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**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **16NT2005** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MATERIALS SCIENCE II** | **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. | \_\_\_\_\_\_\_\_\_\_\_\_ is a measure of resistance to plastic deformation. | CO1 | 1 |
| b. | Which type of powder pressing is utilized when high densities without appreciable grain growth are desired? | CO1 | 1 |
| c. | What is the use of gating system in sand casting? | CO1 | 2 |
| d. | Write short notes on welding. | CO1 | 2 |
| e. | What are the different metal fabrication techniques? With suitable sketch explain in detail the different casting operations used in metal fabrication. | CO1 | 14 |
| (OR) | | | | |
| 2. | a. | The rate of cooling for a quenching treatment depends on the ratio of \_\_\_\_\_\_\_to the mass of the specimen. | CO2 | 1 |
| b. | In which type of casting technique, the pattern is made from a wax or plastic? | CO1 | 1 |
| c. | Explain why do metals have high conductivity? | CO2 | 2 |
| d. | Which type of powder pressing procedure need not be followed by a firing process? Why? | CO1 | 2 |
| e. | Explain the following heat treatment processes i) annealing, ii) quenching and iii) precipitation hardening. | CO2 | 14 |
| 3. | a. | A body that has been formed and dried but not fired is termed **\_\_\_\_\_.** | CO1 | 1 |
|  | b. | \_\_\_\_\_\_\_\_\_ is the forming process used for clay based composition. | CO1 | 1 |
|  | c. | Briefly discuss the electrical conduction in ionic ceramics. | CO2 | 2 |
|  | d. | Write short notes on slip casting. | CO1 | 2 |
|  | e. | What are ceramic materials? Discuss in detail about the clay products and refractories. | CO1 | 14 |
| (OR) | | | | |
| 4. | a. | \_\_\_\_\_\_\_\_ forms the major composition in soda lime glass. | CO1 | 1 |
|  | b. | \_\_\_\_\_\_\_ refractories are commonly used in the arched roofs of steel- and glass-making furnaces. | CO1 | 1 |
|  | c. | Briefly explain why glass–ceramics may not be transparent. | CO1 | 2 |
|  | d. | Mention the factors that affects the degree of vitrification. | CO1 | 2 |
|  | e. | Explain in detail, the different particulate forming processes in ceramic fabrication techniques. | CO1 | 14 |
| 7. | a. | Briefly discuss the Mathiessens rule of resistivity. | CO2 | 3 |
|  | b. | Write short notes on condensation polymerization. | CO1 | 3 |
|  | c. | Compare and contrast thermoplastics and thermosetting plastics. Give examples. | CO1 | 7 |
|  | d. | Draw the heat Vs temperature plot for a crystalline polymer and amorphous polymer. Explain the difference between them. | CO2 | 7 |
| (OR) | | | | |
| 6. | a. | Which type of rubbers are examples of thermosetting polymers? | CO1 | 1 |
|  | b. | Crystallization rate of polymer decreases with the increase in \_\_\_\_\_\_\_\_\_\_\_\_\_. | CO1 | 1 |
|  | c. | List the different molding techniques employed to mold polymers. | CO1 | 2 |
|  | d. | Does the melting point of polymers depend on its molecular weight? If yes, how and why? | CO1 | 2 |
|  | e. | With a neat sketch, explain in detail the stress-strain behavior of brittle polymer, plastic polymer and elastomer. | CO1 | 14 |
| 7. | a. | In transverse loading of a fiber reinforced composite materials, \_\_\_\_\_\_\_\_\_\_\_\_ carry less of the load. | CO1 | 1 |
|  | b. | \_\_\_\_\_\_\_\_\_\_\_ is a very efficient wood composite structure. | CO1 | 1 |
|  | c. | What is a composite? Give one example for natural and synthetic composite. | CO1 | 2 |
|  | d. | Define ferroelectricity. Give examples for ferro electric materials. | CO2 | 2 |
|  | e. | Mention the classification of composites. Discuss any two in detail. | CO1 | 14 |
| (OR) | | | | |
| 8. | a. | Differentiate electronic and ionic conduction. | CO2 | 3 |
|  | b. | Mention the classification of materials based on their conductivity. | CO2 | 3 |
|  | c. | A continuous and aligned glass fiber-reinforced composite consists of 40 vol% of glass fibers having a modulus of elasticity of 69 GPA and 60 vol% of polyester resin that, when hardened, displays a modulus of 3.4 GPa. Compute the modulus of elasticity of this composite, when the stress is applied perpendicular to the direction of fiber alignment. | CO1 | 3 |
|  | d. | With suitable sketch, differentiate fiber reinforced composites based on the alignment of fibers. | CO1 | 7 |
|  | e. | Differentiate pyroelectric and ferroelectric materials and give examples. | CO2 | 4 |
|  | | **Compulsory:** |  |  |
| 9. | a. | What is meant by Tyndal scattering? | CO3 | 2 |
|  | b. | What is thermal shock resistance? How can it be improved? | CO2 | 2 |
|  | c. | Define thermal conductivity. Briefly discuss the conduction mechanism in metals. | CO2 | 4 |
|  | d. | Discuss in detail, the optical properties of metals and non-metals. | CO3 | 12 |

ALL THE BEST