Code No. 3394 / N

FACULTY OF ENGINEERING

B.E. I - Semester (Main) Examination, December 2016

Subject : Engineering Chemistry – I

Time : 3 Hours **Max. Marks: 70**

Note: Answer all questions from Part-A and answer any five questions from Part-B.

PART – A (20 Marks)

1 Define Extensive and intensive properties and give suitable examples. (2)
2 What are the limitations of First Law of Thermodynamics? (2)
3 Define the terms : (i) Phase and (ii) Degrees of freedom (2)
4 Define the terms : (i) Triple point (ii) Eutectic point (2)
5 Define the terms: (i) Priming and (ii) Foaming (2)
6 Calculate temporary hardness and permanent hardness of a sample of water containing $Mg(HCO_3)_2$=7.3 $mg.L^{-1}$;$Ca(HCO_3)_2$=16.2 $mg.L^{-1}$; $MgCl_3$=9.5 $mg.L^{-1}$;$CaSO_4$=13.6$mg.L^{-1}$. (2)
7 Write the applications of conducting polymers. (2)
8 Give one example each for natural and synthetic polymers. (2)
9 Define the terms: (i) viscosity and (ii) viscosity index (2)
10 Classify refractories and give one example each. (2)

PART – B (50 Marks)

11 (a) A gas expands isothermally against a constant external pressure of 1 atm. from a volume of 10 dm^3 to a volume of 20 dm^3. In this process it absorbs 800 J. of thermal energy from its surroundings. Calculate ΔE for the process in Joules. (5)
(b) Define Gibb's and Helmholtz free energy. Derive expressions for variation of free energy with temperature and pressure. (5)

12 (a) State phase rule and discuss the salient features of the phase diagram of water system. (5)
(b) Draw the phase diagram of pb-Ag system forming eutectic alloy and explain. (5)

13 (a) Explain the EDTA method for the determination of temporary and permanent hardness of water. (5)
(b) Mention the specifications of potable water. (5)

14 (a) Write the preparation, properties and engineering applications of Bakelite. (5)
(b) Differentiate between thermoplastic and thermosetting polymers. (5)

15 (a) What is meant by Lubricant? Explain the mechanism of Extreme-pressure lubrication. (5)
(b) Explain the requirements of a good refractory material. (5)

16 (a) One mole of an ideal gas is heated form 100K to 300K. Calculate Δs if (5)
(i) the volume is kept constant
(ii) the pressure is kept constant. Assume that C_v=1.5 R.
(b) Explain the concept of breakpoint chlorination. (5)

17 (a) What are the limitations of raw rubber? Explain the process of vulcanization of rubber. (5)
(b) What is meant by white wares? Give their uses. Explain the method of glazing. (5)

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