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Total No. of Pages: 02

Total No. of Questions: 09

B.Tech.(Marine Engineering) (2013 Batch) / (ME) (2011 Onwards) (Sem.-3)

# ENGINEERING MATERIALS AND METALLURGY

Subject Code: BTME-306 Paper ID: [A1143]

Time: 3 Hrs.

Max. Marks: 60

## INSTRUCTION TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks
- 2. SECTION-B contains FIVE questions carrying FIVE marks each and students
- 3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

## SECTION-A

## 1. Write short notes on:

- (a) Define alloy.
- (b) What are point defects? Name them.
- (c) Define allotropy.
- (d) What is cementite?
- (e) What is eutectoid cast iron?
- (f) Define Bainite.
- (g) Define critical cooling rate.
- (h) What is eutectic reaction?
- (i) Define normalizing.
- (j) Which gas is used for nitriding?

#### **SECTION-B**

- 2. What is unit cell and space lattice? Calculate the radius and coordination number for SCC and BCC structure.
- 3. What are the surface imperfections? State the reasons of occurrence and their remedies.
- 4. State and explain the different stages of phase transformation.
- 5. What are solid solutions? Explain its different types in brief.
- 6. Differentiate between Austempering and Martempering.

#### **SECTION-C**

- 7. Draw and neatly label the iron carbon diagram. Explain the various reactions involved while cooling and heating of steel.
- 8. a) Draw and explain the TTT diagram.
  - b) Write short note on Jominy test.
- 9. a) What is heat treatment? What are its advantages? Explain the annealing process in brief.
  - b) Describe the induction hardening process of case hardening with the help of suitable diagrams.