SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code : EMF(16EE214) **Course & Branch**: B.Tech - EEE **Year & Sem:** II-B.Tech & II-Sem **Regulation:** R16

UNIT-I
INTRODUCTION TO COORDINATE SYSTEMS AND VECTOR ALGEBRA

1. The three vertices of a triangle are located at A(-1,2,5), B(-4,-2,-3), and C(1,3,-2). (a) Find the length of the perimeter of the triangle. (b) Find a unit vector that is directed from the midpoint of the side AB to the midpoint of the side BC. (c) Show that this unit vector multiplied by a scalar is equal to the vector from A to C and that the unit vector is therefore parallel to AC . [12M]
2. The vector from the origin to point A is given as (6,-2,-4), and the unit vector directed from the origin toward point B is (2, -2,1)/3. If points A and B are ten units apart, find the coordinates of point B. [12M]
3. A circle, centred at the origin with radius of 2 units, lies in the xy plane. Determine the unit vector in rectangular components that lies in the xy plane, is tangent to the circle at ($\sqrt{3}$, 1, 0), and is in the general direction of increasing values of y. [12M]
4. A vector field is specified as G= $24xya_x + 12(x^2+2)a_y + 18z^2a_z$. Given two points P(1,2,-1) and Q(2,1,3), find: (a) G at P; (b) a unit vector in the direction of G at Q; (c) a unit vector directed from Q towards P; (d) the equation of surface on which $|G|$=60. [12M]
5. A field is given as G=$[25/(x^2+y^2)](xa_x + ya_y)$, Find: (a) a unit vector in the direction of G at P(3,4,-2); (b) the angle between G and a_x at P; (c) the value of double integral on the plane y=7. [12M]
6. Three vectors extending from the origin are given as r_1 = (7,3,-2), r_2=(-2,7,-3) and r_3=(0,2,3). Find: (a) a unit vector perpendicular to both r_1 and r_2 ; (b)a unit vector perpendicular to the vectors r_1-r_2 and r_2-r_3 ; (c) The area of the triangle defined by r_1 and r_2; (d)The area of the triangle defined by the heads of r_1,r_2, and r_3. [12M]
7. (a) Express the field D= $(x^2+y^2)^{-1}(xa_x+ya_y)$ in cylindrical components and cylindrical variables: (b) Evaluate D at the point where ρ=2, Φ=0.2π, and z=5, expressing the result in cylindrical and rectangular components. [12M]
8. Express in cylindrical components; (a) the vector from C(3,2,-7) to D(-1,-4,2); (b) a unit vector at D directed toward C; (c) a unit vector at D directed toward the origin. [12M]
9. The surfaces ρ=3, ρ=5,Φ=100^o, Φ=130^O, z=3, and z=4.5 define a closed surface. (a) Find enclosed volume; (b) Find the total area of enclosing surface; (c) Find the total length of the twelve edges of the surfaces; (d) Find the length of longest straight line that lies entirely within the volume. [12M]
10. Given point P(r=0.8, θ=30^o, Φ=45^o), and E= $1/r^2(\cos\Phi a_r+\sin\Phi/\sin\theta a_\Phi)$; (a) Find E at P; (b) Find $|E|$ at P; (c) Find a unit vector in the direction of E at P. [12M]

UNIT –II
ELECTROSTATICS

1. (a) State and explain Coulomb's law indicating clearly the units of quantities in the equation of force? 6M
   (b) State and prove Gauss's law and write limitations of Gauss's law? 6M
2. A charge Q_0 located at the origin in free space, produces a field for which E_2=1kv/m at point P (-2, 1,-1). (a) Find Q_0.
   Find E at M (1, 6, 5) in (b) Cartesian coordinates. (c) Cylindrical coordinates. 12M
3. Four positive point charges 10^{-12} coulomb each are situated in X-Y plane at points (0, 0), (0, 1) (1, 1) and (1, 0) m. Find the electric field and potential at (3/4, 3/4) and (1, 1)? 12M
4. (a) Derive the expression for the electric field intensity due to line charge? 6M
   (b) Four concentrated charges Q_1= 0.3 µC, Q_2= 0.2 µC, Q_3= -0.3 µC, Q_4= 0.2 µC are located at the vertices of a plane rectangle. The length of rectangle is 5 cm and breadth of the rectangle is 2 cm. Find the magnitude and direction of resultant force on Q_1? 6M
5. (a) Derive Laplace and Poisson's equation? 6M
   (b) Find electric potential due to electric dipole? 6M
6. (a) Derive the expression for electric field intensity at a point due to electric dipole? 6M
   (b) Derive an expression for electric potential due to point charge? 6M
7. (a) Derive Maxwell first equation? 6M
   (b) Derive the expression for torque on electric dipole in the presence of uniform electric field? 6M
8. Four point charges each of 10µC are placed in free space at the points (1, 0, 0), (-1, 0, 0), (0, 1,0) and (0, -1, 0) m respectively. Determine the force on a point charge of 30µC located at a point (0, 0, 1) m? 12M
9. Derive electrical field intensity due to charged circular ring? 12M
10. a) Write the condition for Laplace equation? 2M
    b) What is the relation between electric flux density and electric field intensity? 2M
    c) Define dipole moment? 2M
    d) Define an electric dipole? 2M
    e) State vector form of coulombs law? 2M

UNIT –III
CONDUCTORS AND DIELECTRICS

1. (a) Derive the continuity equation. What is its physical significance? 6M
   (b) Derive the point form of ohms law? 6M
2. Explain the boundary conditions of two perfect dielectrics materials? 12M
3. Explain the boundary conditions between conductor and free space? 12M
4. Explain the phenomenon of polarization when a dielectric slab is subjected to an electric field? 6M
5. (a) Derive the expression for capacitance of the spherical condenser? 6M
   (b) Find the current in circular wire, if the current density is $\bar{J} = (1 - e^{-100\tau})\, a_z$ A/m^2. The radius of the wire is 2mm? 6M

6. (a) Derive the expression for capacitance of a co-axial cable? 6M
   (b) A parallel plate capacitor has a plate area of $1.5m^2$ and a plate separation of 5mm. Three are two dielectrics in between the plates. The first dielectric has a thickness of 3mm with a relative permittivity of 6 and the second has a thickness of 2mm with a relative permittivity of 4. Find the capacitor? 6M
7. (a) Derive the expression for parallel plate capacitor? 6M
   (b) What is the energy stored in a capacitor made of two parallel metal plates each of 30 cm^2 area separated by 5mm in air. $\varepsilon_o = 8.854x10^{-12}$. The capacitor is charged to potential difference of 500v? 6M
8. At the boundary between glass $\varepsilon_r=4$ and air, the lines of electric field make an angle of 40^0 with normal to the boundary. If electric flux density in the air is $0.25\mu C/m^3$. Determine the orientation and magnitude of electric flux density in the glass? 12M
9. A parallel plate capacitor consists of two square metal plates with 500mm side and separated by 10mm. a slab of sulphur ($\varepsilon_r= 4$) 6mm thick is placed on the lower plate and air gap of 4mm. find capacitance of capacitor? 12M
10. a) Define polarization in dielectric materials? 2M
    b) Write the relation between current I and current density J? 2M
    c) Write the equation for energy stored in capacitor? 2M
    d) Define Dielectric Strength? 2M
    e) A conductivity of a wire is 5000 mho/m and it is subjected to an electric field of 0.1 volts/m. Then what is the current density (J) in a wire? 2M

