

SRI SAIRAM ENGINEERING COLLEGE
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING

SAMPLE QUESTIONS FOR TEACHING LEARNING PROCESS

Domain: **ELECTROMAGNETIC FIELDS AND TRANSMISSION LINES**

1) The constant x-circles of Smith chart becomes smaller due to increase in the value of 'x' from _____

- a. 0 to π
- b. 0 to 2π
- c. 0 to $\pi/2$
- d. 0 to ∞

2) According to Smith diagram, where should be the position of reflection coefficient value for a unity circle with unity radius?

- a. On or inside the circle
- b. Outside the circle
- c. Both a and b
- d. None of the above

3) If the quarter line is short-circuited, then it acts as _____

- a. Conductor
- b. Insulator
- c. Semiconductor
- d. Power regulator

4) After what wavelength does the nature of graph get reversed for the input impedance of open-circuited line?

- a. $\lambda/2$
- b. $\lambda/4$
- c. $\lambda/8$
- d. $\lambda/16$

- 5) What is the phase variation range for reflection coefficient in the transmission lines?
- 0° to 90°
 - 90° to 150°
 - 0° to 180°
 - 90° to 360°
- 6) Which lossless element is inserted between source and load in addition to an ideal transformer in order to reduce the effect of reflection loss phenomenon by image matching?
- Amplitude shifter
 - Phase shifter
 - Frequency divider
 - Voltage divider
- 7) For a transmission line with propagation constant $\gamma = 0.650 + j 2.55$, what will be the value of phase velocity for 1 kHz frequency?
- 1.18×10^3 km/sec
 - 1.50×10^3 km/sec
 - 2.46×10^3 km/sec
 - 4.58×10^3 km/sec
- 8) What would be the depth of penetration for copper at 2 MHz frequency with $\sigma = 5.8 \times 10^7$?
- 46.72 μm
 - 56.90 μm
 - 66.08 μm
 - 76.34 μm
- 9) The ratio of magnitudes of electric field intensity to the magnetic field intensity is regarded as _____
- Intrinsic Impedance
 - Characteristic Impedance
 - Both a and b

d. None of the above

10) How is the relation between energy transfer and the electric and magnetic fields specified?

a. By Poynting theorem

b. By Stoke's theorem

c. By Helmholtz theorem

d. By Lagrange's theorem

11) According to Maxwell's first equation in a point form for the static field, the electric flux per unit volume by leaving a small value is equal to _____

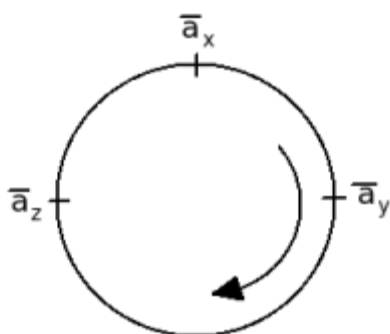
a. Zero

b. Current density

c. Volume charge density

d. Magnetic field intensity

12) If a conductor with length of 5m is located along z-direction with a current of about 3A in a_z direction & $B = 0.04 a_x$ (T), then what would be the value of force experienced by conductor?



a. $0.6a_x$ N

b. $0.6a_y$ N

c. $0.6a_z$ N

d. None of the above

13) Consider the assertions given below. Which of them represent/s the precise condition/s of Ampere's circuital law for the evaluation of magnetic field intensity?

