**21U404** (Pages: 2) Name: .....

Reg.No: .....

**FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2023**

(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 field at a point. What are its units?
2. Explain the term capacitance of a capacitor. What is its unit?
3. What is resistance? Define its unit.
4. Define Meisner effect. Explain the properties of superconductors.
5. What are the magnetic elements of earth? Define them.
6. Give properties of ferromagnetic substances.
7. Distinguish between Tan A and Tan B positions of deflection magnetometer.
8. Define chain reaction.Under what condition is this reaction is said to be critical?
9. What are the features of radioactivity?
10. Mention any two methods of disposal of nuclear wastes.
11. What is meant by cascade theory of cosmic rays?
12. What is the difference between dark matter and dark energy?

**(Ceiling: 20 Marks)**

**Part B** (Short essay questions - Paragraph)

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

13. State and derive Coulomb's theorem.
14. What is meant by electrostatic shielding. Give its practical application.
15. With neat diagram explain the conversion of galvanometer into ammeter.
16. Explain the theory of measuring very small currents using a tangent galvanometer. Define the reduction factor of this galvanometer.

17. The mass of $^{7}_{3}Li$ =7.016004u, mass of $^{6}_{3}Li$=6.015125 u and the mass of neutron is 1.008665 u. Calculate the binding energy of $^{7}_{3}Li$ nucleus.

18. Explain the basic principle and working of a nuclear reactor.

19. Complete the following reaction and verify the conservation of baryon number and electron lepton number $n \rightarrow .....+ e^{-} + \bar{\nu}_e$

**(Ceiling: 30 Marks)**

**Part C** (Essay questions)

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

20. What is a potentiometer? Give its principle. Explain in detail how a potentiometer is used to measure the resistance of a coil.

21. a) With a neat diagram explain the working principle of a cyclotron.
    b) Derive an expression for the final kinetic energy acquired by the accelerated particles

**(1 × 10 = 10 Marks)**

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