Applied chemistry – I | CBGS | FE Sem I
26/05/16

Q.P. Code : **28592**

(2. Hours) | Total Marks : 60

N.B. : (1) Question No. 1 is compulsory.
(2) Answer any three questions from remaining five questions.
(3) Figure to the right indicates full marks.
(4) Atomic weights : Ca = 40, Mg = 24, Cl = 35.5, S = 32, H = 1, C = 12. O = 16.

1. Attempt any **five** from the following : 15
   (a) Write two balanced equations to describe the changes that occur when hard water is boiled.
   (b) Give reasons to explain why natural rubber needs vulcanization.
   (c) Give the preparation and uses of silica bricks.
   (d) Give the number of phases in the following system (any three) :
      (i) Saturated solution of NaCl
      (ii) Mixture of rhombic and monoclinic sulphur
      (iii) Mixture of O_2 and N_2
      (iv) Ice $\rightleftharpoons$ Water equilibrium
   (e) What is grease ? What are the conditions in which greases are used?
   (f) Thermosetting polymers cannot be reshaped and reused. Give reasons.
   (g) Calculate the COD of an effluent sample if 25c.c. of the effluent sample required 8.3 c.c. of 0.001M $K_2Cr_2O_7$ for oxidation.

2. (a) Calculate the quantity of lime and soda required for softening 50,000 L of water containing following salts per litre. 6
   $Ca(HCO_3)_2$ = 16.2mg; $Mg(HCO_3)_2$ = 7.5mg;
   $CaSO_4$ = 13.6mg; $MgSO_4$ = 24.0mg,
   $MgCl_2$ = 10.0mg.

   (b) Explain the following terms : 5
      (i) Condensed Phase rule
      (ii) Triple point

   (c) What are carbon nanotubes ? Describe the laser method of preparation of CNT. 4

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3. (a) (i) Discuss the mechanism of Extreme pressure lubrication.
(ii) Name any four additives in blended oil and give two examples of each. 6

(b) Describe a moulding method suitable for thermoplastic resins. 5

(c) Discuss the limitations of phase rule. 4

4. (a) Give the preparation, properties and uses of (any two) :
(i) PMMA (ii) Silicone rubber (iii) BunaS. 6

(b) Write brief notes on any two methods of disinfecting municipal water with reactions. 5

(c) 1.5g of an oil was saponified with 50ml of 0.1N KOH solution. After refluxing the mixture required 7.5ml of 0.1N HCl for neutralisation. Find the saponification value of oil. 4

5. (a) Draw a neat diagram of rotary kiln in the manufacture of portland cement and mention the reactions in each zone. 6

(b) What is glass transition temperature ? What are the factors affecting glass transition temperature ? What is its significance ? 5

(c) The hardness of 10,000 litres of a water sample was completely removed by passing it through a zeolite softenet. The softener then required 400litres of sodium chloride solution containing 100g/L of NaCl for regeneration. Calculate the hardness of the water sample. 4

6. (a) (i) Discuss the softening and regeneration reactions in the Ion-exchange process.
(ii) Discuss the Reverse Osmosis method of purification of water. 6

(b) Explain the functions of the following constituents in the compounding of plastic (any two) 5
(i) Plasticiser (ii) Lubricants (iii) Stabiliser.

(c) Define and explain the significance of the following properties of lubricants (any two) 4
(i) Flash and Fire point
(ii) Acid value
(iii) Viscosity and viscosity Index.