SGD-II-G1-P1

(Inter Part – I)   (Session 2019-21 to 2022-24)   Sig. of Student --------------------

Chemistry (Objective)   (Group - I)   **Paper (I)**

Time Allowed:- 20 minutes   **PAPER CODE 2481**   Maximum Marks:- 17

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 mark in that question. Write **PAPER CODE, which is printed on this question paper**, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) The volume occupied by 1.4 g of N_2 at S.T.P. is
   (A) $1.12 \, dm^3$ (B) $2.24 \, dm^3$ (C) $22.4 \, dm^3$ (D) $112 \, cm^3$

2) Which of the following is a monoisotopic element.
   (A) Silver   .(B) Calcium   (C) Chlorine   (D) Fluorine

3) Which of the following can be sublime.
   (A) Calcium   (B) NaCl   (C) Naphthalene   (D) Na_2CO_3

4) Constant factor in charlie's law.
   (A) Volume   (B) Pressure   (C) Tempreture   (D) Both V and T

5) The order of rate of diffusion of gases NH_3, SO_2, Cl_2 and CO_2 is
   (A) $NH_3>CO_2>SO_2>Cl_2$ (B) $NH_3>SO_2>Cl_2>CO_2$ (C) $Cl_2>SO_2>CO_2>NH_3$ (D) $NH_3>CO_2>Cl_2>SO_2$

6) Which of the following is amorphous solid
   (A) NaCl   (B) Glass   (C) NaBr   (D) CaF_2

7) Which of the following has highest vapour pressure at 25°C.
   (A) Mercury   (B) Ethanol   (C) CCl_4 (D) Chloroform

8) When 6d orbital is complete the entering electron goes into
   (A) 7f   (B) 7s   (C) 7d   (D) 7p

9) Number of bonds in nitrogen molecule is
   (A) One σ and one π (B) Three sigma   (C) Two sigma and one π (D) One σ and Two π

10) Units of energy in which heat changes in S.I system are.
   (A) Joule   (B) Torr   (C) Erg   (D) Newton

11) The net heat change in a chemical reaction is same weather the reaction completes in one step or several steps. It is known as
   (A) Henry's law   (B) Joule's principle (C) Hesse's law   (D) Law of conservation of energy

12) Mixture of NH_4OH and NH_4Cl makes a buffer whose pH is
   (A) less than seven   (B) 7   (C) More than seven   (D) 4

13) For the reaction $N_2+3H_2\rightleftharpoons 2NH_3$, The pressure at optimum condition is.
   (A) 100 atm   (B) 600 atm   (C) 200-300 atm   (D) 1000 atm

14) Molarity of pure water is.
   (A) 01   (B) 55.5   (C) 18   (D) 8

15) 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

16) Oxidation number of Mn in $KMnO_4$ is
   (A) +5   (B) +7   (C) +3   (D) +2

17) The unit of rate constant is the same as that of the rate of reaction in
   (A) First order reaction (B) Second order reaction   (C) Zero order reaction (D) Third order reaction

Chemistry (Subjective) (Session 2019-21 to 2022-24) Group (I) Paper (I)

Time Allowed: 2.40 hours Section ---------------- I

Maximum Marks: 68

SGD-11-G1-P2

2. **Answer briefly any Eight parts from the followings:-** 8 × 2 = 16

(i) N_2 and CO have the same number of electrons, protons and neutrons.

(ii) 'Mg' atom is twice heavier than that of carbon atom.

(iii) How can the efficiency of a chemical reaction can be expressed?

(iv) List the four postulates of Kinetic molecular theory of gases.

(v) What are characteristics of plasma? **(vi)** Throw some Light on the factor $\frac{1}{273}$ in charle's Law.

(vii) The e/m value of positive rays for different gases are different but those for cathode rays the e/m values is the same. Justify it. **(viii)** What are the defects of Bohr's atomic model.

(ix) Compare line emission and line absorption spectra. **(x)** What is a spontaneous process? Give examples

(xi) Why is it necessary to mention the physical states of reactant and products in a thermochemical equation? **(xii)** Define state and state function's with one example for each.

3. **Answer briefly any Eight parts from the followings:-** 8 × 2 = 16

(i) What is parts per million. Write its formula?

(ii) What are the conditions should be fullfiled to observe colligative properties.

(iii) Define hydrates. Give example. **(iv)** What is activation of catalyst. Give one example?

(v) How surface area has effect on the rate of reaction? **(vi)** Catalyst are specific in their action.

(vii) Why sintered glass crucible is better than gouch crucible?

(viii) Write down major steps involved in complete quantitative analysis.

(ix) How mixture of sand and naphthalene can be separated?

(x) Earthenware vessel keep water cool. Justify. **(xi)** Define symmetry. What are symmetry elements.

(xii) Ionic solids are highly brittle in nature.

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4. **Answer briefly any Six parts from the followings:-** 6 × 2 = 12

(i) Define Bond Energy? **(ii)** A Salt Bridge maintains the electrical neutrality in the cell. Justify it.

(iii) Why cationic radius is smaller than atomic radius?

(iv) Why 2nd Ionization Energy is always greater than first Ionization Energy?

