

B. E. Metallurgical and Material Engineering Examination, 2024

4th Year, 1st Semester

Heat Treatment Technology

Time: Three Hours

Full Marks-100

Answer all parts of a question sequentially in a common place

1. Differentiate the following:

- i) Batch furnace vs. Continuous furnace (CO2)
- ii) Oil fired furnace vs. Electrically heated furnace(CO2) 10

2. How do you control the furnace atmosphere for protection against oxidation and decarburization during heat treatment? What are the common commercially available furnace atmospheres? Discuss in detail. (CO1)

6+12=18

3. Analyze the advantages and disadvantages of different quenching medium. Explain the importance of Severity of quenching. (CO3)

(4+4)=8

4. a) Distinguish between Hardness and Hardenability.

b) Describe Jominy End Quench Hardenability Test or Grossman Critical Diameter Test.

c) What are the factors which are responsible for increasing Hardenability.

(CO4)

4+4+10=18

5.a) Describe grain size index. Discuss the importance of austenite grain size control. Discuss about Subzero treatment. (CO5)

4+10+4=18

[Turn over

6. Discuss the following. (CO6)

a) Overheating and Burning
or Soft Spots

b) Distortion and Warping
or Quench Cracking

6+12= 18