Seat Number

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शार्थ - 005

CHEMISTRY PAPER - I : CH-111
Physical and Inorganic Chemistry
(113101)

P. Pages : 3

Time : Two Hours **Max. Marks : 60**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Graph or diagram should be drawn with the black ink pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. All questions are compulsory.
5. Figures to the right indicates full marks.
6. Draw a neat diagram wherever necessary.
7. Use of logarithmic table and non programmable calculator is allowed.

1. a) Attempt **any six** of the following. **6**

i) The collisions of the gas molecules are perfectly ----------.
   a) Rigid b) Elastic
   c) Non- elastic d) Strong

ii) Which of the following gas can be easily liquified?
   a) H_2 b) N_2
   c) CH_4 d) CO_2

iii) The temperature at which real gas obeys the ideal gas law over in appreciable pressure range is called ---------- temperature.
   a) Boyle's b) Charle's
   c) Avogadro's d) Van der Waals

iv) Mantissa is always ----------.
   a) Zero b) Fraction
   c) Negative d) Positive

v) The quadrant --------- both the Co-ordinates of point are negative.
   a) I b) II
   c) III d) IV

vi) The electronegativity of an atom of the element can be measured by - ----------.

a) Pauling's method b) Mulliken's method
c) Born Haber's cycle d) Both a & b

vii) In NH_3, the N atom has four electron pairs in outer shell, made up of --------.

a) Three BP and one LP b) Two BP and two LP
c) One BP and three LP d) Four BP and zero LP

viii) Which of the following molecule is bent T shape geometry?

a) H_2O b) $SnCl_2$
c) XeF_4 d) ClF_3

b) Answer in one sentence of the followings **any six.** 6

i) Give the unit of Vander Waals constant a & b.

ii) What is critical temperature of gas?

iii) What is the value of compressibility factor for ideal gas.

iv) Find the cube root of 64 Using logarithms.

v) What is the equation of line having slope 3 and intersecting Y-axis at 5.?

vi) State periodic Law.

vii) Define- Ionisation energy.

viii) Which hybridisation is predicted for Cl in ClF_3 ?

2. Answer in two sentences each of the followings **any six.** 12

i) What is Joule Thomson's effect?

ii) Distinguish between ideal and real gas.

iii) Find the slope and intercept of line $2y - 10x = 15$

iv) Find $\frac{dy}{dx}$ of $Y = \frac{4x^5 + 6x^4 + 5x^3 + 2x^2 - 3x}{x}$.

v) Evaluate: $\int (5x^5 + 6x^3 + 7)\, dx$.

vi) Define and explain electron affinity.

vii) Explain - Cation is Smaller and anion is larger than its parent atom.

viii) Write kinetic gas equation. What are terms involved in it?

ix) Draw the structure of ammonia molecule with bond angle.

3. Attempt **any four** of the following. **12**

i) Deduce Graham's Law of diffusion on the basis of kinetic gas equation.

ii) Give the assumptions of kinetic theory of gases.

iii) What is the equation of line which passes through the point (-2,6) and has slope $-\frac{1}{3}$?

iv) Explain, the deviation of Ideal gases from ideal behaviour.

v) Explain the factors affecting on atomic and ionic radii.

vi) Explain the geometry and type of hybridisation of '0' in H_2O molecule according to VSEPR theory.

4. Attempt **any three** of the following. **12**

i) Explain Linde's process for liquefication of gases.

ii) The compressibility factor Z is 0.783 for methane gas. Calculate the volume of 5 moles of methane at 0°C and at 10 atmosphere.

iii) Calculate the pH of nitric acid solution in which the H^+ ion concentration is 1.5×10^{-4} m.

iv) Explain Pauling method for determination of an electronegativity of an element.

v) Give the main assumptions of VSEPR theory.

5. Attempt **any two** of the following. **12**

i) Derive the Vander Waals equation of state.

ii) How lattice energy can be calculated by using Born- Haber cycle?

iii) a) Find $\frac{dy}{dx}$; $y = (x^3 + 3x)(x^2 + 2)$

b) Evaluate; $\int (x^7 + 5x^4 + 6x^2 + 7).dx$.

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