(v) What is pK_b? Give its significance. **(vi)** Define pH?

(vii) What does mean by chemical Equilibrium?

(viii) What is oxidation number? Give example. **(ix)** Define Electrolysis.

Section -------- II , **Note: Attempt any three questions.** (8 × 3 = 24)

5. **(a)** Describe combustion analysis for the determination of percentage of C, H and O in an organic compound.

(b) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000 mm Hg pressure, considering that NH_3 is behaving ideally.

6. **(a)** Describe Manometric method for determination of vapour pressure of a liquid with a diagram.

(b) What is Enthalpy of a reaction? How ΔH of a reaction is measured in Laboratory by glass calorimeter?

7. **(a)** Explain Heisenberg uncertainity principle.

(b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at 25°C. Calculate the solubility of compound. Atomic mass of Ag=108 Cr=52 O=16.

8. **(a)** What is orbital hybridization? Explain the structure of CH_4 molecule on the basis of hybridization theory.

(b) Describe the construction and working of standard hydrogen electrode (SHE).

9. **(a)** Explain continuous and discontinuous solubility curves. **(b)** Describe energy of activation in detail.

Chemistry   (Objective)   (Group - II)   **Paper (I)**
Time Allowed:- 20 minutes   **PAPER CODE 2488**   **Maximum Marks:- 17**

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 mark in that question. Write **PAPER CODE, which is printed on this question paper,** on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.   SGD-11-672-P1   **Q. 1**

1) Which of the following has hydrogen bonding?
   (A) CH_4 (B) CCl_4 (C) NH_3 (D) SiH_4

2) The electron affinity of chlorine is.
   (A) $-349\ kJ\ mol^{-1}$ (B) $-249\ kJ\ mol^{-1}$ (C) $-449\ kJ\ mol^{-1}$ (D) $+396\ kJ\ mol^{-1}$

3) Acid having $K_a > 1$ will be .
   (A) Weak   (B) Very weak   (C) Moderate   (D) Strong

4) 18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to
   (A) $1/5$ (B) 5.1   (C) $1/51$ (D) 6

5) Orbitals having same energy are called:
   (A) unhybrid orbitals   (B) valence orbitals   (C) degenerate orbitals   (D) d-orbitals

6) The volume of 1.6g of CH_4 at S.T.P is
   (A) 1.12 dm^3 (B) 2.24 dm^3 (C) 22.41 dm^3 (D) 112 dm^3

7) Partial pressure of oxygen in air at sea level is.
   (A) 149 torr   (B) 154 torr   (C) 159 torr   (D) 164 torr

8) In silver oxide battery, the cathode is made up of:
   (A) AgO   (B) Ag_2O (C) Ag_2O_3 (D) Ag

9) For the reaction $NaOH + HCl \rightarrow NaCl + H_2O$ the change in enthalpy is called:
   (A) Heat of reaction   (B) Heat of formation   (C) Heat of neutralization   (D) Heat of combustion

10) Stronger the oxidizing agent, greater is the:
    (A) oxidation potential   (B) reduction potential   (C) redox potential   (D) E.M.F of cell

11) The rate of reaction.
    (A) increases as the reaction proceeds   (B) decreases as the reaction proceeds   (C) remains the same as the reaction proceeds   (D) may decrease or increase as the reaction proceeds

12) The largest number of molecules are present in:
    (A) 3.6 g of H_2O (B) 4.8 g of C_2H_5OH (C) 2.8 g of CO   (D) 5.4 g of N_2O_5

13) Solvent extraction method is a particularly useful technique for separation when the product to be separated is.
    (A) non-volatile or thermally unstable   (B) volatile or thermally stable   (C) non-volatile or thermally stable   (D) volatile or thermally unstable

14) The order of the rate of diffusion of gases NH_3, SO_2, Cl_2 and CO_2 is:
    (A) $NH_3>SO_2>Cl_2>CO_2$ (B) $NH_3>CO_2>SO_2>Cl_2$ (C) $Cl_2>SO_2>CO_2>NH_3$ (D) $NH_3>CO_2>Cl_2>SO_2$

15) In order to raise the boiling point of water upto 110°C, the external pressure should be
    (A) between 760 torr and 1200 torr   (B) between 200 torr and 760 torr   (C) 765 torr   (D) any value of pressure

16) Which of the following molecules has zero dipole moment?
    (A) NH_3 (B) $CHCl_3$ (C) H_2O (D) BF_3

17) The pH of $10^{-3} mol\ dm^{-3}$ of an aqueous solution of H_2SO_4 is
    (A) 3.0   (B) 2.7   (C) 2.0   (D) 1.5

Chemistry   (Subjective)   (Session 2019-21 to 2022-24) Group (II)   Paper (I)

Time Allowed: 2.40 hours   Section ----------------- I   Maximum Marks: 68

2.   **Answer briefly any Eight parts from the followings:-**   **8 × 2 = 16**
(i) Define gram atomic mass and gram molecular mass. **(ii)** Define molecular ion. Give one example.
(iii) Mg atom is twice heavier than that of carbon atom. Give reason. *SGD-11-G72-P2*
(iv) State Graham's Law of diffusion. Write its mathematical form.
(v) How the process of respiration obeys the Dalton's law of partial pressure.
(vi) Give verification of Boyle's law from kinetic molecular theory of gases.
(vii) Why e/m value of cathode rays is just-equal to that of electron.
(viii) State Moseley's law. Give its Mathematical expression.
(ix) What is orbital? Draw the shape of p-orbital. **(x)** Define Enthalpy of Atomization. Give one example.
(xi) What are spontaneous and non-spontaneous processes. Give one example for each.
(xii) State Hess's law of constant heat summation. Write its mathematical form.

