FRM

FIRST REVISION TEST - 2024

12 - Std

PHYSICS

`1 2 8 2 3 0 9`

Time : 3.00 hrs.   Marks : 70

Part - I

Note : i) Answer all the questions. ii) Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.   15 X 1 = 15

1. If voltage applied on a capacitor is increased from V to 2V, choose the correct conclusion.
   a) Q remains the same, C is doubled   b) Q is doubled, C doubled
   c) C remains same, Q doubled   d) Both Q and C remain same

2. In Joule's heating law, when R and t are constant, if the H is taken along the y - axis and I^2 along the x-axis, the graph is
   a) straight line   b) parabola   c) circle   d) ellipse

3. A circular coil of radius 5cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly
   a) 1.0 A m^2 b) 1.2 A m^2 c) 0.5 A m^2 d) 0.8 A m^2

4. In a series RL circuit, the resistance and inductive reactance are the same. The phase difference between voltage and current in the circuit is
   a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{6}$ d) zero

5. Which of the following is false for electromagnetic waves
   a) transverse   b) non - mechanical waves
   c) longitudinal   d) produced by accelerating charges

6. In a pure capacitive circuit if the frequency of AC source is doubled, then its capacitive reactance will be
   a) doubled   b) remains same   c) zero   d) halved

7. Lenz's law is established on the basis of the law of
   a) conservation of energy   b) conservation of mass
   c) conservation of momentum   d) polarisation

8. Stars twinkle due to
   a) reflection   b) total internal reflection   c) refraction   d) polarisation

9. Light transmitted by Nicol Prism is
   a) partially polarised   b) unpolarised
   c) plane polarised   d) elliptically polarized

10. A light of wavelength 500 nm is incident on a sensitive metal plate or photoelectric work function 1.235 eV. The kinetic energy of the photo electrons emitted is (Take h = 6.6 X 10^{-34}Js)
    a) 0.58 eV   b) 2.48 eV   c) 1.24 eV   d) 1.16 eV

11. A radioactive element has No number of nuclei at t = 0. The number or nuclei remaining after half of a half-life (that is, at time $t = \frac{1}{2}T_!$)
    a) $\frac{N_o}{2}$ b) $\frac{N_o}{\sqrt{2}}$ c) $\frac{N_o}{4}$ d) $\frac{N_o}{8}$

12. The barrier potential of a Germanium diode is approximately,
    a) 0.7 V   b) 0.3 V   c) 2.0 V   d) 2.2 V

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13. Which one of the following is the natural nanomaterial
   a) Peacock feather   b) Peacock beak   c) Grain of sand   d) Skin of the Whale
14. The input of A and B for the Boolean expression $(\overline{A+B}).(\overline{A.B}) = 1$ is
   a) 0,0   b) 0,1   c) 1,0   d) 1,1
15. The time taken by the radioactive element to reduce to e^{-1} time its original amount is
   its.............. .   a) half-life period   b) half-life period / 2
   c) mean - life period   d) mean - life period/2

II   Part - II i) Answer any six of the following questions.
   ii) Question No. 19 is compulsory.   **6 X 2 = 12**
16. Define one Curie.
17. Differentiate Joule heating effect and Peltier effect.
18. Write a note on Ampere - Maxwell law.
19. A sample of HCl gas is placed in a uniform electric field of magnitude 3×10^4 NC^{-1}. The dipole moment of each HCl molecule is 3.4×10^{-30} cm. Calculate the maximum torque experienced by each HCl molecule.
20. Write the two conditions for total internal reflection.
21. Define work function.
22. Two independent monochromatic sources can never be coherent, Why?
23. What are the merits of fiber optic communication?
24. State Faraday's laws of electromagnetic induction.

III   Part - III i) Answer any six of the following questions.
   ii) Question No. 29 is compulsory.   **6 X 3 = 18**
25. Write down any six properties of electromagnetic waves.
26. Explain how is Galvanometer converted into a Voltmeter?
27. State the postulates of Bohr's atom model.
28. Explain pile of plates.
29. To resistors when connected in series and parallel, their equivalent resistances are $15\,\Omega$ and $\frac{56}{15}\,\Omega$ respectively. Find the value of resistances.
30. What do you mean by electron emission? Explain briefly any two methods of electron emission.
31. Obtain the expression for self inductance of a long solenoid.
32. Drive the equation for apparent depth.
33. Explain how transistor acts as a switch.

IV   Part - IV Answer all the questions.   **5 X 5 = 25**
34. a) Calculate the electric field due to a dipole on its axial line. **(OR)**
   b) Explain the J.J. Thomson experiment to determine the specific charge of electron.
35. a) Obtain the condition for bridge balance in Wheatstone's bridge. **(OR)**
   b) Briefly explain the principle and working of electron microscope.
36. a) Derive the equation for magnetic field produced along the axis of the current-carrying circular coil. **(OR)**
   b) Draw the circuit diagram of a half wave rectifier and explain its working.
37. a) Explain the construction and working of trasformer. **(OR)**
   b) Obtain lens maker's formula.
38. a) Derive an expression for electrostatic potential due to an electric dipole. **(OR)**
   b) Obtain the equation for band width in Young's double slit experiment.

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