D 103070 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION APRIL 2024

Physics/Applied Physics

PHY4C04—ELECTRICITY, MAGNETISM AND NUCLEAR PHYSICS

(2019 Admission onwards)

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. What are baryons and leptons ?
2. Mention some of the uses of a nuclear reactor.
3. State and explain the law of radioactive disintegration.
4. What is electrostatic shielding ?
5. What is latitude effect if cosmic rays ?
6. What is superconductivity ?
7. Explain nuclear waste disposal
8. Explain current density and drift velocity. Write down the expression connecting current density and drift velocity ?
9. Distinguish between dia and ferromagnetic materials with examples
10. State and explain Gauss's law in electrostatics.
11. What is the purpose of large hadron collider ?
12. Explain the principle of hydrogen bomb.

(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. What is the principle of a potentiometer ? How the internal resistance is determined by potentiometer ?

14. The plate of a parallel plate capacitor have an area of 50 cm^2 each and are separated by 2 mm. The capacitor is charged by connecting is to 200 V supply. Find the energy of the charged capacitor.

15. A reactor js developing energy at the rate of 3000 kW. How many atoms of U^{235} undergo fission per second ?

16. Describe the theory, construction and working of a tangent galvanometer

17. The disintegration constant λ of a radioactive element is 0.00231 per day. Calculate its half-life and average life.

18. Explain the classification of Elementary particles and mention their properties.

19. What do you mean by energy of a charged capacitor ? Derive an expression for it.

(Ceiling = 30 marks)

Section C (Essay Type)

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

20. Explain the construction and working of a Searle's vibration magnetometer

21. Discuss the construction and working of a nuclear reactor.

(1 × 10 = 10 mark)