

2053
B.E. (Mechanical Engineering)
Sixth Semester
MEC-605: Materials and Heat Treatment

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following

(5*2=10)

- a) What is the need of IS code?
- b) What is crystal growth?
- c) What is nucleation? Name different types of nucleation.
- d) Name the different stages of case hardening
- e) What are various allotropic forms of iron?

UNIT -I

- II a) Explain different crystal planes and directions with suitable example.
- b) Determine the Miller indices of the cubical crystal plane that intersects the position coordinates $(1, 1/4, 0)$, $(1, 1, 1/2)$, $(3/4, 1, 1/4)$ and all coordinate axes. (5,5)
- III a) Explain different internal surface and volume imperfections and write their significance.
- b) State the properties and applications of Plain Carbon steel. (5,5)
- IV Discuss in detail stages of phase transformation. (10)

UNIT -II

- V Explain Eutectic alloy system with the help of phase diagram. Explain the procedure of measurement of chemical composition of phases and relative amount of each phase. (10)
- VI Explain the various processes involved in phase transformation of 0.8%C steel during heating or cooling process. (10)
- VII a) What is hardenability? How will you measure the hardenability using Jominy Test?
- b) Explain the following case hardening and processes: Cyaniding, Carbonitriding. (5,5)

x-x-x