Ref. No.: Ex/Met/PE/B/T/423A/2024

B.E. METALLURGICAL ENGINEERING FOURTH YEAR SECOND SEMESTER EXAM 2024

Sub: Light Metals and Alloys Time: 3 hours Full Marks: 100

Answer the following Questions (Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 and Q8 are compulsory)

8+8+4

CO-1 Q1 (a) What are the light metals and alloys? What are the main characteristics that give the light metals and alloys the edge over other materials?

(b) Discuss the key applications and future opportunities of light alloys.

© What are the limitations of light metals and alloys?.

OR

4+8+8

CO-1 Q2 (a) What type of alloys are included under the general heading, light metals and alloys?

(b) What alloying elements are commonly used and what is the effect of alloying elements in the commercial light metal alloys?

© Describe the semi-solid processing for synthesis of light weight metallic materials.

8+12

CO-2 Q3 (a). Describe the electrolytic decomposition of Alumina by Hall-Heroult process.

(b) Explain the alloy and temper designations for Aluminium alloys.

OR

10+10

CO-2 Q4 (a) Discuss the properties and various applications of Aluminium?

(b) Explain the various requirements for age hardening with taking a suitable hypothetical phase diagram.

[Turn over

5+10+5

CO-3 Q5 (a) Describe the Dow's process for manufacturing of Magnesium from sea-water.

(b) Discuss the properties and various application of Magnesium.

© Explain the designation system for magnesium alloys with an example.

OR

10+5+5

CO-3 Q6 (d) Draw and describe the phase diagram of Magnesium and Aluminium

(e) Compare the various properties between pure Magnesium and Magnesium alloys

(f) Compare between the Aluminium and magnesium.

6+4+10

CO-4 Q7 (a) Discuss the general characteristics of Titanium

(b) What are the limitations of Titanium?

(c) Describe the various Titanium alloys with examples

8+6+6

CO-5 Q8 Short notes on the following: (a) Metal Matrix Composites (b) Rapid solidification processing (c) Mechanical alloying.