D. 19/9/16 CHEMISTRY P-I F.Y.B.Sc SEM-II MARKS 75 TIME 2.5HRS A.T.K.T.

NOTE: i) All the questions are compulsory.

ii) Figures to right indicate full marks.

iii) Use of non –programmable calculator / log table is allowed.

Q.1. Attempt any four: **[20]**

A) Define Maxwell's Distribution of velocities.

B) Explain mechanism of β ray emission.

C) 11.0 g of carbon dioxide occupied 1.5 dm3 at 298 K., calculate the pressure exerted by it using a) the ideal gas equation and b) van der Waals equation. ($R = 8.314$ Nm K^{-1} mol^{-1}, a $= 0.3640$ Nm^4 mol^{-2}, $b = 4.267 \times 10^{-5}$ m^3 mol^{-1}).

D) Explain the deviation of gases from ideal behavior.

E) Explain Joule-Thomson effect.

F) Define: a) isotopes b) isobars c) isotones with suitable examples.

G) The activity of radio element falls to half its initial value in 5 days. Calculate: a) decay constant b) the time for activity to fall to 1/ 10^{th} of its initial value.

H) Explain the terms:

a) Compressibility factor

b) Correction for volume

Q.2. Attempt any four: **[20]**

A) Define pH and pOH. Show that pH + pOH = 14.

B) Derive Henderson's equation for acidic buffer.

C) Explain oxidation and oxidizing agent by electron transfer concept with suitable examples.

D) Explain precipitation method and volatilization method with example.

E) Write a short note on Ostwald ripening.

F) Explain reduction and reducing agent by classical concept with suitable examples.

G) Calculate the pH of :

a) 0.125 M H_2SO_4.

b) 0.005 M NaOH.

H) Calculate the oxidation number of:

a) C in CH_2Cl_2 b) Mn in $KMnO_4$ c) Pb in Pb_3O_4 d) C in $(C_2O_4)^{2-}$ e) Cr in $(Cr_2O_7)^{2-}$

Q.3. Attempt any four: [20]

A) Explain the theory of range of indicator.
B) Explain the terms:
   a) Titration b) Equivalence point c) Standard solution
   d) Titration error e) Standardisation
C) Explain the Ostwald's theory of indicator.
D) Explain complexometric and precipitation titration.
E) Explain the neutralization curve with suitable example.
F) Define primary standard solution and give the conditions to be fulfilled by primary standard solution.
G) Write conditions to be followed by titrant and titrand during titration.
H) What are different types of titration? Explain acid- base and redox titration.

Q.4. Attempt any three: [15]

A) State any five points of kinetic theory of gases.
B) Give important characteristics of α and β particles.
C) A buffer solution of pH 10.25 is to be prepared from ammonium hydroxide and ammonium chloride. In what molar concentration should the salt and the base be mixed? Kb for ammonium hydroxide is 1.8×10^{-5}.
D) Explain the role of following factors in gravimetric analysis.
   a)Temperature
   b)Nature of solvent
E) Write a note on theory of Acid-Base indicator.
F) Define the terms:
   a) titrant b) titrand c) secondary standard d) indicator e) end point

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