



17303

21415

3 Hours/100 Marks

Seat No.

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- 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.
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MARKS

1. Attempt **any ten** of the following :

20

- a) Define stiffness and toughness.
- b) Give the chemical composition of Y-alloy.
- c) State any two thermosetting materials.
- d) What is meant by Powder Metallurgy ?
- e) Give the composition of C.I.
- f) Define alloy. Give two examples.
- g) List any two properties of nano materials.
- h) State the purpose of annealing.
 - i) What is role of density of materials in Engineering applications ?
 - j) What are different heat treatment processes ?
- k) State different powder making processes.
- l) Write the composition of duralium and state its two uses.

P.T.O.



2. Attempt **any four** of the following :

16

- a) What is solid solution ? Give its types.
- b) State the effect of following elements on steel :
 - i) Chromium
 - ii) Nickel
 - iii) Tungsten
 - iv) Molybdenum
- c) What is heat treatment ? State the objectives of heat treatment.
- d) Explain cooling curve equilibrium diagram for isomorphous system.
- e) Differentiate between annealing and normalizing.
- f) What is tempering ? Differentiate between Austempering and Martempering.

3. Attempt **any four** of the following :

16

- a) What is carburizing ? State two merits and demerits of carburizing.
- b) State the desired properties of bearing materials.
- c) Differentiate between white cast-iron and grey cast iron (At least four points are required).
- d) State the composition and applications of medium carbon steels and high carbon steels.
- e) What is ceramic ? Give its two properties and applications.
- f) Define tool steel. Explain what is meant by H.S.S.



4. Attempt **any four** of the following :

16

a) Give the chemical composition of the following copper alloys.

i) Naval brass

ii) Muntz metal

iii) Gun metal

iv) Bronzes

b) What is cast-iron ? Give the classification of the same.

c) What is subcritical annealing ? What are its purpose ?

d) State any four advantages and limitations of powder metallurgy process.

e) Define composite. State any four properties and applications of composite.

f) State any four properties and uses of stainless steel.

5. Attempt **any two** of the following :

16

a) Explain with sketch of iron and iron carbide phase diagram. Show the temperature, composition and phases on it.

b) i) How the engineering material are classified and give the example of each.

ii) State and explain steels which are used as 'tool steels'.

c) Explain with neat sketch the process of flame hardening with its advantages and limitations.



6. Attempt **any four** of the following :

a) State the properties and applications of the following :

i) Neoprene.

ii) Buna and silicones.

b) What are different Non-Destructive Tests ? What are advantages of NDT in general ?

c) State any four properties and uses of copper.

d) Explain the solidification of pure metal.

e) What is normalising ? State its objectives and applications.

f) Define packing efficiency. Calculate packing efficiency any one crystal structure.
