FE (Rev) 28/ Dec 2012
Appl. Chem I

26 : 2nd half-12-(k) JP

Con. 9077-12. **(REVISED COURSE)** **KR–3474**

(2 Hours) **[Total Marks : 60**

N.B.: (1) Question No. 1 is **compulsory**.
(2) Answer any **three** questions from the remaining **five** questions.
(3) **Figures** to the **right** indicate marks.
(4) **All** the questions carry **equal** marks.
(Atomic weight : Ca = 40, H = 1, C = 12, O = 16, Mg = 24, Na = 23, Cl = 35·5, S = 32, Si = 28 and Al = 27)

1. Attempt any **five** from the following :— **15**
   (a) Distinguish between BOD and COD.
   (b) Write synthesis, properties and applications of Kevlar.
   (c) Define and write significance of Viscocity and Viscocity Index.
   (d) State the limitations of phase rule.
   (e) What is nanomaterial ? Give two properties of nanomaterials which make them different and superior to conventional materials.
   (f) Write synthesis, properties and applications of Buna S.
   (g) Calculate temporary, permanent and total hardness of water sample containing $Mg(HCO_3)_2$ = 7·3 ppm, $Ca(HCO_3)_2$ = 16·2 ppm. $MgCl_2$ = 9·5 ppm $CaSO_4$ = 13·6 ppm.

2. (a) Calculate amount of lime (90%) pure and soda (98% pure) for the treatment of 1million litres of water containing $Ca(HCO_3)_2$ = 8·1 ppm, $CaCl_2$ = 33·3 ppm, HCO_3^- = 91·5 ppm, $MgCl_2$ = 38 ppm, $Mg(HCO_3)_2$ = 14·6 ppm. The coagulant $Al_2(SO_4)_3$ was added at the rate of 17·1 ppm. **6**
   (b) Define phase rule and explain terms like phase, component and degree of freedom by giving appropriate examples. **5**
   (c) Explain manufacturing process for the portland cement. **4**

3. (a) What is lubrication ? Explain fluid film lubrication with the help of diagram. **6**
   (b) Write synthesis, properties and applications of silicon rubber. **5**
   (c) Draw neat labelled phase diagram for water system. **4**

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4. (a) What is fabrication technology ? Mention various moulding techniques and explain injection moulding with the help of diagram. 6

(b) Discuss zeolite process with the help of diagram, chemical reactions and advantages. 5

(c) Find acid value of vegetable oil whose 5 ml requires 2 ml of N/100 KOH during lubrication (Density of oil is 0·92 g/ml). 4

5. (a) What is SWCNT and MWCNT ? Explain Laser method for the manufacturing of carbon nanotubes. 6

(b) Write chemical reactions for manufacturing of phenol formaldehyde resin. Explain its applications and properties also. 5

(c) The hardness of 100,000 litres of water completly removed by passing through zeolite softener, the softner than requires 400 litres of NaCl solution containing 100g/litre NaCl for regeneration. Calculate hardness of water sample. 4

6. (a) Explain activated sludge process with the help of flow sheet diagram. 6

(b) Write a note on compounding of plastic. 5

(c) Write a note on blended oil. 4