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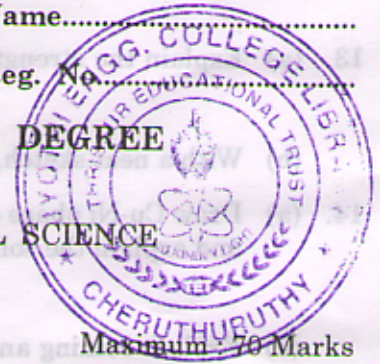
Name.....

Reg. No.....

**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE  
EXAMINATION, DECEMBER 2010**

**AN/ME/AM 09 306—METALLURGY AND MATERIAL SCIENCE**

(2009 admissions)



Maximum - 70 Marks

Time : Three Hours

**Part A**

*Answer all questions.  
Each question carries 2 marks.*

1. What is the API for SC and BCC ?
2. Define elasticity.
3. Define Creep.
4. Draw cooling curve of an isomorphous alloy.
5. What are the applications of gray cast iron ?

(5 × 2 = 10 marks)

**Part B**

*Answer any four questions.  
Each question carries 5 marks.*

6. Define allotropy and give two examples.
7. What is the difference between edge and screw dislocations ?
8. Determine the tensile stress that is applied the [100] axis of silver crystal to cause slip on [111] [110] system. The critical resolved shear stress is 6 MPa.
9. State Hume-Rothery rules.
10. What is meant by Martempering ?
11. What is the chief alloying element in bronze ? What is the important property ? What are its applications ?

(4 × 5 = 20 marks)

**Part C**

*Answer section (a) or section (b) of each question.  
Each question carries 10 marks.*

12. (a) Explain the theory of etching.

Or

- (b) With a neat sketch, explain the working of SEM.

Turn over

13. (a) Explain the strengthening by grain refinement.

Or

(b) With a neat sketch, explain ductile and brittle fracture.

14. (a) Draw Cu-Ni phase diagram. Find the amount of solid and liquid phase 100° C. below 50 % Ni and explain the solidification of the alloy.

Or

(b) Explain Joining and quench test.

15. (a) Write short notes on the properties and applications of Austenitic and Martensitic stainless steel.

Or

(b) Describe the properties and applications of any two Mg alloys.

(4 × 10 = 40 marks)

(5 × 2 = 10 marks)

Part B

Answer any four questions.  
Each question carries 5 marks.

- 6. Define allotropy and give two examples.
- 7. What is the difference between edge and screw dislocations?
- 8. Determine the tensile stress that is applied the [110] axis of silver crystal to cause slip on [111] [011] system. The critical resolved shear stress is 6 MPa.
- 9. State Hume-Rothery rules.
- 10. What is meant by Martensite?
- 11. What is the chief alloying element in bronze? What is the important property? What are its applications?

(4 × 5 = 20 marks)

Part C

Answer section (a) or section (b) of each question.  
Each question carries 10 marks.

- 12. (a) Explain the theory of etching.
- Or
- (b) With a neat sketch, explain the working of SEM.