

22I304

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Name:

Reg. No:

THIRD SEMESTER M.Sc. INTEGRATED GEOLOGY EXAMINATION, NOV. 2023
(CBCSS)

(Regular/Supplementary/Improvement)

**CC20 PHY3 IC02 – OPTICS AND SPECTROSCOPY, MODERN PHYSICS,
ELECTRONICS AND NUMERICAL METHODS**

(Physics)

(2020 Admission onwards)

Time: 2.5 Hours

Maximum: 80 Marks

Credit: 4

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. What are the conditions of obtaining constructive and destructive interference?
2. Give one method of obtaining coherent sources.
3. Explain the interference of light by a plane film.
4. Distinguish between mass number and atomic number.
5. What is meant by half-life of a nuclear decay?
6. What is gamma decay process?
7. What are the major hazard of nuclear radiations?
8. Give three applications of laser.
9. What is an active medium?
10. Define population inversion and stimulated emission.
11. Draw the circuit diagram of CE configuration.
12. What is the need for emitter capacitor in transistor amplifier?
13. What is the role of a filter circuit?
14. What is Rung Kutta method?
15. Compare analytical and numerical methods.

(Ceiling: 25 Marks)

Part B (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

16. A thin plate of mica ($\mu = 1.58$) is used to cover one slit of a double slit arrangement. The central point on the screen is occupied by the seventh fringe. If $\lambda = 5500\text{\AA}$, calculate the thickness of the mica sheet.
17. How will you determine the refractive index of a liquid by Newton's rings?
18. Explain about nuclear sizes, density and shape.

19. Explain nuclear fusion using binding energy curve.
20. With the help of energy band diagram discuss the working of a semiconductor laser.
21. Describe the frequency response curve of a CE amplifier.
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. Describe an experiment to determine the wave length of sodium light using Fresnel's biprism.
25. Explain alpha, beta and gamma decay processes in detail.
26. Explain the different components of a laser. Describe the construction and working of a He-Ne laser.
27. Discuss the different configurations of a transistor and explain input and output characteristics of CE amplifier.

(2 × 10 = 20 Marks)
