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Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019
Advanced Material Science and Surface Coating

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. What is creep? How do you differentiate with fatigue? (05 Marks)
b. Define fracture toughness and explain briefly. (05 Marks)
c. Write a note on Residual ductility in corrosion fatigue. (05 Marks)
d. Write two specific applications of micro and macro examination of a material. (05 Marks)
- 2 a. Define super alloy? Explain its application in Ship Hull. (04 Marks)
b. Explain Amorphous Metallic coating and Metal Metalloid coating. (06 Marks)
c. Briefly note the list of metals and alloys used in ship manufacturing with its properties. (10 Marks)
- 3 a. List the heat treatment process. Explain TTT curves for eutectoid steels. (06 Marks)
b. Explain steel making process with neat sketch. (04 Marks)
c. Write the application of non-ferrous alloy in ship building. Explain the process implemented in heat treatment of non-ferrous alloys. (10 Marks)
- 4 a. Explain Ni-P and Ni - P = B coating with example. (06 Marks)
b. How do metals react under fatigue? (04 Marks)
c. Define corrosion. Differentiate between low temperature and high temperature corrosion. (10 Marks)

PART – B

- 5 a. Differentiate between Soldering and Brazing. (05 Marks)
b. Explain Hot cracking in metals. (05 Marks)
c. List and explain thermomechanical treatments and its effect on the materials used in marine applications. (10 Marks)
- 6 a. Explain the method of welding bronze and brass. (06 Marks)
b. Draw the stress strain curve for ductile materials and explain any one method of welding used. (10 Marks)
c. List the mechanical properties used in selection of the materials for manufacturing of long sustaining component. (04 Marks)
- 7 a. List the non-destructive testing methods and explain any three methods. (10 Marks)
b. Why Notched bar test is done to metals? How it is related to hardness. Name the methods used to conduct hardness test. (10 Marks)
- 8 a. Explain Anodic and cathodic protection. Explain the reasons for static and dynamic stress corrosion cracking. (10 Marks)
b. Explain (i) PVD (ii) Ion-plating (iii) Laser alloying (iv) Galvanising (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.