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Question Paper Code: 94402

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Fourth Semester

Electronics and Communication Engineering

19UEC402– ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES

(Regulation 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. For boundary between conductor and free space the field intensity inside a conductor is_ CO1-U
(a) 1 (b) infinity (c) Zero (d) constant
2. Electromagnetic waves are produced by CO1-U
(a) static charge (b) accelerated charge (c) moving charge (d) charged particle
3. When the load impedance is not equal to characteristic impedance of transmission line _____ takes place. CO2-U
(a) Insertion (b) Reflection (c) both a and b (d) None of these
4. The points of zero voltage or current in the standing waves is CO2- U
(a) Antinodes (b) loops (c) Nodes (d) none
5. The velocity with which the energy propagates along a guide is called CO2- U
(a) Group velocity (b) Phase velocity (c) Space velocity (d) none of these

PART – B (5 x 3= 15 Marks)

6. Write the four Maxwell equations in integral form. CO1-U
7. What is the Difference between displacement current and conduction current? CO1-U
8. Differentiate between Band pass and Band elimination filter CO2-U
9. Define standing Wave ratio CO2-U
10. What are guided waves? Give examples CO2-U

PART – C (5 x 16= 80 Marks)

11. (a) Derive the expression for the capacitance of a coaxial cable using Laplace's equation CO3- App (16)
- Or
- (b) Solve the Laplace equation for the potential field in homogenous region between two concentric conducting spheres with radius a, b and $V=V_0$ at $r=a$ and $V=0$ at $r=b$. Find the capacitance between concentric spheres. CO3- Ana (16)
12. (a) Derive the EM wave propagation parameters in Free space and also derive the expression for electric and magnetic field. CO2-App (16)
- Or
- (b) Derive the Transmission and reflection coefficient of uniform plane waves CO2- App (16)
13. (a) Design a low pass filter for T and π section having cut off frequency 2 KHz to operative with a terminated load resistance of 500 CO3- App (16)
- Or
- (b) Design m-derived low pass filter having a cut off frequency of 5000Hz and design impedance of 600 ohms. The frequency of infinite attenuation is $1.25 f_c$ CO3- App (16)
14. (a) A 70Ω lossless used at a frequency where wavelength 80 cm terminated by load of $140 + j91 \Omega$. Find the reflection coefficient, VSWR and input impedance using smith chart CO5- Ana (16)
- Or
- (b) Derive the expression for single stub matching CO5- Ana (16)
15. (a) Determine the solution of electric and magnetic fields of TE waves guided along rectangular waveguide. CO6- Ana (16)
- Or
- (b) Derive the field equations for TM waves between parallel planes. CO6- Ana (16)