

XII- PHYSICS- PUBLIC MODEL QUESTION PAPER FULL PORTION

TOTAL MARK : 70M TIME : 3 HRS

(18.12.2024)

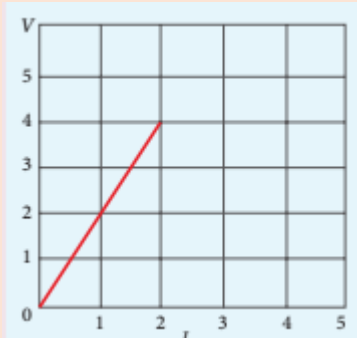
SECTION – A (15 X 1 = 15 M)

Choose the correct best 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 following graph shows current versus voltage values of some unknown conductor. What is the resistance of this conductor?



- (a) 2 ohm (b) 4 ohm
 (c) 8 ohm (d) 1 ohm

3. Three wires of equal lengths are bent in the form of loops. One of the loops is circle, another is a semi-circle and the third one is a square. They are placed in a uniform magnetic field and same electric current is passed through them. Which of the following loop configuration will experience greater torque ?

- a) circle b) square c) semi circle d) elliptical

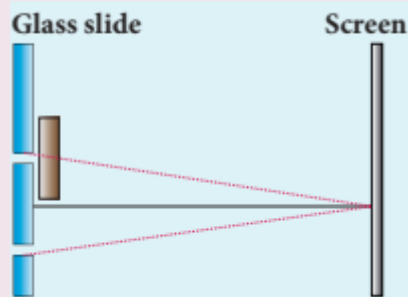
4. A circular coil with a cross-sectional area of 4 cm^2 has 10 turns. It is placed at the centre of a long solenoid that has 15 turns/cm and a cross-sectional area of 10 cm^2 . The axis of the coil coincides with the axis of the solenoid. What is their mutual inductance?

- (a) $7.54 \mu\text{H}$ (b) $8.54 \mu\text{H}$
 (c) $9.54 \mu\text{H}$ (d) $10.54 \mu\text{H}$

5. If the magnetic monopole exists, then which of the Maxwell's equation to be modified?

- (a) $\oint_s \vec{E} \cdot d\vec{A} = \frac{Q_{\text{enclosed}}}{\epsilon_0}$
 (b) $\oint_s \vec{B} \cdot d\vec{A} = 0$
 (c) $\oint_l \vec{B} \cdot d\vec{l} = \mu_0 i_c + \mu_0 \epsilon_0 \frac{d}{dt} \oint_s \vec{E} \cdot d\vec{A}$
 (d) $\oint_l \vec{E} \cdot d\vec{l} = -\frac{d}{dt} \Phi_B$

6. 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
7. One of the of Young's double slits is covered with a glass plate as shown in figure. The position of central maximum will



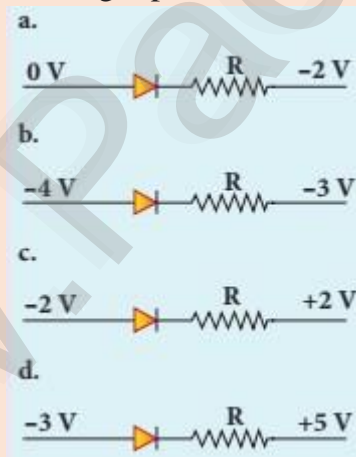
- (a) get shifted downwards
 (b) get shifted upwards
 (c) will remain the same
 (d) data insufficient to conclude

8. In photoelectric emission, a radiation whose frequency is 4 times threshold frequency of a certain metal is incident on the metal. Then the maximum possible velocity of the emitted electron will be

- a) $\sqrt{\frac{hv_0}{m}}$ b) $\sqrt{\frac{6hv_0}{m}}$
 c) $2\sqrt{\frac{hv_0}{m}}$ d) $\sqrt{\frac{hv_0}{2m}}$

9. The half-life period of a radioactive element A is same as the mean life time of another radioactive element B. Initially both have the same number of atoms. Then
 (a) A and B have the same decay rate initially (b) A and B decay at the same rate always
 (c) B will decay at faster rate than A (d) A will decay at faster rate than

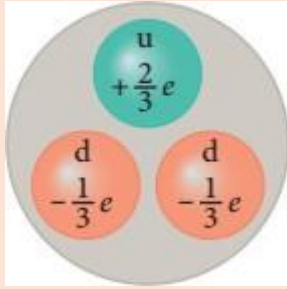
10. Which one of the following represents forward bias diode?



