H.T.No. | | | | | | | | | | |

Code No: ME1511 **GEC-R14**

II B. Tech I Semester Regular Examinations, November 2016

MATERIAL SCIENCE AND METALLURGY

(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 60**

Note: All Questions from **PART-A** are to be answered at one place.
Answer any **FOUR** questions from **PART-B.** All Questions carry equal Marks.

PART-A

6 × 2 = 12M

1. List out line defects with neat sketch.
2. Define allotropy. Explain it with an example.
3. What is meant by heat treatment? What are the different methods of heat treatment?
4. What is the purpose of magnesium treatment in producing S.G. iron?
5. Name the industrially important copper alloys.
6. What are the types of engineering ceramics?

PART-B

4 × 12 = 48M

1. a) Explain briefly bonds in solids. (6M)
   b) Name Hume-Rothery's rules and explain all of them. (6M)
2. a) Draw a neat Iron-carbon equilibrium diagram and write the invariant reactions of Iron carbon diagram. (8M)
   b) Explain about the following in detail: (4M)
   i) Austenite ii) Pearlite iii) Cementite iv) Ledeburite
3. a) What are the differences between TTT diagram and iron-carbon equilibrium diagram? (8M)
   b) Define case hardening and explain about cyaniding. (4M)
4. a) Explain properties and applications of low, medium and high carbon steel. (6M)
   b) Explain properties and applications of Gray cast iron and malleable cast iron. (6M)
5. a) What are the properties of the Titanium that make it a useful engineering material? Explain them in detail. (6M)
   b) What are the properties and applications of Aluminum and Aluminum alloys. (6M)
6. a) Explain the properties and applications of Crystalline ceramics. (5M)
   b) Explain the working principle of Pultrusion processes with neat sketch (7M)

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