3.   **Answer briefly any Eight parts from the followings:-**   **8 × 2 = 16**
(i) Define sublimation giving two examples.
(ii) Give sailent features of a solvent used in process of crystalization.
(iii) Describe most safe and reliable method for drying of crystals.
(iv) Why melting point and boiling point of halogens increases down the group.
(v) Lower alcohols are soluble in water while hydrocarbons are insoluble. Give reason.
(vi) Cleavage of crystals is anistropic property. Explain.
(vii) Why aquous solution of NH_4Cl is acidic in nature.
(viii) Define solubility with two examples. **(ix)** Why NaCl and KNO_3 are used to lower melting point of ice.
(x) Define the term energy of activation. **(xi)** A catalyst is specific in its action. Justify it.
(xii) Rate of reaction decreases with passage of time. Justify it.

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4.   **Answer briefly any Six parts from the followings:-**   **6 × 2 = 12**
(i) Define electronegativity. How does it vary in the group of periodic table?
(ii) Pi (π) bonds are more diffused than sigma bonds. Give the reason.
(iii) Define coordinate covalent bond. Give an example.
(iv) How can we prepare basic buffers? Give an example.
(v) Calculate the pH of 10^{-4} mole dm^{-3} of $Ba(OH)_2$. **(vi)** Give two applications of common ion effect.
(vii) What is standard hydrogen electrode (SHE)?
(viii) Give the electrode reactions during the recharging of lead accumulator.
(ix) Calculate the oxidation number of Cr in $Cr_2(SO_4)_3$ and $Cr_2O_7^{2-}$

Section ------------- II   **Note: Attempt any three questions.**   **(8 × 3 = 24)**

5. (a) Explain evidence of atoms with the help of diagram.
(b) 250 cm^3 of hydrogen is cooled from 127°C to -27°C by maintaining the pressure constant. Calculate the new volume of the gas at Low temperature.
6. (a) Explain molecular solids in detail.
(b) State and explain Hess's law of constant Heat summation with two examples.
7. (a) Write down any four properties of cathode rays.
(b) What is the percentage ionization of acetic acid in a solution in which 0.1 Mole of it has been dissolved per dm^3 of the solution.
8. (a) Explain paramagnetic nature of oxygen on the basis of MOT.
(b) Describe the construction and working of standard hydrogen electrode (SHE).
9. (a) Explain phenol-water system in detail.
(b) Write down any four characteristics of catalyst.

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Chemistry (Objective)   (**Group - I**)   **Paper (I)**

Time Allowed:- 20 minutes   **PAPER CODE 2481**   Maximum Marks:- 17

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 mark in that question. Write **PAPER CODE**, which is printed on this question paper, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.   **Q. 1**

1) Isotopes differ in
   (A) Properties which depend upon mass   (B) Arrangement of electrons in orbitals   (C) Chemical properties   (D) The extent to which they may be affected in electromagnetic field

2) The volume occupied by 1.4 g of N_2 at S.T.P is
   (A) 2.24 dm^3 (B) 22.4 dm^3 (C) 1.12 dm^3 (D) 112 cm^3

3) During the process of crystallization, the hot saturated solution
   (A) Is cooled very slowly to get large sized crystals   (B) Is cooled at moderate rate to get medium sized crystals   (C) Is evaporated to get the crystals of the product   (D) Is mixed with an immiscible liquid to get the pure crystals of the product

4) Which species is formed when iodine is dissolved in the aqueous solution of KI?
   (A) I_2 (B) I^- (C) I_2^- (D) I_3^-

5) Pressure remaining constant, at which temperature the volume of a gas will become twice of what it is at 0 °C
   (A) 546 °C   (B) 200 °C   (C) 546 K   (D) 273 K

6) Equal masses of methane and oxygen are mixed in an empty container at 25 °C. the fraction of total pressure exerted by oxygen is
   (A) $\frac{1}{3}$ (B) $\frac{8}{9}$ (C) $\frac{1}{9}$ (D) $\frac{16}{17}$

7) Amorphous solids
   (A) Have sharp melting points   (B) Undergo clean cleavage when cut with knife   (C) Have perfect arrangement of atoms   (D) Can possess small regions of orderly arrangement of atoms

8) When water freezes at 0 °C, its density decreases due to
   (A) Cubic structure of ice   (B) Empty spaces present in the structure of ice   (C) Change of bond lengths   (D) Change of bond angles

9) Orbitals having same energy are called
   (A) Hybrid orbitals   (B) Valence orbitals   (C) Degenerate orbitals   (D) d-orbitals

