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 :** | **16NT1001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **EVOLUTION OF MATERIALS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | | | | **Course outcome** | **Marks** |
| **PART-A (40X1=40 MULTIPLE CHOICE QUESTIONS)** | | | | | | |
| 1. | Bronze is an alloy of \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_ | | | | CO 1 |  |
|  | a. Cu and In | b. Cu and Ag | c. Cu and Al | d. Cu and Sn |  | (1) |
| 2. | Arrange the structures in increasing order of number of atoms | | | | CO 2 |  |
|  | a. BCC, FCC, SC | b. FCC, BCC, SC | c. SC, BCC, FCC | d. SC, FCC, BCC |  | (1) |
| 3. | The word *alchemist* comes from *alchemy*, which has origins in the Greek word *khemeia*, meaning \_\_\_\_\_\_\_\_\_\_\_\_\_\_. | | | | CO 1 |  |
|  | 1. art of melting metals | b. art of transmuting metals | c. art of making gold out of metals | d. art of understanding the chemistry of metals |  | (1) |
| 4. | Which one of these is the hardest material | | | | CO 1 |  |
|  | a. carbon nanotube | b. graphite | c. diamond | d. quartz |  | (1) |
| 5. | The number of atoms in a FCC structure is \_\_\_\_\_\_\_\_\_\_ | | | | CO 2 |  |
|  | a. 4 | b. 1 | c. 8 | d. 2 |  | (1) |
| 6. | Which one of these polymer is not used for packaging? | | | | CO 4 |  |
|  | a. Poly ethylene | b. Polyacrylate | c. PET | d. Polystyrene |  | (1) |
| 7. | High modulus carbon fibers are made from \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | CO 5 |  |
|  | 1. Polyethylene | b. Polyacrylonitrile | c. petroleum pitch | d. Polypropylene |  | (1) |
| 8. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a type of stretchy polyurethane fabric. | | | | CO 4 |  |
|  | a. nylon | b. polyester | c. acetate | d. spandex |  | (1) |
| 9. | Shaping metal with a hammer is called\_\_\_\_\_\_\_\_\_\_. | | | | CO 1 |  |
|  | a. founding | b. casting | c. forging | d. metal smithing |  | (1) |
| 10. | Which of the following is made of bronze? | | | | CO 1 |  |
|  | a. Iron pillar | b. Eiffel tower | c. Statue of liberty | d. none of the given options |  | (1) |
| 11. | Epoxy resins are used in Composite as ------------. | | | | CO 4 |  |
|  | a. mold | b. binder | c. plasticizer | d. filler |  | (1) |
| 12. | \_\_\_\_\_\_\_\_ is an example for binder in composite material . | | | | CO 3 |  |
|  | a. Silica | b. Epoxy resin | c. mica | d. saw dust |  | (1) |
| 13. | Solar panel works on --------- effect. | | | | CO 5 |  |
|  | a. Photoelectric | b. Induction | c. photo catalytic | d. Photovoltaic |  | (1) |
| 14. | The gas that is generated during the conversion of solar energy to electrical energy is --------. | | | | CO 5 |  |
|  | a. CO2 | b. NO2 | c. SO2 | d. none of these |  | (1) |
| 15. | AFM is used to study | | | | CO 4 |  |
|  | a. Oxidation state | b. crystal structure | c. surface of material | d. All of these |  | (1) |
| 16. | The temperature at which the polymer becomes hard glassy material to soft rubbery material is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | | | CO 4 |  |
|  | a. Rubber transition temperature | b. glass temperature | c. glass transition temperature | d. rubber temperature |  | (1) |
| 17. | In MR dampers ----- increases during the applied magnetic field | | | | CO 2 |  |
|  | a. Viscosity | b. Pour point | c. cloud point | d. mass |  | (1) |
| 18. | Carbon steel contains \_\_\_\_\_\_\_\_\_\_\_\_ | | | | CO 2 |  |
|  | a. Carbon and iron | b. Iron and Chromium | c. 100% iron | d. Iron and Silicon |  | (1) |
| 19. | Which one of the following is not a point defect? | | | | CO 2 |  |
|  | a. Frenkel | b. Schottky | c. F- Center | d. Screw dislocation |  | (1) |
| 20. | The dimentionality of graphene and carbon nanotube are | | | | CO 5 |  |
|  | a. 2 and 0 | b. 1 and 2 | c. 0 and 2 | d. 2 and 1 |  | (1) |

