

Q.P. Code : 803400

(2 Hours)

[Total Marks : 60

N.B. : (1) Question No.1 is **Compulsory**.

(2) Attempt any 3 questions from remaining.

(3) Figures to the right indicate full marks.

(4) Atomic weight H=1, C=12, N=14, O=16, Na=23, Mg=24, S=32,
Cl=35.5, Ca=40

1. Answer **any five** from the following :

15

- (a) What is the role of polymers in medicine and surgery? Explain with the help of any three examples.
- (b) Distinguish between alkaline and non alkaline hardness.
- (c) State the limitations of phase rule.
- (d) What are carbon nanotubes? Explain different types of carbon nanotubes.
- (e) When would solid lubricants are used?
- (f) 6 ml of waste water was refluxed with 25 ml of $K_2Cr_2O_7$ solution and after refluxing the excess unreacted dichromate required 20ml of 0.1 N FAS solution. A blank of distilled water on refluxing with 25 ml of $K_2Cr_2O_7$ solution required 35 ml of 0.1N FAS solution. Calculate the COD of waste water sample.

2. (a) Calculate the quantity of pure lime and soda required for softening of 40000 liters of water containing the following impurities
 $Ca(HCO_3)_2 = 16$ ppm, $Mg(HCO_3)_2 = 7$ ppm, $CaSO_4 = 13$ ppm,
 $MgCl_2 = 10$ ppm, $NaCl = 2$ ppm.

6

- (b) (i) Distinguish between thermoplastics and thermosettings.
- (ii) Define flash and fire points.

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(c) Write the CVD method for preparation of carbon nanotubes.

4

3. (a) What is meant by fabrication of plastics? Explain injection moulding with the help of a neat diagram.

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(b) (i) State the condensed phase rule.

3

(ii) How is gypsum useful in setting and hardening of cement?

2

TURN OVER

- (c) The hardness of 85000 liters of water sample was removed by passing it through a zeolite softener. The zeolite required 2000 liters of NaCl solution containing 190 mg/lit of NaCl for regeneration. Calculate the hardness of water sample. 4
4. (a) How is activated sludge process carried out for the treatment of waste water ? Explain with flow sheet diagram. 6
- (b) (i) 1.4 gm of oil required 1.8 ml of 0.01 N KOH for neutralization. Calculate the acid value and mention whether the oil is suitable to be used or not. 3
- (ii) Write the applications of fullerenes. 2
- (c) What are the functions of fillers and plastisizers in the compounding of plastics ? 4
5. (a) Write the preparation, properties and uses of PMMA and Buna-S. 6
- (b) (i) What are the advantages of ion exchange process ? 3
- (ii) What is oilness ? What is its importance in lubrications ? 2
- (c) What is the application of phase rule to one component water system ? Explain with the help of phase diagram. 4
6. (a) Define lubricants and lubrication. Discuss the hydrodynamic lubrication in detail. 6
- (b) (i) Define phase, component and degree of freedom. 3
- (ii) What are the industrial applications of ultrafiltration ? 2
- (c) What is RCC ? Write the advantages of it. 4
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