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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examination – June – 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. | Derive atomic radius and atomic packing factor for the simple cubic, face centered, body centered and hexagonally close packed structure. | CO 1 | 15 |
| b. | What is miller indices for planes .Where is it used? | CO 1 | 5 |
| (OR) | | | | |
| 2. | a. | Draw a neat sketch and explain the working of a transmission electron microscope. | CO 1 | 10 |
| b. | Describe briefly the procedure for specimen for metallographic examination. | CO 1 | 10 |
| 3. |  | What is meant by a defective crystal? Explain the different point defects in crystals. | CO 2 | 20 |
| (OR) | | | | |
| 4. | a. | Derive the expression for the critical resolved shear stress for the plastic deformation by slip. | CO 2 | 5 |
|  | b. | Explain the plastic deformation by slip and twinning. | CO 2 | 15 |
| 5. | a. | What is meant by creep? | CO 2 | 5 |
|  | b. | Explain the creep mechanism. | CO 3 | 10 |
|  | c. | State the effect of stress and temperature on creep. | CO 3 | 5 |
| (OR) | | | | |
| 6. | a. | Differentiate between ductile and brittle fractures. | CO 3 | 10 |
|  | b. | Describe about the equipment and experiment to predict the fatigue life of a material with a neat sketch. | CO 3 | 10 |
| 7. |  | Draw the iron carbon equilibrium diagram and explain the different phases present in the diagram. | CO 3 | 20 |
| (OR) | | | | |
| 8. | a. | What are cooling curves.Explain with neat sketch | CO 4 | 10 |
|  | b. | Explain about eutectic, eutectoid, peritectic and peritectoid reactions. | CO 4 | 10 |
|  | | **Compulsory:** |  |  |
| 9. |  | Explain the following in detail: | CO 4 | 20 |
|  |  | i)Nitriding ii) Induction hardening  iii) Hardenability iv) Case hardening |  |  |

ALL THE BEST