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| 21. | The method in which one layer of graphite is removed to obtain graphene is | | | | CO 5 |  |
|  | a. Exfoliation | b. epitaxy | c. Incineration of carbon | d. foliation |  | (1) |
| 22. | The material with highest electrical conductivity is | | | | CO 5 |  |
|  | a. copper | b. graphene | c. silver | d. gold |  | (1) |
| 23. | The tensile strength is very high for | | | | CO 5 |  |
|  | a. steel | b. iron | c. graphene | d. thermoplastic |  | (1) |
| 24. | Which one of the following is not a part of transistor | | | | CO 6 |  |
|  | a. collector | b. emitter | c. base | d. source |  | (1) |
| 25. | The role of magnetic lens in SEM is | | | | CO 6 |  |
|  | a. to multiply the intensity of electron beam | b. to reflect the electron beam | c. to scatter the electron beam | d. to converge the electron beam on sample |  | (1) |
| 26. | In AFM the force to the cantilever is given by | | | | CO 6 |  |
|  | a. Gamma ray | b. visible light | c. X-ray | d. beta ray |  | (1) |
| 27. | The tip of the probe in AFM is made up of | | | | CO 6 |  |
|  | a. Indium | b. silicon | c. carbon nanotube | d. diamond |  | (1) |
| 28. | The material present in transparent and foldable display is | | | | CO 6 |  |
|  | a. graphene | b. LED | c. OLED | d. AMOLED |  | (1) |
| 29. | Smart buildings focus on | | | | CO 2 |  |
|  | a. Energy conservation | b. All of these | c. Energy harvesting | d. automated and interlinked processes |  | (1) |
| 30. | The hardness of nanomaterial is measured by | | | | CO 2 |  |
|  | a. indentation | b. Nanoindentation | c. EDTA method | d. compression method |  | (1) |
| 31. | Hardness of material is commonly expressed in | | | | CO 2 |  |
|  | a. ohm -1 | b. ppm | c. mho scale | d.ohm scale |  | (1) |
| 32. | The tip of the probe in nanoindenter is | | | | CO 2 |  |
|  | a. spherical | b. tripyramidal | c. all of these | d. square pyramidal |  | (1) |
| 33. | The electron beam that is reflected by nucleus is known as | | | | CO 6 |  |
|  | a. x-ray | b. secondary electron | c. Auger electron | d. back scattered electrons |  | (1) |
| 34. | The source of electron beam in SEM is | | | | CO 6 |  |
|  | a. x-ray tube | b. emitter | c. Ionizer | d. electron gun |  | (1) |
| 35. | Czochralski’s technique is used to get | | | | CO 6 |  |
|  | a. carbon nanotube | b. graphene | c. silicon | d. semiconductor |  | (1) |
| 36. | Scanning electron microscopy is best used to study | | | |  |  |
|  | a. Small internal cell structures | b. hard objects | c. surface morphology | d. non-conducting materials | CO 6 | (1) |
| 37. | Which of the following statements is most correct about AFM? | | | | CO 6 |  |
|  | a. works under high vacuum | b. uses electromagnetic lenses | c. needs conducting substrates | d. none of the given options |  | (1) |
| 38. | Photograph which is taken from microscope is known as \_\_\_\_\_\_\_\_ | | | | CO 2 |  |
|  | a. macrograph | b. monograph | c. pictograph | d. micrograph |  | (1) |
| 39. | Atomic force microscopy shows images of surfaces through \_\_\_\_\_\_\_\_\_\_ | | | | CO 6 |  |
|  | a. the force of the surface on the tip | b. the electric current that flows from the surface to the tip | c. diffraction of electrons around the molecules of the surface | d. movement of a laser along the surface |  | (1) |
| 40. | \_\_\_\_\_\_\_\_\_\_\_ finds application as a transparent conducting electrode. | | | | CO 5 |  |
|  | a. epoxy resin | b. graphene | c. PET | d. quartz |  | (1) |

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| **PART B(8 X 5 = 40 MARKS) (ANSWER ANY EIGHT)** | | | |
| 41. | Define coordination number and atomic packaging factor. Mention the same for Simple cubic, Body centered and Face centered cubic systems. | CO 1 | (5) |
| 42. | How are the elements arranged in the periodic table? Describe. | CO 1 | (5) |
| 43. | What should be the characteristics of aircraft materials? Suggest some materials that can be used in aircrafts in the future. | CO 3 | (5) |
| 44. | Mention the types of packaging materials with suitable examples. | CO 4 | (5) |
| 45. | Write a short note on Czochralski method of making silicon wafer. | CO 5 | (5) |
| 46. | What are MR fluids and ferrofluids? What are their applications? | CO 2 | (5) |
| 47. | Explain the synthesis and application of epoxy resin. | CO 3 | (5) |
| 48. | What is Young’s modulus? Describe its application in construction. | CO 2 | (5) |
| 49. | Write short notes on nanoindentation. Mention its applications. | CO 5 | (5) |
| 50. | What is a smart building? Mention its chatacteristics. | CO 2 | (5) |
| **PART C( 2 X 10 = 20 MARKS) (ANSWER ANY TWO)** | | | |
| 51. | With neat sketch, explain in detail the seven different crystal systems mentioning their lattice parameters and angles. | CO 2 | (10) |
| 52. | Explain in detail, the different types of defects in materials. | CO 2 | (10) |
| 53. | What is graphene? Discuss in detail, the properties and applications of graphene. | CO 5 | (10) |

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