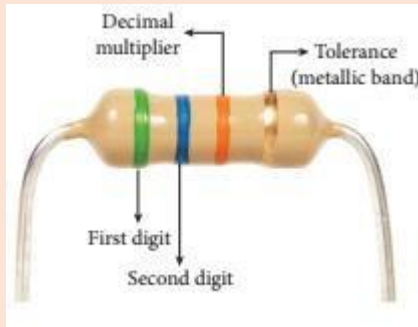
11. The alloys used for muscle wires in Robots are
 a) Shape memory alloys b) Gold copper alloys c) Gold silver alloys
 d) Two dimensional alloy

12. $(A+B) (A+\bar{B}) = \dots\dots\dots$

- a) A b) A+ B c) A.B d) All



13. _____ is
 a) proton b) electron c) neutron d) all

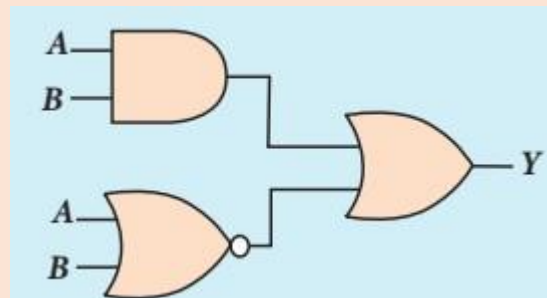


14. _____ find the resistor colour code
 a) 56 k ohm b) 58 k ohm c) 56 ohm d) 58 ohm
 15. The frequency of the domestic AC supply is increased from 50–60 Hz to
 a) 20–40 KHz b) 20–400 KHz c) 200–40 KHz d) 20–40 Hz

SECTION – B (6 X 2 = 12 M)

Answer any six questions compulsory Q.no .24

16. Define 'electrostatic potential'
17. Write a short note on superconductors?
18. State Fleming's left hand rule
19. What for an inductor is used? Give some examples.
20. If the relative permeability and relative permittivity of a medium are 1.0 and 2.25 respectively, find the speed of the electromagnetic wave in this medium
21. Why do stars twinkle?
22. What is presbyopia?
23. A proton and an electron have same kinetic energy. Which one has greater de Broglie wavelength? Justify.
24. Write down Boolean equation for the output Y of the given circuit and give its truth table.



SECTION – B (6 X 3 = 18 M)

Answer any six questions compulsory Q.no .33

25. Obtain the expression for energy stored in the parallel plate capacitor
26. An electric heater of resistance 10Ω connected to 220 V power supply is immersed in the water of 1 kg . How long the electrical heater has to be switched on to increase its temperature from 30°C to 60°C . (Specific heat capacity of water is $s = 4200 \text{ J kg}^{-1} \text{ K}$)
27. Give the properties of dia / para / ferromagnetic materials.
28. Elaborate the standard construction details of AC generator
29. Write short notes on (a) microwave (b) X-ray (c) radio waves (d) visible spectrum
30. Derive the relation between f and R for a spherical mirror.
31. How do we obtain characteristic x-ray spectra?
32. Explain the working principle of a solar cell. Mention its applications.
33. Find the (i) angular momentum (ii) velocity of the electron revolving in the 5th orbit of hydrogen atom.

$$(h = 6.6 \times 10^{-34} \text{ Js}, m = 9.1 \times 10^{-31} \text{ kg})$$

SECTION – D (5 X 5 = 25 M)**Answer all questions**

- 34 a) Explain in detail the construction and working of a Van de Graaff generator
(Or)
- b) Sketch the static characteristics of a common emitter transistor and bring out the essential features of input and output characteristics
- 35.a) Obtain the condition for bridge balance in Wheatstone's bridge
(or)
- b) Discuss the Millikan's oil drop experiment to determine the charge of an electron
- 36.a) Calculate the magnetic field at a point on the axial line of a bar magnet
(Or)
- b) Explain how frequency of incident light varies with stopping potential
- 37.a) Obtain an expression for average power of AC over a cycle. Discuss its special cases.
(Or)
- b) Obtain the equation for bandwidth in Young's double slit experiment
38. a) Discuss the Hertz experiment.
(Or)
- b) Obtain lens maker's formula and mention its significance

SIR CV RAMAN COACHING CENTRE IDAPPADI,SALEM

PREPARED BY Dr.G.THIRUMOOORTHIL,M.Sc,B.Ed,Ph.D ,PHYSICS

thiruphysics1994@gmail.com ,8610568010

Date ; 18.12.2024