

**Draft- Scheme of Valuation/Answer Key**

(Scheme of evaluation (marks in brackets) and answers of problems/key)

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY****SIXTH SEMESTER B.TECH DEGREE EXAMINATION, MAY 2022****Course Code: EE302****Course Name: ELECTROMAGNETICS**

Max. Marks: 100

Duration: 3 Hours

**PART A***Answer all questions, each carries 5 marks.*

Marks

- |   |   |       |
|---|---|-------|
| 1 | Spherical coordinates: $r=3.31, \theta=25.17^\circ, \phi=45^\circ$ ( 5 marks) | ( 5 ) |
| 2 | Statement (2 marks), Equation (2 marks), Explanation (1 mark)                 | ( 5 ) |
| 3 | Explanation with equation (5 marks)   | ( 5 ) |
| 4 | Differential form (2.5 marks), Integral form (2.5 marks)                      | ( 5 ) |
| 5 | Explanation with equation (5 marks)   | ( 5 ) |
| 6 | Diagram (2 marks), Properties (3 marks)                                       | ( 5 ) |
| 7 | Skin depth (2.5 marks), propagation constant (2.5 marks)                      | ( 5 ) |
| 8 | Explanation ( 3 marks), Equation (2 marks)                                    | ( 5 ) |

**PART B***Answer any two full questions, each carries 10 marks.*

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|----|--|-------|
| 9  | a) Definition(2marks), $\text{Curl } \mathbf{A} = \left( \frac{-z}{\rho} \sin\Phi - \rho^2 a_\rho + (3\rho z - \cos\Phi) a_z \right)$ ( 3 marks) | ( 5 ) |
|    | b) Statement (2 marks), Significance (3 marks)   | ( 5 ) |
| 10 | a) Electric field intensity (2 marks), Electric flux density (2 marks)   | ( 4 ) |
|    | b) Derivation ( 6 marks)   | ( 6 ) |
| 11 | a) Divergence of $\mathbf{F}$ ( 3 marks), $\iint \mathbf{F} \cdot d\mathbf{s} = 4$ (3 marks)   | ( 6 ) |
|    | b) Derivation ( 4 marks)   | ( 4 ) |

**PART C***Answer any two full questions, each carries 10 marks.*

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|----|--|-------|
| 12 | a) Statement ( 2 marks), Equation (1 mark)       | ( 3 ) |
|    | b) Derivation(6 marks), Figure (1 mark)          | ( 7 ) |
| 13 | a) Figure (2 marks), Derivation(5 marks)         | ( 7 ) |
|    | b) Statement (1 mark), Equation (2 mark)         | ( 3 ) |
| 14 | a) Explanation with equation (5 marks)           | ( 5 ) |
|    | b) Definition ( 2 marks), Explanation ( 3 marks) | ( 5 ) |

**PART D***Answer any two full questions, each carries 10 marks.*

- 15 Derivation (10 marks) (10)
- 16 a) (i) wave travels in x direction – 1 mark (5)
- (ii) In free space wave velocity is  $3 \times 10^8$  m/s - 2 marks
- (iii) Phase constant ,  $\beta = \frac{\omega}{v} = \frac{2\pi \times 10^9}{3 \times 10^8} = 20.94$  rad/m - 2 marks
- Explanation (5 marks) (5)
- 17 Derivation (10 marks) (10)

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