

Class : 12

Register Number

FIRST REVISION EXAMINATION, JANUARY - 2024

PHYSICS

Time Allowed : 3.00 Hours]

[Max. Marks : 70

PART-I

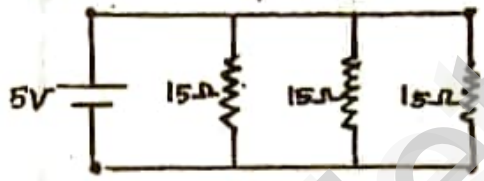
15x1=15

I. Choose the correct answer.

- If Voltage applied on a capacitor is increased from 1V 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

- A circular coil of radius 5 cm and 50 turns carries a current of 3 amperes. The magnetic dipole moment of the coil is nearly
 - a) 1.0 AM²
 - b) 1.2 AM²
 - c) 0.5 AM²
 - d) 0.8 AM²

- What is the current drawn out from the battery?
 - a) 1 A
 - b) 2 A
 - c) 3 A
 - d) 4 A



- In human body dry skin Resistance
 - a) 1000 Ω
 - b) 500 KΩ
 - c) 1000 KΩ
 - d) 500 Ω
- Stars twinkle due to
 - a) Reflection
 - b) Total internal reflection
 - c) Refraction
 - d) Polarisation

- In a series resonant RLC circuit, the voltage across 100 Ω resistor is 40 V. The resonant frequency ω is 250 rad/s. If the value of C is 4 μF, then the voltage across L is
 - a) 600 V
 - b) 4000 V
 - c) 400 V
 - d) 1 V

- The electric and magnetic fields of an electromagnetic wave are
 - a) In phase and perpendicular to each other
 - b) Out of phase and not perpendicular to each other
 - c) In phase and not perpendicular to each other
 - d) Out of phase and perpendicular to each other

- The current sensitivity of a galvanometer can be increased by
 - a) increasing the number of turns, N
 - b) increasing the magnetic induction, B
 - c) increasing the area of the coil, A
 - d) All of these

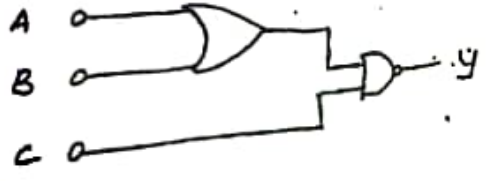
- Light transmitted by Nicol prism is
 - a) Partially polarised
 - b) Plane polarised
 - c) un polarised
 - d) elliptically polarised

- The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by
 - a) λ_p ∝ λ_e
 - b) λ_p ∝ √λ_e
 - c) λ_p ∝ 1/√λ_e
 - d) λ_p ∝ λ_e

- If the focal length is 150 cm for a lens, what is the power of the lens
 - a) 0.55 D
 - b) 0.67 D
 - c) 0.85 D
 - d) 0.47 D
- 1 Curie means
 - a) 3.7 x 10¹⁰ decays / sec
 - b) 3.7 x 10⁻¹⁰ decays / sec
 - c) 7.3 x 10¹⁰ decays / sec
 - d) 7.3 x 10⁻¹⁰ decays / sec

- The nucleus is approximately spherical in shape. Then the surface area of nucleus having mass number A varies as
 - a) A^{2/3}
 - b) A^{4/3}
 - c) A^{1/3}
 - d) A^{1/2}

- The output of the following circuit is 1, when the input ABC is
 - a) 101
 - b) 100
 - c) 110
 - d) 010



- The materials used in Robotics are
 - a) Aluminium and Silver
 - b) Silver and Gold
 - c) Copper and Gold
 - d) Steel and Aluminium

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PART - B

II. Answer Any Six of The Following. (Answer Question No.24 Compulsory)

6x2 =12

16. Distinguish between Coulomb's Force and Gravitational force.
17. Define Ampere's circuital law.
18. What is seebeck effect?
19. Mention the ways of producing induced emf.
20. How are Rainbows formed?
21. What are the applications of LED?
22. How will you define threshold frequency?
23. What is binding energy of a nucleus? Give its expression.
24. Calculate the number of nuclei of Carbon-14 undecayed after 22,920 years if the initial number of carbon-14 atoms is 10,000. The half-life carbon-14 is 5730 years.

PART-C

III. Answer Any Six of The Following. (Answer Question No.33 Compulsory)

6x3=18

25. Obtain the expression for capacitance for a parallel plate capacitor.
26. Explain the equivalent resistance of a series Resistance network.
27. How is a galvanometer converted into an ammeter?
28. Write down the properties of electromagnetic waves?
29. State and Explain Brewster's law.
30. Derive an expression for de-Broglie wavelength for electron.
31. Write down the postulate of Bohr atom model.
32. What are advantages and limitations of frequency modulations.
33. A capacitor of capacitance $10^2/\pi$ μF is connected across a 220V, 50 HZ A.C mains. Calculate the capacitive reactance, RMS value of current and write down the equations of voltage and current.

PART-D

IV. Answer ALL Questions.

5x5 =25

34. a) Derive an expression for electric field due to a dipole at a point on it's axial line.
(OR)
- b) State Biot Savart law. Deduce the relation for the magnetic field at a point due to an infinitely long straight conductor carrying current.
35. a) Obtain the condition for bridge balance in wheat stone's bridge.
(OR)
- b) Obtain the equation for path difference and band width in young's double slit.
36. a) Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating emf of one cycle.
(OR)
- b) Derive the mirror equation and the equation for lateral magnification.
37. a) Briefly explain the principle and working of electron microscope.
(OR)
- b) Explain the construction and working of a full wave rectifier.
38. a) i) Derive the energy expression for an electron in the n-th orbit hydrogen atom using Bohr atom model.
ii) Calculate angular momentum of electron with energy -3.4 eV.
(OR)
- b) Write down Maxwell equations in integral form.