IPE Telangana 2024 (May) Physics Paper II

Section – A

Answer ALL questions **10 x 2 = 20**

1. How do you convert a moving coil galvanometer into a voltmeter?
2. A small angled prism of 4^{o} deviates a ray through 2.48^{o}. Find the refractive index of the prism.
3. Define magnetic declination.
4. Classify the following materials with regard to magnetism : Manganese, Cobalt, Nickel, Bismuth, Oxygen and Copper.
5. Write the expression for the reactance of (i) inductor (ii) capacitor
6. What is the principle of production of electromagnetic waves?
7. What is “Photoelectric effect”?
8. State Heisenberg’s uncertainty principle.
9. What is a p-type semiconductor? What are the majority charge carriers in it?
10. Define modulation. Why is it necessary?

Section –B

Answer ANY SIX questions **6 x 4 = 24**

11. Define critical angle. Explain total internal reflection using a near diagram.
12. Explain Doppler effect in light. Distinguish between red shift and blue shift.
13. Define intensity of electric field at a point. Derive an expression for intensity due to a point charge.
14. Derive the formula for equivalent capacitance in series combination of capacitors.
15. State and explain Biot-Savart law.
16. Obtain the expression for the emf induced across a conductor which is moved in a uniform magnetic field perpendicular to the plane of motion.
17. What are the limitations of Bohr’s theory of hydrogen atom?
18. What is rectification? Explain working of a full wave rectifier.

Section –C

Answer ANY TWO questions **2 x 8 = 16**

19. State the working principle of a potentiometer.
    Explain with the help of a circuit diagram how the emf of two primary cells can be compared using a potentiometer.
    A potentiometer wire is 5m long and a potential difference of 6V is maintained between its ends. Find the emf of a cell which balances against a length of 180 cm of the potentiometer wire.

20. How are stationary waves formed in closed pipes?
    Explain the various modes of vibrations and obtain relations for their frequencies.
    A closed organ pipe 70 cm long is sounded. If the velocity of sound is 331 ms^{-1}, what is the fundamental frequency of vibration of the air column?

21. Explain the principle and working of a nuclear reactor with the help of a labeled diagram.

    If one microgram of $^{235}_{92}U$ is completely destroyed in an atom bomb, how much energy will be released?

Note:

- The questions are obtained from internet and from the students from their interaction for paper discussion after the examination.
- The questions are given here only for ready reference for the students for preparation for upcoming examinations