Full Portion Test - 4

Standard XII

PHYSICS

Time: 3.00 hrs. Maximum Marks: 70

Instructions: 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

2) Use Black or Blue ink to write and pencil to draw diagrams.

PART - I

Note: i) Answer all the questions.

ii) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer: 15x1=15

1. The magnetic needle of a tangent galvanometer is kept small because the magnetic field is
   a) very small b) very large
   c) considered to be small and uniform at centre only
   d) none of the above

2. The momentum delivered to the surface by an electromagnetic wave is
   a) $\frac{U}{C}$ b) $\frac{2U}{C}$ c) $\frac{U}{2C}$ d) UC

3. An electric dipole placed in a uniform electric field has minimum potential energy. The angle of inclination of the dipole moment with the field is
   a) 2π b) π c) zero d) $\frac{\pi}{4}$

4. The particle which gives mass to protons and neutrons are
   a) Higgs particle b) Einstein particle c) Nano particle d) Bulk particle

5. The electrical conductivity of a semiconductor increases when electromagnetic radiation of wavelength shorter than 2480 nm is incident on it. The bandgap (in eV) for the semiconductor is
   a) 0.9 b) 0.7 c) 0.5 d) 1.1

6. The ratio of de-Broglie wavelength of proton and α-particle of a same energy?
   a) 2:1 b) 1:2 c) 4:1 d) 1:4

7. The radius of curvature of curved surface at a thin planoconvex lens is 10 cm and the refractive index is 1.5. If the plane surface is silvered, then the focal length will be
   a) 5 cm b) 10 cm c) 15 cm d) 2 cm

12A25

8. $\frac{20}{\pi^2}$H inductor is connected to a capacitor of capacitance C. The value of C in order to impart maximum power at 50 Hz is
   a) 50 μF b) 0.5 μF c) 500 μF d) 5 μF

9. The ground form of ohm law
   a) $\frac{V^2}{A}$ b) I^2Rt c) $\sigma\vec{E}$ d) $\frac{V}{A}$

10. Atomic number of H like atom with ionization potential 122.4 V for n = 1 is
    a) 1 b) 2 c) 3 d) 4

11. A power of 11 KW is in transmitted through 220 V. The current through line wire is
    a) 5 A b) 0.5 A c) 50 A d) 500 A

12. 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) $\sqrt{\frac{h\nu_0}{m}}$ b) $\sqrt{\frac{6h\nu_0}{m}}$ c) $2\sqrt{\frac{h\nu_0}{m}}$ d) $\sqrt{\frac{h\nu_0}{2m}}$

13. Light transmitted by Nicol prism is,
    a) partially polarised b) unpolarised c) plane polarised d) elliptically polarised

14. An object of size 3 cm is placed 14 cm in front of a concave lens of focal length 21 cm. Find the height of the image
    a) 8.4 cm b) 1.8 cm c) 3 cm d) 4 cm

15. Which of the following elecromagnetic radiations is used for viewing objects through fog?
    a) microwaves b) gamma rays c) x-rays d) infrared

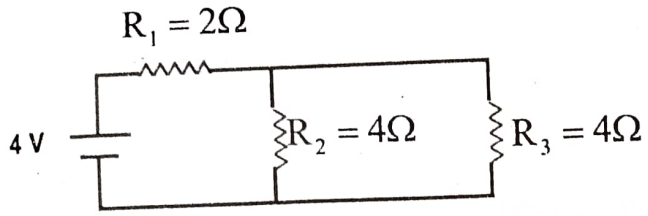
PART - II

Note: i) Answer any six questions.
ii) Q.No. 24 is compulsory.

6x2=12

16. Why do clouds appear white?
17. State Ampere's circuital law.
18. What is meant by electric field lines?
19. How will you define threshold frequency?
20. What are the constituent particles of neutron and proton?

21. Give the principle of AC generator.
22. Define modulation.
23. Give any two examples for "Nano" in nature.
24. Calculate the value of current in the following circuit.



PART - III

Note: i) Answer any six questions. 6x3=18
ii) Q.No. 33 is compulsory.

25. What are Fraunhofer lines? How are they useful in the identification of elements present in the Sun?
26. What is the difference between resolution and magnification?
27. State Kirchhoff's current and voltage rules.
28. Discuss the beta (β^+) decay process with an example.
29. Obtain Gauss law from Coulomb's law.
30. Draw the input and output waveforms of a half wave rectifier.
31. Listout the laws of photoelectric effect.
32. Derive the relation between f and R for a spherical mirror.
33. An electron moving perpendicular to a uniform magnetic field 0.5 T undergoes circular motion of radius 2.5 mm. What is the speed of electron?

PART - IV

Note: Answer all the questions. 5x5=25

34. a) Explain the construction and working of transformer.

(OR)

b) Explain the determination of the internal resistance of a cell using voltmeter.

35. a) Briefly explain the principle working of electron microscope.

(OR)

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

36. a) Discuss the spectral series of Hydrogen atom.

(OR)

b) Derive the expression for the force between two parallel, current-carrying conductors.

37. a) Describe the function of a transistor as an amplifier with the neat circuit diagram. Sketch the input and output waveforms.

(OR)

b) Discuss the diffraction at single slit and obtain the condition for n^{th} minimum.

38. a) Explain the types of emission spectra.

(OR)

b) Calculate the electric field due to dipole at a point on the axial line.

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