

D 120582

(Pages : 2)

Name.....

Reg. No.....

**FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
APRIL 2025**

Physics/Applied Physics

PHY4C04—ELECTRICITY MAGNETISM AND NUCLEAR PHYSICS

(2019—2023 Admissions)

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 question carries a maximum of 2 marks.*

1. State and explain Coulomb's law between charges.
2. Distinguish between electric potential and potential difference.
3. What is Superconductivity ?
4. Explain current density and drift velocity. Write down the expression connecting current density and drift velocity ?
5. Distinguish between Para and ferromagnetic materials with examples.
6. What do you mean by a Capacitor ? What are the factors on which the capacity of a capacitor depends on ?
7. What do you mean by angle of dip ? What is the angle of dip at the magnetic equator ?
8. Distinguish between nuclear fission and fusion.
9. What do you mean by binding energy of a nucleus ? Write the equation of binding energy.
10. What is latitude effect of cosmic rays ?
11. What is the working principle of a Tangent Galvanometer ?
12. How can the sensitivity of potentiometer be increased ?

(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 question carries a maximum of 5 marks.*

13. The plate of a parallel plate capacitor has an area of 100cm^2 each and are separated by 2mm . The capacitor is charged by connecting it to 500 V supply. Find the energy of the charged capacitor.
14. In a chamber a uniform magnetic field 2×10^{-4} is maintained. An electron with a speed of $4 \times 10^6\text{m/s}$ enters the chamber normal to the field. Find the radius of the path and the frequency of revolution of electron.
15. The half-life of a radioactive substance is 4 days. What fraction of 1 gm substance remains after 20 days.
16. What do you mean by a hysteresis loop ? Plot a typical hysteresis loop and indicate retentivity and coercivity.
17. Find the binding energy of $^{56}\text{Fe}_{26}$ in MeV. Given $m_p = 1.007825\text{ amu}$, $m_n = 1.008665\text{ amu}$ and $m_{\text{Fe}} = 55.934939\text{ amu}$.
18. With the help of suitable diagram. Explain the conversion of a galvanometer to a voltmeter.
19. Explain the classification of Elementary particles and mention their properties.

(Ceiling 30 marks)

Section C (Essay Type)

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

20. State and prove Gauss's law in electrostatics. Find the electric field due to a plane sheet of charge and explain Electrostatic shielding.
21. Give an account of the theory, construction and working of a cyclotron. Point out its limitations.

(1 × 10 = 10 marks)