

QUARTERLY PORTION [LESSON-1 to LESSON-6]

CHOOSE THE BEST ANSWER:

50 X 1 = 50

- The unit of Permittivity is ...
 a) $C^2 N^{-1} m^{-2}$ b) $N m^2 C^{-2}$ c) $H m^{-1}$ d) $N C^{-2} m^{-2}$
- In case of a van de Graaff generator, the breakdown field of air is
 a) $2 \times 10^8 \text{ V m}^{-1}$ b) $3 \times 10^6 \text{ V m}^{-1}$ c) $2 \times 10^9 \text{ V m}^{-1}$
 d) $2 \times 10^4 \text{ V m}^{-1}$
- Calculate the number of electrons in one Coulomb of negative charge?
 a) 6.25×10^{15} electrons b) 6.25×10^{18} electrons
 c) 6.25×10^{12} electrons d) 6.25×10^{10} electrons
- Energy is stored in a capacitor in the form of
 a) electrostatic energy b) magnetic energy
 c) light energy d) heat energy.
- A sample of HCl gas is placed in a uniform electric field of magnitude $3 \times 10^4 \text{ N C}^{-1}$. The dipole moment of each HCl molecule is $3 \times 10^{-30} \text{ C m}$. Calculate the maximum torque experienced by each HCl molecule.
 a) $10.2 \times 10^{-26} \text{ Nm}$ b) $9 \times 10^{-26} \text{ Nm}$ c) $9.2 \times 10^{-26} \text{ Nm}$
 d) $10.2 \times 10^{+26} \text{ Nm}$
- A parallel plate capacitor has square plates of side 4 cm and separated by a distance 1 mm. Calculate the capacitance of this capacitor.
 a) 14.16 pF b) $14.16 \times 10^{-14} \text{ f}$ c) $221 \times 10^{-3} \text{ f}$ d) 22 pF

7. A cylinder of radius R and length L is placed in a uniform electric field E parallel to the cylinder axis. The total flux for the surface of the cylinder is given by.

- a) $2\pi R^2 E$ b) $\frac{\pi}{E} R^2$ c) $(2\pi R^2 - \pi R^2)/E$
 d) zero.

8. When a point charge of $6 \mu\text{C}$ is moved between two points in an electric field the work done is $1.8 \times 10^{-5} \text{ J}$. The potential difference between the two points is

- a) 1.08 V b) $1.08 \mu\text{V}$ c) 3 V d) 30 V

9. The resistance of the wire varies inversely as

- a) Area of cross section b) resistivity c) length
 d) Temperature

10. The instrument used for measuring electric current is

- a) galvanometer b) ammeter c) voltmeter d) potentiometer.

11. The unit of emf is

- a) Newton b) volt c) Joule d) Ampere.

12. The rings in the carbon resistor is

Orange orange - orange - silver. What is its value?

- a) $33 \times 10^3 \pm 10\%$ b) $22 \times 10^2 \pm 20\%$

- c) $33 \times 10^3 \pm 5\%$ d) $22 \times 10^3 \pm 5\%$

13. Resistance of a material at 20°C and 40°C are 45Ω and 85Ω respectively. Find its temperature coefficient of resistivity.

a) $\alpha = 0.033 / ^{\circ}\text{C}$

b) $\alpha = 0.044 / ^{\circ}\text{C}$ — c) $\alpha = 0.22 / ^{\circ}\text{C}$

d) $\alpha = 0.24 / ^{\circ}\text{C}$

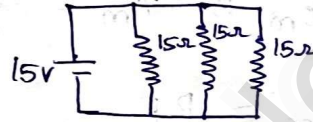
14. What is the current drawn out from the battery?

a) 1 A

b) 2 A

c) 3 A

d) 4 A



15. In a potentiometer arrangement, a cell of emf 1.25V gives a balance point at 35cm length of the wire.

If the cell is replaced by another cell and the balance point shifts to 63cm , what is the emf of the second cell?

a) 22.5V

b) 2.25V

c) 0.225V

d) 252V

16. Kirchoff's I and II laws are based on

conservation of ...

a) charge and energy

b) energy and charge

c) energy and voltage

d) energy and current

17. The potential energy of magnetic dipole whose dipole moment is $\vec{P}_m = (-0.5\hat{i} + 0.4\hat{j})\text{Am}^2$ kept in uniform magnetic field $\vec{B} = 0.2\hat{i}\text{T}$

a) 0.1J

b) 0.2J

c) -0.1J

d) 0.8J

18. The repulsive force between two magnetic poles in air $9 \times 10^{-3} \text{ N}$. If the two poles are equal in strength and are separated by a distance of 10 cm, calculate the pole strength of each pole.

