ACE Engineering College
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An AUTONOMOUS Institution

Question Paper Code: ME303PC | ACE-R20

Semester Supplementary Examination
II B. Tech- I Semester- SEPTEMBER-2022
MATERIAL SCIENCE AND METALLURGY
(Mechanical Engineering)

Time: 3 Hours **Max. Marks: 70**

H. T. No										

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	M
1. a)	Draw the close packed planes and directions in simple cube, BCC and FCC crystals and find out the Miller indices of the planes.	7
b)	Explain briefly the various types of crystal imperfections, with the help of neat sketches	7
2. a)	Distinguish between single crystal and poly crystal. Explain their effect on properties of materials	7
b)	Explain Hume - Rotherys rules for the formation of substitutional solid solutions	7
3. a)	Describe the construction of the phase diagram for two metals completely soluble in liquid state and insoluble in solid state.	7
b)	What is a eutectic temperature? Explain.	7
4. a)	Write important features of iron –iron carbide phase diagram?	7
b)	Define the term heat treatment and explain why are the steels heat treated.	7
5. a)	Steel is made hard by quenching. List at least three conditions which must be fulfilled to justify the above statement	7
b)	What is tempering? Explain the stages in tempering.	7
6. a)	What are the principal advantages of austempering compared with the conventional quench and temper methods and limitations of austempering	7
b)	Discuss Nitridins as a surface hardening mechanism	7
7. a)	What is the difference between maraging steel and martensitic steel? What are the applications of maraging steel?	7
b)	Explain Alpha and Alpha-Beta Alloys of Titanium.	7
8. a)	What is brass? Describe the composition, properties and uses of brasses.	7
b)	Write the properties of titanium and applications of titanium alloys.	7