II B. Tech II Semester Supplementary Examinations, December - 2022
MATERIAL SCIENCE & METALLURGY
(Mechanical Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Answer any **FIVE** Questions, each Question from each unit
All Questions carry **Equal** Marks
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UNIT-I

1　a)　Explain point defect, Line defect and plane defect.　[7M]

　　b)　Classify in detail the different types of crystal imperfections. Explain the edge dislocation with a neat sketch.　[7M]

Or

2　a)　Distinguish among the direction of the dislocation line, the Burgers vector and direction of dislocation motion for:　[7M]
　　　　i) an edge　and　ii) a screw dislocation

　　b)　Discuss how yield strength is related to grain size of ploy crystalline materials.　[7M]

UNIT-II

3　a)　Differentiate between the following:　[7M]
　　　　i) Phase and component　　ii) A system and a state

　　b)　Explain in detail the properties and applications of medium carbon steel.　[7M]

Or

4　a)　Explain in detail the properties and applications of low carbon steel.　[7M]

　　b)　Write the properties of tool steel.　[7M]

UNIT-III

5　a)　Define hardenability of a material and list the factors affecting hardenability.　[7M]

　　b)　What is cast Iron and explain the classification of cast irons?　[7M]

Or

6　a)　Differentiate between Cu alloys and Al alloys with respect to properties, heat treatment, composition and microstructure.　[7M]

　　b)　Discuss different types of annealing processes.　[7M]

UNIT-IV

7　Enumerate the characteristics, properties and applications of composites and polymers.　[14M]

Or

8　Explain the term composite material with examples. State their advantages and limitations of composites in practice.　[14M]

UNIT-V

9　a)　Explain the properties and applications of metal matrix composites (MMC).　[7M]

　　b)　Sketch and explain different methods of processing ceramics　[7M]

Or

10　Write short notes on　[14M]
　　i) Metal Matrix composites　　　　ii) Fiber reinforced composites

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