

B037315(037)

**B. Tech. (Third Semester) Examination,
Nov.-Dec. 2020**

MATERIAL SCIENCE

Time Allowed : Three hours

Maximum Marks : ~~80~~ 100

Note : Attempt all questions. Part (a) is compulsory carries 4 marks. Attempt any two from (b), (c) and (d) carries 8 marks each.

Unit-I

1. (a) What do you understand by crystalline and noncrystalline solid? 24

(b) Explain crystal structure of metals. 78

[2]

- (c) Define Miller indices and explain the procedure to determine Miller indices with an example. 78
- (d) Explain point defects and its types. 78

Unit-II

2. (a) Define toughness and ductility. 28
- (b) Draw and explain stress strain diagram for ferrous and non ferrous metal. 78
- (c) Differentiate between slip and twinning. 78
- (d) What do you understand by recovery, recrystallization and grain growth? Explain. 78

Unit-III

3. (a) Define allotropy of iron. 24
- (b) What is Nucleation? Explain the term homogenous and heterogenous nucleation. 78
- (c) Describe cooling curve for pure metal and alloys. 78
- (d) Explain micro-constituent of iron iron carbide phase diagram. 78

[3]

Unit-IV

4. (a) Give four objectives of heat treatment process. 28/4
- (b) Draw and explain TTT curve for specific composition of steel. 78
- (c) What is Tempering? Explain martempering and austempering. 78
- (d) Write short notes on : 78
- (i) Flame Hardening
 - (ii) Induction Hardening

Unit-V

5. (a) Define steel and cast iron. 24
- (b) Give the composition, properties and application of gray cast iron and nodular cast iron. 78
- (c) Write short notes on : 78
- (i) Muntz metal
 - (ii) Gun metal
- (d) Write short notes on : 78
- (i) Duralumin
 - (ii) Sintered Carbide