Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov/Dec – 2017**

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| **Code :** | **14ME2003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MATERIAL SCIENCE AND ENGINEERING** | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Give a detailed account on the classification of engineering materials and give one application for each material. | CO1 | 8 |
| b. | Define atomic packing factor and coordination number. | CO1 | 7 |
| c. | List the various properties of engineering materials. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Explain the working of scanning electron microscope with a neat sketch. Give its advantages and limitations. | CO1 | 15 |
| b. | Mention any five differences between optical and electron microscopes. | CO1 | 5 |
|  |  |  |  |  |
| 3. | a. | State and explain Fick’s Laws of diffusion. | CO1 | 10 |
|  | b. | What is strain hardening? | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Discuss the various point defects. | CO2 | 6 |
|  | b. | Discuss slip and twinning in detail. | CO2 | 6 |
|  | c. | Explain the 3 stages of annealing. | CO2 | 8 |
|  |  |  |  |  |
| 5. | a. | What are the various stages in creep? | CO2 | 10 |
|  | b. | Explain the various creep mechanisms with neat sketches. | CO3 | 10 |
| (OR) | | | | |
| 6. | a. | Explain various stages in ductile fracture with neat sketches. | CO3 | 10 |
|  | b. | What is endurance limit? Explain. | CO3 | 5 |
|  | c. | Define transient creep. | CO3 | 5 |
|  |  |  |  |  |
| 7. | a. | What are cooling curves? List the procedure to construct a phase diagram. | CO3 | 10 |
|  | b. | State Hume Rothery rules. | CO3 | 10 |
| (OR) | | | | |
| 8. |  | Explain Fe-C equilibrium diagram with neat sketches. | CO4 | 20 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | What is hardenability ?Explain the Jominy end quench test used to determine hardenability of steel. | CO4 | 10 |
|  | b | Write short notes:  i. Carburising ii. Annealing | CO4 | 5+5 |

ALL THE BEST