1. When two vectors are perpendicular,Then their
   [a) Dot product is zero b) Cross product is zero c) Both are zero d) Bothare not zero
2. 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
3. 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
4. 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
5. The dot product of two vectors is a scalar. The cross product of two vectors is a vector. State True/False.
   [a) True   b) False
6. Which of the Pythagorean Theorem is valid in Electromagnetics?
   a) |dot product| + |dot product| = 1 b) |cross product| – |cross product| = 1
   [c[) |dot product|^2 + |cross product|^2 = 1 d) |dot product| + |cross product| = 0
7. The distance vector is obtained in
   a) Cartesian coordinate system   b) Spherical coordinate system
   c) Circular coordinate system   [d) Space coordinate system
8. The divergence of distance vector is
   a) 0   [b) 3   c) 2   d) 1
9. Find a vector normal to a plane consisting of points p1(0,1,0), p2(1,0,1) and p3(0,0,1)
   a) –j – k   b) –i – j   c) –i – k   d) –i – j – k
10. The polar form of Cartesian coordinates is
    [a) Circular coordinates   b) Spherical coordinates
    c) Cartesian coordinates   d) Space coordinates
11. he work-electric field relation is given by
    a) Volume integral   b) Surface integral
    [c) Line integral   d) Relation impossible
12. The distance vector can be used to compute which of the following?
    a) Dot product   b) Cross product
    [c) Unit normal vector   d) Area
13. Find the projection of A on B. Given A = 10j + 3k and B = 4j + 5k.
    a) 6   [b) 6.25   c) 6.5   d) 6.75

14. The vector product of two vectors is given by area of the parallelogram. State True/False.
    [a) True   b) False
15. The del operator is called as
    a) Gradient   b) Curl   c) Divergence [d) Vector differential operato
16. The relation between vector potential and field strength is given by
    [a) Gradient b) Divergence c) Curl   d) Del operator
17. The Laplacian operator is actually
    a) Grad(Div V) [b) Div(Grad V)   c) Curl(Div V)   d) Div(Curl V)
18. The divergence of curl of a vector is zero. State True or False.
    [a) True   b) False
19. The curl of gradient of a vector is non-zero. State True or False.
    a) True   [b) False
20. A vector is said to be solenoidal when its
    [a) Divergence is zero   b) Divergence is unity
    c) Curl is zero   d) Curl is unity
21. The magnetic field intensity is said to be
    a) Divergent b) Curl free   [c) Solenoidal   d) Rotational
22. A field has zero divergence and it has curls. The field is said to be
    a) Divergent, rotational   [b) Solenoidal, rotational
    c) Solenoidal, irrotational   d) Divergent, irrotational
23. When a vector is irrotational, which condition holds good?
    a) Stoke's theorem gives non-zero value [b) Stoke's theorem gives zero value
    c) Divergence theorem is invalid   d) Divergence theorem is valid
24. The Cartesian system is also called as
    a) Circular coordinate system   [b) Rectangular coordinate system
    c) Spherical coordinate system   d) Space coordinate system
25. The volume of a parallelepiped in Cartesian is
    [a) dV = dx dy dz   b) dV = dx dy   c) dV = dy dz   d) dV = dx dz
26. A charge is placed in a square container. The position of the charge with respect to the origin can be found by
    a) Spherical system   b) Circular system
    [c) Cartesian system   d) Space coordinate system
27. The scalar factor of Cartesian system is unity. State True/False.
    [a) True   b) False
28. The Cartesian coordinates can be related to cylindrical coordinates and spherical coordinates. State True/False.
    [a) True   b) False
29. 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
30. The spherical equivalent of the vector B = yi + (x + z)j located at (-2,6,3) is given by
    a) (7,64.62,71.57) b) (7,-64.62,-71.57) c) (7,-64.62,71.57) [d) (7,64.62,-71.57)

31. Convert the point (3,4,5) from Cartesian to spherical coordinates
   [a) (7.07,45º,53º)   b) (0.707,45º,53º)   c) (7.07,54º,63º)   d) (0.707,54º,63º)
32. Spherical systems are employed in waveguides. State True/False
   a) True   [b) False
33. Find the Cartesian coordinates of B(4,25º,120º)
   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)

