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**Question Paper Code : X 60845**

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020  
Fourth Semester

Mechanical Engineering

ME 2253/ME 44/ME 1253/10122 ME 304/080120017 – ENGINEERING  
MATERIALS AND METALLURGY

(Common to Automobile Engineering and Mechanical and Automation  
Engineering)

(Regulations 2008/2010)

(Also Common to PTME2253 for B.E. (Part-Time) Fourth Semester –  
Mechanical Engineering – Regulations 2009)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. Differentiate Isomorphous and Eutectic reactions.
2. Draw the microstructure eutectoid steel and white cast iron.
3. Define the term stress relief annealing and Spheroidizing.
4. Differentiate between Tempering and Maraging.
5. What is meant by slip and twinning ?
6. Define fracture toughness.
7. Which type of stainless steel is used for surgical instruments ?
8. What is the typical constituent microstructure of bearing alloy ?
9. Define plastics.
10. What is PA ?



## PART – B

(5×16=80 Marks)

11. a) What are the properties and application of different types of Cast Iron ?  
Explain in brief. (16)  
(OR)
- b) Explain with a phase diagram of Eutectoid and Peritectic reaction. (16)
12. a) i) Distinguish between annealing and normalizing. (6)  
ii) Explain with neat setup fig the working principle of an induction hardening. (10)  
(OR)
- b) Explain Jominy test (or) End quench harden ability test with the help of the neat sketches. (16)
13. a) i) Draw the engineering stress – strain curve for mild steel, aluminium and cast iron. Discuss the tensile test and different mechanical properties obtained in tensile testing. (6+6)  
ii) Write a short note on compression test. (4)  
(OR)
- b) i) List the various types of hardness testing. Write a short note on Brinell and Vickers hardness and their significance. (4+4+4)  
ii) What do you mean by slip and twinning ? (4)
14. a) i) Brief on the influence of alloying elements in steel under classification of ferrite and austenite stabilizer. (10)  
ii) List the types and their typical applications of tool steel. (6)  
(OR)
- b) i) What are the types of cast iron or copper alloy, their composition, properties and applications ? (8)  
ii) Brief on the precipitation hardening and ageing treatment of Al-Cu alloy. (8)
15. a) Explain the following polymers with its structures.  
i) Polyethylene  
ii) Polypropylene  
iii) Polybutylene  
iv) Polyvinyl chloride. (16)  
(OR)
- b) Explain the mechanical, physical and chemical properties of ceramics. (16)
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