17941

16117

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions : *(1)* ***All*** *questions are* ***compulsory****.*
(2) Illustrate your answers with neat sketches ***wherever*** *necessary.*
(3) Figures to the ***right*** *indicate* ***full*** *marks.*
(4) Assume suitable data, if ***necessary****.*
(5) Use of Non-programmable Electronic Pocket Calculator is ***permissible****.*
(6) Mobile Phone, Pager and any other Electronic Communication devices are ***not*** *permissible in Examination Hall.*

Marks

1. Attempt **any five** : **20**

a) Describe the concept of unit cell and space lattice.
b) Give the classification of carbon steel.
c) State the objectives of heat treatment.
d) Suggest suitable material for
   i) Nut and bolts ii) Household utensils
   iii) Machine tool beds iv) Car bodies
e) What are the effects of following on properties of steel ?
   i) Phosphorus ii) Sulphur
   iii) Silicon iv) Chromium
f) Enlist four properties of copper alloys.
g) What is composite material ? How they are classified ?

2. Attempt **any four** : **16**

a) What is creep ? What are its three stages ?
b) Draw iron-carbon equilibrium diagram and label it.
c) Differentiate between annealing and normalizing (four points).
d) What is tool steel ? State its properties.
e) Write the uses of copper.
f) Explain 'compacting' related to powder metallurgy and state its necessity.

3. Attempt **any four** : **16**

a) Explain solidification of pure metal with example.
b) State the advantages and limitations of nitriding (two each).
c) State the purpose of normalizing.
d) Give the advantages and disadvantages of alloy steel.
e) What is ceramic ? State its properties and application.
f) State the industrial application of powder metallurgy.

P.T.O.

Marks

4. Attempt **any two** : **16**

a) Explain substitutional and interstitial solid solutions.

b) Explain TTT diagram for hypoeutectoid steel.

c) i) Explain the meaning of case hardening.

ii) Describe carburising. State its advantages and limitations.

5. Attempt **any four** : **16**

a) What is case hardening ? What are its types ?

b) Explain the tempering process.

c) What is cast iron ? Give its classification.

d) State the properties of copper.

e) Differentiate between thermoplastics and thermosetting plastics (four points).

f) What is 'porous bearing' ? How it is manufactured ?

6. Attempt **any four** : **16**

a) Explain various critical temperatures on Fe-Fe_3C diagram and their significance.

b) Explain ultrasonic crack detection non-destructive technique.

c) Give the applications of high carbon steel.

d) What is stainless steel ? State its properties.

e) State the properties and uses of aluminium.

f) State advantages and disadvantages of powder metallurgy (two each).
