Register Number.....

B.E. DEGREE EXAMINATIONS: APRIL /MAY 2009

Third Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

U07EE301 Electromagnetic Theory

Time: Three Hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (20 × 1 = 20 Marks)

1.A quantity which gives only direction is called

(a)vector (b)scalar (c)Unit vector (d) Force

2. Differential volume in cylindrical co-ordinate system is

(a)dv=rdrdφdz (b)dv=dx dy dz (c)dv=dr dφ dz (d)dv=r^2sinθdrdθdφ

3. Value of ay . aφ is

(a) cos θ (b)cosφ (c)-sin θ (d)0

4. A co-ordinate φ *in* cylindrical system is defined in Cartesian system as

(a) φ=$\tan^{-1}$(x/y) (b)φ=$\sin^{-1}$(y/x) (c)φ=$\tan^{-1}$(y/x) (d)φ=$\cos^{-1}$(y/x)

5. Coulomb's law is

(a)linear (b) non linear (c)phase (d) tangent

6. The region where the force acts is called

(a)electric flux (b)electric field (c)field intensity (d)flux density

7. The unit of potential difference is

(a)Joules/coulomb (b) coulomb (c) coulomb/joules (d) joules

8. In an electrified of given charge distribution, if we join all the points which are at ---------- potential, then an equipotential surface is obtained

(a) Equal (b) different (c) lower (d) greater

9. If you grip the current filament in your right hand with the thumb in the direction of current then the direction of H is the

(a)Right hand rule (b) Cramer's rule (c) left hand rule (d) Faradays law

10. The_____ is defined as the tangential force times the radial distance at which it acts

(a) Torque (b) power (c) energy (d) magnetic flux density

11. Tangential component of electric field intensity and electric flux density are zero, this is the boundary condition between

(a)conductor and free space (b) two conductors

(c) Two perfect dielectrics (d) conductor and dielectric

12. In case of boundary condition between perfect dielectrics, the tangential component of ---- ---------- is continous across the boundary.

(a) Electric flux density (b) surface charge density

(c) Electric field intensity (d) magnetic flux density

13. Point form of Maxwell's fourth equation for the time varying field is

(a) $\nabla.B=0$ (b) $\nabla.D=\rho v$ (c) $\int H.dl=1$ (d) $\int E.dl=-\int (\delta B/\delta t).ds$

14. Point form of maxwell's first quation for the time varying field is obtained from

(a) Ampere's law (b) Gauss's law

(c) Coulomb's law (d) Faradays law

15. The ratio of displacement current to the cross sectional are of plats of capacitor is called

(a) Displacement current density (b) Conduction current

(c) Conduction current density (d) Displacement current

16. The current passing through resistor duo to actual motion of charges is called

(a) Conduction current (b) current density

(c) Displacement conduction (d) current

17. $\nabla \times H=(\sigma+jw\ \varepsilon)\vec{E}$ in the point form of

(a) Harmonically varying field (b) static field

(c) time varying field (d) Non-time varying field

18. The uniform plane wave is ---------- to the direction of propagation.

(a) Perpendicular (b) equal (c)same (d) parallel

19. The ratio of magnitude of electric field intensity to the magnitude of magnetic field intensity is called

(a) Extrinsic impedance (b) intrinsic impedance

(c) impedance (d) resistance

20. Conductivity of perfect dielectric is

(a) Unity (b) zero (c) 0.5 (d) $1/\sqrt{12}$

PART B (5 x 16 = 80 Marks)

21. (a) State and proof the Divergence theorem

(OR)

21. (b) Derive the relationship between the Cartesian and cylindrical system

22.(a). Derive the boundary conditions for electrostatic field

(OR)

22.(b). Four positive point charges are located at in the x-y plane at points (0,0), (0,1), (1,0) and (1,1)m. All the four charges have equal values of 1 μC. Find the electric field intensity and flux density at (0.5, 0.5) m.

23.(a). Derive the Magnetic Field Intensity and Magnetic Flux Density due to a current element at any point on its axis.(assume disc radius is b m and height h m)

(OR)

23.(b). Derive the Magnetic Field Intensity at any point along the axis of solenoid.

24.(a). Derive the Maxwell's equation in integral form

(OR)

24.(b).(i). List out the points: the relation between field theory and circuit theory. (8)

(ii). Derive the faradays law in point and integral form (8)

25.(a). State and derive the general wave equations

(OR)

25.(b). Derive an expression for skin depth for propagation of plane wave in good conductor.

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