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BACHELOR OF VOCATION
Automotive Manufacturing
Subject: Material Science
Subject Code: BBME-208
Semester: Fourth
September 2020
Theory (External): 35 Marks
Time: 03 hours

INSTRUCTIONS TO THE STUDENTS

1. Read the questions carefully and write the answers in the answer sheets.

2. Wherever necessary, the diagram drawn should be neat and properly labelled.

3. This questions paper comprises of 6 questions out of which student need to attempt any 3 questions.

4. All questions carry equal marks.

5. The time allotted will be 3 hours for examinations including time of downloading of question paper to emailing of answer books to the concerned Dean/IC.

ESSAY TYPE QUESTIONS

1. Calculate the volume of an FCC unit cell in terms of the atomic radius R. Show that the atomic packing factor for the FCC crystal structure is 0.74.

2. What point defects are possible for MgO as an impurity in Al_2O_3? How many Mg^{2+} ions must be added to form each of these defects?

3. Describe the Interstitial Defects and Frenkel defect with diagram.

4. Explain the following heat treatments:
   i. Carburizing
   ii. Stress relieving
   iii. Annealing
   iv. Normalizing and
   v. Quenching.

5. Define fatigue and specify the conditions under which it occurs. From a fatigue plot for some material, determine (a) the fatigue lifetime (at a specified stress level), and (b) the fatigue strength (at a specified number of cycles).

6. Explain the mechanism of corrosion. What preventive measures should be taken to avoid corrosion?

****END OF PAPER****