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APR-MAY

B. E. (Fifth Semester) Examination, 2020

(Old Scheme)

(Et & T Engg. Branch)

ELECTROMAGNETICS WAVES & ANTENNAS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Part (a) of each question is compulsory. Attempt any two parts from parts (b), (c) and (d) of each question. Part (a) is of 2 marks and part (b), (c) and (d) are of 7 marks each.

Unit-I

1. (a) Define Skin depth. 2
- (b) Write down & explain the integral form of Maxwell equation. 7

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- (c) State and prove Poynting's theorem. 7
- (d) Find the intrinsic impedance η , the propagation constant r and the wave velocity v for a conducting medium in which $\sigma = 58 \text{ Ms/m}$, $\mu_r = 1$, at a frequency $f = 100 \times 10^6 \text{ Hz}$. 7

Unit-II

2. (a) State condition for lossless transmission line. 2
- (b) Define primary constant of a transmission line. 7
- (c) Derive derivation for input impedance of transmission line terminated with any load impedance (Z_R). 7
- (d) Calculate the characteristic impedance, propagation constant and velocity of propagation at 400 kc/s for a transmission line having $L = 0.6 \text{ mH/km}$, $C = 0.08 \mu\text{f/km}$ and negligible R and G . 7

Unit-III

3. (a) Define Dominant Modes. 2
- (b) Derive derivation for all field component in wave propagation between rectangular waveguide for T.M. mode. 7

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- (c) Define wave impedance, cut off wavelength phase velocity and group velocity in wave guidefield. 7
- (d) The larger dimension of the cross-section of a rectangular waveguide is 2 cm. Find the cut-off frequency and wavelength for the dominant TE mode. 7

Unit-IV

4. (a) Define isotropic radiator. 2
- (b) Define antenna gain, antenna efficiency and bandwidth. 7
- (c) State & prove reciprocity theorem for antenna. 7
- (d) Explain the radiation from a small current element. 7

Unit-V

5. (a) Define pattern multiplication. 2
- (b) Explain Broadside and End fired array. 7
- (c) Write short note on Rhombic Antenna and Loop Antenna. 7

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(d) Derive derivation for total far field at distance point for array of two point source with equal amplitude and phase.

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