

**SUBJECT CODE:- 287**  
**FACULTY OF ENGINEERING AND TECHNOLOGY**  
**T.E.(MECH/PROD) Examination Nov/Dec 2015**  
**Metallurgy & Materials**  
**(Revised)**

[Time: Three Hours]

[Max. Marks: 80]

“Please check whether you have got the right question paper.”

N.B i) Solve any three questions from each section.

Section A

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|-----|--|----|
| Q.1 | a) What are miller’s indices? Explain how miller’s indices of a crystallographic plane are derived.    | 07 |
|     | b) Describe the solidification of a liquid metal in an ingot mould. Draw cooling curve for pure metal. | 07 |
| Q.2 | a) Draw and explain a phase diagram for a peritectic reaction.   | 07 |
|     | b) What is Gibbs phase rule? How is it modified for metallurgical systems?                             | 06 |
| Q.3 | a) How the “TTT curves” determined for a given steel? Explain.   | 07 |
|     | b) Distinguish between patenting and austempering.   | 06 |
| Q.4 | a) Describe Jominy end-quench test for determining the hardenability of a steel.                       | 07 |
|     | b) What is nitriding? Explain the process of nitriding of steel.                                       | 06 |
| Q.5 | a) Distinguish between Annealing and Normalizing   | 05 |
|     | b) What is spheroidizing? Explain its aim  | 04 |
|     | c) Explain the term “unit cell”  | 04 |

Section – B

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|------|---|----|
| Q.6  | a) Classify the alloy steels in brief. Discuss the effects of alloying elements in steels                               | 08 |
|      | b) Explain with suitable example.   | 06 |
|      | i. Indian standard designation system of steel  |    |
|      | ii. AISI designation system of steel.   |    |
| Q.7  | a) Explain why gray cast iron is softer than white cast iron? Explain the mechanical characteristics of gray cast iron. | 07 |
|      | b) Distinguish between malleable cast iron and nodular cast iron.   | 06 |
| Q.8  | a) What are gun metals? What are the various types of gun metals?   | 07 |
|      | b) Write a short note on “properties and applications of titanium” its alloys   | 06 |
| Q.9  | a) Enlist major properties of crystalline and non-crystalline ceramics.   | 06 |
|      | b) Explain properties and applications of metal matrix composites.  | 07 |
| Q.10 | a) Write a note on “weld decay and its remedies”  | 05 |
|      | b) Explain importance and applications of Nano technology   | 04 |
|      | c) What is dezincification of brass? How it can be controlled?  | 04 |