34   The area of sphere can be computed from the sphere volume. State True/False.
   [a) True   b) False

35. The cylindrical coordinate system is also referred to as
a) Cartesian system   [b) Circular system
c) Spherical system   d) Space system

36. A charge located at point p (5,30º,2) is said to be in which coordinate system?
a) Cartesian system   [b) Cylindrical system

c) Spherical system   d) Space system

38Cylindrical system is employed in waveguides. State True/False.
   [a) True   b) False

39 Charges filled inside a cylindrical will possess flux in which direction?
a) Upwards b) Downwards [c) Laterally outwards d) Inwards

40 Gradient of a function is a constant. State True/False.
a) True   [b) False

41.The mathematical perception of the gradient is said to be
a) Tangent   b) Chord [c) Slope   d) Arc

43. Divergence of gradient of a vector function is equivalent to
[a) Laplacian operation   b) Curl operation
c) Double gradient operation   d) Null vector

44 .The gradient of xi + yj + zk is
a) 0   b) 1   c) 2   [d) 3

45. Curl of gradient of a vector is
a) Unity   b) Zero
[c) Null vector   d) Depends on the constants of the vector

45. The gradient can be replaced by which of the following?
a) Maxwell equation   b) Volume integral
[c) Differential equation   d) Surface integral

46. When gradient of a function is zero, the function lies parallel to the x-axis. State True/False.

[a) True   b) False

47. The divergence of a vector is a scalar. State True/False.

[a) True   b) False

48. The divergence concept can be illustrated using Pascal's law. State True/False.

[a) True   b) False

49. Compute the divergence of the vector xi + yj + zk.

a) 0   b) 1   c) 2   [d) 3

50.. Find the divergence of the vector yi + zj + xk.

a) -1   [b) 0   c) 1   d) 3

51. Given $D = e^{-x}\sin y\ i - e^{-x}\cos y\ j$

Find divergence of D.

a) 3   b) 2   c) 1   [d) 0

52. 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) $(x - 1)(1 - e)$

53. 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, solenoid   lc) 1, divergent d) 0, divergent

54. 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

55. Find the divergence of the field, $P = x^2yz\ i + xz\ k$

a) xyz + 2x   [b) 2xyz + x   c) xyz + 2z   d) 2xyz + z

56. 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

57.. Find the potential between two points p(1,-1,0) and q(2,1,3)with $E = 40xy\ i + 20x^2\ j + 2\ k$

a) 104   b) 105   [c) 106   d) 107

58. Find the potential between a(-7,2,1) and b(4,1,2). Given $E = (-6y/x^2\ )i + (6/x)\ j + 5\ k$.

a) -8.014   b) -8.114   [c) -8.214   d) -8.314

59. The potential of a uniformly charged line with density λ is given by, $λ/(2πε)\ \ln(b/a)$. State True/False.

[a) True   b) False

60. A field in which a test charge around any closed surface in static path is zero is called

a) Solenoidal   b) Rotational   c) Irrotational   [d) Conservative

61. The potential in a lamellar field is

a) 1   [b) 0   c) -1   d) ∞

62. Line integral is used to calculate

a) Force   b) Area   c) Volume   [d) Length

63. The energy stored in the inductor 100mH with a current of 2A is
    [a) 0.2   b) 0.4   c) 0.6   d) 0.8

64. An electric field is given as E = 6y²z i + 12xyz j + 6xy² k. An incremental path is given by dl = -3 i + 5 j – 2 k mm. The work done in moving a 2mC charge along the path if the location of the path is at p(0,2,5) is (in Joule)
        a) 0.64   [b) 0.72   c) 0.78   d) 0.80
65. The integral form of potential and field relation is given by line integral. State True/False
    [a) True   b) False

66. If V = 2x²y – 5z, find its electric field at point (-4,3,6)
        a) 47.905   [b) 57.905   c) 67.905   d) 77.905
67 Gauss law for electric field uses surface integral. State True/False
    [a) True   b) False

68. Surface integral is used to compute
        a) Surface   [b) Area   c) Volume   d) density

69. Coulomb's law can be derived from Gauss law. State True/ False
    [a) True   b) False

70 Evaluate Gauss law for D = 5r²/4 i in spherical coordinates with r = 4m and θ = π/2.
    a) 600   b) 599.8   [c) 588.9   d) 577.8

