

OBJECTIVE

NOTE:



You have four choices for each objective type question as A , B , C and D . The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question.

QUESTION NO. 1

DGR-1-24

- 1 For a reaction $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$ the change in enthalpy is called :
 (A) Heat of neutralization (B) Heat of reaction
 (C) Heat of formation (D) Heat of combustion
- 2 An excess of silver nitrate is added to barium chloride solution and precipitates removed by filtration , what are the main ions in the filtrate ?
 (A) Ba^{2+} and NO_3^- only (B) Ag^+ , Ba^{2+} and NO_3^- only
 (C) Ag^+ and NO_3^- only (D) Ba^{2+} , NO_3^- and Cl^-
- 3 Which of the following solution has the highest boiling point ?
 (A) 18 % solution of glucose (B) 6.0 % solution of urea
 (C) 5.85 % solution of sodium chloride (D) All have the same boiling point
- 4 If a strip of Cu metal is placed in a solution of FeSO_4 :
 (A) Cu will be deposited (B) Fe is precipitated out
 (C) Cu and Fe both dissolved (D) No reaction takes place
- 5 With increase of 10 °C temperature the rate of reaction doubles. This increase in rate of reaction is due to:
 (A) Increase in number of effective collisions. (B) Increase in activation energy of reactants.
 (C) Decrease in activation energy of reaction.
 (D) Decrease in the number of collisions between reactant molecules.
- 6 One mole of SO_2 contains :
 (A) 6.02×10^{23} atoms of oxygen (B) 6.02×10^{23} atoms of sulphur
 (C) 18.1×10^{23} molecules of SO_2 (D) 4 gram atoms of SO_2
- 7 How many particles are called fundamental particles of an atom ?
 (A) 3 (B) 5 (C) 100 (D) 6
- 8 What are the units of R_f value ?
 (A) Cm (B) Cm^3 (C) dm^3 (D) No units
- 9 Which of the following cannot sublime ?
 (A) Naphthalene (B) Iodine (C) Ammonium chloride (D) MnO_2
- 10 If absolute temperature of a gas is doubled and the pressure is reduced to one half , the volume of the gas will
 (A) Be doubled (B) Reduced 1/4 (C) Increases four times (D) Remain unchanged
- 11 Partial pressure of oxygen in lungs (in torr) is :
 (A) 150 (B) 116 (C) 760 (D) 159
- 12 Molecules of CO_2 in dry ice form the :
 (A) Molecular crystals (B) Ionic crystals (C) Covalent crystals (D) Any type of crystals
- 13 Vapour pressure is not affected by :
 (A) Temperature (B) Intermolecular forces (C) Surface area (D) Pressure
- 14 Wave number of the light emitted by a certain source is $2 \times 10^6 \text{ m}^{-1}$. The wavelength of this light will be :
 (A) 500 n.m (B) 500 m (C) 200 n.m (D) $5 \times 10^7 \text{ m}$
- 15 Radioactive copper emits :
 (A) α - rays (B) β - rays (C) γ - rays (D) Positive rays
- 16 Which of the following molecules have zero dipole moment ?
 (A) NH_3 (B) CHCl_3 (C) BF_3 (D) H_2O
- 17 The bond order of helium molecule is :
 (A) 3 (B) 2 (C) 1 (D) Zero

**SECTION-I****QUESTION NO. 2 Write short answers to any Eight (8) of the following** *DAK-1-24* 16

i	N ₂ and CO have the same number of electrons, protons and neutrons, justify.
ii	Law of conservation of mass have to be obeyed during stoichiometric calculations, explain.
iii	Why actual yield is always less than theoretical yield ?
iv	Write two suitable uses of the technique of chromatography
v	In solvent extraction technique, why repeated extractions using small portions of solvent are more efficient than using a single extraction but larger volume of solvent.
vi	How undesirable colours in crystallization process can be removed ?
vii	Write formulas to interconvert various scales of temperature.
viii	How density of an ideal gas can be calculated from ideal gas equation ?
ix	Derive Charle's law by kinetic equation of gases.
x	What is Handerson equation and for what purpose it is used ?
xi	What are applications of buffer solutions in daily life ?
xii	Derive ionic product of water and what is its value at 25°C.

