12TH STD > MODEL QUESTION PAPER – 1 (2022 – 2023)

PHYSICS

[Time allowed: 3.00 Hours]   [Maximum Marks: 70]

Introductions :

1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams

PART – I

Notes : (i) Answer **all** the questions.   **[15x1=15]**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

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. The study of motion of electric charges within the material is called ....

(a) Conductivity   (b) Resistance   (c) Current Electricity   (d) Drift Velocity

3. A plane glass is placed over a various coloured letters (violet, green, yellow, red) The letter which appears to be raised more is,

(a) Red   (b) Yellow   (c) Green   (d) Violet

4. J.J Thomson discovered ....

(a) Protons   (b) Neutrons   (c) electrons   (d) Quarks

5. The speed of light in an isotropic medium depends on,

(a) its intensity

(b) its wavelength

(C) the nature of propagation

(d) the motion of the source w.r.t medium

6. Stars twinkle due to,

(a) Refraction   (b) Reflection   (c) Total Internal Reflection   (d) Polarisation

7. The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by

(a) $\lambda_p \propto \lambda_e^2$ (b) $\lambda_P \propto \sqrt{\lambda_e}$ (c) $\lambda_p \propto \frac{1}{\sqrt{\lambda e}}$ (d) $\lambda_P \propto \lambda_e$

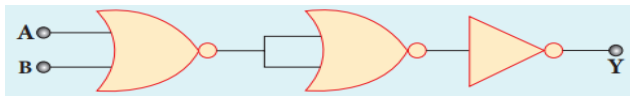**8. What is the value of resistance of the following resistor?**

(a) 150 K Ω (b) 100 K Ω (c) 1000 K Ω (d) 1 K Ω

9. The method of making nanomaterial by assembling the atoms is called

(a) Cross down Approach   (b) Bottom-up Approach

(c) Top down Approach   (d) Diagonal Approach

10. The given electrical network is equivalent to

(a) AND gate   (b) OR gate   (c) NOR gate   (d) NOT gate

11. Th e electric and the magnetic field, associated with an electromagnetic wave, propagating along X axis can be represented by

(a) $\vec{E} = E_0\hat{i}$ and $\vec{B} = B_0\hat{k}$ (b) $\vec{E} = E_0\hat{j}$ and $\vec{B} = B_0\hat{i}$

(c) $\vec{E} = E_0\hat{k}$ and $\vec{B} = B_0\hat{j}$ (d) $\vec{E} = E_0\hat{i}$ and $\vec{B} = B_0\hat{j}$
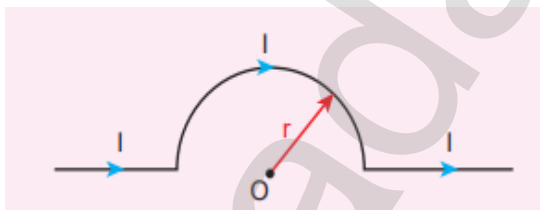
12. A coil of 200 turns carries a current of 0.4 A. If the magnetic flux of 4 m Wb is linked with each turn of the coil, find the inductance of the coil. [Hint: NΦ = LI]

(a) L = 3H   (b) L = 5H   (c) L = 2H   (d) L = 3.5H

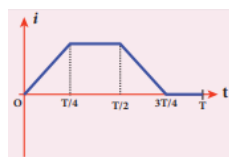**13. The momentum of wavelength of 0.01 Å is ....**

(a) 6.626×10^{-22} kgm/s   (b) 6.5×10^{-23} kgm/s

(c) 5×10^{-24} kgm/s   (d) 7.2×10^{-34} kgm/s

14. The magnetic field at the center O of the following current loop is

(a) $\frac{\mu_0 I}{4r} \odot$ (b) $\frac{\mu_0 I}{2r} \otimes$ (c) $\frac{\mu_0 I}{4r} \otimes$ (d) $\frac{\mu_0 I}{2r} \odot$

15. The current *i* flowing in a coil varies with time as shown in the figure. The variation of induced emf with time would be

(a)   (b)   (c)   (d)

PART-II

Note : Answer **any six** questions. Question No. **24** is **compulsory.**   [6x2=12]

16. Define 'Electric Flux'

17. State Ampere's circuital law.

18. State Huygens's principle.

19. What are step-up and step-down transformers?

20. What are Electromagnetic waves?

21. How will you increase the current sensitivity of a galvanometer?

22. Define 'Threshold Frequency'

23. The repulsive force between two magnetic poles in air is 9 x 10^{-3} 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.

24. An electron moving perpendicular to a uniform magnetic field *0.500 T* undergoes circular motion of radius *2.80 mm*. What is the speed of electron?

PART-III

Note : Answer **any six** questions. Question No. **33** is **compulsory.**   [6x3=18]

25. Explain the equivalent resistance of a series network.

26. How will you convert galvanometer into a voltmeter.

27. Derive the relation between *f* and *R* for a spherical mirror.

28. List out any 3 laws of photoelectric effect.

29. Write the Uses of Polaroids.

30. Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.

31. A closed coil of 40 turns and of area 200 cm^2, is rotated in a magnetic field of flux density 2 Wb m^{-2}. It rotates from a position where its plane makes an angle of 30° with the field to a position perpendicular to the field in a time 0.2 sec. Find the magnitude of the emf induced in the coil due to its rotation.

32. Write down the properties of electromagnetic waves.

33. One type of transparent glass has refractive index 1.5. What is the speed of light through this glass?

PART-IV

34. (a) Calculate the electric field due to a dipole on its axial line.

OR

(b) Obtain the condition for bridge balance in Wheatstone's bridge.

35. (a) Obtain a relation for the magnetic at a point along the axis of a circular coil carrying current.

OR

(b) Write down the Maxwell's equations in integral form.

36. (a) Explain the construction and working of transformer.

OR

(b) Derive the mirror equation and the equation for lateral magnification.

37. (a) Obtain the equation for bandwidth in Young's double slit experiment.

OR

(b) Discuss the spectral series of hydrogen atom.

38. (a) Draw the circuit diagram of a half wave rectifier and explain its working.

OR

(b) Obtain Einstein's photoelectric equation with necessary explanation.

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