



11. a) Explain in detail Eutectoid and Eutectic reactions. How do you classify steel and cast iron ? (16)
- (OR)
- b) Draw and explain microstructure of Carbon steel. Write the applications of steel and cast iron. (16)
12. a) What is full annealing ? Write in detail on hardening and tempering of steel . (16)
- (OR)
- b) What is hardenability ? How do you conduct Jominy end quench test ? Differentiate between Austempering and Martempering. (16)
13. a) What is Twinning ? Explain in detail of types of Fracture. How do you conduct material testing under tension, compression and shear loads ? (16)
- (OR)
- b) What is Fatigue ? How do you conduct Fracture Toughness tests ? And Explain. (16)
14. a) Write short notes on the following :
- 1) HSLA (5)
 - 2) Maraging steels (5)
 - 3) Effect of alloying additives in steel (6)
- (OR)
- b) What is precipitation hardening ? Due to heat treatment, what changes have to be happened on Al and its alloys ? And Explain. (16)
15. a) Write short notes on the following non ferrous materials.
- 1) PMMA (5)
 - 2) ABS (5)
 - 3) PPS (6)
- (OR)
- b) Explain in detail of various engineering ceramics. What is PTFE ? (16)
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