THIRD SEMESTER M.Sc. INTEGRATED GEOLOGY EXAMINATION, NOV. 2022

(CBCSS - UG)

(Regular/Supplementary/Improvement)

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

(Geology)

(2020 Admission onwards)

Time: 2 ½ Hours   Maximum: 80 Marks

Credit: 4

Part A (Short answer questions)

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

1. State superposition principle.

2. Define interference.

3. Give one method of obtaining coherent sources.

4. What are isotopes?

5. What is meant by binding energy of a nucleus?

6. What is beta decay process?

7. Mention any two methods of disposal of nuclear wastes.

8. What is population inversion? Why is it so important in laser action?

9. Give three applications of laser.

10. Explain what is a metastable state?

11. What is the need for emitter capacitor in transistor amplifier?

12. What is meant by current amplification factor?

13. State de Morgans laws.

14. What do you mean by interpolation?

15. What is Rung Kutta method?

(Ceiling: 25 Marks)

Part B (Short essay questions - Paragraph)

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

16. How will you determine the thickness of a given thin sheet of mica using biprism experiment?

17. Explain the phenomenon of colours of thin films.

18. Explain the properties of nuclear forces.

19. The maximum wavelength for photoelectric emission in tungsten is 230 nm. What wavelength of light must be used in order for electrons with a maximum energy of 1.5eV to be ejected?

20. Explain the principle and working of a He-Ne laser.

21. Explain the working of a transistor as an amplifier.

22. How bisection method is used for solution of algebraic equations?

23. Explain Euler method to find solution of differential equations using an example.

(Ceiling: 35 Marks)

Part C (Essay questions)

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

24. What are Newton's rings? Derive an expression for the radii of rings.

25. Explain nuclear properties such as constituents, mass, size, shape, density, binding energy, nuclear forces, etc.

26. Explain laser action with specify absorption, spontaneous emission, stimulated emission with neat diagram.

27. Explain half wave rectifier and full wave rectifier, and obtain its efficiency.

(2 × 10 = 20 Marks)

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