10) Bohr's model of atom is contradicted by
   (A) Planck's quantum theory   (B) Dual nature of matter   (C) Heisenberg's uncertainty principle   (D) All of the above

11) Which one has a lone pair of electrons on central atom?
   (A) SO_2 (B) BF_3 (C) SO_3 (D) CH_4

12) Which of the following species has unpaired electrons in antibonding molecular orbitals?
   (A) O_2^{2+} (B) N_2^{2-} (C) B_2 (D) F_2

13) In endothermic reactions, the heat content of the
   (A) Products is more than that of reactants   (B) Reactants is more than that of products   (C) Surroundings increases   (D) Reactants and products is equal

14) The pH of 10^{-3} mol dm^{-3} of an aqueous solution of H_2SO_4 is
   (A) 3   (B) 2.7   (C) 2   (D) 1.5

15) An aqueous solution of ethanol in water may have vapour pressure.
   (A) Equal to that of water   (B) Equal to that of ethanol   (C) More than that of water   (D) Less than that of water

16) The cathodic reaction in the electrolysis of dil.H_2SO_4 with Pt electrodes is
   (A) reduction   (B) Oxidation   (C) Both oxidation and reduction   (D) Neither oxidation nor reduction

17) In Zero order reaction, the rate is independent of
   (A) Temperature of reaction   (B) Concentration of reactants   (C) Concentration of products   (D) None of these

1122 (Inter Part - I) Warning:- Please, do not write anything on this question paper except your Roll No.

Chemistry (Subjective) (Session 2018-20 to 2021-23) **Group (I)** **Paper (I)**

Time Allowed: 2.40 hours   Section ----------------- I   Maximum Marks: 68

2. **Answer briefly any Eight parts from the followings:-** $8 \times 2 = 16$

(i) 18 g of H_2O and 16 g of CH_4 have equal number of molecules in them.

(ii) N_2 and CO have equal number of electrons, protons and neutrons.

(iii) Many Chemical reactions takes place in our surroundings involve limiting reactant.

(iv) How the Filteration rate can be increased by Fluted Filter Paper.

(v) Give any two properties of solvent used in crystallization process.

(vi) What is sublimation also Give its example.

(vii) Why critical temperature of NH_3 is higher than CO_2

(viii) Animals inhale O_2 and exhale CO_2 why?   (ix) Why H_2 diffuses more quickly than O_2.

(x) How the K_c predicts the direction of reaction.

(xi) How Buffer solution is prepared.   (xii) Define conjugate acid with an example.

3. **Answer briefly any Eight parts from the followings:-** $8 \times 2 = 16$

(i) How Evaporation cause cooling?   (ii) Why H_2O boils at 98 ^oC at Muree hills?

(iii) What is Isomorphism and Polymorphism? (iv) Why ionic solids are highly brittle.

(v) How positive rays are produced in discharge tube?   (vi) Write equation for the decay of free neutron?

(vii) What is atomic emission and atomic absorption spectrum?   (viii) Draw shapes of p-orbital?

(ix) How will you prepare one molar solution of sucrose?   (x) What are partially miscible liquids. Give two examples?

(xi) What is catalytic poisoning give example?   (xii) What is effect of temperature on the rate of reaction?

4. **Answer briefly any Six parts from the followings:-** $6 \times 2 = 12$

(i) Write down any two examples of molecules in which octet rule is not followed.

(ii) Why Size of Anion is usually greater than its parent atom?

(iii) Bond order of He_2 molecule is zero why?

(iv) Bond distance is the compromize distance between two atoms. How?

(v) Differentiate between exothermic and endothermic reactions.

(vi) Define enthalpy of reaction. Give example.

(vii) What is enthalpy of combustion. Give example.

(viii) Write down electrode reactions of silver oxide battery.

(ix) Calculate oxidation Number of 'cr' in $K_2Cr_2O_7$.

Section ------------- II

Note: Attempt any three questions. $(8 \times 3 = 24)$

5. (a) What are isotopes? Explain the relative abundance of isotopes.

   (b) Write down the four defects of Bohr's atomic model.

6. (a) Calculate the density of methane (CH_4) at 0 ^oC and 1 atmospheric pressure.

   (b) Explain four industrial applications of electrolysis.

7. (a) Describe four postulates of VSEPR theory.

   (b) State Hess's law of constant heat summation. Explain this law in the formation of sodium carbonate.

8. (a) Define vapour pressure of liquids. On what factors it depends. Also explain manometric method for its determination.

   (b) The solubility of PbF_2 at 25 ^oC is 0.64 gdm^{-3}. Calculate K_{sp} of PbF_2.

9. (a) Explain measurement of boiling point elevation by Landsberger's method.

   (b) Give four characteristics of enzymes catalyst.

