A

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The maximum space rate of charge of that function is   CO1 -R

    (a) Gradient   (b) Curl   (c) Divergence   (d) del operator

2. Under what condition the vectors are said to be in parallel   CO1 -R

    (a) A.B=0   (b) AxB=0   (c) Δ.A=0   (d) ΔxA=0

3. Poisson's equation is   CO2-R

    (a) $\Delta^2 V = -\rho/\varepsilon$ (b) $\Delta^2 V = 0$ (c) $\Delta V = -\rho/\varepsilon$ (d) $\Delta V = 0$

4. Relation between electric field intensity and electric flux density D=   CO2- R

    (a) ε/σ (b) ε/E (c) $E\,\varepsilon$ (d) σ/ε

5. Hysteresis loop gives the relation of   CO3- R

    (a) B lags H   (b) B leads H   (c) B independent   (d) none of the above

6. Inductance of a toroid is directly proportional to   CO3- R

    (a) No.of turns   (b) square of the area   (c) area   (d) volume

7. Maxwells equationIV is derived from   CO4- R

    (a) Faradays law   (b) Amperes circuit law

    (c) Gauss law of electric field   (d) Gauss law of magnetic field

8. Circuit theory satisfies   CO4- R

    (a) Three dimensional analysis   (b) simple to understand

    (c) reference frequency   (d) voltage is not directly involved

9. For a uniform plane wave E and H is at   CO5- R

    (a) Parallel to each other   (b) different frequency

    (c) Perpendicular to each other   (d) different phase

10. The characteristic impedance of free space is given by   CO5- R

    (a) Ratio of E and H   (b) permeability / permittivity

    (c) square root of Ratio of E and H   (d) permittivity / permeability

<center>PART – B (5 x 2= 10Marks)</center>

11. Give the physical significance of Divergence.   CO1- R

12. State Coulomb's law of electric charges.   CO2- R

13. Brief amperes circuital law   CO3- R

14. Compare Field Theory and Circuit Theory   CO4- R

15. What do you mean by "Depth of penetration"?   CO5- R

<center>PART – C (5 x 16= 80Marks)</center>

16. (a) Verify the divergence theorem for the following vector $A=xy^2$ ax+y^3 ay+y^2z az and the surface is a cuboid defined by 0<x<1, 0<y<1, 0<z<1.   CO1 -App   (16)

<center>Or</center>

    (b) Explain in detail the basics and differential elements of different co-ordinate system and derive its relevant equations   CO1- App   (16)

17. (a) (i) Obtain the dipole moment of electric dipole.   CO2- App   (8)

       (ii) Derive an expression for energy density in electrostatic fields.   CO2- App   (8)

<center>Or</center>

    (b) Show that the tangential component of Electric field intensity is continuous across the boundary, whereas the normal component of Electric field intensity is discontinuous at the boundary.   CO2- Ana   (16)

18. (a) Determine the magnetic field at point P due to the current carrying conductor.   CO3- Ana   (16)

<center>Or</center>

    (b) (i) State and Explain Biot savarts law   CO3- Ana   (8)

       (ii) Explain clearly about magnetic scalar and vector potential   CO3- Ana   (8)

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19. (a) With necessary explanation, derive the Maxwell's equation in differential and integral forms. CO4 -U (16)

Or

(b) State and explain Faraday's law of electromagnetic induction and derive the expressions for statically and dynamically induced emf. CO4 -Ana (16)

20. (a) (i) Sate and explain Poynting's theorem CO5- U (12)

(ii) What is the physical significance of the Poynting theorem CO5- R (4)

Or

(b) Determine the wave velocity and characteristic impedance for its propagation in free space. CO5 U (16)

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