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B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018

Third Semester

Electrical and Electronics Engineering EE 2202 - ELECTROMAGNETIC THEORY

(Regulations 2008)

(Common to PTEE 2202 - Electromagnetic Theory for B.E. (Part-Time) Second Semester – Electrical and Electronics Engineering – Regulations 2009)

Time: Three Hours

Maximum: 100 Marks

Answer ALL questions

 $(10\times2=20 \text{ Marks})$

- 1. State Stoke's theorem.
- 2. State the conditions for a field to be a) solenoidal b) irrotational.
- 3. State the application of Gauss's law.
- 4. Write down Poisson's and Laplace's equations.
- 5. State Biot-Savrat's law.
- 6. Give any two dissimilarities between electric and magnetic circuits.
- 7. State Ampere's circuit law.
- 8. What is the fundamental difference between static electric and magnetic field lines?
- 9. Mention the properties of uniform plane wave.
- 10. What is called skin effect?

PART - B (5×16=80 Marks)

- 11. a) Write short notes on the following:
 - i) Gradient
 - ii) Divergence theorem
 - iii) Curl and
 - iv) Stokes theorem.

 $(4 \times 4 = 16)$

(OR)

b) Express the vector B in cylindrical and spherical systems. Given $B = ya_x + (x + z) a_y$, then find B at (-2, 6, 3).



12.	a)	i)	Find the potential at $r_A = 1$ m with respect to $r_B = 2$ m due to point charge $Q = 10$ nC at the origin and zero reference at infinity.	(8)
		ii)	Find the capacitance of a parallel plate capacitor with dielectric $~\epsilon_{rl}^{}=1.5$ and $\epsilon_{r2}^{}=3.5$ each occupy one half of the space between the plates of area $2m^2$ and $d=10^{-3}$ m.	(8)
			(OR)	
	b)	i)	In spherical coordinates $V=-25V$ on a conductor at $r=2$ cm and $V=150$ V at $r=35$ cm. The space between the conductor is a dielectric of $\epsilon_r=3.12$. Find the surface charge densities on the conductor.	(8)
		ii)	Derive Laplace and Poisson's equation.	(8)
13.	a)		erive the expression for magnetic field intensity due to infinitely long straight inductor carrying a current of 1 amps along Z-axis.	(16)
			(OR)	
s.	b)	i)	Determine H for a solid cylindrical conductor of radius a, where the current I is uniformly distributed over the cross section.	(8)
		ii)	Calculate the inductance of a ring shaped coil of mean diameter 8 mm, wound on a wooden core of 40 mm diameter containing 2500 turns.	(8)
14.	a)		erive Maxwell's equation in both point and integral form conducting medium and free space.	(16)
			(OR)	
	b)	i) ii)	Explain the concept of emf induction in static and time varying magnetic field. A parallel plate capacitor with plate area of 5cm ² and plate separation of 3mm has a valte as 50 sin 10 ³ t V applied to its plates. Calculate the displacement.	(8)
			has a voltage 50 sin 10^3 t V applied to its plates. Calculate the displacement current assuming $\varepsilon = 2 \varepsilon_0$.	(8)
15.	a)			(16)
			(OR)	
	b)	ε _r	9375 MHz uniform plane wave is propagating in a material medium of = 2.56. If the amplitude of the electric field intensity of lossless medium 500V/m. Calculate the phase constant, propagation constant, velocity, avelength and intrinsic impedance.	