A. If H is tangential to the path, then its value must be different at all the points

B. At each point on closed path, H is either tangential or normal to the path

a. A is true and B is false

b. A is false and B is true

c. Both A & B are true

d. Both A & B are false

14) If the medium is different than air, then what would be the equation of capacitance for a co-axial cable capacitor?

a. $C = \epsilon_0 \epsilon_r A / d$

b. $C = 4\pi \epsilon_0 \epsilon_r [ab / a - b]$

c. $C = 2\pi \epsilon_0 \epsilon_r L / \ln (b/a)$

d. $C = 2\pi \epsilon_0 \epsilon_r R$

15) Which type of capacitor possesses magnitude of flux density equivalent to its surface charge density?

a. Parallel Plate capacitor

b. Spherical Capacitor

c. Co-axial cable capacitor

d. None of the above

16) For an estimated value of polarization (P) = $4.42 \times 10^{-10} \text{ C/m}^2$ and the availability of 4×10^{18} dipoles/m³, what will be the value of average dipole moment for dielectric material?

a. 0.05×10^{-28}

b. 1.105×10^{-28}

c. 1.205×10^{-28}

d. 1.405×10^{-28}

17) If the magnitude of E for a dielectric material is 0.12 mV/m along with electric susceptibility of about 4, what would be the magnitude of polarization?

- a. $2.20 \times 10^{-15} \text{ C/m}^2$
- b. $3.89 \times 10^{-15} \text{ C/m}^2$
- c. $4.24 \times 10^{-15} \text{ C/m}^2$
- d. $5.64 \times 10^{-15} \text{ C/m}^2$

18) According to the definition of dielectric strength of dielectric medium, which value of electric field give rise to an occurrence of dielectric breakdown phenomenon?

- a. Maximum
- b. Minimum
- c. Initial
- d. Final

19) Consider a point charge of about 10 nC is located at origin. If $V = 4 \text{ V}$ at $(0,5,7)$ and point A $(-6,4,12)$, then what would be the value of potential at point B $(2,10,14)$?

- a. 1.261 V
- b. -1.261 V
- c. 2.696 V
- d. -2.696 V

20) If a point 'P' has spherical coordinates $(r = 5000, \theta = 0^\circ, \phi = 0^\circ)$, then what will be its equivalent value (x,y,z) in Cartesian co-ordinate system?

- a. $(5000, 0, 0)$
- b. $(0, 5000, 0)$
- c. $(0, 0, 5000)$
- d. $(0, 0, 0)$

21) Which among the following represents a scalar quantity?

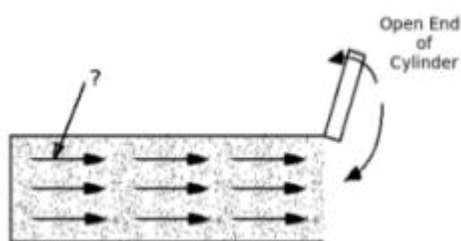
- a. Velocity
- b. Momentum
- c. Force

d. Potential

22) Basically, the flux lines which are represented by the lines of force are regarded as

- a. Branch lines
- b. Node lines
- c. Stream lines
- d. Loop lines

23) What does an arrow indicate in the diagram shown below?



- a. Displacement Vector
- b. Velocity Vector
- c. Viscosity Vector
- d. Acceleration Vector

24) Consider the equation given below. What does it represent from the following?

$$\text{Equation: } \nabla \cdot \mathbf{D} = (\partial D_x / \partial x) + (\partial D_y / \partial y) + (\partial D_z / \partial z)$$

- a. Divergence in Cartesian system
- b. Divergence in Cylindrical system
- c. Divergence in Spherical system
- d. None of the above

25) Which form of Gauss's law is regarded as Maxwell's first equation?

- a. Point form
- b. Line form
- c. Angular form

d. Exponential form

26) Under which category of charge distribution does the cathode ray tube belong to?

a. Point Charge

b. Line Charge

c. Surface Charge

d. Volume Charge

27) What kind of function is an electric field intensity with respect to the value of charge?

a. Linear

b. Angular

c. Delta

d. Sinc

28) At which point it becomes necessary to determine the electric field intensity?

a. Field Point

b. Source Point

c. Sink Point

d. Static Point

29) An electric field exhibits variation corresponding to _____

a. Position

b. Time

c. Both a and b

d. None of the above

30) How does the short-circuited line behave for the first $\lambda/4$ distance if input impedance is purely reactive?

a. As an inductance

b. As a resistance

c. As a capacitance

d. As a conductance

31) What would be the Standing Wave Ratio (SWR) for a line with reflection coefficient equal to 0.49?

