

18U407

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Name:

Reg. No.....

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2020

(CUCBCSS-UG)

(Regular/Supplementary/Improvement)

CC15U PH4 C04 - ELECTRICITY, MAGNETISM AND NUCLEAR PHYSICS

(Physics - Complimentary Course)

(2015 Admission onwards)

Time: Three Hours

Maximum: 64 Marks

Section A

Answer *all* questions. Each question carries 1 mark.

1. The SI unit of electric potential is _____
2. The surface of a conductor behaves as _____
3. The mobility of a current carrier is _____ proportional to the mass of the carrier.
4. The number of electrons passing through a conductor in 12s when a current of 2A flows through it is _____
5. The area of the hysteresis loop gives the measure of _____ of the specimen.
6. If the angle of a dip at a place is 60° , the resultant magnetic field at that place is _____
7. The decay constant of the radio nuclide whose half life is 5 hour is _____
8. Moderators are used to slow down _____
9. _____ is responsible for the decay of strange particles.
10. The interaction between quarks is mediated by the particles called _____

(10 x 1 = 10 Marks)

Section B

Answer *all* questions. Each question carries 2 marks

11. What is meant by electric flux?
12. Write a short note of equi-potential surface.
13. Derive the relation between electric current and drift velocity.
14. What is meant by isoclinic and isodynamic lines?
15. Define the reduction factor of T.G.
16. Briefly explain about the carbon 14 dating.
17. Distinguish between baryons and mesons on the basis of quark model.

(7 x 2 = 14 Marks)

Section C

Answer any *three* questions. Each question carries 4 marks.

18. Show that the electrostatic field is a conservative field.
19. How can we convert a galvanometer to an ammeter?
20. Explain the domain theory of ferromagnetism.
21. Explain the processes nuclear fission and nuclear fusion from the binding energy curve.
22. Explain the latitude and longitude effects on cosmic rays.

(3 x 4 = 12 Marks)

Section D

Answer any *three* questions. Each question carries 4 marks.

23. In Bohr model of hydrogen atom, the electron is pictured to rotate in a circular orbit of radius 5×10^{-11} m, at a speed 2.2×10^6 m/s. What is the current associated with electron motion?
24. Two positive point charges $16\mu\text{C}$ and $4\mu\text{C}$, are separated in vacuum by a distance of 3 m. Find the point on the line between the charges, where the net electric field is zero.
25. In the magnetic meridian of a certain place, the horizontal component of earth's magnetic field is 0.26G and the dip angle is 60° . Find the vertical component of earth's magnetic field. Also find out the net magnetic field at this place.
26. How long does it take for 60% of a sample of radon to decay? The half life of radon is 3.8d.
27. Determine that the following reaction is possible on the basis of lepton number conservation law $\mu^+ = e^+ + \nu_e + \nu_\mu$.

(3 x 4 = 12 Marks)

Section E

Answer any *two* questions. Each question carries 8 marks.

28. State and explain Gauss's law. Apply this law to find the electric field due to two parallel plane sheets of charge of equal and opposite surface charge densities.
29. Give the theory of Carey Foster bridge with a neat circuit diagram. How can the temperature coefficient of resistance of a material be found out using this bridge?
30. Give the theory of vibration magnetometer. With the help of Searle's vibration magnetometer, how can be find the magnetic moment of a magnet.
31. With necessary theory, discuss the working of cyclotron accelerator.

(2 x 8 = 16 Marks)
