FIRST REVISION TEST - 2024 | Reg. No. | | | | | | |

XII - PHYSICS

Time Allowed : 3.00 Hrs.   Maximum Marks:70

Part - I

I. Choose the correct answer: 15 x 1 = 15

1. An electron enters between two horizontal plates separated by 2 mm and having a P.D of 1000 V. The force on electron is
   a) 8×10^{-12} N
   b) 8×10^{-14} N
   c) 8×10^{9} N
   d) 8×10^{14} N

2. A toaster operating at 240 V has a resistance of 120 Ω. Its power is
   a) 400 W
   b) 2 W
   c) 480 W
   d) 240 W

3. A bar magnet of length l and magnetic moment P_m is bent in the form of an arc as shown in figure. The new magnetic dipole moment is
   a) P_m
   b) $\frac{3}{\pi}P_m$
   c) $\frac{2}{\pi}P_m$
   d) $\frac{1}{2}P_m$

4. The flux linked with a coil at any instant 't' is given by $\phi_B = 10t^2 - 50t + 250$. The induced emf at t = 3 sec. is
   a) −190 V
   b) −10 V
   c) 10 V
   d) 190 V

5. Cyclotron frequency does not depend upon
   a) radius
   b) magnetic induction
   c) velocity
   d) none of these

6. An LC circuit contains inductance L = 1 μH and capacitance C = 0.01 μF. The wavelength of electromagnetic wave generated is nearly
   a) 0.5 m
   b) 5 m
   c) 188 m
   d) 30 m

7. A light bulb is placed between two plane mirrors inclined at an angle of 60°. Number of images formed are
   a) 2
   b) 4
   c) 5
   d) 6

8. An object is placed in front of a convex mirror of focal length of f and the maximum and minimum distance of an object from the mirror such that the image formed is real and magnified
   a) 2f and c
   b) c and ∞
   c) f and 0
   d) none of these

9. When light is incident on a soap film of thickness 5×10^{-5} cm, the wavelength of light reflected maximum in the visible region is 5320 A°. Refractive index of the film will be
   a) 1.22
   b) 1.33
   c) 1.51
   d) 1.83

10. The dual nature of light is exhibited by
    a) diffraction and photo electric effect
    b) diffraction and reflection
    c) refraction and interference
    d) photoelectric effect

11. The electron micro-scope works on the principle of
    a) particle theory
    b) matter wave concept
    c) uncertainty
    d) all of the above

12. $_1H^1$ and $_1H^3$ are examples of
    a) isobars
    b) isotones
    c) isotopes
    d) none of these

13. In an hydrogen atom, the electron revolving in the fourth orbit, has angular momentum equal to
    a) h
    b) h/π
    c) $4h/\pi$
    d) $2h/\pi$

14. To obtain sustained oscillation in an oscillator
    a) feedback should be positive
    b) feedback factor must be unity
    c) phase shift must be 0 or 2π
    d) all the above

12 - Physics - 1

15. Which one of the following is the natural nano material?
   a) peacock feather
   b) peacock beab
   c) grain of sand
   d) skin of the whale

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory)   6 x 2 = 12

16. Mention any two applications of capacitors.
17. Find the heat energy produced in a resistance of 10 Ω when 5 A current flows through it for 5 minutes.
18. State Fleming's left hand rule.
19. What are the methods of producing induced emf.
20. Compute the speed of the electromagnetic wave in a medium if the amplitude of electric and magnetic fields are 3×10^4 N/C and 2×10^{-4} Tesla respectively.
21. Why do clouds appear white?
22. What is Bremsstralung?
23. What are the advantages of frequency modulation?
24. $_{92}U^{235}$ emits 2α, 3β and 2γ particles. What is resulting atomic number and mass number?

Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory)   6 x 3 = 18

25. Obtain the expression for capacitance of a parallel plate capacitor.
26. Resistance of a material at 20°C and 40°C are 45 Ω and 85 Ω respectively. Find its temperature co-efficient of resistivity.
27. Give an account of magnetic Lorentz Force.
28. Find out the phase relationship between voltage and current in a pure resistive circuit.
29. Discuss the Hertz experiment.
30. Obtain an expression for Fresnel's distance.
31. Write the characteristics of photons.
32. Give the Barkhausen conditions for sustained oscillations. Mention any two uses of oscillators.
33. calculate the number of nuclei of carbon-14 undecayed after 22,920 years if the intial number of carbon-14 atoms is 10,000. The half life of carbon-14 is 5730 years.

Part - IV

IV. Answer all the questions.   5 x 5 = 25

34. a) Calculate the electric field due to a dipole on its equitorial plane. *(OR)*
   b) Prove law of reflection using Huygen's principle.
35. a) Explain the determination of the internal resistance of a cell using Voltmeter.
   (OR)
   b) Find out the phase relationship between voltage and current in a capacitve circuit.
36. a) Calculate the magnetic field inside and outside of the long solenoid using Ampere's circultal law. *(OR)*
   b) Write down Maxwell equations in integral form.
37. a) Obtain the equation for lateral displacement of light passing through a glass slab. *(OR)*
   b) Obtain Einstein's photo electric equation with necessary explanation.
38. a) Explain the J.J.Thomson experiment to determine the specific charge of electron.
   (OR)
   b) Draw the circuit diagram of a half wave rectifier and explain its working.

12 - Physics - 2