

(6 pages)

Reg. No. :

Code No. : 20604 E Sub. Code : EEPH 21

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2025.

Second Semester

Physics

Elective – ALLIED PHYSICS – II

(For those who joined in July 2023 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. The instrument used to determine the optical rotation is:
- (a) Polarimeter
 - (b) Ohm meter
 - (c) Spectrometer
 - (d) Ammeter

2. The phenomenon of diffraction can be understood using.
- (a) Huygens principle
 - (b) Fraunhofer
 - (c) Fresnel
 - (d) Uncertainty principle
3. The Zeeman effect is not used in.
- (a) NMR (b) MRI
 - (c) Optical amplifiers (d) Laser cooling
4. The Minimum energy required to remove an electron is called.
- (a) Stopping potential
 - (b) Kinetic energy
 - (c) Work function
 - (d) Photo electron
5. Which of the given elements are not radioactive.
- (a) Tritium (b) Francium
 - (c) Zirconium (d) Uranium

6. The energy released during nuclear Fusion and nuclear Fission reaction is due to.
- Chemical reaction
 - The conversion of electrical energy
 - Conversion of mass into energy
 - Conversion of gravitational energy
7. As an object approaches the speed of light its mass becomes.
- Zero
 - Double
 - Remains same
 - Infinite
8. Length contraction happens only.
- Perpendicular to direction of motion
 - Along direction of motion
 - Both (a) and (b)
 - Proper Length
9. Which of the following controls the current in a Zener diode.
- Zener diode resistance
 - Potential barrier
 - Reverse bias voltage
 - External circuits

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10. Depletion region behaves as.
- Semiconductor
 - Insulator
 - Conductor
 - High resistance

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) How an air wedge can be used to find the diameter of a thin wire?
- Or
- (b) Give the theory of plane transmission grating for normal incidence.
12. (a) Describe Zeeman effect theory with spectral patterns.
- Or
- (b) Derive Einstein's photoelectric equation.
13. (a) Describe the Liquid drop model of the nucleus.
- Or
- (b) Outline the differences between nuclear fission and nuclear fusion.

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14. (a) State the postulates of the special theory of relativity.

Or

- (b) What is Length Contraction on the basis of the theory of relativity.

15. (a) Explain Forward and Reverse biasing of a junction diode.

Or

- (b) Explain a Zener diode. Give its symbol.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Describe the colours of thin films.

Or

- (b) Explain the phenomenon of polarisation by double refraction.

17. (a) State Pauli's exclusion principle. Calculate the number of electrons that can occupy a given subshell.

Or

- (b) Explain how Bohr's atom model successfully accounts for the hydrogen spectrum.

18. (a) Explain.

(i) Mass defect of a nucleus.

(ii) Binding energy of nucleus.

Or

- (b) What do you understand by Nuclear Fission? Explain the release of energy during nuclear Fission.

19. (a) Derive Lorentz transformation equation.

Or

- (b) Derive Einstein's mass energy relation.

20. (a) Describe the I-V characteristics of a zener diode.

Or

- (b) Explain with a circuit diagram the use of a zener diode as a voltage regulator.