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Question Paper Code: 35404

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Electronics and Communication Engineering

01UEC504- TRANSMISSION LINES AND WAVEGUIDES

(Regulation 2013)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

- Which stands for dB relative level?
(a) $dBrn$ (b) dBa (c) dBr (d) dBx
- One decibel equals to
(a) $5.356N$ (b) $8.686N$ (c) $7.635N$ (d) None of these
- A transmission line is terminated in a load equal to its characteristic impedance. The reflection coefficient is
(a) plus one (b) minus one (c) zero (d) infinity
- A ____ band is the range of frequencies or wavelengths that can pass through a filter without being attenuated.
(a) Pass (b) Band (c) Base (d) Low
- Reflection Coefficient $K = \frac{\text{Voltage at load}}{\text{Incident voltage at the load}}$
(a) Reflected (b) Incident (c) Reflection (d) Inflection
- The distance the wave travels along the line while the phase angle is changing through ____ radians is called a wavelength.
(a) 1 (b) 2 (c) 2.5 (d) 1.5

7. Assumptions for the analysis of the performance of the radio frequency Line, leakage conductance G is
 (a) 0.5 (b) 0 (c) 2.5 (d) 1.5
8. Dominant mode means
 (a) highest cut-off frequency (b) lowest cut-off wavelength
 (c) guide wavelength (d) lowest cut-off frequency
9. Dominant mode in circular cavity resonator is
 (a) TM_{010} (b) TM_{111} (c) TM_{101} (d) TM_{100}
10. Principal mode is
 (a) TE mode (b) TM mode (c) TEM mode (d) None

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Derive the characteristic impedance and propagation constant of a symmetrical T-Network. (8)
12. Derive the general transmission line equation for voltage and current at any point on a line. (8)
13. A transmission line has a characteristic impedance of 300Ω and terminated in a load $Z_L = 150 + j150 \Omega$. Find the following using smith chart.
 (1) VSWR.
 (2) Input impedance at a distance 0.1λ from the load.
 (3) Input admittance from 0.1λ
 (4) Position of first voltage minimum and maximum from the load. (8)
14. Derive the field expression of TM waves guided by a parallel conducting plane. (8)
15. A rectangular air-filled waveguide with dimension $0.9 \text{ inch} \times 0.4 \text{ inch}$ cross section and 12 inch length is operated at 9.2 GHz with a dominant mode. Find cut-off frequency, guide wave-length, phase velocity, characteristics impedance and the loss. (8)