

(7 pages)

Reg. No. :

Code No. : 20851 E Sub. Code : FEPH 21/
EEPH 41

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

Second Semester

Physics

Elective — ALLIED PHYSICS – II

(For those who joined in July 2024 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following does not show any interference pattern?
 - (a) Soap bubble
 - (b) Excessively thin film
 - (c) A thick film
 - (d) Wedge Shaped film

2. Which of the following is the correct expression for the resolving power of a grating?

- (a) $(nN + 1)/\lambda$ (b) nN/λ
(c) $nN/\lambda + 1$ (d) nN

3. What is Pauli's exclusion principle?

- (a) Electrons are distinguishable physically and mathematically
- (b) Electrons in the same orbital must have the same quantum numbers
- (c) The wave function of any system of electrons must be antisymmetric with respect to the interchange of any two electrons
- (d) The wave function of any system of electrons must be symmetric with respect to the interchange of any two electrons

4. The principal quantum number describes

- (a) energy and size of the orbit
- (b) the shape of the orbital
- (c) spatial orientation of the orbital
- (d) the spin of the electron

5. In which of the following process are Neutrons emitted?
- Inverse beta Decay
 - Nuclear fission
 - Spontaneous Fission
 - Nuclear fusion
6. Which of the following expressions correctly represents the mass of the nucleus?
- $(A - Z)m_n + Zm_p - B/c^2$
 - $(A - Z)m_n + Zm_p + B/c^2$
 - $(A + Z)m_n + Zm_p - B/c^2$
 - $(A + Z)m_n + Zm_p + B/c^2$
7. A frame of reference has four coordinates, x, y, z , and it is referred to as the _____.
- Inertial frame of reference
 - Non-inertial frame of reference
 - Space-time reference
 - Four-dimensional plane

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8. If an object reaches the speed of light, its length changes to _____.
- Infinite
 - Double of the value
 - Half of the value
 - Zero
9. What type of device is a diode?
- Unidirectional
 - Bidirectional
 - Isolated
 - Inappropriate
10. Which region of the diode, does the anode correspond to?
- N-type
 - P-type
 - Depletion layer
 - Hidden

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Discuss the phenomenon for the colors of thin films.

Or

- (b) State and explain Brewster's law.

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12. (a) State and explain the Pauli's exclusion principle.

Or

- (b) Annotate on Stark effect.

13. (a) Explain radioactivity.

Or

- (b) Summarize the concept of thermonuclear reaction.

14. (a) Describe about the frame of reference.

Or

- (b) Derive Lorentz transformation equation.

15. (a) Examine the principle and working action of zener diode.

Or

- (b) Demonstrate the construction and working of full wave rectifier.

PART C — ($5 \times 8 = 40$ marks)

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

Each answer should not exceed 600 words.

16. (a) Determine the wavelength of different colours using diffraction grating.

Or

- (b) Criticize the optical activity and its applications in sugar industries.

17. (a) Explain Bohr atom model.

Or

- (b) Discuss about the magic numbers.

18. (a) Explain nuclear models.

Or

- (b) Analyze the concept of nuclear fusion.

19. (a) Obtain an expression for Galilean transformation equations.

Or

- (b) State the postulates of special theory of relativity.

20. (a) Draw and explain the characteristic of diode.

Or

- (b) Describe about the USB cell phone charger.
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