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B.Sc. Engg. (CEE)/2nd Sem. 17th February, 2023
(10:00 am-11:30 am)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

TERM: MID SEMESTER EXAMINATION
COURSE NO.: Chem - 4253
COURSE TITLE: Chemistry of Engineering
Materials

SUMMER SEMESTER: 2020-2021
TIME: 1.5 Hours
FULL MARKS: 75

There are 4 (Four) questions. Answer any 3 (Three) questions. Do not write on this question paper. The figures in the right margin indicate full marks and corresponding CO and PO in the brackets. Symbols convey their usual meanings. Assume reasonable values for any missing data.

1. (a) Define corrosion giving example and distinguish it from erosion, Discuss the electro-chemical mechanism of wet corrosion with suitable example. (8 $\frac{2}{3}$)
(CO1)
(PO1)
(b) What is spontaneity of corrosion? How could it be determined? (8.00)
Show by calculation using the following information that in Daniel cell the metal of Zn electrode is being corroded not the metal of copper electrode: (CO1)
(PO1)
 E_{Ox}° of Zn-electrode = 0.762 Volt and E_{Ox}° of Cu-electrode = 0.344 Volt
(c) What are the unique properties of water? Discuss them in brief. (8 $\frac{1}{3}$)
(CO2)
(PO1)
2. (a) Define polymer and distinguish between high polymer and low polymer with suitable example. (8 $\frac{2}{3}$)
With the help of chemical reactions discuss the mechanism of different classes of addition polymerization reaction. (CO1)
(PO1)
(b) With suitable chemical reactions discuss condensation polymerization, ring opening polymerization and oxidative polymerization. (8.00)
(CO1)
(PO1)
(c) What are different sources of industrial water? Which source of water do you consider the most suitable one for industry? Justify your answer. (8 $\frac{1}{3}$)
(CO2)
(PO1)
3. (a) What is micro-biological corrosion? Write the chemical reactions involved in micro-biological corrosion. How can it be prevented? (8 $\frac{2}{3}$)
(CO1)
(PO1)
(b) Write the symbols and names of different units of rate corrosion. Distinguish between localized corrosion. What do you understand by pitting and pitting factor? Illustrate with a diagram. (08)
(CO1)
(PO1)

(c) What are the major problems arise in boiler due to use of untreated water? Discuss them in brief. With suitable reactions discuss how dissolved oxygen from water can be removed. (8 $\frac{1}{3}$)
(CO2)
(PO1)

4. (a) What do you understand by polymer processing? Discuss the functions of different additives used in polymer processing. (8 $\frac{2}{3}$)
(CO1)
(PO1)

(b) Discuss the synthesis of the following polymers with suitable reactions:
(i) PVC (ii) Teflon (iii) Melamine (iv) Nylon 6,8 (8)
(CO1)
(PO1)

(c) Discuss with suitable reactions the following water treatment processes:
(i) Lime-soda process and (ii) Zeolite process (8 $\frac{1}{3}$)
(CO2)
(PO1)