Seat Number

Nov - 2015

कणगा - 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 indicate 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) In Joule Thomson effect there is fall in temperature of gas occur due to .....

a) zero work done b) work is done on the gas
c) work is done by the gas d) Maximum work

ii) The ratio of molar gas constant to Avogadro's number is known as .....

a) Boyle's point b) Critical constant
c) Compressibility factor d) Boltzmann constant

iii) Mantissa is always .....

a) Negative b) Positive
c) Zero d) Exponential

iv) Liquefication of gas depends on .....

a) temperature of gas b) pressure of gas
c) shape of container d) nature of gas

v) In the following elements which one is non-metallic element.

a) Ge b) Si
c) C d) Sn

vi) In modern periodic table the elements are arranged in accordance with .....
a) increasing mass b) increasing atomic volume
c) increasing atomic no. d) alphabetically

vii) The geometry of H_2O molecule according to V.S.E.P.R. theory is
a) tetrahedral b) Pyramidal
c) angular d) Planar triangle

viii) The F-Cl-F bond angle in ClF_3 molecule is .....
a) 90° b) 87.5°
c) 104.5° d) 109.5°

b) Answer in one sentence **any six.** 6

i) Define compressibility factor.

ii) Define Boyle temperature.

iii) Define critical pressure of gas.

iv) What is the integral of $10x^2.dx$.

v) What is ionization energy of an element.

vi) Define atomic radius.

vii) Define electron affinity of an element.

viii) Give uses of V.S.E.P.R. Theory.

2. Answer in two sentence each **any six.** 12

i) State Joule Thomson effect.

ii) Give the methods for liquification of gas.

iii) Give any two assumptions of kinetic theory of gases.

iv) Evaluate $\int 4x \cdot dx$

v) Evaluate $\int_5^{10} d\log P$

vi) Why noble gases have zero electron affinity.

vii) What is screening effect.

viii) Explain assumptions of V.S.E.P.R. Theory.

ix) If $y = x^5$ then find dy/dx.

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

i) What are Vander Waal's constant ? Give their units.

ii) Distinguish between ideal gas and real gas.

iii) Explain volume correction in Vander Waal's equation.

iv) Deduce Vander Waal's constant in terms of critical constant.

v) Explain the variation of ionization energy in period.

vi) Give the number of L.P. and B.P. present in XeF_2 molecule.

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

i) Explain Claude's method with neat diagram.

ii) The dissociation constant of acetic acid is 1.75×10^{-5}. Calculate pKa of acetic acid.

iii) Calculate the critical constants for C_2H_2 using Vander Waal's constants $a = 4.39$ lit^2 atm mole^{-1}, and $b = 0.05136$ lit mol^{-1}.

iv) Show that for real gas $\frac{R.Tc}{Pc.Vc} = \frac{8}{3}$

v) On the basis of V.S.E.P.R. theory the expected shape of ClF_3 molecule is t.b.p. but it is bent T-Shape. Explain.

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

i) Discuss Andrew's isotherms of CO_2.

ii) Explain various forms of equation of straight line in detail.

iii) Define lattice energy of ionic solid determined by Born-Haber cycle.

****