BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - V E & TC E & TC :SUMMER- 2022
SUBJECT : ELECTROMAGNETIC ENGINEERING

Day : Friday
Date : 3/6/2022

S-13360-2022

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B:

1) All questions are **COMPULSORY.**
2) Figures to the **RIGHT** indicate full marks.
3) Draw neat labeled diagrams **WHEREVER** necessary.

Q.1 **a)** What is curl of a vector? Explain it? **(06)**

b) Define Stoke's Theorem? **(04)**

OR

a) If $\vec{A}= 10e^{-2z}(\rho\hat{a}_y + \hat{a}_z)$, determine the flux of A out of the entire surface of the cylinder $\rho=1$, $0 \leq z \leq 1$ using divergence theorem. **(05)**

b) Define spherical co- ordinate system and find out the co- ordinate system in terms of Cartesian co- ordinate system? **(05)**

Q.2 **a)** Find the boundary condition of dielectric medium for electrostatic field? **(06)**

b) Establish the relationship between electric potential and electric field intensity? **(04)**

OR

a) Find out the electric filed intensity due to uniformly charged sphere? **(05)**

b) What is electric dipole? Establish a relationship between electric dipole and electric field intensity? **(05)**

Q.3 **a)** Explain Biot Savarct's law? **(05)**

b) Find out Gauss's law in magneto static? **(05)**

OR

a) Explain Ampere's circuit law? **(05)**

b) Find out the force due to magnetic field? **(05)**

Q.4 **a)** What is displace current and Derive it? **(05)**

b) Derive an expression for continuity equation? **(05)**

OR

a) A parallel plate capacitor with plate area of $5cm^2$ and plate separation of 3mm has a voltage 10 sin 10^{3t} volt applied to its plate. Calculate the displacement current assuming $\varepsilon=3\varepsilon_0$ **(05)**

b) Explain Maxwell's equation in integral form? **(05)**

Q.5 Explain the effect of reflection of a plane wave at normal incidence? **(10)**

OR

a) What is the effect of the plane wave in lossless dielectric medium? **(06)**

b) A uniform plane wave propagating in a medium has: **(04)**
$\vec{E}= 2e^{-\alpha z}\sin(10^8t-\beta_z)\,\hat{a}_y$ V/m
If the medium in characterized by $\varepsilon r=1, \mu=20, \sigma=3$ s/m find α, β and $\vec{H}$.

Q.6 **a)** A distortion less line has $Z_0= 60\Omega$, $\alpha=20$ mN/m $\mu= 0.6$ when C in the speed of light in vacuum find R, L, G, C at 100MHz. **(06)**

b) What is standing wave ratio? **(04)**

OR

a) Explain the transmission line parameters? **(05)**

b) What is characteristics impedance fore distortionless line? **(05)**

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