

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

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
**FOURTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018**

**Course Code: EE206**

**Course Name: MATERIAL SCIENCE (EE)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer all questions, each carries 5 marks*

- |   |  | Marks |
|---|--|-------|
| 1 | What is electrical conductivity? Obtain the expression for electrical conductivity of a metal.                                 | (5)   |
| 2 | Explain the properties SF6 gas as an insulator.  | (5)   |
| 3 | List the factors which affect ageing of insulator.   | (5)   |
| 4 | Write short notes on ferrites.   | (5)   |
| 5 | What is superconductivity? Give the applications of superconductor.  | (5)   |
| 6 | What are the classifications of solar cell? Explain.   | (5)   |
| 7 | What is optical microscopy?  | (5)   |
| 8 | What are the limitations of optical microscopy? Give one merit of scanning electron microscopy compared to optical microscopy. | (5)   |

**PART B**

*Answer any two questions, each carries 10 marks*

- |    |   |      |
|----|---|------|
| 9  | Explain Clausius Mosotti relation.  | (10) |
| 10 | Describe the applications of following insulating materials used in electrical apparatus:<br>i) Liquid insulator                      ii) Gaseous insulators<br>iii) Organic insulator                      iv) Inorganic insulator | (10) |
| 11 | Distinguish between electronic and ionic polarization. How do they depend on frequency?   | (10) |

**PART C**

*Answer any two questions, each carries 10 marks*

- |    |   |            |
|----|---|------------|
| 12 | Explain streamer mechanism of spark.  | (10)       |
| 13 | Explain the classification of magnetic materials with example.  | (10)       |
| 14 | a) Explain the properties and application of alloys of iron.<br>b) What are the application of vacuum insulation. | (7)<br>(3) |

**PART D**

*Answer any two questions, each carries 10 marks*

- |    |  |                   |
|----|--|-------------------|
| 15 | a) What is Type-I and Type-II superconductors?<br>b) What is atomic absorption spectroscopy?                       | (6)<br>(4)        |
| 16 | Explain the construction and working of organic solar cell.  | (10)              |
| 17 | a) What is biocompatibility?<br>b) What are the properties of nanotubes?<br>c) What is photoelectron spectroscopy? | (2)<br>(3)<br>(5) |

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