

3723-08.

3. : (1) Question No. 1 is compulsory.
(2) Attempt any four questions from remaining six.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) At. wts. H = 1, C = 12, O = 16, Ca = 40, Mg = 24, Cl = 35.5, S = 32, Na = 23.

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Answer any five :—

- (a) Explain the principle of EDTA method.
(b) State applications of conducting polymers.
(c) Define vulcanisation of rubber.
(d) State and explain condensed phase rule.
(e) Explain Heat resisting steels with suitable examples.
(f) What are fullerenes? State their uses.
(g) Find acid value of a vegetable oil whose 10ml required 4.0 ml of 0.1 N KOH during titration.
(density of the oil = 0.92) 8
- (a) Explain the following properties of lubricant with significance.
(i) Viscosity and viscosity index
(ii) Flash point and fire point
(iii) Saponification value. 7
- (b) Explain preparation methods and uses of
(i) PMMA (ii) Urea formaldehyde. 8
- (a) Calculate the quantity of lime and soda required for softening of 1,00,000 litres of water containing following impurities in ppm. The purity of lime is 70% and soda 85%. $\text{Ca}(\text{HCO}_3)_2 = 30.2$, $\text{Mg}(\text{HCO}_3)_2 = 22.8$, $\text{CaCl}_2 = 28.1$, $\text{MgCl}_2 = 8.7$, $\text{CaSO}_4 = 35.0$, $\text{MgSO}_4 = 6.7$, $\text{Na}_2\text{SO}_4 = 17.9$. 7
- (b) With reference to polymers explain :
(i) Glass transition temperature
(ii) Polymer Composites. 5
- (a) One litre of hard water containing 4.5 gm of CaCl_2 was passed through a permutit's softener. Calculate quantity of NaCl produced in soft water. 5
- (b) Write note on solid lubricants. 5
- (c) Define BOD & COD with their significance. 5
- (a) Define Gibb's phase rule equation? Explain the application to one component system. 5
- (b) Write note on Nickel-Hydrogen batteries. 5
- (c) What are stainless steels? Explain the specific effects of following elements on the properties of steels :
(i) Molybdenum (ii) Silicon (iii) Tungsten (iv) Cobalt. 5
- (a) What are nanowires? State the applications of nanomaterials. 5
- (b) Explain any one method for production of electricity using solar energy. 5
- (c) Explain Reverse Osmosis and Ultrafiltration. 5

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Write note on (any three) :—

- (a) Activated Sludge process (d) Hydrogen as a fuel
(b) Extreme pressure lubrication (e) Preparation of Buna-S and Buna-N
Haeckelites