

D 140853

(Pages : 2)

Name.....

Reg. No.....

**FOURTH SEMESTER (CBCSS—U.G.) DEGREE EXAMINATION
APRIL 2026**

Physics

PHY4C04—ELECTRICITY MAGNETISM AND NUCLEAR PHYSICS

(2019 Syllabus)

Time : Two Hours

Maximum : 60 Marks

*The symbols used in this question paper have their usual meanings.***Section A (Short Answer Type)***Answer **all** questions in two **or** three sentences, each correct answer carries a maximum of 2 marks.*

1. Explain the stability of nucleus and binding energy.
2. What do you mean by angle of dip ? What is the angle of dip at the magnetic equator ?
3. Discuss any *four* properties of paramagnetic materials.
4. State and Explain Gauss's law in electrostatics.
5. Differentiate between nuclear fission and fusion with example.
6. Explain critical magnetic field H_c in superconductivity. How it is related T_c ?
7. Explain the principle of ^{14}C dating.
8. What is azimuth effect of cosmic rays ?
9. Explain current density and drift velocity. Write down the expression connecting current density and drift velocity.?
10. Distinguish between primary and secondary cosmic rays ?
11. Write an expression for the capacitance of a cylindrical capacitor and explain the terms.
12. Why the potentiometer is superior to voltmeter in measuring the e.m.f of a cell ?

(Ceiling 20 marks)

Turn over

Section B (Paragraph / Problem Type)

Answer **all** questions in a paragraph of about **half a page to one page**, each correct answer carries a maximum of 5 marks.

13. How many kilowatts energy will be released by complete fission of 1kg of U^{235} . Given that the energy released per fission is 200 MeV ?
14. Helium nucleus has +2e charge and neon nucleus + 10e charge. Calculate the force of repulsion between them if they are separated by a distance of 10^{-6} m. ($e = 1.6 \times 10^{-19}$ C).
15. A cyclotron in which the flux density is 1.4 weber/m² is employed to accelerate protons. How rapidly should the electric field between the Dees be reversed ? Mass of the proton = 1.67×10^{-27} kg. and charge= 1.6×10^{-19} .
16. With the help of suitable diagram, explain the conversion of a galvanometer to an ammeter.
17. Explain the classification of Elementary particles and mention their properties.
18. Derive an expression for finding the moment of a bar magnet using deflection magnetometer in T and C position.
19. What is the principle of a potentiometer ? How the internal resistance is determined by potentiometer ?

(Ceiling 30 marks)

Section C (Essay type)

Essays - Answer in about **two pages**, any **one** question. Answer carries 10 marks.

20. Derive an expression for the capacitance of a parallel plate capacitor. What will be the capacitance if the space between the plates is partially filled with a slab of thickness d and relative permittivity ϵ_r ?
21. Discuss the working principle of a Carey Foster bridge. How will you determine the temperature co-efficient of resistance of a material using a Carey Foster bridge.

(1 × 10 = 10 mark)