Chemistry (Objective) www.FGSTUDY.com   (Group - II)   www.FGSTI Paper (I)
Time Allowed:- 20 minutes   **PAPER CODE 2482**   Maximum Marks:- 17

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 mark in that question. Write **PAPER CODE, which is printed on this question paper**, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed. **Q. 1**

1) A limiting reactant is the one which
(A) Is taken in Lesser quantity in grams as compared to other reactants.
(B) Is taken in Lesser quantity in volume as compared to the other reactants
(C) Gives the maximum amount of the product which is required
(D) Gives the minimum amount of the product under consideration

2) The number of moles of CO_2 which contain 8.0 g of oxygen.
(A) 0.25
(B) 0.50
(C) 1.0
(D) 1.50

3) During process of crystallization, the hot saturated solution.
(A) Is cooled very slowly to get large sized crystals
(B) Is cooled at a moderate rate to get medium sized crystals
(C) Is evaporated to get the crystals of the product
(D) Is mixed with an immiscible liquid to get the pure crystals of the product

4) Compound which undergo sublimation is
(A) $KMnO_4$
(B) $CaCO_3$
(C) NH_4Cl
(D) Na_2CO_3

5) If absolute temperature of a gas is doubled and the pressure is reduced to one half, the volume of the gas will be
(A) Remains unchanged
(B) Increase four times
(C) Reduce to ¼
(D) Be doubled

6) The pressure remaining constant; at which temperature the volume of a gas will become twice of what it is at 0 °C
(A) 546 °C
(B) 200 °C
(C) 546 K
(D) 273 K

7) Acetone and chloroform are soluble in each other due to
(A) Intermolecular hydrogen bonding
(B) Ion-dipole interaction
(C) Instantaneous dipole
(D) All of the above

8) Which of the following is a pseudo solid?
(A) CaF_2
(B) Glass
(C) NaCl
(D) All

9) When 6d orbital is complete, the entering electron goes into
(A) 7f
(B) 7s
(C) 7p
(D) 7d

10) Rutherford's model of atom failed because
(A) The atom did not have a nucleus and electron
(B) It did not account for the attraction between proton and neutron
(C) It did not account for the stability of the atom
(D) There is actually no space between the nucleus and the electrons

11) Which of the following statement is not correct regarding bonding molecular orbitals?
(A) Bonding molecular orbitals possess less energy than atomic orbitals from which they are formed
(B) Bonding molecular orbitals have low electron density between the two nuclei
(C) Every electron in the bonding molecular orbitals contributes to the attraction between atoms
(D) Bonding molecular orbitals are formed when the electron wave undergo constructive interference

12) In methanol, bond between carbon and oxygen
(A) Ionic
(B) Non-polar
(C) Polar
(D) Coordinate

13) The change in heat contents of a chemical reaction at constant temperature and pressure is called
(A) Enthalpy change
(B) Heat of sublimation
(C) Bond energy
(D) Internal energy change

14) Which statement about the following equilibrium is correct.
$$2SO_{2(g)} + O_{2(g)} \rightleftharpoons 2SO_{3(g)} \quad \Delta H = -188.3 \ KJ\,mole^{-1}$$
(A) The value of K_p falls with a rise in temperature
(B) The value of K_p falls with increasing pressure
(C) Adding V_2O_5 catalyst increase the equilibrium yield of sulphur trioxide
(D) The value of K_p is equal to K_c

15) 18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to
(A) 1/5
(B) 5.1
(C) 1/51
(D) 6

16) If the salt bridge is not used between two half cells, then the voltage;
(A) Decrease rapidly
(B) Decrease slowly
(C) Does not change
(D) Drops to zero

17) With increase of 10 °C temperature. The rate of reaction doubles. This increase in the rate of reaction is due
(A) Decrease in activation energy of reaction
(B) Decrease in the number of collisions between reactant molecules
(C) Increase in activation energy of reactants
(D) Increase in number of effective collisions

Chemistry (Subjective) (Session 2018-20 to 2021-23) **Group (II)** **Paper (I)**

Time Allowed: 2.40 hours   Section ---------------- I   Maximum Marks: 68

2. Answer briefly any Eight parts from the followings:-   8 × 2 = 16

(i) Define Avogadro's number with a suitable example. (ii) Write two assumptions of stoichiometry
(iii) Many chemical reactions involve limiting reactant as taking place in our surrounding, justify.
(iv) Why crystallization is a better technique for separation and purification?
(v) Name any four sublimed solids. (vi) What is R_f value; Also write its formula.
(vii) Deduce Boyle's Law with the help of kinetic theory of gases.
(viii) Write any four applications of plasma.
(ix) The plot of PV versus P is a straight line at constant temperature and with a fix number of moles of an ideal gas, explain.
(x) How equilibrium constant (K_c) predicts direction of reaction. (xi) How does buffer act?
(xii) Give optimum conditions to get maximum yield of Ammonia (NH_3)

3. Answer briefly any Eight parts from the followings:-   8 × 2 = 16

(i) Why gasoline evaporates faster than water.
(ii) Define molar heat of vapourization with example.
(iii) Define enthalpy change either it be positive or negative.
(iv) Differentiate between crystalline and amorphous solids. Give examples.
(v) What is frequency and wave number. (vi) Define spectrum Give example.
(vii) What is atomic emission spectrum.
(viii) Differentiate between stark's effect and Zeemann's effect
(ix) Define Roult's law with two statements giving its equation.
(x) Define solubility, give one example. (xi) What is meant by promotor or activator, give example.
(xii) What is negative catalysis.

