Class : 12

Register Number

FIRST REVISION EXAMINATION, JANUARY - 2024

Time Allowed : 3.00 Hours] **PHYSICS** [Max. Marks : 70

PART-I

I. Choose the correct answer. 15x1=15

1. Consider an oscillator which has a charged particle oscillating about its mean position with a frequency of 300 MHz. The wavelength of electromagnetic waves produced by this oscillator is
   a) 1 m b) 10 m c) 100 m d) 1000 m
2. The ratio of the wavelengths radiation emitted for the transition from n=2 to n=1 in Li^{++}, He^{+} and H is
   a) 1:2:3 b) 1:4:9 c) 3:2:1 d) 4:9:36
3. The wave associated with a moving particle of mass $3x10^{-6}$ g has the same wavelength has an electron moving with a velocity $6x10^{6}$ ms^{-1}. The velocity of the particle is
   a) 1.82×10^{-18} ms^{-1} b) 9×10^{-2} ms^{-2} c) 3×10^{-31} ms^{-1} d) 1.82×10^{-18} ms^{-1}
4. ——— is the example for non-polar molecules
   a) N_2O b) H_2O c) CO_2 d) NH_3
5. In a series resonant RLC circuit, the voltage across 100Ω resistor in 40V. 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
6. The resistivity of Semi Conductor lies between
   a) 10^{11} Ωm - 10^{19} Ωm b) 10^{-3} Ωm - 10^{-6} Ωm
   c) 10^{-6} Ωm - 10^{6} Ωm d) 10^{-6} Ωm - (-∞) Ωm
7. In a large building, there are 15 bulbs of 40 W, 5 bulbs of 100 W, 5 fans of 80 W and 1 heater of 1kW are connected The voltage of the electric mains is 220 V. The minimum capacity of the main fuse of the building will be:
   a) 14 A b) 8 A c) 10 A d) 12 A
8. The alloys used for muscle wires in Robort's are
   a) Shape memory alloys b) Gold copper alloys
   c) Gold Silver alloys d) Two dimensional alloys
9. The object is located 10 cm to the left of the surface, then ——— in the position of the image of a point [Radius of curvature of the spherical surface in 15 cm, n_1=1, n_2=20]
   a) 60 cm to the left b) 60 cm to the right
   c) 30 cm to the left d) 30 cm to the right
10. The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?
    a) 30° b) 45° c) 60° d) 90°
11. First diffraction minimum due to a single slit of width $1.4x10^{-4}$ cm is at 30°. Then wavelength of light used in
    (a) 400 Å (b) 500 Å (c) 600 Å (d) 700 Å
12. An object is placed in front of convex mirror of focal length of f and the maximum and minimum distance of an object from the mirror such that the image formed is real and magnified
    (a) 2f and C (b) C and ∞ (c) f and 0 (d) None of these
13. If the input to the NOT gate is A = 1011, its output is
    (a) 0100 (b) 1000 (c) 1100 (d) 0011
14. A parallel plate capacitor stores a change 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

15. In the graph between frequency of incident radiation and the stopping potential, the work function can be calculated from
a) X - intercept b) Y - intercept c) Slope of the line d) (a) and (b)

PART-B

II. **Answer Any SIX of The Following. (Answer Question No.24 Compulsory)** 6x2 =12

16. What is Coronae discharge?
17. Why do stars twinkle?
18. The resistance of a nichrome wire at 20°C is 10Ω. If its temperature coefficient of resistivity of nichrome is 0.004/°C. Find the resistance of the wire at boiling point of water.
19. Define work function of a metal.
20. State Biot-Savert law.
21. Calculate the radius of $_{79}Au^{197}$ nucleus.
22. What is meant by biasing? Mention its types.
23. Give two uses of IR radiation.
24. The equation for an alternating current is given by i=77 sin 314t. Find the peak current and frequency.

PART-C

III. **Answer Any SIX of The Following. (Answer Question No.33Compulsory)** 6x3=18

25. Derive an expression for energy stored in the capacitor.
26. Explain Focal length of lenses in contact.
27. A coil of a tangent galvanometer of diameter 0.24 m has 100 turns. If the horizontal component of Earth's magnetic field is 25 x 10^{-4} T then, calculate the current which gives a deflection of 60°.
28. Derive an expression for De-Broglie wave length of electrons.
29. Explain cells in series.
30. A monochromatic light of wavelength of 500 nm. Strikes a operating and Produces fouth order maximum at an angle of 30°. Find the number of slits per centimeter.
31. State and prove De-Morgan's First Theorem.
32. Explain AC circuit containing pure resistor.
33. Calculate the time required for 60% of a sample of radon undergo decay. Given $T_{\frac{1}{2}}$ of radon = 3.8 days.

PART-D

IV. **Answer ALL Questions.** 5x5 =25

34. a) Derive the expression for electrostatic potential due to an electric dipole.

(OR)

b) Obtain the equation for bandwidth in young's double slit experiment.

35. 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) Give the construction and working of photo emissive cell.

36. a) Explain the construction and working of a full wave vectitier.

(OR)

b) Explain the maxwell's modification of Ampere's circuital law.

37. a) Derive the expression for the force on a current carrying conductor in a magnetic field.

(OR)

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

38. a) Discuss the spectral series of hydrogen atom.

(OR)

b) Explain the equivalent resistance of a Series and Parallel resistor network.