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

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**End Semester Examination – Nov/Dec – 2018**

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| **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. | Compare and contrast the process of annealing and quenching. | CO1 | 2 |
| b. | Mention the use of gating system in sand casting. | CO1 | 2 |
| c. | Define precipitation hardening. Give examples of alloys that are hardened by precipitation treatments | CO1 | 2 |
| d. | Mention the different metal fabrication techniques? With suitable sketch explain in detail the different metal casting operations. | CO1 | 14 |
| (OR) | | | | |
| 2. | a. | Explain the conventional heat treatment procedures for producing martensitic steels. | CO1 | 2 |
| b. | List the advantages of powder metallurgy over casting. | CO1 | 2 |
| c. | Differentiate the process of sand casting and die casting | CO1 | 2 |
| d. | Describe in detail, the different types of heat treatment processes for metals. | CO1 | 14 |
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| 3. | a. | Define advanced ceramics. Mention its applications. | CO1 | 2 |
| b. | Briefly explain why glass–ceramics may not be transparent. | CO1 | 2 |
| c. | Briefly discuss the electrical conduction in ionic ceramics. | CO1 | 2 |
| d. | What are the different ceramic fabrication techniques? With suitable sketch explain in detail the different glass forming processes. | CO1 | 14 |
| (OR) | | | | |
| 4. | a. | Briefly discuss the electrical conduction in ionic ceramics. | CO2 | 2 |
| b. | Differentiate uniaxial and isostatic pressing. | CO1 | 2 |
| c. | Mention the factors that affects the degree of vitrification. | CO1 | 2 |
| d. | List the different ceramic fabrication techniques? With suitable sketch explain in detail the process of slip casting followed by drying and firing. | CO1 | 14 |
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| 5. | a. | List the different molding techniques employed to mold polymers. | CO1 | 2 |
| b. | Define polydispersity index. | CO1 | 2 |
| c. | Define yield point. | CO1 | 2 |
| d. | Differentiate number average molecular weight and weight average molecular weight. Explain their role in determination of the degree of polymerization. | CO1 | 6 |
| e. | Mention the classification of polymeric materials. Discuss in detail the mechanical behavior of polymers with suitable stress-strain diagram. | CO1 | 8 |
| (OR) | | | | |
| 6. | a. | Define the term “degree of Polymerization”. | CO1 | 2 |
| b. | Mention the properties of elastomers. | CO1 | 2 |
| c. | Melting of polymer is same as that of metal, is it true or false? Justify your answer. | CO2 | 2 |
| d. | Explain the process of condensation polymerization. | CO1 | 7 |
| e. | Compare and contrast thermoplastics and thermosetting plastics. | CO1 | 7 |
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| 7. | a. | Mention the role of reinforcement and matrix in glass fiber reinforced polymer matrix composite? | CO1 | 2 |
| b. | Briefly explain the role of the two different phases in a composite material. | CO1 | 2 |
| c. | Describe a composite. Give one example for natural and synthetic composite. | CO1 | 2 |
| d. | Explain in detail, the different types of fiber reinforced composites and structural composites, with suitable examples. | CO1 | 14 |
| (OR) | | | | |
| 8. | a. | Explain the Mathiessens rule of resistivity. | CO2 | 2 |
| b. | Define ionic polarization. | CO2 | 2 |
| c. | Briefly discuss on conducting polymers. | CO2 | 2 |
| d. | Mention the classification of composites. Explain in detail, the different production methods of composite materials. | CO1 | 14 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Mention the factors that would cause thermal stress in a material. | CO2 | 2 |
| b. | Define the term “Thermal shock”. | CO2 | 2 |
| c. | Define Tyndall effect. | CO3 | 2 |
| d. | Discuss in detail, the various optical properties of metals and non-metals. | CO3 | 14 |