C 21552   (Pages : 2)   Name......................................

Reg. No.................................

FOURTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION APRIL 2022

Physics/Applied Physics

PHY 4C 04—ELECTRICITY MAGNETISM AND NUCLEAR PHYSICS

(2019 Admission onwards)

Time : Two Hours   Maximum : 60 Marks

Section A

*Answer at least **eight** questions.*

Each question carries 3 marks.

All questions can be attended.

Overall Ceiling 24.

1. Explain Gauss's law in electrostatics.

2. How will you define the potential difference between two points in an electric field ? What is its unit ?

3. What do you mean by a capacitor ? What are the factors on which the capacity of a capacitor depends on ?

4. Write down the expression connecting current density and drift velocity. What are the terms involved ?

5. What do you mean by angle of dip ? What is the angle of dip at the magnetic equator ?

6. Give any *four* properties of paramagnetic materials.

7. What is the use of a deflection magnetometer ? How will you arrange a deflection magnetometer in tan B position ?

8. What is the working principle of a tangent galvanometer ?

9. What do you mean by nuclear fission ? Give an example.

10. What are secondary cosmic rays ? What is its content ?

11. Give the quark composition of a proton and a neutron.

12. What is the purpose of large hadron collider ?

(8 × 3 = 24 marks)

Turn over

Scanned with OKEN Scanner

Section B

13. If 1 coulomb charge is placed at the centre of a cube of side 10 cm, estimate the flux coming out any face of the cube.

14. A sphere of 10 cm. diameter is suspended within a hollow sphere of 12 cm. diameter. If the inner sphere be charged to a potential of 15,000 volt and the outer sphere be earthed, determine the charge on the inner sphere.

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

16. What do you mean by a hysteresis loop ? Plot a typical hysteresis loop and indicate retentivity and coercivity.

17. Discuss the arrangement of a Searle's vibration magnetometer using a suitable figure. Give a application of a Searle's vibration magnetometer.

18. The half life of a radioactive substance is 15 years. Calculate the period in which 2.5 % of the initial quantity will be left over.

19. Discuss the lepton and baryon number conservation laws giving an example for each.

$(5 \times 5 = 25$ marks$)$

Section C

20. Using a suitable figure, 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.

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

$(1 \times 11 = 11$ marks$)$

180470