24I301S (Pages: 2) Name: ....

Reg. No: ....

THIRD SEMESTER M.Sc. INTEGRATED GEOLOGY EXAMINATION, NOV. 2025
(CBCSS)
**CC20PHY3IC02 – OPTICS AND SPECTROSCOPY, MODERN PHYSICS,
ELECTRONICS AND NUMERICAL METHODS**
(Physics)
(2020 to 2022 Admissions – Supplementary)

Time: 2 ½ Hours   Maximum: 80 Marks

Credit: 4

Part A (Short answer questions)
Answer *all* questions. Each question carries 2 marks.

1. What is meant by destructive superposition?

2. Why is the angle of Fresnel's biprism kept so small?

3. What is Fresnel diffraction?

4. State the hypothesis of de Broglie.

5. Explain the uncertainty principle.

6. What is de Broglie's phase velocity?

7. What is the importance of schrodinger's time dependent equation?

8. What is the reason for monochromaticity of laser beam?

9. Explain the quantum behaviour of light.

10. What are the advantages of diode laser?

11. What are three regions of transistor?

12. Draw the symbol of diode.

13. Write down the truth table of XOR gate.

14. Write taylor series expansion of sinx.

15. Write the application of least square fitting.

(Ceiling: 25 Marks)

Part B (Short essay questions - Paragraph)
Answer *all* questions. Each question carries 5 marks.

16. Explain the temporal coherence.

17. The distance between the slit and biprism and between the biprism and the screen are 50 cm each. The angle of biprism is 179° and its refractive index is 1.5. If the distance.

18. Derive time dependent and time independent Schrodinger equation.

19. Find the total binding energy B and also the average binding energy per nucleon B∕A for 238U.

20. Explain Einstein coefficients. How are they related?

21. Explain half wave rectifier.

22. Explain interpolation method using suitable example.

23. Explain numerical integration by trapezoidal and simpsons 1/3 method.

(Ceiling: 35 Marks)

Part C (Essay questions)

Answer any *two* questions. Each question carries 10 marks.

24. Explain the formation of Newton's rings. How can these be used to determine the wavelength of monochromatic light.

25. Explain alpha, beta and gamma decay processes in detail.

26. Discuss theory and working of ruby laser with a neat diagram.

27. Describe the working of CE amplifier and explain its frequency respose curve.

(2 × 10 = 20 Marks)

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