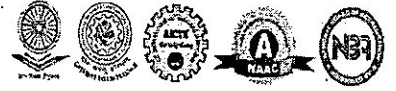




**ACE**  
Engineering College  
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Question Paper Code:

ME303PC

ACE-R20

**Semester End Examination**  
**II B. Tech- I Semester- March-2022**  
**MATERIAL SCIENCE AND METALLURGY**  
**(Mechanical Engineering )**

Time: 3 Hours

Max. Marks: 70

H. T. No									
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Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1. a)	Explain in detail metallic bonding and its properties	7
b)	Compare intermediate phases and solid solutions?	7
2. a)	Write equations for the following invariant reactions: eutectic, peritectic, monotectic, eutectoid and peritectoid. How many degrees of freedom do exist at invariant reaction points in binary phase diagram?	7
b)	Draw iron-carbon equilibrium diagram and mark on it all salient temperatures, composition and phases involved.	7
3. a)	Draw Cu-Ni phase diagram and label the important reactions and regions?	7
b)	Explain different types of transformations in solid state? Illustrate with an example	7
4. a)	Compare annealing and normalizing. When do you use them	7
b)	Explain why hardening by quenching is following by tempering. How do mechanical properties vary with tempering temperature?	7
5. a)	What information is made available by the isothermal transformation diagram that was lacking in the iron-carbon equilibrium diagram?	7
b)	Define the term heat treatment and explain why steels are heat treated?	7
6. a)	Explain in detail about different types of carburizing methods?	7
b)	Write full name of TTT diagram and explain how it is constructed.	7
7. a)	Enlist the properties of pure Aluminum and mention the composition, specific properties and applications of any one aluminum alloy.	7
b)	Write the properties of alpha titanium alloy? Explain its typical applications	7
8. a)	Name the various types of cast iron and discuss their properties and uses	7
b)	Which stainless steel is best suited for surgical instruments? Explain	7