

Name of the Program: B.Sc. in ME/IPE  
Semester: 2nd

Date: 16 May, 2023  
Time: 10:00 am–01:00 pm

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ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)  
ORGANISATION OF ISLAMIC COOPERATION (OIC)  
DEPARTMENT OF MECHANICAL AND PRODUCTION ENGINEERING

Semester Final Examination  
Course No.: Chem 4215  
Course Title: Chemistry of Engineering materials

Summer Semester, A. Y. 2021-2022  
Time: 3 hours  
Full Marks: 150

There are **6 (three)** questions. Answer all **6 (three)** questions. The symbols have their usual meanings. Programmable calculators are not allowed. Marks of each question and corresponding COs and POs are written in the brackets.

1. a) Define corrosion and discuss the electro-chemical mechanism of corrosion. 7  
CO1  
PO1
- b) Write the name of different factors on the rate of under-water corrosion and discuss the effect of temperature and velocity of water on the rate of under-water corrosion. 8  
CO2  
PO1
- c) Interpret different form of corrosion with appropriate figure. 10  
CO3  
PO2
2. a) Write the reactions involved during melting of glass raw materials (i) when the batch material contains only soda, limestone and silica and (ii) when the batch material contains red led,  $K_2CO_3$  and silica. 7  
CO1  
PO1
- b) Discuss the following terms. 8  
(i) Microbiological corrosion and (ii) removal of dissolved oxygen from environment CO2  
PO1
- c) Discuss the raw materials for the manufacturing of glasses. 10  
CO3  
PO2
3. a) Write the classification of ceramics. 7  
CO1  
PO1
- b) Discuss the chemical conversion during firing of ceramics wares. 8  
CO2  
PO1
- c) Describe the manufacturing process of ceramic with the appropriate flow chart. 10  
CO3  
PO2

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|-------|---|------------------|
| 4. a) | Describe the principle of determination total hardness of water hardness by EDTA method.  | 7<br>CO1<br>PO1  |
| b)    | Discuss the following terms.<br>(i) Sedimentation (ii) Coagulation (iii) Filtration of water.   | 8<br>CO2<br>PO1  |
| c)    | Interpret priming and foaming, their effect on boiler, and the prevention/minimization process of priming and foaming.  | 10<br>CO3<br>PO2 |
| 5. a) | Define Portland cement and classify the Portland cement.  | 7<br>CO1<br>PO1  |
| b)    | Explain lubricant and its function. Discuss preparation, and advantage and disadvantage of grease.  | 8<br>CO2<br>PO1  |
| c)    | What do you understand by setting and hardening of cement? Discuss the theories of setting and hardening with suitable chemical reactions.                            | 10<br>CO3<br>PO2 |
| 6. a) | Write short notes on the following terms.<br>(i) Softening temperature of refractory materials (ii) Vulcanization of rubber and (iii) Chemical composition of rubber. | 7<br>CO1<br>PO1  |
| b)    | What do you understand by compounding of rubber? Describe the substances used in compounding of rubber with their functions.  | 8<br>CO2<br>PO1  |
| c)    | Discuss the manufacturing process of refractory materials.  | 10<br>CO3<br>PO2 |