UNIT –IV

MAGNETO STATICS

1. Derive the expression for torque produced on a closed current carrying when placed in a magnetic field? 10M
2. Using Biot-savart's law. Find $\vec{H}$ and $\vec{B}$ due conductor of finite length? 12M
3. Find the magnetic field intensity $\bar{H}$ due to co-axial cable? 12M
4. (a) Write down maxwell's third equation in point and integral form? 6M
   (b)Find magnetic field intensity $\bar{H}$ due to solenoid carrying current I and having length L= 4m? 6M
5. (a) State and explain Biot-savart's law? 6M
   (b) Explain maxwell's second equation? 6M
6. (a) State and explain ampere's circuital law? 6M
   (b) Derive the expression for the force between two current carrying wires? 6M
7. (a) A circular loop is located on $X^2+Y^2=9$ and Z=0 carries a direct current of 10A along $\overline{a_\varphi}$ direction. Determine $\bar{H}$ at (0, 0, 5) m? 6M
   (b) Explain about Magnetic Dipole Moment? 6M
8. Using Biot-savart law or Amperes law find $\vec{H}$ due conductor of infinite length? 12M
9. (a) Explain relationship between magnetic torque and moment? 6M
   (b) Derive an expression for the force between two current carrying wires? 6M

10. a). Define Magnetic dipole moment? 2M
    b). Write Lorentz force equation? 2M
    c) State point form of Amperes law? 2M
    d) State Ampere's circuital law? 2M
    e) State Biot-savats law? 2M

UNIT –V

MAGNETIC POTENTIAL & TIME VARYING FIELDS

1. (a) What is vector magnetic potential? Derive vector poisson's equation? 6M
   (b) A toroid has air core and has a cross sectional area of $10mm^2$ it has 1000 turns and its mean radius is 10mm. find its inductance? 6M
2. Derive the expression for self inductance of solenoid and toroid? 12M
3. (a) A coil of 500 turns is wound on a closed iron ring of mean radius 10cm and cross section of 3 cm^2. Find the self inductance of the winding if the relative permeability of iron is 800? 6M
   (b) Explain the difference between self inductance and mutual inductance? 6M
4. (a) Derive the expression for inductance of a co-axial cable? 6M
   (b) Compute the energy density in free space on account of field having $\vec{H}$ = 1000 A /m? 6M
5. (a) A coil of 1000 turns is wound on a Toroidal iron ring of mean radius 10cm and cross section of $3cm^2$. Find the self inductance of the winding if the relative permeability of iron is 800? 6M
   (b) Explain scalar magnetic potential and its limitations? 6M
6. Find the mutual inductance between a long, straight wire and square loop lying in same plane? 12M
7. Derive an expression for the force between two straight long and parallel conductors? 12M
8. Derive the expression for Neuman's formula? 12M
9. Explain the concept of energy stored in magnetic fields? 12M
10. a) Define self inductance? 2M
    b) Define mutual inductance? 2M
    c) Define inductance? 2M
    d) What is the inductance of Solenoid? 2M
    e) What is the inductance of Toroid? 2M

11. Explain faradays law of electromagnetic induction and there from derive maxwell's equation in differential and integral form? 12M
12. (a) A copper wire carries current of 1A. Determine displacement current in the wire at 1 MHz for copper $\varepsilon=\varepsilon_o$ and $\sigma=5.8x10^7$? 6M
    (b) Explain pointing vector and its significance? 6M
13. Derive an expression for motional and transformer induced emf? 12M
14. What is displacement current? Explain physical significance of displacement current?
15. Explain faradays law of electromagnetic induction and derive the expression for induced e.m.f? 12M

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UNIT-I
INTRODUCTION TO COORDINATE SYSTEMS AND VECTOR ALGEBRA

1. In three dimensional coordinate systems, coordinates are
   A)perpendicular to each other B) parallel to each other
   C) same direction for each other D)opposite direction for each other

2. Three dimensional coordinate system is one in which coordinates intersect each other at
   A) negative points B) zero points C)positive points D) absolute points

3. Rectangular coordinate system is also known as
   A) Space coordinate system B) Polar coordinate system
   C) Cartesian coordinate system D)Planar coordinate system

3. The range of azimuthal angle φ in the spherical polar coordinates is
   A) $[0,2\pi]$ B) $[0,\pi]$ C) $[0,\pi/2]$ D) $[-\pi, +\pi]$

5. The equation to a surface in spherical coordinates is given by $\theta=\pi/3$. The surface is a.
   A) sector of a circle
   B) A cone making an angle of $\pi/3$ with the z-axis
   C) A vertical plane making an angle of $\pi/3$ with the z-axis
   D) A vertical plane making an angle of $\pi/3$ with the x-axis

6. The equation to a surface in spherical coordinates is given by $\varphi=\pi/3$. The surface is a.
   A) sector of a circle
   B) A cone making an angle of $\pi/3$ with the z-axis
   C) A vertical plane making an angle of $\pi/3$ with the z-axis
   D) A vertical plane making an angle of $\pi/3$ with the x-axis

7. Expressed in spherical coordinates, the equation $x^2+y^2+z^2= 4z$ becomes
   A) $4\cos\boldsymbol{\theta}\sin\Phi$ B) $4\sin\boldsymbol{\theta}\cos\Phi$ C) $4\cos\boldsymbol{\theta}$ D) $4\sin\boldsymbol{\theta}$

8.The cylindrical coordinate system is also referred to as
   A) Cartesian system B) Circular system C) Spherical system D) Space system

9. Transform the point (-2,6,3) into cylindrical coordinates.
   A) (6.325,-71.57,3) B) (6.325,71.57,3) C) (6.325,73.57,3) D) (6.325,-73.57,3)

10. A charge located at point p $(5,30^0,2)$ is said to be in which coordinate system?
   A) Cartesian system B) Cylindrical system C) Spherical system D) Space system

11. Transform the spherical system B = (10/r)i + (10cos θ)j + k into cylindrical form at (5, π/2, -2)
A) 2.467i + j + 1.167k B) 2.467i – j + 1.167k
C) 2.467i – j – 1.167k D) 2.467i + j – 1.167k

12. Convert the given rectangular coordinates A(2,3,1) into corresponding cylindrical coordinates
A) (3.21,56.31,1) B) (3.21,57.31,0) C) (3.61,57.31,0) D) (3.61,56.31,1)

13. Convert the point (3,4,5) from Cartesian to spherical coordinates
A) $(7.07,45^0,53^0)$ B) $(0.707,45^0,53^0)$ C) $(7.07,54^0,63^0)$ D) $(0.707,54^0,63^0)$

14. Find the spherical coordinates of A(2,3,-1)
A) $(3.74, 105.5^0, 56.13^0)$ B) $(3.74, 105.5^0, 56.31^0)$
C) $(3.74, 106.5^0, 56.13^0)$ D) $(3.74, 106.5^0, 56.31^0)$

