**INDIAN MARITIME UNIVERSITY**
(A Central University, Government of India)

**May/June 2017 End Semester Examinations**
B. Tech (Marine Engineering – Fifth Semester)

**Material Science – UG11T 2501/UG11T 1501**

Date: 28.06.2017 Maximum Marks : 100
Time: 3 Hrs Pass Marks : 50

**Part -A** 10x3=30 Marks

(All questions are Compulsory)

1. (a) Explain briefly the term "Ionization Potential".

   (b) What is the basic difference between cast iron and steel?

   (c) List down various non-destructive tests carried out on materials.

   (d) Name five important mechanical tests which give valuable Information about metals and alloys.

   (e) What are the main purposes of Heat Treatment of a material?

   (f) Define Fatigue.

   (g) Briefly discuss Mechanism of galvanic corrosion.

   (h) Briefly give the effects of the following elements on steel Carbon, Sulphur, Phosphorous.

   (i) How do you define "Allotropy"? Give suitable example

   (j) State briefly how refractories are classified ?

**Part- B** 5X14=70 Marks

(Answer Any 5 of the following)

2. Use two labelled sketches to show schematically the differences between. (14 Marks)

   (a) The bonding of atoms in a solid metal such as Sodium, and

   (b) The bonding of atoms in solid non-metal such as sodium chloride.

3. (a) Write short notes on "Stainless Steel" and "High Speed Steel". (7 Marks)

(b) Briefly describe the procedure of carrying out the "Tensile Test" on a sample of material. (7 Marks)

4. What is meant by annealing? Explain the various types of annealing with suitable examples. (14 Marks)

5. Draw a neat diagram of iron carbon equilibrium diagram and explain it briefly. (14 Marks)

6. (a) What is meant by corrosion ? (3 Marks)

(b) How does sacrificial anode prevent corrosion? Give an example. (5 Marks)

(c) Explain the term anodizing and phosphating. (6 Marks)

7. Discuss the materials to be selected for manufacture of the following components with their approximate compositions: (14 Marks)

   (a) Stern Frame.
   (b) Engine Crankshaft.
   (c) Diesel Engine Cylinder Cover.
   (d) Diesel Engine Cylinder Liner.

8. Write a brief note on Refractories, mentioning it's different types and properties. What is dimensional stability of refractory material? (14 Marks)

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