

**MOUNT CARMEL MISSION MATRIC HIGHER SECONDARY SCHOOL
KALLAKURICHI**

SUBJECT: PHYSICS
CLASS : XII

TIME : 3 HOURS
MARKS : 70

PART-I

Choose the correct answer

15×1=15

1. Parallel plate capacitor stores a charge Q at a voltage V . Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?
 (a) Capacitance (b) charge (c) voltage (d) Energy density
2. The force experienced by a unit charge is called.
 (a) Electric potential (b) Electric flux (c) Electric field (d) Electric charge
3. The internal resistance of a 2.1 volt cell which gives a current of 0.2 A. through a resistance of 10 ohm is
 (a) 0.2 ohm (b) 0.5 ohm (c) 0.8 (d) 1.0 ohm
4. The electric bulb is rated 100 W, 230V. The supply voltage drops to 115 V. What is the heat energy produced by the bulb in 20 min?
 (a) 30kJ (b) 40kJ (c) 35kJ (d) 45kJ
5. If a current I is flowing in a straight wire parallel to the x -axis and the magnetic field is along the y -axis then the wire experiences
 (a) in Z -direction (b) in Y -direction (c) no force (d) in X -direction
6. When the current changes from $+2A$ to $-2A$ in $0.05s$, an emf of $8V$ is induced in a coil. The coefficient of self-induction of the coil is
 (a) $0.2H$ (b) $0.1H$ (c) $0.8H$ (d) $0.4H$
7. If V_g, V_x, V_m are the speeds of gamma rays, X-ray and the microwave respectively in vacuum, then
 (a) $V_g < V_x < V_m$ (b) $V_g > V_x > V_m$ (c) $V_g = V_x = V_m$ (d) $V_g > V_x < V_m$
8. The transfer nature of light is shown in,
 (a) interference (b) diffraction (c) scattering (d) polarisation
9. Light incident from air on a slab of refractive index 2. The maximum possible angle of refraction is,
 (a) 30° (b) 45° (c) 60° (d) 90°

10. Emission of electron by the absorption of heat energy is called emission
 (a) photo electric (b) field (c) Thermionic (d) secondary
11. Calculate the radius of $^{197}_{79}\text{Au}$
 (a) $R = 5.97 F$ (b) $R = 6.97 F$ (c) $R = 7.97 F$ (d) $R = 8.67 F$
12. The initiation potential of hydrogen atom is
 (a) 13.6 eV (b) -13.6 eV (c) -13.6 V (d) 13.6 V
13. Electrical series circuit in digital form is
 (a) AND (b) OR (c) NOR (d) NAND
14. The barrier potential of silicon diode is approximately
 (a) 0.7 V (b) 0.3 V (c) 2.0 V (d) 2.2 V
15. The materials used in Robotics are.
 (a) Aluminum silver (b) silver and gold
 (c) copper and gold (d) Steel and aluminum

PART-II

Answer the following questions any six.

(Q.no 24 compulsory)

$6 \times 2 = 12$

16. What is corona discharge?
17. State Ampere's circuital law.
18. What are Fraunhofer lines?
19. Mention the difference between interference and diffraction.
20. How will you define threshold frequency?
21. Write the properties of neutrino?
22. In the magnetic field of 0.05 T , area of a coil changes from 101 cm^2 to 100 cm^2 changing the resistance which is 2 ohm . What is the amount of charge that flows during this period?
23. What do you mean by doping?
24. If an electric field of magnitude 570 NC^{-1} is applied in the copper wire, find the acceleration experienced by the electron.

PART-III

Answer the following questions any six

(Q.no 33 compulsory)

$6 \times 3 = 18$

25. Calculate the momentum of an electron with kinetic energy 2 eV
26. Write the properties of cathode rays.

27. Give the Barkhausen conditions for sustained oscillation.
28. State and obtain Malu's law.
29. Write down the properties of electromagnetic waves
30. Derive the relation between f and R for a spherical mirror.
31. How will you induce an emf by changing the area enclosed by the coil?
32. Discuss the conversion of galvanometer into an ammeter and also a voltmeter.
33. An electron in Bohr's hydrogen atom has an energy of -3.4 eV. What is the angular momentum of the electron?

PART-IV

Answer the all questions

5x5=25

- 34.(a) Derive the expression for the force on your current carrying conductor in a magnetic field.
(OR)
(b) Derive an expression for electrostatic potential due to an electric dipole. and special cases.
- 35.(a) Obey the condition for the Wheatstone's bridge.
(OR)
(b) Show mathematically that the rotation of a coil in a magnetic field over one rotation induces an alternating EMF of one cycle.
- 36.(a) Obtain the equation for bandwidth in Young's double slit experiment.
(OR)
(b) Explain the types of emission spectrum. Give their types.
- 37.(a) Obtain the law of radioactivity
(OR)
(b) Obtain lens maker's formula and mention its significance.
- 38.(a) Explain the construction and working of a full wave rectifier.
(OR)
(b) Describe briefly Davisson - Germer experiment which demonstrated the wave nature of electrons.

****All the best****

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