Q.P. Code :22640   21/12/2017

[Time: Two Hours]   **[Marks:60]**

Please check whether you have got the right question paper.

N.B:
1. Question.No.1 is compulsory.
2. Answer any three questions from the remaining five.
3. All questions carry equal marks.
4. Atomic weights: Ca= 40, C = 12, O = 16,H =1, Mg =24, S=32, Cl=35.5

Q.1 Attempt **any five** from the following.   15
   a) Distinguish between BOD & COD.
   b) Give the preparation, properties & uses of Kevlar.
   c) Calculate total hardness, in ppm, in given water sample:
      i)   50ml standard hard water, containing 1mg pure $CaCO_3$ per ml, consumed 20ml EDTA solution.
      ii) 50ml water sample consumed 30ml EDTA solution using Erio-Black T indicator.

   d) Define flash point & fire point? Give its significance.
   e) State the number of phases, component for the following equilibrium
      i) $H_2O_{(s)} \rightleftharpoons H_2O_{(l)} \rightleftharpoons H_2O_{(g)}$
      ii) Mixture of Rhombic & monoclinic sulphur.

   f) What are plasticizers? Give its uses & examples.
   g) Write a brief note on CNT's.

Q.2 a) Calculate the quantity of lime & soda required for softening of 1,00,000 liters of water   06
         containing the following impurities in ppm. The purity of lime is 70% & soda is 85%
         $Ca(HCO_3)_2 = 30.2$, $Mg(HCO_3)_2 = 20.8$, $CaCl_2 = 28.1$, $MgCl_2 = 8.78$,
         $CaSO_4 = 35$, $MgSO_4 = 6.7$

   b) i) Distinguish between thermoplastic & thermosetting resins.   03
      ii) What are the functions of lubricants?   02

   c) What is Decay of concrete? Discuss its prevention.   04

Q.3 a) Define fabrication. List the methods used. Discuss extrusion moulding in detail.   06

   b) i) What are the limitations of phase rule?   03
      ii) Draw a neat, labeled diagram of the Rotary kiln.   02

   c) 15,000 liters of hard water was passed through a zeolite softener. The exhausted zeolite   04
      required 120 liters of NaCl having strength of 30g/l of NaCl. Calculate the hardness of
      water.

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Q.4 a) What is activated sludge? How is the process carried out for treatment of waste water? **06**
Explain with a flow sheet diagram.

b) i) 20ml of lubricating oil was dissolved in alcohol. The solution was titrated against 0.1N **03**
KOH solution. At the end point the burette reading was found to be 2.5ml. calculate the
acid value of the oil
(density of oil = 0.86 g/ml)
ii) Distinguish between the dry & wet process for manufacturing of Portland cement. **02**

c) List the uses of polymers in medicine & surgery. **04**

Q.5 a) Write notes on (**any two**) **06**
i) Glass transition temperature
ii) Conducting polymers
iii)Vulcanization

b) i) Discuss the treatment of water using bleaching powder. **03**
ii) Explain the mechanism of Extreme pressure lubrication **02**

c) What is reduced phase rule? Draw the phase diagram of the Ag-Pb system with proper **04**
labelling.

Q.6 a) What are the conditions for use of solid lubricants? Discuss the structure & uses of **06**
Graphite.

b) i) Discuss the Triple point in a one-component system. **03**
ii) Explain Reverse Osmosis. **02**

c) Write a note on Fullerens. **04**

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