QUESTION NO. 3 Write short answers to any Eight (8) of the following 16

i	Why intermolecular forces are weaker than intramolecular forces ?
ii	What are advantages of Vacuum distillation ?
iii	Differentiate between Isomorphism and polymorphism.
iv	Diamond is hard and electrical insulator. Justify it.
v	Explain Atomic Emission Spectrum.
vi	Define (a) Wave number (b) Frequency
vii	Write electronic configuration of Cr ₂₄ and Zn ₃₀
viii	What is Moseley's law ? Give its mathematical expression.
ix	What do you mean by water of crystallization ? Give an example.
x	Why NaCl and KNO ₃ are used to lower the melting point of ice ?
xi	Differentiate between instantaneous and average rate of a reaction.
xii	What do you mean by Homogeneous catalysis ? Give an example.

QUESTION NO. 4 Write short answers to any Six (6) of the following 12

i	How does the hybridization scheme explain the bond length ?
ii	Define electron affinity. Name the factors affecting it.
iii	The radius of an atom cannot be determined precisely. Give the reason.
iv	Why do the lone pairs of electrons on an atom occupy more space than bond pairs ?
v	Define standard enthalpy of formation. Give an example.
vi	Define exothermic reaction. Give an example.
vii	Differentiate between spontaneous and non-spontaneous process.
viii	What is anodized aluminium ?
ix	Give the electrode reactions during the recharging of lead accumulator.

SECTION-II**Note: Attempt any Three questions from this section****8 x 3 = 24**

Q.5.(A)	Define limiting reactant , write down the steps involved in identification of limiting reactant.	1+3
(B)	Define hydrogen bonding , how does it explain structure of ice (without diagram).	1+3
Q.6.(A)	Write a note on " Principal Quantum Number "	4
(B)	250 Cm ³ of the sample of hydrogen gas effuses four times as rapidly as 250 Cm ³ of an unknown gas. Calculate the molar mass of unknown gas.	4
Q.7.(A)	Discuss sp – hybridization with example of ethyne.	1+3
(B)	The solubility product of Ag ₂ CrO ₄ is 2.6 x 10 ⁻² at 25°C. Calculate the solubility of the compound.	4
Q.8.(A)	Describe construction and working of a Bomb Calorimeter.	4
(B)	What is standard electrode potential ? How can it be measured ?	4
Q.9.(A)	What are continuous and discontinuous solubility curves ? Draw these curves to explain the answer.	2+2
(B)	Discuss homogeneous and heterogeneous catalysis in detail with two examples of each.	2+2



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QUESTION NO. 1

DQK-2-24

- 1 The order of rate of diffusion of gases NH_3 , SO_2 , Cl_2 and CO_2 is
(A) $\text{NH}_3 > \text{SO}_2 > \text{Cl}_2 > \text{CO}_2$ (B) $\text{NH}_3 > \text{CO}_2 > \text{SO}_2 > \text{Cl}_2$ (C) $\text{Cl}_2 > \text{SO}_2 > \text{CO}_2 > \text{NH}_3$ (D) $\text{NH}_3 > \text{CO}_2 > \text{Cl}_2 > \text{SO}_2$
- 2 Partial pressure of oxygen in lungs is :
(A) 760 torr (B) 320 torr (C) 159 torr (D) 116 torr
- 3 Which of the following is a Pseudo solid ?
(A) CaF_2 (B) Glass (C) NaCl (D) KCl
- 4 The number of Na^+ ions which surround each Cl^- ion in the NaCl crystal is :
(A) 4 (B) 6 (C) 8 (D) 12
- 5 The e/m value for the positive rays is maximum for :
(A) H_2 (B) H_e (C) O_2 (D) N_2
- 6 The number of neutrons present in ${}_{19}\text{K}^{39}$ is :
(A) 18 (B) 19 (C) 20 (D) 39
- 7 Which of the following has zero dipole moment ?
(A) NH_3 (B) CHCl_3 (C) H_2O (D) CO_2
- 8 In Al_2O_3 , the ratio between the ions is :
(A) 1 : 2 (B) 2 : 1 (C) 2 : 3 (D) 3 : 2
- 9 Calorie is equivalent to :
(A) 0.4184 J (B) 41.84 J (C) 4.184 J (D) 418.4 J
- 10 The pH of human blood is :
(A) 7.0 (B) 7.35 (C) 4.0 (D) 6.5
- 11 In a mixture of 7 g of N_2 and 8 g of O_2 , the mole fraction of O_2 is
(A) 1 (B) 0.1 (C) 0.5 (D) 0.2
- 12 The cell in which electrical energy is converted into chemical energy is called :
(A) Galvanic cell (B) Electrolytic cell
(C) Fuel cell (D) Deniel cell
- 13 Indicate the enzyme which catalyzes the $\text{C}_6\text{H}_{12}\text{O}_6 \longrightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$:
(A) Diastase (B) Zymase (C) Urease (D) Invertase
- 14 18 g of H_2O sample has :
(A) 1 mole of H - atom (B) 0.5 mole of O - atom
(C) 6.22×10^{23} moles of H_2O (D) 6.02×10^{23} molecules of H_2O
- 15 The percentage of nitrogen in ammonia is :
(A) $(14/34) \times 100$ (B) $(14/17) \times 100$ (C) $(3/17) \times 100$ (D) $(28/38) \times 100$
- 16 Which one of the following does not undergo sublimation :
(A) KMnO_4 (B) Naphthalene (C) NH_4Cl (D) Iodine
- 17 The comparative rates at which the solutes move in paper chromatography depend on :
(A) Size of paper (B) R_f value of solute
(C) Temperature of the experiment (D) Size of the chromatographic tank used

