7292

Code : 20ME11T

Register Number

I Semester Diploma Examination, February/March-2023

MATERIALS FOR ENGINEERING

Time : 3 Hours] **[Max. Marks : 100**

Instructions : (i) Answer any **one** full question from each Section – **I, II, III, IV & V.**

(ii) Each one full question carries 20 marks.

SECTION – I

1. (a) Mention any four Engineering materials used in daily life application. **4**

(b) Explain the crystal structure of Diamond with a neat diagram. **6**

(c) Define Mechanical Property. **2**

(d) Name the mechanical property for the below listed conditions : **8**

(i) The property that enables a metal to resist deformation under load.

(ii) The property that helps to resist scratch.

(iii) Glass bottle breaks immediately when dropped to floor.

(iv) Spring and rubber come back to their original position after deformation.

(v) Mild steel, Copper, Aluminium can be drawn out into thin wire.

(vi) The property of the material which enables it to withstand shock or impact.

(vii) Tin can be hammered or rolled into sheets.

(viii) Clay materials undergo permanent deformation.

2. (a) Explain Electron Microscope with neat sketch. **10**

(b) Explain the effect of various elements used for alloying. **5**

(c) Write a note on tool steel. **5**

SECTION – II

3. (a) Name the Cast Iron with its composition and properties used for making machine tool bodies. 7

(b) Select relevant stainless steel with justification for the following application : 6

(i) Knife blade

(ii) Dairy equipment

(iii) Textile

(c) Explain Plain Carbon steels. 7

4. (a) Differentiate between Ferrous and Non-Ferrous metals. 6

(b) Name the following metals (or) alloys : 5

(i) Metal alloyed with Iron to make stainless steel.

(ii) A metal which is an alloy of Copper and Zinc.

(iii) An alloy of Aluminium used for making kitchen utensils.

(iv) A metal used for making Jewellery.

(v) A metal which is an alloy of Copper and Tin.

(c) Give reasons for the following : 6

(i) School bells are made up of metals.

(ii) Electric wires are made of Copper.

(iii) Electric wires are covered with rubber like material.

(d) A metal "X" acquires a green colour coating on its surface when exposed to air. 3

(i) Identify the metal "X".

(ii) Name the process responsible for change.

(iii) List two important methods to prevent the process.

SECTION – III

5. (a) Write the properties and application of Aluminium. 8

(b) Differentiate between Thermoplastic and Thermosetting plastic by giving one example for each. 8

(c) State two uses of Bakelite & Nylon. 4

6. (a) Explain composite materials with its properties and applications. 8

(b) How steels are designated ? Indicate the meaning of following designated materials : 6

(i) 30C8

(ii) FG200

(c) Write a note on Spring Steel. 6

SECTION – IV

7. (a) List any eight applications of Biomaterials. 8

(b) Write a note on intelligent materials with reference to changes in the environment. 6

(c) Explain mechanism of heat treatment. 6

8. (a) Sketch Iron-Carbon diagram for mild steel by indicating all phase transformation. 10

(b) What is a solid solution ? Explain different types of solid solution. 5

(c) State objectives of the following : 5

(i) Carburizing

(ii) Nitriding

SECTION – V

9. (a) List the purpose of heat treatment. 8

(b) Which process is used to soften the mild steel ? Explain. 6

(c) Explain with sketch Electroplating. 6

10. (a) State the factors influencing corrosion. 4

(b) What are the methods of surface treatment ? 8

(c) Explain the construction and working of electrochemical cell. 8