4. Answer briefly any Six parts from the followings:-   6 × 2 = 12

(i) Define electron affinity. Give an example.
(ii) The lone pair of electrons occupy more space than bond pair of electrons. Why?
(iii) Draw molecular orbital diagram of N_2.
(iv) Write the basic assumption of Valence shell electron pair repulsion theory.
(v) What is a spontaneous process? Give an example.
(vi) Differentiate between internal energy and enthalpy.
(vii) Define enthalpy of formation. Give an example.
(viii) Impure copper can be purified by electrolytic process. How?
(ix) Differentiate between electrolytic cell and galvanic cell.

Section ------------- II

Note: Attempt any three questions.   (8 × 3 = 24)

5. (a) Define Limiting reactant and how it is identified by different steps.
   (b) Explain Millikan's oil droplet experiment for determination of charge on electron.
6. (a) There is a mixture of Hydrogen, helium and methane occupying a vessel of volume 13 dm^3 at 37 °C and 1 atm. The masses of H_2 and He are 0.8 g and 0.12 g respectively. Calculate the mole fraction of each gas?
   (b) What is Galvanic cell. Give the construction of Zn – Cu Galvanic cell. Briefly explain composition of electrodes and chemical reactions at electrodes.
7. (a) Define electron Affinity. Enlist factors influencing Electron Affinity. How it varies in groups and periods?
   (b) State First law of thermodynamics. Prove that $\Delta E = q_v$
8. (a) What are liquid crystals? Give their four applications in daily life.
   (b) The solubility of CaF_2 in water at 25 °C is found to be 2.05×10^{-4} mol dm^{-3}. Calculate the value of K_{sp} at this temperature.
9. (a) Explain the depression of the freezing point of a solvent by a solute with the help of a graph.
   (b) What are enzymes? Give examples in which they act as catalyst. Mention the characteristics of enzyme catalysis.

Chemistry (Subjective) (Session 2017-19 to 2020-22) **Group (I)** **Paper (I)**

Time Allowed: 2.40 hours **Section ---------------- I** Maximum Marks: 68

2. **Answer briefly any Eight parts from the followings:-** $8 \times 2 = 16$

(i) Justify the statement 23g sodium and 238g of uranium have equal no of atoms.

(ii) Magnesium atom is twice heavier than that of carbon atom.

(iii) 180 g glucose and 342g of sucrose have same number of molecules but different number of atoms present in them.

(iv) What is difference between partition and adsorption type of chromatography.

(v) Define sublimation by giving one example.

(vi) Sate charless law by giving its mathematical expression.

(vii) Do you think that some of the postulates in kinetic molecular theory of gases are faulty? Point out these postulates. (viii) State Avogadro's law of gases?

(ix) Where is plasma found?

(x) Define fractional crystallization by giving one example.

(xi) Why $Na_2SO_4 .10H_2O$ shows discontinuous solubility curve.

(xii) Define colligative properties.

3. **Answer briefly any Eight parts from the followings:-** $8 \times 2 = 16$

(i) Define dipole-dipole forces with one example.

(ii) What is dipole-induced dipole force? (iii) Define London dispersion forces.

(iv) Why methane is gas while hexane is a liquid.

(v) Define spectrum. (vi) What is S (vii) Define Heisenberg's uncertainity principle.

(viii) Define atomic orbital. (ix) Define the Le-Chatli's principle.

(x) Why catalyst does not affect the equilibrium position.

(xi) Define order of reaction. (xii) What is half life period.

4. **Answer briefly any Six parts from the followings:-** $6 \times 2 = 12$

(i) Define ionization energy and electron affinity with one example in each case.

(ii) Write the Lewis Structures for the following compounds.
   (a) HCN   (b) CCl_4

(iii) Define hybridization. What type of hybridization is found in CH_4?

(iv) Write down four postulates of VSEPR Theory.

(v) Define the following with one example in each
   (a) Standard enthalpy of reaction.   (b) Standard enthalpy of combustion.

(vi) Differentiate between internal energy of the system and the enthalpy of the system.

(vii) Why the standard oxidation potential of Zn is+0.76 V and its reduction potential is -0.76 V?

(viii) Why the equilibrium is set up between metal atoms of electrode and ions of metal in a cell?

(ix) Why a salt bridge maintains the electrical neutrality in the cell?

Section ------------- II

Note: Attempt any three questions. $(8 \times 3 = 24)$

5. (a) Calculate the masses of 10^{-3} moles of $MgSO_4$ and 2.74 moles $KMnO_4$.
   (b) Describe any four crystal systems.

6. (a) Write down eight postulates of Kinetic molecular theory of gases.
   (b) Derive the equation for the radius of nth orbit of hydrogen atom using Bohr's model.

7. (a) Define ionization energy. Name the factors on which it depends. Also explain its trends in the periodic table.
   (b) Define enthalpy and prove that $\Delta H = q_p$.

8. (a) What is the percentage ionization of acetic acid in a solution in which 0.1 mol of it has been dissolved per dm^3 of the solution $(K_a=1.85 \times 10^{-5})$
   (b) What is Arrhenius Equation? How can you calculate the energy of activation of a reaction from this equation.

9. (a) Briefly explain the working of Galvanic Cell.
   (b) Explain Beckmann method to determine depression of Freezing Point.