15. Find the Cartesian coordinates of $B(4,25^0,120^0)$
A) (0.845, 1.462, 3.625) B) (-0.845, 1.462, 3.625)
C) (-8.45, 2.462, 6.325) D) (8.45, 2.462, 6.325)

16. Given B= (10/r)i+(rcos θ) j+k in spherical coordinates. Find Cartesian points at (-3,4,0)
A) -2i + j B) 2i + k C) i + 2j D) –i – 2k

17. The scalar factor of spherical coordinates is
A) 1, r, r sin θ B) 1, r, r C) r, r, 1 D) r, 1, r

18. Transform the vector (4,-2,-4) at (1,2,3) into spherical coordinates.
A) 3.197i – 2.393j + 4.472k B) -3.197i + 2.393j – 4.472k
C) 3.197i + 2.393j + 4.472k D) -3.197i – 2.393j – 4.472k

19. Cylindrical systems have the following scalar values respectively
A) 1, ρ ,1 B) 1, 1, 1 C) 0,1,0 D) 1,0,0T

20. he volume of a parallelepiped in Cartesian is
A) dV = dx dy dz B) dV = dx dy C) dV = dy dz D) dV = dx dz

21. Transform the vector A = 3i – 2j – 4k at P(2,3,3) to cylindrical coordinates
A) -3.6j – 4k B) -3.6j + 4k C) 3.6j – 4k D) 3.6j + 4k

22. Which of the following criteria is used to choose a coordinate system?
A) Distance B) Intensity C) Magnitude d) Geometry

23. Vector transformation followed by coordinate point substitution and vice-versa, both given the same result. Choose the best answer.
A) Possible, when the vector is constant B) Possible, when the vector is variable
C) Possible in all cases D) Not possible

24. The polar form of Cartesian coordinates is
A) Circular coordinates B) Spherical coordinates
C) Cartesian coordinates D) Space coordinates

25. The cross product of the vectors 3i + 4j – 5k and –i + j – 2k is,
A) 3i – 11j + 7k B) -3i + 11j + 7k C) -3i – 11j – 7k D) -3i + 11j – 7k

26. Which of the following are not vector functions in Electromagnetics?
A) Gradient B) Divergence
C) Curl D) There is no non- vector functions in Electromagnetics

27. The work done of vectors force F and distance d, separated by angle θ can be calculated using,
A) Cross product B) Dot product C) Addition of two vectors D) Cannot be calculated

28. Find whether the vectors are parallel, (-2,1,-1) and (0,3,1)
A) Parallel B) Collinearly parallel C) Not parallel D) Data insufficient

29. When two vectors are perpendicular, their
A) Dot product is zero B) Cross product is zero
C) Both are zero D) Both are not necessarily zero

30. Find the gradient of $t = x^2y + e^z$ at the point p(1,5,-2)
A) i + 10j + 0.135k B) 10i + j + 0.135k C) i + 0.135j + 10k D) 10i + 0.135j + k

31. Curl of gradient of a vector is
A) Unity B) Zero C) Null vector D) Depends on the constants of the vector

32. Find the gradient of the function given by, $x^2 + y^2 + z^2$ at (1,1,1)
A) i + j + k B) 2i + 2j + 2k c) 2xi + 2yj + 2zk D) 4xi + 2yj + 4zk

33. Find the gradient of the function sin x + cos y.
A) cos x i – sin y j B) cos x i + sin y j C) sin x i – cos y j D) sin x i + cos y j

34. Compute the divergence of the vector xi + yj + zk.
A) 0 B) 1 C) 2 D) 3

35. Find the divergence of the vector yi + zj + xk.
A) -1 B) 0 C) 1 D) 3

36. Given $D = e^{-x}\sin y\, i - e^{-x}\cos y\, j$ Find divergence of D.
A) 3 B) 2 C) 1 D) 0

37. Find the divergence of the vector $F = xe^{-x} i + y j - xz k$
A) $(1 - x)(1 + e^{-x})$ B) $(x - 1)(1 + e^{-x})$ C) $(1 - x)(1 - e)$ D) $(x - 1)(1 - e)$

38. Determine the divergence of $F = 30 i + 2xy j + 5xz^2 k$ at (1,1,-0.2) and state the nature of\ the field.
A) 1, solenoidal B) 0, solenoidal C) 1, divergent D) 0, divergent

39. Find whether the vector is solenoidal, E = yz i + xz j + xy k
A) Yes, solenoidal B) No, non-solenoidal
C)) Solenoidal with negative divergence D) Variable divergence

40. Identify the nature of the field, if the divergence is zero and curl is also zero.
A) Solenoidal, irrotational B) Divergent, rotational
C) Solenoidal, irrotational D) Divergent, rotational

41. The curl of a curl of a vector gives a
A) Scalar B) Vector C) Zero value D) Non zero value

42. Find the curl of A = (y cos ax)i + (y + e^x)k
A) 2i – ex j – cos ax k B) i – ex j – cos ax k
C) 2i – ex j + cos ax k D) i – ex j + cos ax k

43. Find the curl of the vector A = yz i + 4xy j + y k
A) xi + j + (4y – z)k B) xi + yj + (z – 4y)k
C) i + j + (4y – z)k D) i + yj + (4y – z)k

UNIT –II
ELECTROSTATICS

1. A Quantity which gives only direction is called [ ]
A) Vector B) Scalar C) Unit Vector D) None

2. The charge of an electron is [ ]
A) 1.60219×10^{-19} C B)-1.60219×10^{19} C C)-1.60219×10^{-19} C D) 1.60219×10^{19} C

3. The two equal and opposite point charges are separated by a very small distance is known as [ ]
A) Dipole moment B) Potential gradient C) Dipole D) None

4. Find the Laplacian of the Potential function $V=x^2+y^2+z^2$ [ ]
A) $2V/m^2$ B) $6\ V/m^2$ C)$4\ V/m^2$ D)$8\ V/m^2$

5. The _ is defined as the tangential force times the radial distance at which it acts [ ]
A) Power B) Energy C) Torque D) Magnetic flux density

6. Steady magnetic fields are governed by _____ law. [ ]
A) Biot–Savart's B)Ampere's Circuital C)Both (A) and (B) D)None of these

7. Four fundamental equations of electromagnetics are grouped under [ ]
A) Fleming's laws B) faraday's laws C) lorentz equations D) maxwell's equation

8. According to poisson's equation, if V is the potential function, then [ ]
A) $\nabla^2 V=-\rho/\varepsilon$ B) $\nabla^2 V=-\rho/E$ C) $\nabla^2 V=0$ D)none of these

9. According to Gauss law ψ= [ ]
A) Q_{end} B) $\int_S D.\,dS$ C) $\int_V \rho_V\,dV$ D) ALL

10. Which of the following is a vector quantity? [ ]
A) Electrical potential B) Electrical field intensity
C) Electrical charge D) none of the above

11. An infinite number of charge each equal to q are placed along the x-axis at x=1,x=2,x=3 and so on .
The potential at x=0 due to this set of charges will be [ ]

