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3562 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION

APRIL 2021

Physics/Applied Physics

PHY 4C 04—ELECTRICITY MAGNETISM AND NUCLEAR PHYSICS

ıe : Two Hours Maximum : 60 Marks

The symbols used in question paper have their usual meanings.

Section A (Short Answers)

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. Give the differential form of Gauss's law in electrostatics. What are the terms involved in the expression ?
2. What are the properties of equipotential surfaces ?
3. What do you mean by the capacitance of a capacitor ? Give the basic expression for the same.
4. Give the vector statement of Ohm's law. What are the terms involved ?
5. Give the value of the angle of dip at the magnetic pole and magnetic equator.
6. Give any *four* properties of ferromagnetic materials.
7. What is the use of a deflection magnetometer ? How will you arrange a deflection magnetometer in tan C position ?
8. What is nuclear fusion ? Give an example.
9. What are cosmic ray showers ?
10. What are the fundamental interactions in nature ?
11. What do you mean by hypercharge ? What is the hypercharge of π^+ particle ?
12. Name the different leptons.

(8 × 3 = 24 marks)

Turn over

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Section B (Paragraph/Problem Type)

Answer at least **five** *questions.*
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. How much electric flux will come out through a surface S = 10 j kept in an electrostatic field E = $2i + 4j + 7k$?

14. Determine the capacitance of a sphere of 20 cm diameter inside which there is an earth-connected sphere of 10 cm diameter, the medium between the spheres being air.

15. A galvanometer of resistance 15 ohms gives full scale deflection for a current of 2 milli-amp. Calculate the shunt resistance needed to convert it to an ammeter of range 5 A.

16. What is the origin for a hysteresis loop in ferromagnetic materials ? Use a typical hysteresis loop indicating retentivity and coercivity.

17. Discuss the working principle of a tangent galvanometer. What do you mean by the reduction factor of a tangent galvanometer ?

18. How long will it take for 60 % of a sample of radon to decay ? Given, the half-life of radon = 3.8 days.

19. Explain the distinction between particles and antiparticles. Illustrate using two examples.

(5 × 5 = 25 marks)

Section C (Essay Type)

Answer any **one** *question.*
The question carries 11 marks.

20. Explain the working principle of a potentiometer. How will you determine the resistance of a wire using a potentiometer ?

21. Using a suitable figure, explain the working principle of a linear accelerator.

(1 × 11 = 11 marks)