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Second Revision Examination - 2024

PHYSICS

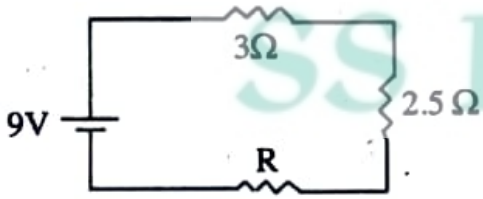
Time : 3.00 Hrs. Marks : 70

PART – I

(i) Answer all the questions. (ii) Choose the most suitable answer from the given alternatives and write the answer with option code. **15 x 1 = 15**

1. A ray of light travelling in a transparent medium of refractive index 'n' falls, on a surface separating the medium from air, at an angle of incidence of 45, they can undergo total internal reflection for the following 'n' a) n = 1.25 b) n = 1.5 c) n = 1.33 d) n = 1.4
2. In a hydrogen atom, the electron revolving in the second orbit, has an angular momentum equal to

   a) h b) $\frac{2h}{\pi}$ c) $\frac{4h}{\pi}$ d) $\frac{h}{\pi}$
3. Two radiations with photon energies 0.9ev and 3.3ev respectively are falling on a metallic surface successively. If the work function of the metal is 0.6ev, then the ratio of the maximum speeds of the emitted electron will be a) 1:4 b) 1:3 c) 1:1 d) 1:9
4. The Zener diode is primarily used as
   a) Rectifier b) amplifier c) oscillator d) Voltage regulator
5. The materials used in Robotics are
   a) Aluminium & Silver b) Silver & Gold c) Copper & Gold d) Steel & aluminium
6. A Capacitor of capacity 'C' has charge 'Q' and stored energy is 'W'. If the charge is increased to '2Q' the stored energy will be
   a) W/2 b) 2W c) 4W d) W/4
7. There is a current of 1 A in the circuit shown below, What is the resistance 'R'?



   a) 1.5 Ω b) 2.5 Ω c) 3.5 Ω d) 4.5 Ω
8. The vertical component of the Earth's magnetic field at a place is equal to the horizontal component, what is the value of dip at this place?
   a) 30° b) 45° c)60° d)90°
9. When the current charges from +2A to -2A in 0.05s, an emf of 8V is induced in a coil. The co-efficient of self-induction of the coil is
   a) 0.2H b) 0.4H c) 0,8H d) 0.1H
10. Which of the following electromagnectic radiations used for viewing objects through fog?
    a) microwave b) gamma rays c) X-rays d) infrared rays
11. Which that cannot be polarized?
    a) longitudinal waves b) transverse waves c) electromagnectic waves d) light waves
12. The internal resistance of a 2.1V cell which gives a current of 0.2A through a resistance of 10 Ω is
    a) 0.2 Ω b) 0.5 v c) 0.8 Ω d)1.0 Ω
13. Fraunhofer lines are an example of ..... Spectrum.
    a) line emission b) band emission c) line absorption d) band absorption
14. First diffraction minimum due to a single slit of width 1.0 x 10^{-5} cm is at 30° . Then the wave length of light used is a) 400A° b) 500A° c) 600A° d) 700A°

15. If the input of the NOT gate is A=1101, its output is
a) 0011 b) 0010 c) 0100 d) 1100

PART - II

Answer any six questions. Q.No. 24 is compulsory. **6 x 2 = 12**

16. Define electric flux. Give its unit.
17. Determine the number of electrons flowing per second through a conductor, When a current of 32 A flows through it.
18. State Fleming's left hand rule.
19. A Capacitor blocks DC, but allows AC, Why?
20. What are electromagnectic waves?
21. What is the power of a lens? Give its unit.
22. Give any two applications of x-rays.
23. Distinguish between avalanche and Zener breakdown.
24. Calculate the radius of $_{79}Au^{197}$

PART - III

Answer any six questions. Q.No. 33 is compulsory **6 x 3 = 18**

25. Derive the expression for the torque experienced by a dipole due to a uniform electric field.
26. What is Seebeck effect? Give its applications (any two)
27. An electron moving perpendicular to a uniform magnetic field 0.500T undergoes circular motion of radius 2.50mm. What is the speed of electron?
28. Explain the various losses in a transformer.
29. Derive the relation between F and R for a spherical mirror.
30. Write short notes on Nicol prism.
31. Derive an expression for De-Broglie wavelength of electrons.
32. Draw the circuit diagram of NPN transistor in common Emitter configuration.
33. 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 of carbon -14 is 5730 years)

PART - IV

Answer all questions. **5 x 5 = 25**

34. a) Calculate the electric field due to a dipole at a point on its axial line **(OR)**
b) Explain the working of a single phase AC generator with necessary diagram
35. a) Deduce the expression for the force between two long parallel current carrying conductors. **(OR)**
b) Derive the mirror equation and the equation for lateral magnification.
36. a) How the emf of two cells are compared using potentiometer? **(OR)**
b) Explain about compound microscope and obtain the equation for the magnification
37. a) (i) Write down the properties of electro magnetic waves (any six)
(ii) Compute the speed of the Em wave in a medium if the amplitude of electric and magnetic fields are 3×10^{4} Nc^{-1} and 2×10^{-4} T, respectively. **(OR)**
b) Discuss the spectral series of Hydrogen atom.
38. a) (i) obtain Einestein's photoelectric equation with necessary explanation.
(ii) List out the characteristics of photons. **(OR)**
b) Explain the constructions and working of a Full wave rectifier.