A) q B) 3 q/2 C) 2 q D) 4 $q/4$

12. An infinite number of charges, each equal to 1 q are placed at n=1, 3, 9, 27, 81. . . The electronic potential at n= 0 will be [ ]

A) q B) 3/2 q C) 2 q D) 5 $q/2$

13. A tiny particle carrying a charge of 0.2 coulomb is accelerated through a P.D of 1000 V. The K.E. acquired by the particle will be [ ]

A) 100 J B) 200 J C) 300 J D) 400 J

14. Given V=2x^2 y-12z, V at (0, 0 ,6) is…….. [ ]

A) -72V B) 62V C) 70 V D) 0 V

15. The unit of electric field intensity is [ ]

A) A/m B) V/m C) V/m D) A/sec

16. The total flux out of a closed surface is equal to the net charge with in the surface. This statement an expression of a [ ]

A) gauss law B)divergence theorem C)faraday's law D)Maxwell's equations

17. In homonogenous linear, isotropic and stationary media, for a plane electromagnetic wave [ ]

A) $\nabla \cdot D = \rho$ B) $\nabla . D = \rho$ C) $\nabla * D = \rho$ D) none

18. It is given that electric flux density (D) in acertain region is expressed by D= $(1/r)a_r$ in spherical co-ordinates. The charge density (u) in this region is given by [ ]

A) l/r B) l/r^2 C) $-l/r^2$ D) r^2

19. The electric field intensity (E) and electric potential (V) are interrelated by [ ]

A) E= -Divergence of V B) E= Divergence of V C) E=-gradient of V D) none of these

20. For an infinite line charge [ ]

A) E= $\rho_S /2\varepsilon$ B) E= $\rho_S /2\pi\varepsilon$ C) E= $\rho_S /4\pi\varepsilon$ D) None

21. Potential at R due to a point charge Q is V = [ ]

A) $V=Q/4\pi\varepsilon R$ B) $V=Q/4\pi\varepsilon R^2$ C) $V=QR/4\pi\varepsilon$ D) None

22. Point charges 30nc,-20nc and 10nc are located at (-1, 0, 2), (0, 0, 0) and (1, 5,-1) respectively. The total flux leaving a cube of side 6 m centered at the origins is [ ]

A) 20nc B)-2nc C) 10nc D) -10nc

23. Inside a hollow spherical conductor [ ]

A) Electrical field is zero B) Electrical field is constant

C) Electrical field changes with the magnitude of charge given to the conductor

D) None of the above

24. A sphere of one meter radius can attain a maximum potential of [ ]

A) 1000 V B) 2 KV C) 30 KV D) 3 million volts

25. Surface integral of electric field intensity is [ ]

A) Electrical charge B) differential of volume flux

C) Net flux emanating from surface D) none of these

26. A plane z=10 m carries charge 20 nc/m^2.Electric field intensity at the origin is [ ]

A) -15 a_z V/m B) -36 π a_z V/m C) -72 pia_z V/m D) -360 π a_z V/m

27. Point charges Q_1=1 nC and Q_2 =2 Nc are at a distance apart. Which of the following statements are correct? [ ]

A) The force on Q_1 is repulsive B) the force on Q_2 is the same in magnitude as that-on Q_1

C) As the distance between them decreases, the force on Q_1 increases linearly

D) All the above

28. Find the Laplacian of the Potential function $V=2x^2+y^2+z^2$ [ ]

A) 2V/m2 B) 6 V/m2 C) 4 V/m2 D) 8 V/m2

29. The unit of electric flux is [ ]

A) Coulomb B) Coulomb/m^2 C) Weber D) Newton/ Coulomb

30. Coulomb's law States that [ ]

A) $F=Q1Q2/4\pi \varepsilon R^2$ B) F=Q1/4π ε R C) F=Q2/4π R D) None

31. The electric flux density D is related to E as [ ]

A) D=E B) εD=E C) D=εE D) None

32. The electric displacement current density is measured in [ ]

A) coulombs/meter B) coulombs /meter ^{2} C) volts/m D) amp/m^2

33. Conductivity is measured in [ ]

A) ohm-m B) ohms/m C)mho-m D) mhos/m

34. The relation between electric polarization and susceptibility indicates that electric Polarizations is [ ]

A) Independent of susceptibility B) inversely proportional to susceptibility

C) Proportional to square root of susceptibility D) proportional to susceptibility

35. The divergence theorem applies to a [ ]

A) Static field only B) time varying field only C) both A & B D) magnetic fields only

36. Find the Laplacian of the Potential function $V=x^2+y^2-z$ [ ]

A) 2V/m2 B) 6 V/m2 C) 4 V/m2 D) 8 V/m2

37. The electric flux density (D) and the electric field intensity (E) interrelated by [ ]

A) D=εE B) D=E/ε C) D=εE² D) D=μE

38. First Maxwell's equation is [ ]

A) ρ_V=V.D B) ρ_V=V.E C) both A & B D) None

39. Laplaces equation V^2 V= [ ]

A) - ρ_v /ε B) ρ_v C) 1 D) 0

40. The unit of field intensity is [ ]

A) Coulomb B) Coulomb/m^2 C) Weber D) Newton/ Coulomb

UNIT –III

CONDUCTORS AND DIELECTRICS

1. The conductivity of a material usually depends on [ ]

A) Temperature B) Frequency C) Temperature and Frequency D) Length

2. The electric field inside the conductor is [ ]

A) Maximum B) Zero C) both a and b D) infinity

3. Convection current occurs when current flows through an insulating medium such as [ ]

A) Liquid B) Copper C) Resistor D) Air

4. Charges in dielectric material are called [ ]

A) Bound charges B) free charges C) polar charges D) none

5. The expression for Electric displacement in Dielectrics, D= [ ]

A) €$_0$ E –P B) €$_0$ E +P C) P - €$_0$ E D) both b & c

6. The phenomena of polarization happens in [ ]

A) Dielectrics B) conductors C) insulators D) none

7. Point form of ohm's law is [ ]

A) E=σJ B) J=σE C) E=σ/J D) E=J

8. For steady current, the continuity equation [ ]

A) $\nabla \cdot \bar{J} = 0$ B) $\nabla \cdot \bar{J} = 1$ C) $\nabla \times \bar{J} = 0$ D) none

9. On the two sides of the boundary, the tangential components of **E** are [ ]

A) Same B) Discontinuous C) Zero D) Infinity

10. A dielectric material is Isotropic if € does not change with [ ]

A) Point to point B) E C) V D) Direction

11. The law of refraction is [ ]

A) $\frac{Tan\,\theta 1}{Tan\,\theta 2} = \frac{\epsilon r1}{\epsilon r2}$ B) $\frac{Tan\,\theta 2}{Tan\,\theta 1} = \frac{\epsilon r1}{\epsilon r2}$ C) $\frac{Tan\,\theta 1}{Tan\,\theta 2} = \frac{\epsilon r2}{\epsilon r1}$ D) $\frac{Tan\,\theta 2}{Tan\,\theta 1} = \frac{\epsilon ro}{\epsilon r1}$

