53-p3-upq-Con No. File

Con. 5626–10.

GT–7776

(2 Hours)

[Total Marks : 75

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

Q1)   Attempt any five from the following.   15

    a) Explain Flash point and Fire point with its significance.

    b) What are the merits of Phase rule?

    c) Distinguish between conventional and non-conventional energy sources.

    d) Find the acid value of a used oil sample whose 7ml required 3.8ml of N/50 KOH during titration.(density of oil= 0.88). State whether the oil is suitable for lubrication or not.

    e) Explain the principle of EDTA method.

    f) Explain the following terms with their significance:
      i) Biological oxygen demand   ii) Chemical oxygen demand

    g) What is Shape memory effect? Name a few shape memory alloy types.

Q2)a) Describe the method for production of bio-gas from waste. Give its advantages and composition.   6

    b) Explain polymer fracture in different types of polymer materials.   5

    c) Hardness of 4,500 liters of water was removed completely by   4
zeolite softener. This zeolite required 30 liters of 100gm/lit of NaCl to
regenerate. Calculate the hardness of water.

Q3) a) Write short notes on any two of the following: 6
    i)Nanomaterial-Graphite   (ii)Liquid Crystal polymers (iii) Reverse Osmosis

    b) Calculate the quantity of lime and soda required for softening   5
50,000 liters of water containing the following salts per liter:
$Ca(HCo_3)_2$=8.1mg, $Mg(HCo_3)_2$=7.5,$CaSO_4$=13.6mg, $MgSO_4$=12mg,
$MgCl_2$=2mg, NaCl= 4.7mg.

    c) Write a note on Blended oils.

4

Q4) a) Write the synthesis, properties and uses of the following: 6
      (i)Buna-S   (ii) PE
  b) Discuss the application of phase rule to one component system.   5
  c) Explain Vulcanization of rubber.   4

Q5) a) Explain the following types of lubrication: 6
   i) Boundary lubrication   (ii) Extreme pressure lubrication
  b) What is activated sludge? Explain the method with a proper flow sheet diagram.   5
    What are its advantages?
  c) Explain the solar heating system using flat plate collector   4

Q6)a) Explain the following additives used for compounding of plastics: 6
   i) Plasticizers   (ii) Resins   (iii) catalysts
  b) Explain the hot lime soda method for softening of water with the help of a neat   5
    diagram. What are advantages and disadvantages of lime soda process?
  c) Explain the effect of the following elements on alloy steels: 4
   i) Chromium   (ii) manganese   (iii) Nickel   (iv) Cobalt

Q7) a) Write short notes on:
   i) Nano cones   (ii) Application of nano materials in environmental technologies   6
  b) 1gm of $CaCO_3$ was dissolved in 1liter of distilled water, 50ml of this solution required
    45ml of EDTA solution for titration. 50ml of hard water required 25ml of EDTA for
    titration. The same sample of water after boiling consumed 15ml of EDTA for titration.
    Calculate the hardness of water.   5
  c) Explain in details the injection moulding method for fabrication of plastics   4