22449

21819

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following: **10**

a) Define stiffness and elasticity.

b) State the meaning of 40Cr4Mo2.

c) Discuss the properties of:

(i) Low carbon steel

(ii) High carbon steel

d) State the principle of heat treatment.

e) State any four important points of powder metallurgy.

f) State the characteristics of ferrous material.

g) List the advantages of carburizing.

Marks

2. Attempt any THREE of the following: **12**

a) Classify engineering materials.

b) Draw crystal structure of FCC, BCC and HCP.

c) Explain solid solution with neat sketch.

d) Differentiate between ductility and malleability with example.

3. Attempt any THREE of the following: **12**

a) Explain Gibbs phase rule.

b) Draw Iron- Carbon equilibrium diagram and show various phases in it.

c) Explain principle of lever arm.

d) Draw cooling curves of metals and alloys.

4. Attempt any THREE of the following: **12**

a) Explain annealing with its purposes.

b) Explain nitriding process.

c) Differentiate between flame hardening and induction hardening.

d) State applications of normalizing process.

e) Explain with neat sketch the principle of automization for powder manufacturing.

5. Attempt any TWO of the following: **12**

a) Summarize high speed tool steel with their types.

b) Give composition and properties of following:

(i) Y- alloy

(ii) Duralumin

c) State the types of cast iron and draw the microstructures of the same.

Marks

6. Attempt any TWO of the following: **12**

a) Explain different phases in Iron carbon equilibrium diagram with its reactions and equations.

b) Define powder metallurgy. State steps in powder manufacturing process.

c) (i) State applications of powder metallurgy

(ii) State merits and demerits of powder metallurgy.