(Inter Part – I)   (Session 2017-19 to 2020-22)   Sig. of Student ------------------

Chemistry (Objective)   (Group - I) S4D-G-21 Paper (I)

Time Allowed:- 20 minutes   **PAPER CODE 2481**   Maximum Marks:- 17

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 mark in that question. Write **PAPER CODE, which is printed on this question paper,** on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) Isotopes differ in the presence of
   (A) Electrons   (B) Protons   (C) Neutrons   (D) Positrons

2) Average atomic mass of Neon is
   (A) 20.81   (B) 21.81   (C) 22.18   (D) 20.18

3) The rate at which solutes move in paper chromatography depend on
   (A) Size of paper   (B) R_f values of solutes   (C) Temperature   (D) Pressure

4) Kinetic energy of gas molecules is zero at
   (A) $0C°$ (B) $0F°$ (C) $0k$ (D) $-10C°$

5) The number of molecules of water in one dm^3 is close to
   (A) $\frac{6.02}{22.4} \times 10^{23}$ (B) 18×10^{23} (C) $\frac{12.04}{22.4} \times 10^{23}$ (D) $55.6 \times 6.02 \times 10^{23}$

6) The number of unit cell parameters are
   (A) 2   (B) 4   (C) 6   (D) 8

7) The maximum boiling point of NH_3 among the hydrides of group V is due to
   (A) Small size of N atom   (B) Lone pair of electron   (C) Enhanced electro negative character of Nitrogen   (D) Pyramidal shape of NH_3

8) Splitting of spectral lines in a strong Electric field is called
   (A) Zeeman effect   (B) Stark effect   (C) Compton effect   (D) Photoelectric effect

9) Bohr Model of atom is contradicted by
   (A) Plank's quantum Theory   (B) Dual nature   (C) Heisen berg's principle   (D) Pauli's exclusion principle

10) The number of bonds in oxygen molecule is
    (A) Two σ bonds   (B) Two π bonds   (C) one σ, one π (D) one σ, Two π

11) Bond order of Helium molecule is
    (A) Zero   (B) One   (C) Two   (D) Three

12) Which of these is not a state function.
    (A) Temperature   (B) Pressure   (C) Volume   (D) Heat

13) How much nitrogen fixation is carried out by Haber's process.
    (A) 13%   (B) 35%   (C) 50%   (D) 73%

14) The value of pK_w at 25 °C for water is
    (A) 10^{-7} (B) 7   (C) 10^{-14} (D) 14

15) 18g Glucose is dissolved in 90g of water the relative lowering of vapour pressure is
    (A) $\frac{1}{5}$ (B) 5.1   (C) $\frac{1}{51}$ (D) 6

16) Stronger the oxidizing agent, greater is the
    (A) Oxidation potential   (B) Reduction potential   (C) Redox potential   (D) E.M.F. of cell

17) In Zero order reaction the rate is independent of
    (A) Temperature   (B) Pressure   (C) Concentration   (D) Volume

Chemistry (Objective)   (Group - II) $S40-42-2$ **Paper (I)**

Time Allowed:- 20 minutes   **PAPER CODE 2488**   Maximum Marks:- 17

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 mark in that question. Write **PAPER CODE, which is printed on this question paper**, on the both sides of the Answer Sheet and fill bubbles accordingly, otherwise the student will be responsible for the situation. Use of Ink Remover or white correcting fluid is not allowed.

Q. 1

1) If the salt bridge is not used between two half cells, then the voltage
   (A) Decrease rapidly   (B) Decrease slowly   (C) Does not change   (D) Drops to zero

2) If the rate equation of a reaction $2A + B \longrightarrow$ products is, rate $= k[A]^2[B]$ and A is present in large excess, then order of reaction is
   (A) 1   (B) 2   (C) 3   (D) 1.5

3) The angle between sides 'b' and 'c' is _____
   (A) Beta   (B) Alpha   (C) Theta   (D) Gamma

4) Isotopes differ in
   (A) Properties which depend upon mass   (B) Arrangement of electrons in orbitals   (C) Chemical properties   (D) The extent to which they may be affected in electromagnetic field

5) The number of atoms in 1.79 g of gold and _____ g of sodium are equal.
   (A) 0.023   (B) 23   (C) 230   (D) 2300

6) The comparative rates at which the solutes move in paper chromatography depend on
   (A) R_f values of solutes   (B) The size of paper   (C) Temperature of the experiment   (D) Size of the chromatographic tank used

7) Equal masses of methane and oxygen are mixed in an empty container at $25\,^{\circ}C$. The fraction of total pressure exerted by methane is
   (A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{1}{9}$ (D) $\frac{8}{9}$

8) The molar volume of CO_2 is maximum at
   (A) $127\,^{\circ}C$ and 1 atm   (B) $0\,^{\circ}C$ and 2 atm   (C) S.T.P   (D) $273\,^{\circ}C$ and 2 atm

9) Intermolecular forces present in ammonia are _____.
   (A) Hydrogen bonding   (B) Ion-dipole forces   (C) Dipole-induced dipole forces   (D) London-dispersion forces