12. The energy density W_m can write [ ]

A) W=1/2 D.E B) W=1/2∈E^2 C) W=D^2/2∈ D) All

13. Which is not an example of convection current [ ]

A) A moving charged belt B) Electronic movement in vacuum tube

C) an electron beam in a television tube C) Electric current flowing in a copper wire

14. Unit of permittivity [ ]

A) F/m B) m/F C) F.m D) F/m^2

15. Dielectric strength is the _____value of electric field at which dielectric breakdown occurs[ ]

A) Maximum B) Minimum C) Zero D) Infinity

16. If no free charges exist at interface then [ ]

A) $D_{1n}-D_{2n}= \rho_s$ B) $D_{1n}-D_{2n}= 0$ C) $D_{1n}-D_{2n}= \infty$ D) None

17. A material is said to be a conductor if [ ]

A) □/ω□<<1 B) □/ω□>>1 C) □/ω□=1 D)□/ω□=0

18. If a dielectric material of ε_r =4 is kept in an electric field $\mathbf{E}=3\mathbf{a}_x+2\mathbf{a}_y+\mathbf{a}_z$, V/m, find electric susceptibility. [ ]

A) 1 B) 2 C) 3 D)4

19. When an electric field **E** is applied, the force on an electron with charge –e is [ ]

A) **F=-eE** B)**F=eE** C)**F=-e/E** D)**F=e/E**

20. _____is current at a given point trough a unit normal area at that point. [ ]

A) Current density B) Flux density C) Both D) Electric field

21. At boundary condition of two dielectrics $D_n1=$ [ ]

A) D_{n2}/ε B) D_{n2} C) εD_{n2} D) none

22. At boundary condition of two dielectrics $E_t1=$ [ ]

A) E_{t2}/ε B) E_{t2} C) εE_{t2} D) None

23. The flux passing through a $2m^2$ area that is normal to the xx-axis at x=4.5m for $D=10x\ \bar{a}_x$ is [ ]

A) 60 C B) 30 C C) 90 C D) 120 C

24. Dipole moment of two equal & opposite charges separated with equal distance d is [ ]

A) p=Q/d B) p=d/Q C) p=Qd D) None

25. In a capacitor, the conduction current and displacement currents are -------- [ ]

A) Equal B) Zero C) not Equal D) depends on area of capacitor plate

26. The displacement current density is given by [ ]

A) $J_D= \frac{\partial D}{\partial t}$ B) $J_D= -\frac{\partial D}{\partial t}$ C) $J_D= -\frac{\partial B}{\partial t}$ D) $J_D= \frac{\partial B}{\partial t}$

27. Polarization of dielectric materials results in [ ]

A) Production of eddy currents B) Creation of dielectric dipoles

C) Release of protons D) absorption of electrons

28. The unit of Polarization is the same as that of [ ]

A) Electric field density (D) B) electric intensity (E) C) charge D) dielectric flux

29. The Polarization of dielectric material is given by [ ]

A) $P=\varepsilon_r E$ B) $P= (\varepsilon_r-1)E$ C) $P= (\varepsilon_r-1)E\varepsilon_o$ D) $P= (\varepsilon_r-1)\varepsilon_o$

30. The capacitance of an insulated conducting sphere of radius R in vacuum is [ ]

A) $2\pi\varepsilon_0 R$ B) $4\pi\varepsilon_0 R$ C) $4\pi\varepsilon_0 R^2$ D) $4\pi\varepsilon_0/R$

31. The conductivity of an ideal conductor is [ ]

A) Zero B) infinite C) 100C D) 50nF

32. The continuity equation of the current is based on [ ]

A) Conservation of charge B) Conservation of momentum

C) Conservation of motion D) Conservation of velocity

33. Capacitance is measured in _____ [ ]

A) Coulomb/ amp B) amp/Coulomb C) Coulomb/ volt D) volt/ Coulomb

34. The maximum value of applied electric field at which the dielectric break down occurs is called [ ]

A) dielectric field B) dielectric intensity C) dielectric strength D) none

35. Dielectrics can store the energy due to [ ]

A) magnetization B) Polarization C) density D) electrons

36. The conductivity of ideal conductor is [ ]

A) Zero B) infinite C) +250C D) +100C

37. Current density is _____ [ ]

A) Scalar quantity B) vector quantity C) both D) none

38. In Dielectrics displacement current is under the influence of [ ]

A) Magnetic field B) magnetic field intensity C) electric field D) electric field intensity

39. The phenomena of polarization happen in [ ]

A) Dielectrics B) conductors C) insulators D) none

40. Energy stored in capacitor is____ [ ]

A) $\frac{1}{2} cv^2$ B) $\frac{1}{2} Lv^2$ C) $\frac{1}{2} cI^2$ D) $\frac{1}{2} LI^2$

UNIT –IV

MAGNETO STATICS

1. In steady magnetic field $\nabla \times \vec{H}$ = ---------- [ ]

A) Zero B) $\vec{J}$ C) $-\frac{\partial B}{\partial t}$ D) $\frac{\partial D}{\partial t}$

2. The line integral of magnetic field intensity $\vec{H}$ around a closed path is exactly equal to the direct current enclosed by that path is given by ---------- law [ ]

A) Gauss B) Faraday's C) Biot-savart D) Amperes

3. The magnetic force F_m on a moving charge is given by---------- [ ]

A) F =QE B) F= V×B `C) F= Q V×B D) F=0

4. The Lorentz force equation is given by---------- [ ]

A) F =QE B) F= Q (E+V×B) C) F= Q V×B D) none

5. The Maxwell equation in time variant field is given by---------- [ ]

A) $\nabla \times \vec{H} = \vec{j}$ B) $\nabla \times \vec{H} = \vec{j} + \frac{\partial D}{\partial t}$ C) $\nabla \times \vec{H} = \vec{j} + \frac{\partial E}{\partial t}$ D) $\nabla \times \vec{H} = 0$

6. The faraday's law in differential form is given by [ ]

A) $\nabla \times \vec{E} = \vec{j}$ B) $\nabla \times \vec{E} = \frac{\partial D}{\partial t}$ C) $\nabla \times \vec{E} = -\frac{\partial B}{\partial t}$ D) $\nabla \times \vec{E} = \frac{\partial B}{\partial t}$

7. In general magnetic field intensity is directly proportional to [ ]

A) Voltage B) current C) distance D) None

8. In general magnetic field intensity is inversely proportional to [ ]

A) Voltage B) current C) distance D) None

9. A conductor 6m long lies along Z direction with a current of 2A in a direction. Find the force experienced by the conductor if $\vec{B}$ = 0.08 a_x Tesla. [ ]

A) 0.9 a_y B) 0.96 a_y C) 0.96 a_z D) 0.96 a_x

10. The magnetic field intensity at the centre of a long solenoid is---------- [ ]

A) H= $N\frac{I^2}{l}$ B) $\frac{NI}{l}$ C) $\frac{NI}{l^2}$ D) $\frac{N^2 I}{l}$

