4/6/2011

F.E. Sem I (All Branches)
Applied Chemistry - I.

77: 1st Half-Exam.-11 mina-(c).

Con. 3280-11.

RK-1053

(2 Hours) **[Total Marks : 75**

N. B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from remaining **six** questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) **All** questions carry **equal** marks.
(5) **At·wts :–** H = 1, Mg = 24, C = 12, O = 16, S = 32, Ca = 40, Cl = 35·5, Na = 23.

1. Attempt any **five** :— **15**
   (a) Distinguish between thermoplastic and thermosetting resins.
   (b) Find the acid value of a used oil sample whose 6 ml required 2·6 ml of 0·02 N KOH for titration (density of oil = 0·91) and state whether the oil is suitable for lubrication or not.
   (c) Explain the Nickel-Hydrogen batteries with the help of chemical reactions.
   (d) State the limitations of the phase rule.
   (e) What are carbon-nanotubes ? Explain different types of carbon-nanotubes.
   (f) What is shape memory effect ? Name a few shape memory alloy types.
   (g) A water sample on analysis has been found to contains :
   $MgCl_2$ = 19 mg/lit, $CaCO_3$ = 05 mg/lit
   $Ca(HCO_3)_2$ = 29·5 mg/lit $CaSO_4$ = 13·0 mg/lit.
   Calculate temporary, permanent and total hardness.

2. (a) What is meant by fabrication of plastics ? Explain Extrusion moulding with the help of neat diagram. **5**
   (b) Define lubrication and explain the mechanism of hydrodynamic lubrication. **5**
   (c) Describe the method for production of bio-gas from waste. Give its composition and uses. **5**

3. (a) Calculate the amount of lime (90% pure) and soda (95% pure) required to soften 50,000 litres of same water containing the following impurities in ppm : **5**
   $Mg(HCO_3)_2$ = 155 $MgCl_2$ = 23
   NaCl = 6·9 H_2SO_4 = 5
   Na_2SO_4 = 18·4 $CaCl_2$ = 111.
   (b) Give the synthesis and uses of :— **5**
   (i) Polystyrene (ii) Urea formaldehyde.
   (c) State condensed Phase Rule ? Explain the Lead-Silver System with phase diagram. **5**

4. (a) 50 ml sample of water required 7·2 ml of N/20 disodium EDTA for titration. After boiling and filtration the same volume required 4 ml of EDTA. Calculate each type of hardness. **5**
   (b) Write a note on Solid Lubricants. **5**
   (c) What are the main constituents of plastics ? Wirte the functions and examples of each constituent. **5**

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5. (a) The hardness of 3500 litres of water was completely removed by zeolite softner. The zeolite had required 25 litres of 100 gm/lit of NaCl to regenerate. Calculate the hardness of the water. **5**

(b) What is solar energy ? Explain the working of solar heating system using flat plate collectors. **5**

(c) Explain the reverse osmosis and ultrafiltration. **5**

6. (a) What are stainless steels ? Explain the specific effects of the following elements on the properties of steels :— **5**

(i) Chromium (ii) Molybdenum.

(b) What are nano-materials and explain the structural details of Hackelites. **5**

(c) Write a note on Conducting Polymers. **5**

7. Write a short notes on (any **three**) :— **15**

(a) Applications of Nanomaterials in the Medicines and Catalysis.

(b) Blended Oils.

(c) Nano Cones

(d) One Component System.

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