

INDIAN MARITIME UNIVERSITY
(A Central University, Govt. of India)

May/June 2015 End Semester Examinations

SEMESTER – V, B.TECH (MARINE ENGINEERING)

MATERIAL SCIENCE (T 1501)

Date: 04.06.2015

Time: -3 Hrs

Max. Marks: 100

Pass Marks: 50

PART – A **(3 x 10 = 30 Marks)**
(Compulsory Questions)

1. a) Explain briefly the term “Ionization Potential”.
- b) Write short notes on “Principal Quantum No” and “Azimuthal Quantum No”.
- c) Why “grey Cast Iron” is preferred over “White Cast Iron”?
- d) Name five important mechanical tests which give valuable informations about metals and alloys.
- e) What do you understand by “Substitutional Solid Solution”: and “Interstitial Solid Solution”?
- f) What are “Liquidus Line” and “Solidus Line”?
- g) What are the main purposes of Heat Treatment of a material?
- h) What is the function of “Sacrificial Anode”? Give an example.
- i) What is a S-N curve? Why is it taken?
- j) What is “PTFE”? Mention any three of its uses.

PART – B **(5 x 14 = 70 Marks)**
(Answer any five of the following)

2. Use two labelled sketches to show schematically the differences between **(14)**
 - (a) The bonding of atoms in a solid metal such as Sodium, and
 - (b) The bonding of atoms in solid nonmetal such as Sodium Chloride.

3. a) Write short notes on “Stainless Steel” and “High Speed Steel”. (7)
- b) Briefly describe the procedure of carrying out the “Tensile Test” on a sample of material (7)
4. Show how an equilibrium diagram for an alloy of “A” and “B” can be drawn when “A” and “B” are completely soluble in liquid but partially soluble in solid state. (14)
5. Describe the different methods involved to increase the surface hardness of different steel products. (14)
6. Explain the process of failure of a material due of fatigue and explain the appearances on the fractured surfaces. (14)
7. Discuss the different means of control and prevention of corrosion in materials. (14)
8. Discuss the materials to be selected for manufacture of the following components with their approximate compositions:- (14)
- (a) Stern Frame
 - (b) Engine crankshaft
 - (c) Diesel Engine Cylinder cover
 - (d) Diesel Engine Cylinder Liner