11. The total magnetic flux coming out of closed surface is---------- [ ]

A) infinite B) finite C) zero D)None

12. The MFI due to an infinitely long straight conductor carrying a current I is----- [ ]

A) H= $\frac{I}{2\pi d}$ B) H = $\frac{I}{2d}$ C) H = $\frac{I}{d}$ D) 2dl

13. The line integral of H about any closed path is exactly equal to the ------- enclosed by that path [ ]

A) field B) potential C)current D)None

14. The MFI at the centre of the square current carrying wire is [ ]

A) H= $\frac{I}{a}$ B) H = $\frac{\sqrt{2}I}{a}$ C) H = $\frac{2I}{\pi a}$ D) $\frac{\sqrt{2}I}{\pi a}$

15. The expression for biot-savarts law in integral form is [ ]

A) H= $\int \frac{I.\overrightarrow{dl} \times \vec{r}}{4\pi r^2}$ B) H= $\int \frac{I.\overrightarrow{dl} \times \vec{r}}{4\pi r^3}$ C) H=$\int \frac{I.\overrightarrow{dl} \times \vec{r}}{4\pi r}$ D) $\int \frac{I.\overrightarrow{dl} \times \vec{r}}{4r^2}$

16. The Amperes circuital law in integral form is [ ]

A) $\oint \vec{H}.\overrightarrow{dl}$ = I B) $\oint \vec{H}.\overrightarrow{dl}$ = J C) $\oint \vec{H}.\overrightarrow{dl}$ = 0 D) none

17. Point form of Ampere's circuital law is [ ]

A) $\nabla \times \vec{H} = \vec{j}$ B) $\nabla \times \vec{H} = 0$ C) $\nabla \times \vec{B} = \vec{j}$ D) $\nabla \times \vec{H} = 0$

18. The charges is motion produce a---------- [ ]

A) Electric field B) magnetic field C) electro static fields D) None

19. If the particle is at rest in magnetic fields, then it will experience---------- [ ]

A) Forces B) no forces C) can't say D) none

20. The force on a straight conductor in a magnetic field is given by /F/= [ ]

A) BILsinΘ B) $\vec{F} = I\vec{l} \times \vec{B}$ C) A or B D) none

21. The surface integral of B over a closed surface S in a magnetic field must be [ ]

A) BSCOSΘ B) BS SINΘ C) Zero D) none

22. A differential current loop is carrying current I have a magnetic dipole moment m= [ ]

A) $\frac{I}{A}$ B) IA C) $I^2 A$ D) None

23. Magnetic field intensity interms of magnetic flux density is given as---------- [ ]

A) $\vec{H} = \mu \vec{B}$ B) $\vec{H} = \frac{\vec{B}}{\mu}$ C) $\vec{H} = \frac{\vec{B}}{\varepsilon\mu}$ D) $\vec{H} = \frac{\vec{B}}{\varepsilon}$

24. The concept of displacement current was a major contribution attributed to [ ]

A) Faraday B) Lenz C) Lorentz D) Maxwell

25. Magnetic fields can exert force on [ ]

A) Moving charges only B) Staionary charges only C) A and B D) None

26. Ampere's law state that the force $\vec{F}$ between two parallel wire carrying current I_1 and I_2 is equal to [ ]

A) $\frac{\mu_0 I_1 I_2}{2\pi d}$ B) $\frac{\mu_0 I_1 I_2}{2\pi d} l$ C) $\frac{\mu_0 I_1 I_2}{2d}$ D) $\frac{\mu_0 I_1 I_2}{2\pi dl}$

27. When a charged particle having charge Q travels with velocity V in magnetic field $\vec{B}$, it will experience a force F_m is given by [ ]

A) $\overrightarrow{F_m}$= Q ($\vec{V} \times \vec{B}$) B)QVB sinΘ C) A or B D) none

28. The expression for Torque on a current loop placed in a magnetic field is T = [ ]

A) mB sinΘ B)$\vec{m} \times \vec{B}$ C)A or B D) none

29. The unit of magnetic field intensity $\overrightarrow{H}$ is ---------- [ ]

A) weber B) $\frac{AT}{m}$ C)Tesla D)no units

30. The Curl operator used in ----------fields [ ]

A) Electrostatic B) Magneto static C) both A and B D) none

31. The torque on a magnetic dipole is ($\vec{F} = force\ and\ \vec{R} = moment\ of\ arm$) [ ]

A)$\vec{T} = \vec{R} \times \vec{F}$ B) $\vec{T} = \vec{F} \times \vec{R}$ C)$\vec{T} = \vec{R}.\vec{F}$ D) $\vec{T} = \vec{F}$

32. The MFI at the centre of the circular loop is [ ]

A) H = $\frac{I}{2a}$ B) H = $\frac{I}{a}$ C) L = $\frac{\sqrt{3}}{2a}$ I D) L = $\frac{5I}{2a}$

33. Ampere's law state that the force $\vec{F}$ between two parallel wire carrying current I_1 and I_2 is equal to [ ]

A) $\frac{\mu_0 I_1 I_2}{2\pi d}$ B) $\frac{\mu_0 I_1 I_2}{2\pi d} l$ C) $\frac{\mu_0 I_1 I_2}{2d}$ D) $\frac{\mu_0 I_1 I_2}{2\pi dl}$

34. When a charged particle having charge Q travels with velocity V in magnetic field $\vec{B}$, it will experience a force F_m is given by [ ]

A) $\overrightarrow{F_m}$= Q ($\vec{V} \times \vec{B}$) B) QVB sinΘ C) A or B D) none

35. The line integral of magnetic field intensity $\vec{H}$ around a closed path is exactly equal to the direct current

enclosed by that path is given by ---------- law [ ]

A) Gauss B) Faraday's C) Biot savart D) Amperes

36. In the expression $\vec{B} = \times \vec{A}$, is $\vec{A}$ is called ---------- [ ]

A) Area of the field B) vector magnetic potential C) scalar magnetic potentials D) None

37. The expression for biot-savarts law in integral form is [ ]

A) H= $\int \frac{I.\overline{dl} \times \vec{r}}{4\pi r^2}$ B) H= $\int \frac{I.\overline{dl} \times \vec{r}}{4\pi r^3}$ C) H=$\int \frac{I.\overline{dl} \times \vec{r}}{4\pi r}$ D) $\int \frac{I.\overline{dl} \times \vec{r}}{4r^2}$

38. The faraday's law in integral form is given by [ ]

A) $emf = -\int_s \frac{\partial B}{\partial t}.ds$ B) $emf = \int_s \frac{\partial B}{\partial t}.ds$ C) $emf = -\int_s \frac{\partial D}{\partial t}.ds$ D) none

39. The force of ---------- is experienced between two parallel conductors carrying current in opposite direction. [ ]

A) Attraction B) Repulsion C) Zero D) None

40. The force of ---------- is experienced between two parallel conductors carrying current in same direction. [ ]

A) Attraction B) Repulsion C) Zero D) None

UNIT –V

MAGNETIC POTENTIAL AND TIME VARYING FIELDS

1. The inductance of a solenoid is given by [ ]

A) L = $\frac{N\mu A}{l}$ B) L =$\frac{N\mu}{l}$ C) L = $\frac{N^2\mu A}{l}$ D) L = $\frac{N^2\mu A}{2\pi R}$

