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007303

Mar. 2022

B.Tech. (EL) - III SEMESTER

Electromagnetic Fields (ELPC-304)

Time : 90 Minutes] [Max. Marks : 25

Instructions :

1. *It is compulsory to answer all the questions (1 mark each) of Part-A in short.*
2. *Answer any three questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Write easy to go matrix for transformation of rectangular coordinate system to cylindrical coordinate system. (1)

(b) Write expression of Laplacian operator in Cylindrical coordinate system. (1)

(c) How do you convert surface integral to volume integral? (1)

(d) Find the loss tangent of a material with conduction current density of 10 units and displacement current density of 30 units. (1)

(e) EM waves do not travel inside metals. State True/False. (1)

(f) Find whether the vector is solenoidal,

$$E = yz\,i + xz\,j + xy\,k.$$ (1)

(g) What is skin effect? (1)

(h) Write expression scalar magnetic potential. (1)

(i) Write expression of Maxwell's equation based on Faraday's Law. (1)

(j) Define snell's law. (1)

PART-B

2. Write boundary condition for Electric Field Intensity. Assume any *one* case. (5)

3. Derive continuity equation. What is its physical interpretation? (5)

4. Derive expression of Energy stored in magnetic field. (5)

5. What is the inconstancy reported in Ampere's law? Derive the modified Ampere's law. (5)

6. Derive transmitting coefficient and reflection coefficient of EM Wave striking normally at the dielectric surface. (5)