- a) 60 NT^{-1} b) 30 NT^{-1} c) 20 NT^{-1} d) 300 NT^{-1}

19. The equation of Curie-Weiss law

a) $\frac{C}{T} = \chi_m$ b) $\chi_m = \frac{C}{T - T_c}$ c) $\chi_m = T - T_c$

d) $\chi_m = PE$

20. The voltmeter resistance is

a) $R_g = R_v + R_h$ b) $R_v = R_g + R_h$ c) $R_h = R_v + R_g$

d) $R_g = R_h + R_v$

21. 1 Weber =

a) 10^6 maxwell b) 10^8 maxwell c) 10^{-8} maxwell.

d) 10^{-6} maxwell.

22. A cyclotron cannot accelerate

- a) electrons b) protons c) deuterons d) α -particles

23. A circular coil with cross-sectional area 0.1 cm^2 is kept in a uniform magnetic field of strength 0.2 T . If the current passing in the coil is 3 A and plane of the loop is perpendicular to the direction of magnetic field, calculate total torque on the coil.

a) $6 \times 10^{-6} \text{ Nm}$ b) zero c) 6 Nm

d) 0.6 Nm

24. The value of Bohr magneton is . . .

- a) $9.27 \times 10^{-34} \text{ Am}^2$ b) $9.27 \times 10^{24} \text{ Am}^2$
 c) $9.27 \times 10^{24} \text{ Am}^2$ d) $9.72 \times 10^{-24} \text{ Am}^2$

25. RMS voltage and frequency of $V = 230 \sin(314t)$

Ac. source.

- a) 162.6 V, 50 Hz b) 230 V, 50 Hz c) 230 V m, 60 Hz
 d) 162.6 V, 25 Hz

26. The phase difference between V_L and V_C in

series RLC circuit

- a) 2π b) $\pi/2$ c) $2\pi/3$ d) π

27. If the angular speed of rotation of an armature of ac generator is doubled, the

induced emf will be

- a) same b) halved c) doubled d) quadrupled.

28. The primary winding of a transformer has 500 turns, where as its secondary has 5000 turns. Primary

is connected to a.c supply of 20V, 50 Hz.

The secondary will have an output of . . .

- a) 2V, 50 Hz b) 2V, 5 Hz
 c) 20V, 50 Hz d) 200V, 50 Hz

29. Change of current of $1A/s$ causes emf of 1V to be equal to . . .

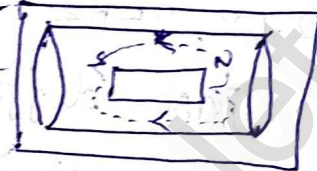
- a) 1 H b) $1V/m$ c) 1 Am d) 1 S

30. If Capacitance is $\frac{10^2}{\pi} \mu F$ connected across 220V, 50 Hz A.C. Calculate the Capacitive reactance.

- a) 1000Ω b) 100Ω c) 10Ω d) 0Ω

31. Calculate the magnetic flux coming out from closed surface containing magnetic dipole as shown in figure.

- a) $\Phi_B = B \cdot A$ b) $\Phi_B = BA \cos \theta$
 c) $\Phi_B = \oint \mathbf{B} \cdot d\mathbf{A}$ d) zero.



32. A straight metal wire crosses a magnetic field of flux 4 mWb in a time 0.4 s . Find the magnitude of the emf induced in the wire.

- a) $\mathcal{E} = -10 \text{ mV}$ b) $\mathcal{E} = 10 \text{ mV}$
 c) $\mathcal{E} = 0.1 \text{ mV}$ d) $\mathcal{E} = 100 \text{ mV}$

33. If the relative permeability and relative permittivity of a medium are 1.0 and 2.25 respectively, find the speed of the electromagnetic wave in this medium.

- a) $3 \times 10^8 \text{ m/s}$ b) $2 \times 10^8 \text{ m/s}$ c) $1.5 \times 10^8 \text{ m/s}$
 d) $1 \times 10^8 \text{ m/s}$

34. A transmitter consists of LC circuit with an inductance of $1 \mu\text{H}$ and a capacitance of $1 \mu\text{F}$. What is the wavelength of the EM wave it emits?

- a) 1884 m b) 18.84 m c) 1.884 m
 d) 81.84 m

35. The average energy density of an EMW is

- a) $\frac{1}{2} \epsilon_0 E$ b) $\frac{1}{2} \epsilon_0 E^2$ c) $\frac{1}{4} \epsilon_0 E^2$ d) $\frac{1}{4} \epsilon_0 E$

36. The unit of $(\mu_0 \epsilon_0)^{-1/2}$

- a) Pascal b) Nm^{-1} c) m s^{-1} d) kg m^{-1}

37. Compute the speed of electromagnetic wave in a medium if the amplitudes of electric and magnetic fields in it are $3 \times 10^4 \text{ V m}^{-1}$ and $2 \times 10^{-4} \text{ T}$ respectively.