2. The inductance of a Torroid is given by [ ]

A) L = $\frac{N\mu A}{l}$ B) L =$\frac{N\mu}{l}$ C) L = $\frac{N^2\mu A}{l}$ D) L = $\frac{N^2\mu A}{2\pi R}$

3. The divergence of magnetic flux density $\nabla.\vec{B}$ is ---------- [ ]

A) $\nabla.\vec{B} = \rho_v$ B) $\nabla.\vec{B} = -\rho_v$ C) $\nabla.\vec{B} = 0$ D) none

4. What is the energy density in free space on account of field intensity H= 1000A/m? [ ]

A) 0.2 J/m^3 B) 0.628 J/m^3 C) 0.735 J/m^3 D) 0

5. The scalar magnetic potentials satisfy the ---------- equation [ ]

A) Poisson B) Laplace C) Both A &B D) None

6. The vector magnetic potentials satisfy the ---------- equation [ ]

A) Poisson B) Laplace C) Both A &B D) None

7. What is the value of permeability constant μ_0 in free space [ ]

A) 8.54×10^{-12} H/m B) $4\pi\times10^{-12}$ H/m C) $4\pi\times10^{-7}$ H/m D) 0

8. The numan's formulae for finding the mutual inductance is given by [ ]

A) M=$\frac{\mu}{4\pi}\iint_{c1c2}\frac{dl_1.dl_2}{r}$ B) M=$\frac{\mu}{4\pi}\iint_{c1c2}\frac{dl_1}{r}$ C) M=$\frac{\mu I}{4\pi}\iint_{c1c2}\frac{dl_1.dl_2}{r}$ D) none

9. If the two coils L_1 and L_2 are connected in series aiding the total inductance is [ ]

A) L_1+L_2 B) L_1+L_2-2M C) L_1+L_2+2M D) $M = \frac{L1L2}{L1+L2}$

10. If the two coils L_1 and L_2 are connected in series opposing the total inductance is [ ]

A) L_1+L_2 B) L_1+L_2-2M C) L_1+L_2+2M D) $M = \frac{L1L2}{L1+L2}$

11. If the two coils L_1 and L_2 are connected in parallel aiding the total inductance is [ ]

A) L_1+L_2 B) L_1+L_2-2M C) $M = \frac{L1L2-M^2}{L1+L2+2M}$ D) $M = \frac{L1L2-M^2}{L1+L2-2M}$

12. If the two coils L_1 and L_2 are connected in parallel opposing the total inductance is [ ]

A) L_1+L_2 B) L_1+L_2-2M C) $M = \frac{L1L2-M^2}{L1+L2+2M}$ D) $M = \frac{L1L2-M^2}{L1+L2-2M}$

13. The energy density in magnetic field is given by [ ]

A) $\frac{1}{2}\mu H^2$ B) $\frac{1}{2}\mu B^2$ C) $\frac{1}{2}\mu H$ D) none

14. The energy stored in magnetic field is given by [ ]

A) $\frac{1}{2}LI$ B) $\frac{1}{2}LI^2$ C) $\frac{1}{2}I^2$ D) none

15. The coefficient of coupling K between two coil is [ ]

A) K =M$\sqrt{L_1L_2}$ B)K= $\frac{M}{\sqrt{L_1L_2}}$ C)K= $\sqrt{\frac{M}{L_1L_2}}$ D)None

16. In free space relative permeability μ_r=---------- [ ]

A) 0 B) 1 C) infinite D) None

17. What is the unit of Energy density? [ ]

A) Joules B)Weber C)Joules /m^3 D)Weber/m^3

18. in magnetic fields $\nabla.\vec{B}$ is ---------- [ ]

A)$\nabla.\vec{B} = \frac{\rho_v}{\varepsilon}$ B)$\nabla.\vec{B} = -\rho_v$ C) $\nabla.\vec{B} = 0$ D) none

19. The transformer induction equation is given by [ ]

A) emf =$-\oint_s \frac{\partial B}{\partial t}$ B) emf = $\oint_s \frac{\partial B}{\partial t}$ C) emf =$-\oint_s \frac{\partial D}{\partial t}$ D) emf = $\oint_s \frac{\partial D}{\partial t}$

20. The emf induced in a coil is directly proportional to [ ]

A) flux B) rate of change of flux C) current D) none

21. Find the coefficient of coupling K between two coil, where $L_1=L_2=M=1H$ [ ]

A) K =1 B) K= 0.5 C) K=2 D) None

22. The inductance of a Torroidal ring is given by [ ]

A) L = $\frac{N\mu A}{l}$ B) L = $\frac{N\mu}{l}$ C) L = $\frac{N^2\mu A}{l}$ D) L = $\frac{N^2\mu A}{2\pi R}$

23. The curl of magnetic field intensity is [ ]

A)$\nabla \times \vec{H} = \vec{j}$ B) $\nabla \times \vec{H} = 0$ C) $\nabla \times \vec{B} = \vec{j}$ D)$\nabla \times \vec{H} = 0$

24. The unit of scalar magnetic potential is [ ]

A) Ampere B) Volt C) Amp/m D) Volt/m

25. Vector magnetic potential exists in regions where **J** is [ ]

A) Absent B) Present C) not related to **J** D) None

26. Vector magnetic potential has applications in [ ]

A) Antennas B) transmission lines C) Microwave ovens D) All

27. Magnetic scalar potential is defined in the region [ ]

A) **J**=0 B)**J**>0 C) **J**<0 D)**E**=0

28. The relation between magnetic flux density **B**and vector magnetic potential **A** is [ ]

A) $\bar{B}=\nabla.\bar{A}$ B) $\bar{A}=\nabla.\bar{B}$ C) $\bar{B}=\bar{A}X\nabla$ D) $\bar{B}=\nabla X\bar{A}$

29. If R is the mean radius of toroid with N number of turns and A is the area of cross-section of a toroid then Inductance of toroid is [ ]

A) $L=\frac{\mu NA}{2\pi r}$ B) $L=\frac{\mu NR}{2\pi A}$ C) $L=\frac{\mu N^2 A}{2\pi r}$ D) None

30. If M is the mutual inductance between two magnetically coupled circuits having self-inductances L_1 and L_2 and K is the coefficient of coupling between them then [ ]

A) M = K $\sqrt{L_1L_2}$ B) K = M $\sqrt{L_1L_2}$ C) M = K L_1L_2 D) None

31. The magnetic field in a solenoid is [ ]

A) H=N/I B) H=n/I C) H=NA/I D) H=I/N

32. A toroid has air core and has a cross-sectional area of $10mm^{2.}$ It has 1000 turns and its mean radius is 10 mm. Find its inductance. [ ]

