2SChe-T2 - Chemistry -II (Physical Chemistry) Paper- II

P. Pages : 2

Time : Three Hours

0052

GUG/W/16/5569

Max. Marks : 50

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Notes : 1. All **five** questions are compulsory and carry equal marks.
         2. Draw diagrams and give equations wherever necessary.

1. A) Explain mass defect and nuclear binding energy per nucleon. Discuss nuclear stability on the basis of nuclear binding energy per nucleon. **5**

   B) Determine the maximum and minimum value for the function
   $$F(x) = 2x^3 - 9x^2 + 12x + 6$$ **5**

OR

   C) Give the comparison between liquid drop model and shell model. **2½**

   D) Evaluate $\int \dfrac{1}{(a-x)^2} \cdot dx$ **2½**

   E) Explain the terms permutations and combinations. **2½**

   F) Discuss the applications of radioisotopes in
   i) Medical Science and   ii) Agriculture **2½**

2. A) Derive Kinetic gas equation. **5**

   B) Derive the relationship between critical constants and Van der Waal's constants. **5**

OR

   C) Write the postulates of Kinetic theory of gases. **2½**

   D) Calculate average velocity of hydrogen molecule at 25ºC (R = 8.314 JK^{-1}mol^{-1}) **2½**

   E) Explain the following terms
   i) Compressibility factor.
   ii) Boyle's temperature. **2½**

   F) Explain critical phenomenon with suitable example. **2½**

3. A) What are liquid crystals? Describe types of liquid crystal. **5**

   B) What is surface tension? How is surface tension of a liquid determined by drop number method? **5**

OR

   C) Write note on seven segment cell. **2½**

   D) What are intermolecular forces? Discuss dipole – dipole interaction in liquids. **2½**

	E)	In an experiment with Ostwald viscometer, pure water takes 1.52 minutes to flow through the capillary at 20°C while another liquid having density 0.80 g. cm^{-3} takes 2.25 minutes. Calculate relative viscosity and absolute viscosity of the liquid if density of water is 0.9982 g. cm^{-3} and viscosity of water is 1.005 centipoise.	**2½**
	F)	Define i) Relative viscosity. ii) Specific viscosity. How they are related with intrinsic viscosity.	**2½**
4.	A)	Explain "order of reactions". Derive the integrated rate equation for second order reaction, when the initial concentration of reactants are equal.	**5**
	B)	Discuss briefly collision theory of bimolecular reaction.	**5**

OR

	C)	Mention characteristics of catalysed reaction.	**2½**
	D)	For First order reaction, the rate constant is 0.450 sec^{-1}. What is half life and mean life of the reaction.	**2½**
	E)	Give the postulates of transition state theory.	**2½**
	F)	Explain Enzyme catalysis with suitable examples.	**2½**
5.		Attempt **any ten.**	
	i)	Evaluate $\dfrac{20!}{2! \ 18!}$	**1**
	ii)	Define nuclear fusion.	**1**
	iii)	Find the slope of the line passing through (0, 2) and (-3, -4).	**1**
	iv)	Define mean free path and collision diameter.	**1**
	v)	State law of corresponding states.	**1**
	vi)	Explain the term RMS velocity.	**1**
	vii)	Define parachor value.	**1**
	viii)	Explain the term thermography.	**1**
	ix)	What is molar refraction?	**1**
	x)	What is pseudo unimolecular reaction?	**1**
	xi)	Write Eyring equation for rate constant of bimolecular reaction.	**1**
	xii)	What is homogeneous catalysis?	**1**

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