71. Compute the Gauss law for D= 10ρ³/4 i, in cylindrical coordinates with ρ= 4m, z=0 and z=5.
        a) 6100 π   b) 6200 π   c) 6300 π   [d) 6400 π

72. Compute divergence theorem for D= 5r²/4 i in spherical coordinates between r=1 and r=2.
        a) 80π   b) 5π   [c) 75π   d) 85π

73. Find the value of divergence theorem for A = xy² i + y³ j + y²z k for a cuboid given by 0<x<1, 0<y<1 and 0<z<1.
        a) 1   b) 4/3   [c) 5/3   d) 2

74. The ultimate result of the divergence theorem evaluates which one of the following?
            a) Field intensity   b) Field density   c) Potential   [d) Charge and flux
75. Find the value of divergence theorem for the field D = 2xy i + x² j for the rectangular parallelepiped given by x = 0 and 1, y = 0 and 2, z = 0 and 3.
            a) 10   [b) 12   c) 14   d) 16

76. If D = 2xy i + 3yz j + 4xz k, how much flux passes through x = 3 plane for which -1<y<2 and 0<z<4?
            a) 12   b) 24   [c) 36   d) 48
77 Divergence theorem is based on
    [a) Gauss law   b) Stoke's law   c) Ampere law   d) Lenz law
78. The Gaussian surface for a line charge will be

a) Sphere   [b) Cylinder   c) Cube   d) Cuboid
79. The Gaussian surface for a point charge will be
    a) Cube   b) Cylinder   [c) Sphere   d) Cuboid

80. A circular disc of radius 5m with a surface charge density ρs = 10sinφ is enclosed by surface. What is the net flux crossing the surface?
        a) 3   b) 2   c) 1   [d) 0

81. The total charge of a surface with densities 1,2,…,10 is
        a) 11   b) 33   [c) 55   d) 77

82. The work done by a charge of 10µC with a potential 4.386 is (in µJ)
        a) 32.86   [b) 43.86   c) 54.68   d) 65.68
83. The potential of a coaxial cylinder with charge density 1 unit , inner radius 1m and outer cylinder 2m is (in 10^9)
        a) 12.74   b) 13.47   [c) 12.47 d) 13.74
84. Find the potential due to a charged ring of density 2 units with radius 2m and the point at which potential is measured is at a distance of 1m from the ring.
        a) 18π   b) 24π   c) 36π   [d) 72π
85. Gauss law cannot be used to find which of the following quantity?
        a) Electric field intensity b) Electric flux density c) Charge[d) Permittivity
86. Gauss law for magnetic fields is given by
        a) Div(E) = 0 [b) Div(B) = 0   c) Div(H) = 0   d) Div(D) = 0
87. The given equation satisfies the Laplace equation.
V = x^2 + y^2 – z^2. State True/False.
        [a) True   b) False

88. In free space, the Poisson equation becomes
        a) Maxwell equation b) Ampere equation [c) Laplace equation d) Steady state
89. If Laplace equation satisfies, then which of the following statements will be true?
        a) Potential will be zero   [b) Current will be infinite
        c) Resistance will be infinite   d) Voltage will be same

90. . Find the electric field of a potential function given by 20 log x + y at the point (1,1,0).
        a) -20 i – j   b) -i -20 j   c) i + j   d) (i + j)/20
91. When a material has zero permittivity, the maximum potential that it can possess is
        [a) ∞   b) -∞   c) Unity   d) Zero

92. In free space, the charge carriers will be
        a) 0   b) 1   [c) 100   d) Infinity
93. In free space, which parameter will be unity?
        a) Permittivity   b) Absolute permittivity [c) Relative permittivity d) Permeability
94. Which parameter is unity in air medium?
    a) Permittivity   b) Absolute permeability   [c) Relative permeability   d) Permeability
96. The conductivity in free space medium is
        a) Infinity   b) Unity   [c) Zero   d) Negative
97. The intrinsic impedance of free space is
    a) 489   b) 265   c) 192   [d) 377

99In free space, the ratio of frequency to the velocity of light gives the phase constant. State True/False.   [a) True   b) False

100. The vectors of the electromagnetic wave propagation can be expressed in
a) Dot product [b) Cross product c) Unit vector   d) Perpendicular vector