- a) $3 \times 10^8 \text{ m/s}$ b) $1 \times 10^8 \text{ m/s}$ c) $1.5 \times 10^8 \text{ m/s}$
d) $1.5 \times 10^{-8} \text{ m/s}$

38. Gamma rays are used in the treatment of

- a) Cancer b) Polio c) AIDS d) Tuberculosis

39. The displacement current is ...

- a) $\epsilon_0 \frac{d\phi_E}{dt}$ b) $\frac{\epsilon_0}{R} \frac{d\phi_E}{dt}$ c) $\epsilon_0 \frac{E}{R}$

- d) $\epsilon_0 q \frac{c}{R}$

40. What is the cause of "Green house effect"?

- a) Infrared rays b) ultraviolet rays
c) X-rays d) radiowaves

41. The range of wavelength of visible light is

- a) 10 \AA to 100 \AA b) 4000 \AA to 8000 \AA
c) 8000 \AA to 10000 \AA d) $10,000 \text{ \AA}$ to $15,000 \text{ \AA}$

Q2. TV remote uses . . .

- a) visible light b) ultraviolet
c) Infrared d) radio wave

Q3. When light is refracted which of the following does not change?

- a) wave length b) frequency c) Velocity
d) Amplitude.

Q4. The apparent flattening of the sun at sunset and sunrise is due.

- a) refraction b) diffraction c) total Internal reflection
d) Interference.

Q5. In Primary rainbow what is the order of colours observed from earth?

- a) Violet innermost, Red outermost
b) Red innermost, Violet outermost
c) Random
d) Red innermost, Blue outermost

Q6. The focal length of a converging lens are f_v and f_r for violet and red light respectively.

Q7. Then,

- a) $f_v > f_r$ b) $f_v = f_r$ c) $f_v < f_r$
d) All the above.

47. If the focal length is 50cm for a lens,
 What is the power of the lens?
 a) 0.5 D b) 0.67 D c) 0.7 D d) 0.6 D

48. Find the ratio of the intensities of lights with
 wavelengths 500nm and 300nm which undergo
 Rayleigh scattering?

a) 9:25 b) 3:5 c) 81:625 d) 5:3

49. Number of Images produced by two
 Parallel plane mirror is
 a) zero b) 3 c) 8 d) infinity.

50. Which colour of light has the highest speed
 a) Red b) violet c) green d) Yellow.

38. a) Cancer.

39. a) $\epsilon_0 \frac{d\phi_E}{dt}$

40. a) Infrared

41. b) 4000\AA to 8000\AA

42. c) Infrared

43. b) frequency

44. a) refraction

45. a) Violet inner most. Red outermost

46. c) $f_v < f_r$

47. b) $0.67 D$

48. c) $81 : 625$

49. d) Infinity

50. b) violet.

20. b) $R_v = R_g + R_h$
21. b) 10^8 maxwell
22. a) electrons
23. b) zero
24. c) $9.27 \times 10^{-24} \text{ Am}^2$
25. a) 162.6V, 50 Hz
26. d) π
27. c) doubled
28. d) 200V, 50 Hz
29. a) 1H
30. b) 100 Ω
31. d) zero
32. b) 10mV
33. b) $2 \times 10^8 \text{ m/s}$
34. a) 1884m
35. b) $\frac{1}{2} \epsilon_0 E^2$
36. c) m/s
37. c) $1.5 \times 10^8 \text{ m/s}$

Test - 1 [ONE MARKS]

ANSWER KEY

1. a) $c^2 N^{-1} m^{-2}$
2. b) $3 \times 10^6 \text{ V/m}$
3. b) $6.25 \times 10^8 \text{ electrons}$
4. a) electrostatic energy
5. b) $9 \times 10^{-26} \text{ Nm}$
6. a) 14.16 Pf
7. d) zero
8. c) 3 V
9. a) Area of cross section
10. b) ammeter
11. b) volt
12. a) $55 \times 10^5 \pm 10\%$
13. b) $\alpha = 0.044 / ^\circ\text{C}$
14. c) 3 A
15. b) 2.25 V
16. a) charge and energy
17. a) 0.1 J
18. b) 30 N s^{-1}
19. b) $\lambda_m = \frac{c}{\nu - \nu_c}$