A) 0.02mH B) 0.002mH C) 0.02H D) 0.02mH

33. Energy density in a magnetic field [ ]

A) $W_H=0.5\mu H^2$ B) $W_H=1/2\ \mu H^2$ C) $W_H=1/2$ B.H D) All

34. Inductance has equivalent use in magnetics as _____has in electrostatics, including storage of energy. [ ]

A) Electric filed B) Electric Flux density C) Potential D) Capacitance

35. Self-inductance is defined as the rate of total magnetic flux linkage to the_____ through the coil. [ ]

A) Current B) energy C) Power D) flux

36. The mutual inductance between two coupled circuit has the property that [ ]

A) $L_{12}>L_{21}$ B) $L_{12}<L_{21}$ C) $L_{12}=L_{21}$ D) $L_{12}\leq L_{21}$

37. If a current of 1.0 amp flowing in an inductor , L=2 henry, the energy stored in an inductance [ ]

A) 2 J B) 1J C) 2J/m D) 0.5J

38. If μ=1.0 μH/m for a medium, H=2.0 A/m, the energy stored in the field is [ ]

A) 0.5 J/m^3 B) 1μJ/m^3 C) 2μJ/m^3 D) 1J/m^3

39. The force produced by B=2wb/m^2on a current element of 2 A-m is [ ]

A) 4 N B) 1 N C) 2 N D) 0.5 N

40. $M_{12}=\frac{N1\ \emptyset 12}{I2}$ is _____ inductance between two coils [ ]

A) Self B) Mutual C) Series D) Parallel

41. Current passing through the capacitor is called [ ]

A) Conduction current B) Convection current C) Displacement current D) All

42. Electromagnetic fields produced by [ ]

A) Stationary charges B) Steady current C) time-varying currents D) All

43. Except in electrostatics, voltage and potential difference are usually [ ]

A) not equivalent. B) equivalent C) zero D) infinity

44. When a conducting loop is moving in a static B field, an emf is induced in the loop. Such an emf is called as [ ]

A) Motional emf B) flux cutting emf C)Static emf D) a & b

1. In case of time varying fields Gauss law is [ ]

A) Curl H=J+ ∂D/∂t B) Div D= ρ_v C) Div .B = 0 D) Curl E =-∂ B/∂

2. Formula for displacement current [ ]

A) ∂**D**/∂t B) **J**=J+∂**D**/∂t C)**J**=σ**E** D) **J**=∂**B**/∂t

3. Who is the founder of electromagnetic theory [ ]

A) Faraday B)Lenz C)Lorentz D)Maxwell

4. A time-harmonic field is one that varies_____with time. [ ]

A) Periodically B) sinusoidally C) non-periodically D)a & b

5. A loop is rotating about the y-axis in a magnetic field B = Ba sin wt$\mathbf{a}_x$Wb/m^2. The voltage induced in the loop is due to [ ]

A) Rotional emf B) Transformer emf

C) A combination of motional and transformer emf D) none of the above

6. The Maxwell's equation ∇.**B**=0 is due to [ ]

A) **B**=μ**H** B) B=μ/H C) non-existence of mono pole D) none of these

7. Applications of electromagnetic waves [ ]

A) satellite B) television C)Radars D) All

8. For a uniform plane wave in the x-direction has [ ]

A) $E_x=0$ B) $H_x=0$ C) $E_x=0$ and $H_x=0$ D) $E_z=0$

9. **E.H** of a uniform plane wave is [ ]

A) EH B) 0 C) ηE^2 D) ηH^2

10. The direction of propagation of EM wave is obtained from [ ]

A) **E×H** B) **E.H** C) **E** D) **H**

11. Velocity of the wave in an idle conductor is [ ]

A) Zero B) very large C) moderate D) small

12. Velocity of EM wave in free space is [ ]

A) Independent of frequency (f) B) increase with increase in f

C) Decrease with increase in f D) Zero

13. Pointing vector **P**= [ ]

a) **E×H** B) **E.H** C) ½ **E×H** D) **(E×H)**^{2}

14. Depth of penetration δ= [ ]

A) $1/\beta$ B) $1/\alpha$ C) $1/\gamma$ D) $1/\sigma$

15. In pointing vector **E×H** represents [ ]

A) Electric field per unit area B) magnetic field per unit area

C) power flow per unit area D) All

16. Velocity of EM wave in good dielectric is [ ]

A) $v=\omega/\beta$ B) $v=\omega/\alpha$ C) $v=\omega/\delta$ D) $v=\alpha/\beta$

21. Reciprocal of attenuation constant is called [ ]

A) Skin depth B) pointing vector C) drift current D) displacement current

22. A wave propagating in the +z direction and the wave is called_____ [ ]

A) Forward travelling wave B) backward travelling wave C) wavelength D) none

23. The emf induced in coil is given by [ ]

A) $e=-N\frac{d\emptyset}{dt}$ B) $e=-N\frac{dI}{dt}$ C) $e=-L\frac{dI}{dt}$ D)A and C

24. A wave propagating in the -z direction and the wave is called_____ [ ]

A) Forward travelling wave B) backward travelling wave C) wavelength D) none

25. Skin resistance (Ω/m^2) is defined ____ part of intrinsic impedance for good conductor [ ]

A) Real part B) imaginary part C) zero D) none

26. The field intensity in a conductor rapidly decreases are known as [ ]

A) Skin depth B) skin effect C) pointing field D) wave field

27. Skin depth is also known as [ ]

A) Wave depth B) pointing depth C) penetration depth D) drift current

28. In dielectric medium the displacement current is_____ compared to conduction current [ ]

A) greater B) equal C) lesser D) none

29. The e.m.f is induced in a stationary closed path due to the time varying field is called [ ]

A) Statically induced e.m.f B) dynamically induced e.m.f

C) Motional e.m.f D) none

30. The e.m.f is induced in a stationary closed path due to the static varying field is called [ ]

A) Statically induced e.m.f B) dynamically induced e.m.f

C) Transformer e.m.f D) none

31. Skin Depth δ= [ ]

A) α B) 1/α C)1/β D) β

32. For a time varying fields ∇ X H= _____ [ ]

A) $J+\frac{\partial \vec{B}}{\partial t}$ B) $J+\frac{\partial \vec{D}}{\partial t}$ C) $J+\frac{\partial \vec{E}}{\partial t}$ D) $I+\frac{\partial \vec{D}}{\partial t}$

33. Poynting vector _____ [ ]

A) AXB B) AXE C) EXH D) BXH

34. The induced voltage opposes the flux producing in it is called _____Law [ ]

A) Lenz's B) Faraday's C) Ampere's D) Gauss

35. Time varying fields are due to _____Charges [ ]

A) Static B) Accelerated C) Decelerated D) Uniform

36. Time varying fields are due to _____Charges Lenz's [ ]

A) Static B) Accelerated C) Decelerated D) Uniform

37. The induced voltage opposes the flux producing in it is called _____Law [ ]

A) Lenz's B) Faraday's C) Ampere's D) Gauss

38. The induced emf, V_{emf} in any closed circuit is equal to time rate of change of the magnetic flux linkages by the circuit is called _____Law [ ]

A) Gauss's B) Ampere's C) Lenz's D) Faraday's

39. If a moving loop is kept in a static B field, the emf induced is _____. [ ]

A) Rotational B) Motional C) Both D) None of these

40. The ratio of transmitted electric field to incident electric field is called_____ [ ]

A) Transmission B) Reflection C) Both D) None

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