

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech (Minor) Degree Examination December 2021 (2020 admission)

Course Code: MET285**Course Name: MATERIAL SCIENCE AND TECHNOLOGY(MINOR)**

Max. Marks: 100

Duration: 3 Hours

PART A***Answer all questions. Each question carries 3 marks*****Marks**

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| 1 | Which are the characteristics of ionic crystal? | (3) |
| 2 | What is co-ordination Number? | (3) |
| 3 | Define Fick's second law of diffusion | (3) |
| 4 | Define Hall-Petch theory | (3) |
| 5 | Explain the need of alloying | (3) |
| 6 | Explain Super plasticity | (3) |
| 7 | Define Dielectric loss | (3) |
| 8 | Define Composites? How they are classified? | (3) |
| 9 | Which are the properties of semiconducting materials | (3) |
| 10 | Classify Superconductors | (3) |

PART B***Answer any one full question from each module. Each question carries 14 marks*****Module 1**

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|-----|---|------|
| 11a | Explain Bohr's model and Rutherford's atomic model | (8) |
| 11b | Describe about secondary bonds | (6) |
| 12 | Differentiate between crystalline and amorphous materials. Explain about the types of metallic crystals | (14) |

Module 2

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|-----|---|-----|
| 13a | With a neat sketch, explain about the structure determination by X –ray diffraction | (8) |
| 13b | What are crystallographic planes? How Miller indices for planes can be determined? | (6) |
| 14a | Explain about the types of surface defects | (8) |
| 14b | Brief about slip. | (6) |

Module 3

- 15a Define fatigue? Explain about the fatigue test with a neat sketch. (10)
- 15b Draw the typical S-N curve of mild steel and aluminum (4)
- 16 Classify strengthening mechanisms. Explain any three methods (14)

Module 4

- 17 Explain in detail about Ceramic matrix composites (14)
- 18a Explain about the fiber phase and matrix phase in composites (8)
- 18b Describe about ferroelectric materials (6)

Module 5

- 19a Explain about superconducting phenomenon. What are the properties of superconductors. (8)
- 19b Describe about semiconductors (6)
- 20 Explain the following terms: (14)
- i) Integrated circuits ii) P N P Transistor