10) Quantam number values for '3d' orbitals will be
   (A) n=3 , ℓ=0   (B) n=3 , ℓ=1   (C) n=3 , ℓ=2   (D) n=3 , ℓ=3

11) Orbitals having same energy are called
   (A) Valence orbitals   (B) Hybrid orbitals   (C) d-orbitals   (D) Degenerate orbitals

12) Bond order of helium molecule is _____.
   (A) Two   (B) One   (C) Zero   (D) Three

13) Berylliumdichloride follows _____ hybridization
   (A) sp   (B) sp^3 (C) sp^2 (D) sp^3d^2

14) The Born-Haber cycle is the application of _____ law.
   (A) Hess's   (B) Le-chatlier   (C) Coulomb   (D) Pascal

15) The pH of 0.001 $moldm^{-3}$ of an aqueous solution of H_2SO_4 is
   (A) 3   (B) 2.7   (C) 2.0   (D) 1.5

16) The pH of human blood is maintained at _____
   (A) 7   (B) 7.35   (C) 7.95   (D) 8.00

17) The molal boiling point constant is the ratio of the elevation in boiling point to
   (A) Molarity   (B) Molality   (C) Mole fraction of solvent   (D) Mole fraction of solute

Chemistry   (Subjective)   (Session 2017-19 to 2020-22)   **Group (II)**   **Paper (I)**

Time Allowed: 2.40 hours   **Section ---------------- I**   Maximum Marks: 68

2.   **Answer briefly any Eight parts from the followings:-** SGD-62-21 $8 \times 2 = 16$

(i)   Justify that 180 g of glucose and 342 g of sucrose have the same number of molecules but different number of atoms present in them.   **(ii) Define isotopes. Give one example.**

(iii) What is gram atom? How we can calculate gram atom of an element? Give its relationship.

(iv) What is chromatography? Write its two uses. **(v) Define sublimation. Write two solids which can be sublimed.**

(vi) Differentiate between natural and artificial Plasma.

(vii) Derive the units for gas constant R in general gas equation when the pressure is in atmosphere and volume in dm^3.

(viii) Verify Boyle's law from kinetic theory of gases.

(ix) Write two applications of Dalton's law of partial pressure.

(x)   Define solubility. How it can be expressed?   **(xi) What is discontineous solubility curve. Give one example.**

(xii) How do you Justify that freezing points are depressed due to the presence of solutes.

3.   **Answer briefly any Eight parts from the followings:-** $8 \times 2 = 16$

(i)   Why in a very cold winter the fish in gardens ponds owe their lives to hydrogen bonding?

(ii) Why water and ethanol can mix easily and in all proportions.

(iii) Define unit cell. Give one example.   **(iv) Define transition temperature. Give one example.**

(v)   What is hydrogen spectrum. Name four spectral lines.

(vi) Write down two defects in Bohr's atomic model.

(vii) Whichever gas is used in discharge tube, the nature of the cathode rays remains the same. Why?

(viii) Give any two properties of cathode rays.   **(ix) Define (a) Reversible reactions (b) state of equilibrium.**

(x)   Define Buffer capacity.   **(xi) Define instantaneous and average rates of reaction**

(xii) Define specific rate constant or velocity constant.

4.   **Answer briefly any Six parts from the followings:-** $6 \times 2 = 12$

(i)   Differentiate between polar and non polar covalent bond.

(ii) Explain the formation of co-ordinate covalent bond between NH_3 & BF_3

(iii) Explain the geometry of H_2S molecule on the basis of VSEPR theory.

(iv) How ionization energy varies in the periodic table.

(v)   Define standard enthalpy of formation with two examples.

(vi) Differentiate between atomization energy and Lattice energy.

(vii) How electrochemical series helps to predict the feasibility of a chemical reaction? Give an example.

(viii) Write the function of salt bridge in Galvanic cell.

(ix) Differentiate between Galvanic cell and electrolytic cell.

Section ------------- II

Note: Attempt any three questions. $(8 \times 3 = 24)$

5. (a) Calculate the number of grams of K_2SO_4 and water produced when 14 gram of KOH are reacted with excess of H_2SO_4. Also calculate the number of molecules of water produced.

    (b) How does hydrogen bonding explains the following
         (i) Structure of DNA   (ii) Structure of Ice.

6. (a) Write down the postulates of Kinetic molecular theory of gases.

    (b) Explain Millikan's oil drop experiment to determine the charge of an electron.

7. (a) Draw and discuss the geometry of Ethylene with respect to sp^2-hybridization.

    (b) How can you measure enthalpy of reaction by glass calorimetric method.

8. (a) The following reaction was allowed to reach the state of equilibrium
         $2A_{(aq)} + B_{(aq)} \rightleftharpoons C_{(aq)}$ the initial amount of the reactants present in one dm^3 of solution were 0.50 moles of A and 0.60 moles of B. At equilibrium the amounts were 0.20 moles of A and 0.45 moles of B and 0.15 moles of C. Calculate the equilibrium constant K_c.

    (b) Define half life period. Explain with two examples.

9. (a) Give differences between Ideal and Non-Ideal solution.

    (b) Write different rules for assigning oxidation number by giving one example.