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16133(D) - 0 DEC 2016

B. Tech 5th Semester Examination
Electromagnetic Field Theory (NS)

EC-314

Time : 3 Hours

Max. Marks : 100

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all selecting one question each from sections A, B, C and D. Section-E is compulsory.

SECTION - A

1. (a) What are the different applications of Gauss law in electrostatics? (10)
- (b) Write Poisson's equation for a simple medium. (10)
2. Convert the point P (3, 4, 5) from the Cartesian to spherical coordinates. Prove that $\text{curl grad } \Phi = 0$. (20)

SECTION - B

3. (a) Define boundary conditions for current densities. (10)
- (b) State Joules law and its applications. (10)
4. Calculate the magnetic flux density due to a coil of 500 A and area 30 cm^2 , on the axis of the coil at a distance of 10 m from centre. (20)

SECTION - C

5. (a) Define Intrinsic impedance for electromagnetic waves. (10)

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- (b) Derive the expression for propagation of uniform plane wave dielectric medium. (10)

6. What do you mean by Poynting's theorem and give its significance. (10)

SECTION - D

7. (a) Derive the equation for transmission line. Obtain the condition for a distortion less transmission line. (12)
- (b) Explain standing wave ratio (SWR). (8)
- 8 (a) Define reflection and refraction of plane at conductor surface. (12)
- (b) Explain Poynting theorem for EM wave. (8)

SECTION - E

9. (a) Characteristic impedance of transmission line.
- (b) Explain Ampere's force law.
- (c) Define magnetic vector potential.
- (d) What do you mean by Laplace's equation?
- (e) What is physical significance of divergence of D?
- (f) Define Laplace's equation.
- (g) Define EM wave in homogeneous medium.
- (h) Define wave propagation.
- (i) Define Coulomb's law.
- (j) State differential form of Faraday's law. (2×10=20)