17303

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.

Marks

1. Attempt the following (any TEN) : **20**

(a) Define hardness and toughness.

(b) Define the terms (i) fatigue strength (ii) malleability.

(c) Define (i) Pure metal (ii) Alloy.

(d) Explain the term solid solubility.

(e) List four objectives of heat treatment.

(f) What is the importance of TTT diagram ?

(g) Mention the types of cast iron.

(h) State the properties of stainless steel.

(i) Give the composition of Y-alloy and Muntz metal.

(j) State the applications of bronzes.

(k) State the uses of Acrylics.

(l) Define the terms : (i) Austenite, (ii) Pearlite.

(m) Explain the term 'Powder metallurgy'.

(n) State different powder making process.

2. Attempt the following (any FOUR) : **16**

(a) Give the classification of engineering materials mentioning one example of each.

(b) What did you understand by the term 'packing efficiency' ? State its importance.

(c) Draw iron carbide phase diagram and show various phases in it.

(d) Explain the process of normalizing.

(e) State the effect of following alloying elements on properties of steel :

(i) Nickel

(ii) Chromium

(iii) Molybdenum

(iv) Tungsten

(f) State four advantages and four limitations of powder metallurgy.

3. Attempt the following (any FOUR): **16**

(a) Describe subcritical annealing.

(b) Compare flame hardening with induction hardening.

(c) Explain isomorphous system with neat sketch.

(d) List the different steps used to produce the component by powder metallurgy. State the importance of sintering.

(e) What are the desirable properties of bearing materials ? Also mention any two materials used as a bearing material.

(f) State the properties and applications of polyesters.

4. Attempt the following (any FOUR): **16**

(a) What is nitriding ? State its advantages and limitations.

(b) Give the classification of tool steel.

(c) Define (i) Cementite, (ii) Ferrite

(d) What is carburizing ? List its advantages and limitations.

(e) What are the properties and applications of Naval brass ?

(f) State the characteristics and applications of ABS.

5. Attempt the following (any FOUR): **16**

(a) Differentiate between Austempering and Martempering.

(b) What are the properties and applications of high carbon steels ?

(c) Define (i) Substitutional solid solution (ii) Interstitial solid solution

(d) What are the properties and application of copper ?

(e) What is composite material ? State its properties and applications.

(f) Draw the microstructure of white C.I. and grey cast iron giving two applications of each.

6. Attempt the following (any FOUR): **16**

(a) Explain spheroidise annealing with its applications.

(b) Explain solidification of pure metal with neat sketch.

(c) What are the properties and applications of Nano materials ?

(d) Draw the following crystal structure :

(i) Body Centred Cubic Structure (BCC)

(ii) Face-Centred Cubic Structure (FCC)

(e) Explain properties of grey cast iron and white cast iron.

(f) Explain properties of High Speed Steel (HSS) and Spring Steels.
