

20U404

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Name:

Reg.No:

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2022

(CBCSS - UG)

(Regular/Supplementary/Improvement)

CC19U PHY4 C04 / CC20U PHY4 C04 - ELECTRICITY, MAGNETISM AND NUCLEAR PHYSICS

(Physics - Complementary Course)

(2019 Admission onwards)

Time : 2.00 Hours

Maximum : 60 Marks

Credit : 2

Part A (Short answer questions)

Answer *all* questions. Each question carries 2 marks.

1. Define Electric flux. How it is related to electric field?
2. What is parallel plate capacitor? What is its capacitance?
3. Define Current density.
4. Give four applications of superconductivity.
5. What are the magnetic elements of earth? Define them.
6. What is hysteresis?
7. What is the principle of tangent galvanometer?
8. Define mass defect. What is the expression for mass defect of a nucleus?
9. Why do we need slow neutrons to cause nuclear fission? Can a slow proton cause fission of any heavy nuclei?
10. What are the major hazards of nuclear radiations?
11. What are Hadrons? Give example.
12. Explain briefly about LHC.

(Ceiling: 20 Marks)

Part B (Short essay questions - Paragraph)

Answer *all* questions. Each question carries 5 marks.

13. State and prove Gauss's law in electrostatics.

14. Write a short note on Dielectrics.
15. A galvanometer has resistance of 30 ohm and current of 2 mA is needed to give full scale deflection. What is the resistance needed and how it is to be connected to convert the galvanometer into (a) an ammeter of 0.3 amperes range (b) into a voltmeter of 0.2 V range.
16. In tan A position a short magnet is placed at a distance d_1 from the centre of the compass box of a deflection magnetometer. When the same magnet is placed at a distance d_2 from the compass box in tan B position of the magnetometer, the deflection remains same. Find the ratio $\frac{d_1}{d_2}$
17. What is the role of a moderator in a nuclear reactor?
18. The magnetic field strength in a 20 MeV proton cyclotron is 2T. What is the required frequency of the oscillator controlling the potential of the Dees? Also find out the diameter of the cyclotron
19. Explain Cosmic ray shower.

(Ceiling: 30 Marks)

Part C (Essay questions)

Answer any *one* question. The question carries 10 marks.

20. What is a Carey foster bridge? What is its principle? With the help of a neat diagram explain the experiment to measure the resistance of a coil using Carey Foster Bridge.
21. Give an account of the law of disintegration of radioactive substances. Deduce from this law the value of a) half life; b) mean life

(1 × 10 = 10 Marks)
