



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.
