

# COMMON FIRST REVISION EXAMINATION - 2024

Std - XII

Time : 3.00 Hours

PHYSICS

Marks: 70

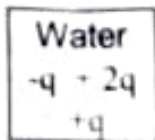
Part - I

Answer all the questions:

15 x 1 = 15

Choose the correct answer:

1. The total electric flux for the following closed surface which is kept inside water



- a)  $\frac{80q}{\epsilon_0}$       b)  $\frac{q}{40\epsilon_0}$       c)  $\frac{q}{80\epsilon_0}$       d)  $\frac{q}{160\epsilon_0}$

2. A electric field  $\vec{E} = 10x \hat{i}$  exists in a certain region of space. Then the potential difference  $V = V_0 - V_A$ . [Where  $V_0$  is the potential at origin and  $V_A$  is the potential at 2m] is

- a) 10V      b) -20V      c) +20V      d) -10V

3. The electric field due to an infinite plane sheet of charges with uniform surface charge density  $\sigma$  is

- a)  $E = \frac{\sigma}{\epsilon_0}$       b)  $E = \frac{2\sigma}{\epsilon_0}$       c)  $E = \frac{\sigma}{2\epsilon_0}$       d)  $E = 0$

4. In india electricity is supplied for domestic use at 220V and 110V in USA. if the resistance of a 60W bulb use in India is R, the resistance of a 60W bulb in USA will be

- a) R      b) 2R      c)  $\frac{R}{4}$       d)  $\frac{R}{2}$

5. The temperature coefficient of resistance of a wire is 0.00125 per  $^{\circ}\text{C}$ . At  $20^{\circ}\text{C}$ ,  $R = 1\Omega$ . The resistance of the wire will  $2\Omega$  at

- a)  $800^{\circ}\text{C}$       b)  $700^{\circ}\text{C}$       c)  $850^{\circ}\text{C}$       d)  $820^{\circ}\text{C}$

6. Which of the following is produced more heat energy for the given values of resistance current and time of flow?

- a)  $3\Omega, 2\text{A}, 1\text{S}$       b)  $2\Omega, 1\text{A}, 3\text{S}$       c)  $1\Omega, 3\text{A}, 2\text{S}$       d)  $2\Omega, 2\text{A}, 2\text{S}$

7. 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) -0.8J      c) 0.1J      d) 0.8J

8. The phenomenon of lagging of magnetic induction behind the magnetising field is called .....

- a) remanence      b) coercivity      c) hysteresis      d) resonance

9. If the geometrical length of the bar magnet is 24cm, then the magnetic length of the same magnet is .....

- a) 24cm      b) 28.8cm      c) 20cm      d) 12cm

10. In a series RL circuit the resistance and inductive reactance are the same. Then the phase difference between voltage and current is

- a)  $\pi/4$       b)  $\pi/2$       c)  $\pi/6$       d) zero

11. An inductor 20mH, a capacitor  $50\mu\text{F}$  and a resistor  $40\Omega$  are connected in series across a source of emf  $V = 10\sin 340t$ . The powre loss in Ac circuits is

- a) 0.76W      b) 0.89W      c) 0.46W      d) 0.67W

12. Alternators work on the principle of

- a) electro static induction      b) corona discharge  
c) electro magnetic induction      d) tangent law

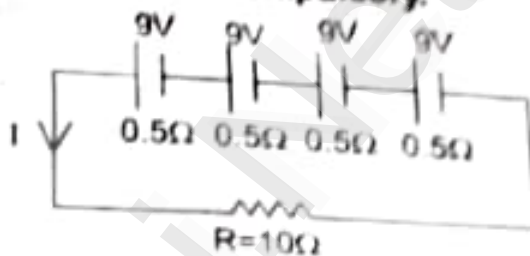
13. Which of the following is false for electromagnetic waves?
  - a) transverse
  - b) non-mechanical waves
  - c) longitudinal
  - d) produced by accelerated charges
14. If  $E = E_0 \sin(10^6 x - \omega t)$  be the electric field of a plane electro magnetic wave, the value of  $\omega$  is
  - a)  $0.3 \times 10^{14} \text{ rad s}^{-1}$
  - b)  $3 \times 10^{14} \text{ rad s}^{-1}$
  - c)  $0.3 \times 10^{14} \text{ rad s}^{-1}$
  - d)  $3 \times 10^{14} \text{ rad s}^{-1}$
15. The instantaneous value of sinusoidal alternating current is given by  $i = 3.14 \sin 157t$ . The average value of alternating current is
  - a) 3.14A
  - b) 157A
  - c) 2A
  - d) 6.28A

**Part - II**

**6 x 2 = 12**

Answer any six of the following questions. Question No. 18 is compulsory.

16. What is meant by quantisation of charge?
17. Define "electric flux".
18. Find the total current flow through the given circuit



19. State Kirchhoff's voltage rule.
20. What is magnetic susceptibility?
21. A cyclotron is operated to accelerate protons with a magnetic field of strength 1 Tesla. Calculate the frequency in which the electric field between two dees could be reversed.
22. State Fleming's right hand rule.
23. Define 'power factor'.
24. Why are electromagnetic waves non-mechanical?

**Part - III**

**6 x 3 = 18**

- Answer any six questions of the following. Question No. 31 is compulsory.
25. Obtain the expression for capacitance of a parallel plate capacitor.
  26. Dielectric strength of air is  $3 \times 10^6 \text{ Vm}^{-1}$ . Suppose the radius of a hollow sphere in the van de Graff generator is  $R = 0.5\text{m}$ . Calculate the maximum potential difference created by this generator.
  27. State the applications of seebeck effect.
  28. Explain the determination of the internal resistance of a cell using voltmeter.
  29. Discuss the conversion of galvanometer into a voltmeter.
  30. Write down the properties of dia-magnetic materials.
  31. A 400 mH coil of negligible resistance is connected to an AC circuit in which an effective current of 6mA is flowing, find out the voltage across the coil if the frequency is 1000 Hz.
  32. Obtain the expression for self inductance of a long solenoid.
  33. Give three uses each of i) IR radiation ii) UV radiation

**Part - IV**

**5 x 5 = 25**

Answer all the questions in detail.

34. Derive the expression for electrostatic potential due to an electric dipole and discuss the special cases. (OR) State Gauss law and deduce the expression for electric field due to an infinitely long charged wire.
35. Derive the expression for equivalent resistance when resistors are connected in series and parallel. (OR) Obtain the condition for bridge balance in wheatstone's bridge.
36. Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current. (OR) Derive the expression for the force on a current carrying conductor in a magnetic field.
37. Show mathematically that the relation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle. (OR) Explain the construction and working of transformer.
38. Write down Maxwell equations in integral form. (OR) Explain the types of emission spectra.