5)$$

$$W = -2.5 \times 2 = -5.0 \text{ L}$$

Change L into Joule  $1 \text{ L} = 101.32 \text{ J}$

$$-5.0 \times 101.33 = -505 \text{ J}$$

Q.119 (c)  $2\text{H}_2 \rightarrow 4\text{H} \quad \Delta H = +869.6$

$$\text{Dissociation energy for 1 mole} = \frac{869.6}{2}$$

$$= 434.8$$

Q.120 (b)

Entropy تب کم ہوتی ہے یعنی negative ہوتی ہے جب نمبر آف

مولز کم ہوتے ہیں۔

# MEDAIDPK.COM

Your Ultimate Partner for MDCAT, NUMS & MBBS Professional Exams

Want **Explanation With Each Question???**

[Click Here](#) To Solve Tests/MCQs/Past Papers For Free On Our Website : [MedAidPK.com](#)

scan to visit Website



**What You Will Get?**

**Explanation** For Each and Every MCQ

**Real Time Exam Experience**

**More Than 25,000+ MCQs**

**Results** : Test Yourself and Get Instant Result

**Review Your Mistakes**

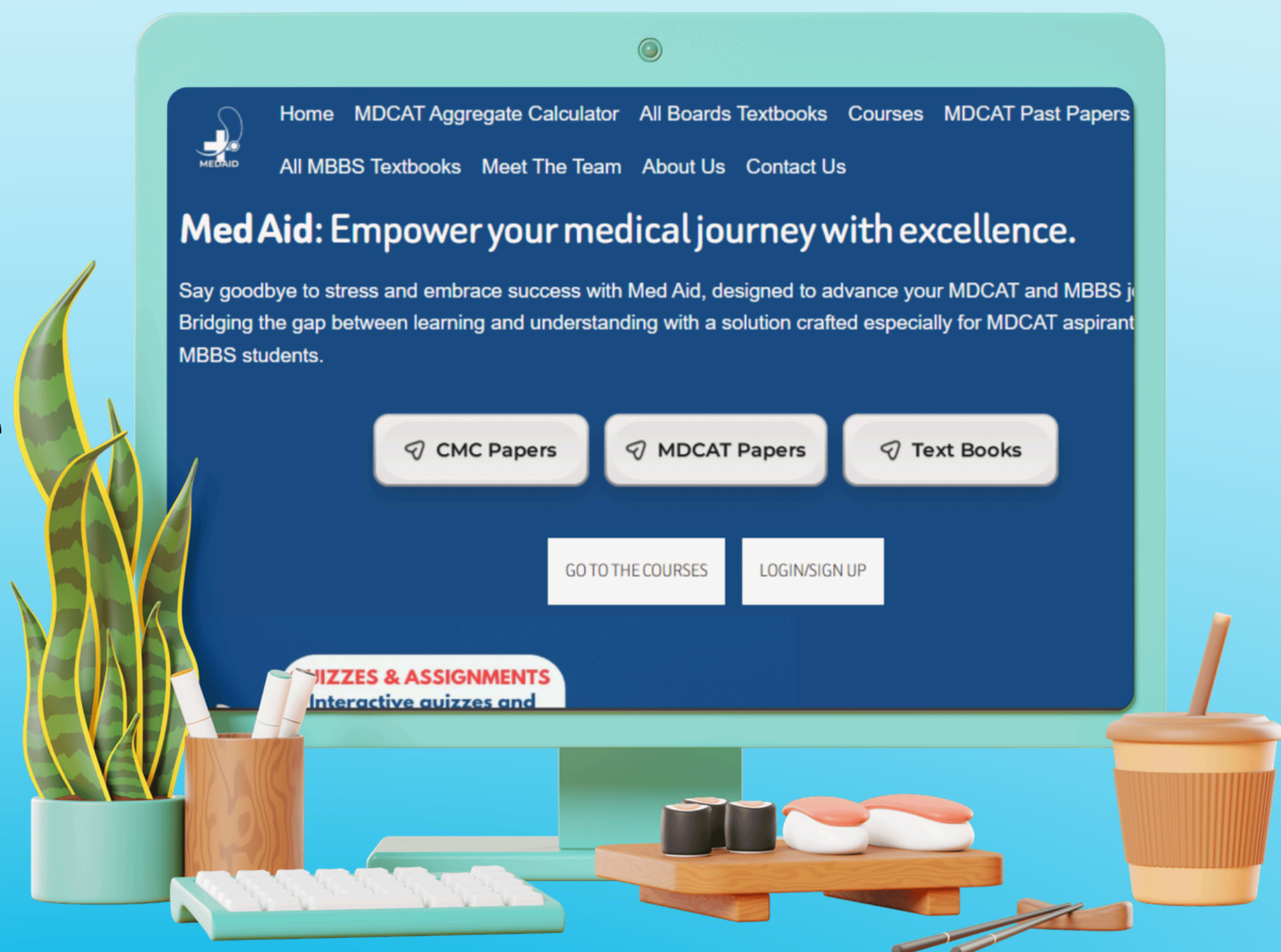
**Bonus Talks:**

- **NUMS/FMDC/MDCAT** Past Papers (Solved with Explanations) **2012-2025**
- **CMC MBBS Past Papers** With Explanations
- **Chapter-Wise & System-Wise** Study Material
- **OVER 200+ Medical Books**
- **ALL MDCAT PREP BOOKS**
- **MedAid Free MDCAT Weekly Test Series**

scan this QR code



Join MedAid  
Whatsapp  
Community



**CLICK HERE MEDAIDPK.COM**



MEDAID.CONTACT@GMAIL.COM



+92 333 1617207