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.

1. 1. If ω is cube root of unity, then $(1+\omega-\omega^2)^3 =$

    (A) -8ω (B) 8ω (C)   8   (D)   -8

2. $\dfrac{p(x)}{x^2+1}$ will be proper fraction if degree of $p(x)$ is

    (A)   1   (B)   2   (C)   3   (D)   4

3. The series $a + ar + ar^2 + \text{---} \infty$ ___ges if

    (A) $|r| > 1$ (B) $|r| \geq$ (C) $|r| \leq 1$ (D) $|r| < 1$

4. A , G , H , are in

    (A)   A . P   (B)   G . P   (C)   H . P   (D)   series

5. For an event A, range of its probability P (A) is

    (A) $-1 \leq P(A) \leq 1$ (B) $0 < P(A) < 1$ (C) $0 \leq P(A) \leq 1$ (D) $P(A) = 1$

6. If $^nc_4 - {}^nc_5 = 0,$ then $n =$

    (A)   0   (B)   4   (C)   6   (D)   9

7. $(1+i)^8 =$

    (A)   2   (B)   4   (C)   8   (D)   16

8. The conjunction of two statements p and q is denoted by

    (A) $p \leftrightarrow q$ (B) $p \rightarrow q$ (C) $q \rightarrow p$ (D) $p \wedge q$

9. If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = 2$ then $\begin{vmatrix} c & d \\ a & b \end{vmatrix} =$

    (A)   2   (B)   -2   (C) ± 2 (D)   0

10. If $|A| = 5,$ then $|A'| =$

    (A)   - 5   (B) $\dfrac{1}{5}$ (C)   0   (D)   5

11. No. of roots of the equation $(x-4)^2 = x^2 - 8x + 16$ are

    (A)   2   (B)   4   (C)   8   (D)   infinite

(Turn Over)

12. In an equilateral $\triangle ABC$

    (A) $r_1 > r_2$ (B) $r_1 < r_2$ (C) $r_1 = r_2$ (D) $r_1 \neq r_2$

13. With usual notations $a + b - c =$

    (A) $2s$ (B) $2s - 2c$ (C) $2s - 2b$ (D) $2s - 2a$

14. $Sin^{-1}(0) + Cos^{-1}(0) =$

    (A) $\dfrac{\pi}{2}$ (B) $\dfrac{\pi}{6}$ (C) $\dfrac{2\pi}{5}$ (D) $\dfrac{\pi}{4}$

15. If $Sinx = -\dfrac{\sqrt{3}}{2}$, then $x =$

    (A) $\dfrac{\pi}{3}$ (B) $\dfrac{4\pi}{3}$ (C) $\dfrac{2\pi}{3}$ (D) $\dfrac{5\pi}{3}$

16. If n is even , middle term of $(a+b)^n$ is

    (A) $(\dfrac{n}{2})th\ term$ (B) $(\dfrac{n+2}{2})th\ term$ (C) $(\dfrac{n+1}{2})th\ term$ (D) $(\dfrac{n+3}{2})th\ term$

17. 2nd term of $(a+b)^7$ is

    (A) a^7 (B) $7ab^6$ (C) $7a^6b$ (D) $7ab$

18. $Tan(\alpha - 90^\circ) =$

    (A) $Cot\alpha$ (B) $-Cot\alpha$ (C) $Tan\alpha$ (D) $-Tan\alpha$

19. $\dfrac{\pi}{3} rad$ is an angle.

    (A)   acute   (B)   obtuse   (C)   straight   (D)   reflexive

20. Period of $\dfrac{1}{2}\sin 2x$ is

    (A) $\dfrac{\pi}{2}$ (B) π (C) 2π (D) 4π

Chemistry (New Scheme)   (INTERMEDIATE PART - I)   Paper : I
Time : 2 : 40 Hours   Marks : 68

Subjective

Note :- Section I is compulsory. Attempt any three (3) questions from Section II.

(Section I)

2.   **Write short answers to any Eight Parts.**   (8 x 2 = 16)

    i. N_2 and CO molecules have equal number of protons and neutrons. Justify.

    ii.   Mg atom is twice heavier than C-atom. Why?

    iii.   What is justification of two strong peaks of almost equal heights in the mass spectrum for Bromine?

    iv.   How crystals are dried in vacuum desiccator?

    v.   Why fluted filter paper is used for greater rate of filtration than ordinary cone filter paper?

    vi.   Write any two characteristics of plasma.

    vii.   Why real gases deviate from ideal behaviour?

    viii.   Define Avogadro's Law. How many molecules of an ideal gas present in $22.4 dm^3$ at STP?

    ix.   -273. 15°C is known to be the lowest temperature of an ideal gas. Give reason.

    x.   Relative lowering of vapour pressure is independent of temperature. Justify this statemen

    xi.   Define hydrolysis. Give chemical equation for hydrolysis of ammonium chloride.

    xii.   Define molality. Give one of its mathematical expression.

3.   **Write short answers to any Eight parts.**   (8 x 2 = 16)

    i.   Cleavage of the crystals is itself an isotropic behaviour. Justify.

    ii.   How liquid crystals are used to locate veins, arteries, infections and tumors?

    iii.   Lower alcohols are soluble in H_2O but hydrocarbons are insoluble. Give reason.

    iv.   Why graphite is good conductor of electricity but diamond is bad conductor of electricity?

    v.   Give two importances of Moseley Law.

    vi.   State Heisenberg's uncertainty principle.

    vii.   Differentiate between orbits and orbitals.

    viii.   How the dual nature of electron was verified?

    ix.   How acidic and basic buffers are prepared? Give one example of each.

    x.   State Law of Mass Action.

    xi.   Define activation energy and activated complex.

    xii.   How does the increase of temperature increases the rate of the chemical reaction.

(Turn Over)

4. **Write short answers to any Six parts.** (2 x 6 = 12)

   i. Why did the atomic Radii cannot be measured precisely?

   ii. In NH_3 bond angle is 107.5° but in NF_3 it is 102°. Explain it.

   iii. NH_3 can form coordinate covalent bond with H^+. Explain!

   iv. Oxygen molecule is paramagnetic in nature. Justify!

   v. Prove that $\Delta E = q_v$.

   vi. Define the terms Heat and Work.

   vii. A salt bridge maintain the electrical neutrality in galvanic cell. Explain.

   viii. Define standard electrode potential?

   ix. Write down chemical reactions taking place in alkaline battery.

(Section – II)

Note: Attempt any three (3) questions from Section II. Each question carries 08 marks.(3 x 8 = 24)

5. (a) Define limiting reactant. Write different steps involved in the identification of limiting reactant. How does it control the yield of product formed in chemical reaction.

  (b) Describe manometric method for the measurement of vapour pressure of a liquid.

6. (a) $250 cm^3$ of the sample of hydrogen effuses four times as rapidly as $250 cm^3$ of an unknown gas. Calculate the molar mass of unknown gas.

  (b) Derive the equation for the radius of nth orbit of hydrogen atom using Bohr's model.

7. (a) Define hybridization. Explain sp^3 hybridization with the example of methane (CH_4).

  (b) How enthalpy of reaction is determined by glass calorimeter?

8. (a) $N_2(g)$ and $H_2(g)$ combine to $NH_3(g)$. The value of K_c in this reaction at 500°C is 6.0×10^{-2}. Calculate the value of K_p for this reaction.

  (b) Describe the homogeneous and heterogeneous catalysis with one example of each.

9. (a) Write note on   (i) Hydration   (ii) Hydrates

  (b) Explain the construction of fuel cell.

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