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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

**End Semester Examination – Nov/Dec – 2016**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14NT2008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MATERIALS SCIENCE AND ENGINEERING II** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | Marks |
| 1 | a. | What are the 3 factors that determines the production of martensitic microstructure during heat treatment of steel? | CO1 | 3 |
| b. | Which type of powder pressing procedures need not be followed by a firing process? Why? | CO1 | 3 |
| c. | What are the different ceramic fabrication techniques? With suitable sketch explain in detail the different glass forming processes. | CO1 | 14 |
| (OR) | | | | |
| 2 | a. | Is powder metallurgy process suitable for metals having low ductility? If yes, why? | CO1 | 3 |
| b. | Compare and contrast annealing and quenching processes. | CO2 | 3 |
| c. | What are the different metal fabrication techniques? With suitable sketch explain in detail the different forming operations used in metal fabrication. | CO1 | 14 |
| 3. | a. | Define polydispersity index. | CO1 | 2 |
| b. | Is it possible to control the thermal shock in materials? How? | CO2 | 3 |
| c. | List the different molding techniques employed to mold polymers. | CO1 | 3 |
| d. | Mention the classification of composites. Discuss the particulate composites in detail. | CO1 | 12 |
| (OR) | | | | |
| 4. | a. | Is it possible to have zero or negative thermal expansion? How? | CO2 | 3 |
| b. | Define the term “Thermal shock”. | CO2 | 3 |
| c. | Explain in detail the different types of polymer synthesis. | CO1 | 10 |
| d. | A continuous and aligned glass fiber-reinforced composite consists of 30 vol% of glass fibers having a modulus of elasticity of 69 GPA and 70% of a polyester resin, that when hardened, displays a modulus of 2.5 GPA. Compute the modulus of elasticity of this composite in the longitudinal direction. | CO1 | 4 |
| 5. | a. | Explain why ceramics and polymers are poor conductors of heat. | CO2 | 3 |
| b. | Define the term “negative thermal expansion”. Give an example for material with negative thermal expansion. | CO2 | 2 |
| c. | Compare and contrast thermoplastics and thermosetting plastics. | CO1 | 7 |
| d. | Explain in detail, the different production methods of composite materials. | CO1 | 8 |
| (OR) | | | | |
| 6. | a. | What is a composite material? Give examples for natural and synthetic composites. | CO1 | 3 |
| b. | Does the melting point of polymers depend on its molecular weight? If yes, how and why? | CO1 | 3 |
|  | c. | What is thermal shock resistance? How can it be improved? | CO2 | 4 |
| d. | With suitable sketch, differentiate fiber reinforced composites based on the alignment of fibers. | CO1 | 10 |
| 7. | a. | Is it possible to induce electrical conduction in polymers? Explain. | CO2 | 3 |
| b. | Define dielectric strength. | CO2 | 3 |
| c. | Differentiate intrinsic and extrinsic semiconductors. Give examples. | CO3 | 6 |
| d. | Discuss in detail, the difference between dia, para and ferro magnetic materials. | CO1 | 8 |
| (OR) | | | | |
| 8. | a. | Differentiate super conductivity and semiconductivity. | CO3 | 4 |
| b. | What are cooper pairs? Where are they found? | CO2 | 4 |
| c. | Define pyroelectricity. | CO3 | 2 |
| d. | Briefly discuss ferroelectricity and piezoelectricity with suitable examples. | CO3 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Briefly discuss on Ryleigh scattering and Tyndall scattering? | CO1 | 8 |
| b. | Discuss in detail, the optical properties of metals and non-metals. | CO3 | 12 |

ALL THE BEST