- a. 0.01
- b. 2.12
- c. 2.921
- d. 3.545

32) Which operation is performed over the in phase incident and reflected waves in order to obtain maximum voltage of SWR?

- a. Addition
- b. Subtraction
- c. Differentiation
- d. Integration

33) Which parameter is much larger than the resistance at radio frequencies in RF circuits?

- a. Inductive reactance
- b. Capacitive susceptance
- c. Shunt conductance
- d. Series admittance

34) Which primary constant of transmission line exhibits its dependency of value on the cross-sectional area of conductors?

- a. Resistance (R)
- b. Inductance (L)
- c. Conductance (G)
- d. Capacitance (C)

35) If the rate of attenuation is high for good conductors at radio frequency, where does an input wave get reduced to?

- a. Zero

- b. Infinity
 - c. Minor proportion of its initial strength value
 - d. Major proportion of its final strength value
- 36) Maxwell's second equation of static field is a point form of _____
- a. Ampere's circuital law
 - b. Gauss's law
 - c. Lenz law
 - d. Biot Savart law
- 37) Which form of Maxwell's equation specifies the fundamental relationship between the electric and magnetic fields in time varying field?
- a. Point form
 - b. Integral form
 - c. Exponential form
 - d. None of the above
- 38) Which nature of applied voltage results in the flow of conduction current in the displacement current concept?
- a. Constant
 - b. Variable
 - c. Both a and b
 - d. None of the above
- 39) In Ampere's circuital law, what is the purpose of an 'Amperian Path'?
- a. Computation of magnetic field intensity
 - b. Determination of differential element of path length
 - c. Estimation of electric flux density
 - d. Detection of loop in a constant plane

40) What is the direction of magnetic field intensity vector due to infinite long straight filament?

- a. Radial
- b. Elliptical
- c. Parabolic
- d. Circumferential

41) Which co-ordinate/s serve/s to be a function of magnitude of magnetic field intensity due to infinite long straight filament?

- a. 0
- b. Φ
- c. z
- d. r

42) What is the value of cross product for two similar unit vectors?

- a. Zero
- b. Infinity
- c. Third unit vector
- d. Negative vector

43) Consider the equation of spherical capacitor given below. What does the potential between the spheres specify?

$$\text{Equation: } V = -(V_0 / r) [ab / a-b] + V_0[a / a-b]$$

- a. As an integral of capacitance
- b. As a derivative of radius
- c. As an index of radial direction
- d. As a function of position

44) If the volume charge density is found to be zero, then what would be the transformed type of Poisson's equation especially due to presence of line, point or surface charge?

- a. $\nabla^2 V = -(\rho_v / \epsilon)$
- b. $\nabla^2 V = -\rho_v$

c. $\nabla^2 V = 1$

d. $\nabla^2 V = 0$

45) Poisson's equation is derived from _____

a. Laplace equation

b. Gauss's law

c. Thevenin's theorem

d. Kirchhoff's law

46) If the material is isotropic and linear, what would be the direction of electric field intensity and the polarization at each point?

a. Parallel

b. Perpendicular

c. Both a and b

d. None of the above

47) Which consequence/s is/are likely to occur due to polarization?

a. Increase in electric flux density

b. Decrease in electric flux density

c. Stability in electric flux density

d. None of the above

48) What is the value of rate of change of charge density for steady state current?

a. 0

b. 0.5

c. 1

d. ∞

49) Which parameter is considered as a reference for the measurement of zero potential?

a. Field

b. Ground

- c. VCC
- d. None of the above

50) Electric field intensity is defined as the ratio of _____ to the test charge.

- a. Displacement
- b. Pressure
- c. Force
- d. Current