CHEMISTRY

GROUP : SECOND



SUBJECTIVE PART

TIME: 2 HRS 40 MINUTES

MARKS: 68

SECTION-I

QUESTION NO. 2 Write short answers to any Eight (8) of the following DGK-2-24 16

i	Process of cation formation is endothermic. Justify.
ii	What are homoatomic and heteroatomic molecules? Give one example of each.
iii	Why actual yield is always less than theoretical yield?
iv	How rate of filtration can be increased?
v	What is safe and reliable method for drying the crystals?
vi	Give two characteristics of ideal solvent used for crystallization.
vii	Define isotherm. What is the effect of temperature on isotherm?
viii	What is quantitative definition of Charles's law? Give its mathematical form.
ix	Define critical temperature. On which factor does it depend?
x	Define pH and pOH. Give its mathematical form.
xi	Define common ion effect. Give one example.
xii	What are acidic and basic buffers. Give one example of each.

QUESTION NO. 3 Write short answers to any Eight (8) of the following 16

i	Define Lattice energy. Give example.
ii	Why transition temperature is shown by elements having allotropic forms and by compounds showing polymorphism. Give example.
iii	Iodine dissolves readily in Tetrachloromethane. Give reason.
iv	Water and ethanol can mix easily and in all proportions. Give reason.
v	Prove that $E = hc\bar{\nu}$
vi	Complete (or) write balanced equation for two Nuclear reactions. (a) ${}^4_2\text{He} + {}^9_4\text{Be} \longrightarrow ?$ (b) ${}^{14}_7\text{N} + {}^1_0\text{n} \longrightarrow ?$
vii	Why is it necessary to decrease the pressure in the discharge tube to get the cathode rays?
viii	How neutrons are used in the treatment of Cancer?
ix	One molal solution of urea in water is dilute as compared to one molar solution of urea, but the number of particles of the solute is same. Justify.
x	Differentiate between ideal and non-ideal solutions.
xi	The rate of a chemical reaction is an ever changing parameter under the given conditions. Give reason.
xii	What is Pseudo first order reaction?

QUESTION NO. 4 Write short answers to any Six (6) of the following 12

i	Dipole moment of CO ₂ is zero, but that of SO ₂ is 1.61 D why?
ii	Anionic radius is more than its parent atom why?
iii	Draw geometry of BeCl ₂ molecule on the basis of VSEPR theory.
iv	Define covalent radius. Give one example.
v	Define thermochemistry.
vi	State standard enthalpy of solution. Give example.
vii	Define internal energy.
viii	Draw diagram of voltaic cell.
ix	Define electrochemistry.

SECTION-II

Note: Attempt any Three questions from this section 8 x 3 = 24

Q.5.(A)	What is stoichiometry? Give its assumptions. Mention two laws which help to perform the stoichiometric calculation.	1+2+1
(B)	Define vapour pressure of liquids. Also explain manometric method for its determination.	1+3
Q.6.(A)	Calculate the density of CH ₄ (g) at 0 °C and 1 atmospheric pressure.	4
(B)	Describe Millikan's oil drop method to measure the charge on electron.	4
Q.7.(A)	Write down the four postulates of VSEPR theory.	4
(B)	N ₂ (g) and H ₂ (g) combine to give NH ₃ (g). The value of K _c in this reaction at 500 °C is 6.0 x 10 ⁻² . Calculate the value of K _p for this reaction.	4
Q.8.(A)	Define the following with examples. (i) Enthalpy (ii) Exothermic reaction (iii) Boundary (iv) Enthalpy of atomization	4
(B)	Write any four industrial importance of electrolytic process.	4
Q.9.(A)	Derive a relationship for $M_2 = \frac{K_b}{\Delta T_b} \cdot \frac{1000W_2}{W_1}$	4
(B)	What do you mean by the term "order of reaction"? Explain by giving any three suitable examples.	1+3