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Name:

Reg.No:

FOURTH SEMESTER INTEGRATED M.Sc. GEOLOGY DEGREE EXAMINATION, APRIL 2026

(CBCSS)

(Regular/Supplementary/Improvement)

CC23PHY4IC04 - ELECTRICITY, MAGNETISM AND NUCLEAR PHYSICS

(Physics)

(2023 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 2

Part A (Short answer questions)

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

1. Define electric potential energy.
2. What is dielectrics? Distinguish between a polar and a non polar dielectrics.
3. What are superconductors? Give examples.
4. How a galvanometer is converted into an ammeter?
5. Give properties of ferromagnetic substances.
6. What is the principle of deflection magnetometer? How can we set up deflection magnetometer in Tan A position?
7. How can we compare the magnetic moments using Searle's vibration magnetometer?
8. Why do we need slow neutrons to cause nuclear fission? Can a slow proton cause fission of any heavy nuclei?
9. What changes do occur in the mass number and atomic number of radionuclide during positive beta decay?
10. Mention any two methods of disposal of nuclear wastes.
11. Leptons are more elementary than others', comment on this statement.
12. The idea of Higgs bosons provides a satisfactory solution and fitted well with the established theory', Comment on this statement.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

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

13. State and derive Coulomb's theorem.

14. A current of 5 ampere is passing through a metallic wire of cross sectional area $4 \times 10^{-3} \text{ m}^2$. if the density of the charge carrier in the wire is $5 \times 10^{26} \text{ m}^{-3}$. find the drift speed of electrons.
15. With the help of neat diagram, explain the experiment to measure the resistance of a coil using Carey Foster Bridge.
16. Estimate the radius and density of C-12 nucleus. ($R_0 = 1.2 \text{ fm}$).
17. What is the role of a moderator in a nuclear reactor?
18. What are particle accelerators? Define the working principle of a linear accelerator.
19. Explain Cosmic ray shower.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

20. What is a Capacitor. Derive the expression for the capacitance of parallel plate capacitor.
21. Explain the magnetism of earth and the magnetic elements.

(1 × 10 = 10 Marks)
