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10MR762

**Seventh Semester B.E. Degree Examination, Dec.2017/Jan.2018**  
**Advanced Material Science and Surface Coating**

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting  
at least TWO questions from each part.**

**PART – A**

- 1 a. What is fatigue? How do you differentiate it with creep? (05 Marks)  
b. Define fracture toughness and explain. (05 Marks)  
c. Write a note on residual ductility in corrosion fatigue. (05 Marks)  
d. Write specific applications of micro and macro examination of material. (05 Marks)
- 2 a. Define super alloy? Explain its application in ship's Hull. (04 Marks)  
b. Explain Amorphous metallic coatings and Metal Metalloid coating. (06 Marks)  
c. Briefly explain Metal 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 a neat sketch. (04 Marks)  
c. With the applications on non-ferrous alloy in ship building. Explain the processes implemented in heat treatment 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. (06 Marks)  
d. Write specific application of special polymer material. (04 Marks)

**PART – B**

- 5 a. Differentiate between soldering and brazing. (05 Marks)  
b. Briefly explain hot cracking. (05 Marks)  
c. Explain thermo mechanical treatments and its effects 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 strains curve for ductile materials and explain its welding techniques. [Ductile metal = stainless steel]. (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 NDT methods and explain in detail. (10 Marks)  
b. Why notched bar test is used? What are the implications of hardness test? List the types of methods used to conduct test. (10 Marks)
- 8 a. Explain Anodic and Cathodic protection, explain the causes of static and dynamic stress corrosion cracking. (10 Marks)  
b. Explain : i) PVD ii) Ion plating c) Laser alloying d) Galvanizing. (10 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any remaining classification or appeal to moderator and for signature version of AD-8 - 50 will be treated as malpractice.