15U409   (Pages:2)   Name:.....................

Reg. No:...........................

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, MAY 2017

(CUCBCSS-UG)

Physics - Core Course

CC15U PH4 C04 - ELECTRICITY, MAGNETISM AND NUCLEAR PHYSICS

(2015 Admission)

Time: Three Hours   Maximum: 64 Marks

Section A

(Answer *all* questions)

1. Electric field inside a conductor is..........

2. If the separation between the parallel plates is halved, capacitance is ....

3. The flux of electric field through the surface of a cube with a charge q at the center is........

4. Magnetic susceptibility of a diamagnetic material is..................

5. Magnitude of the horizontal component of Earth's magnetic field is...........T.

6. In TanA position the Earth's magnetic field, B_h and applied magnetic field is ....

7. Half-life of ^{14}C is ....

8. Baryon number of tau particle is.............

9. The charge of down quark is ....

10. Expansion of the Universe is first discovered by..........

(10 x 1 = 10 marks)

Section B

(Answer *all* questions)

11. What is electro static shielding?

12. Discuss the reason for Earth's magnetic field?

13. What is Drift velocity of a charge?

14. What are type I and type II super conductors?

15. The nucleus of iron isotope ^{56}Fe is the most stable. Explain the reason.

16. Give two supporting evidences for the Big Bang model of universe.

17. What is the difference between dark matter and dark energy?

(7 x 2 = 14 marks)

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Section C

(Answer any *three* questions)

18. What are type I and type II super conductors?

19. Explain magnetic hysteresis and B-H curve.

20. Distinguish between para, dia and ferro magnetism.

21. Explain the how the age of a sample is determined using carbon dating.

22. What are cosmic rays. Discuss the latitude and longitude effect of cosmic ray shower.

(3 x 4 =12 marks)

Section D

(Answer any *three* questions)

23. Find the electric field a distance z above the midpoint between two equal charges q a distance d apart.

24. Discuss on the binding energy and stability of nucleus.

25. Find the decay constant of a radioactive sample whose activity becomes $1/16^{th}$ in 10 years.

26. Determine the energy released in the deutirium-tritium fusion reaction, $_1H^2 + _1H^3 = _2H^4 + n$.

    $[m(_1H^2) = 2.014102u, m(_1H^3) = 3.016049u, m(_2H^4) = 4.002603u,$ and $m(n) = 1.008665]$

27. Deuterons, the nucleuses of heavy hydrogen, are accelerated in a cyclotron. Determine the frequency of the voltage source, if the value of magnetic field strength in the cyclotron makes 1.5T and the mass of deuterons is 3.3×10^{-27}kg.

(3 x 4 = 12 marks)

Section E

(Answer any *two* questions)

28. What is a capacitor? Derive expressions for electric field inside and capacitance of a parallel plate capacitor.

29. Explain the theory of linear accelerator and cyclotron.

30. With proper theory explain the experimental procedure for the determination of temperature coefficient of a resistance using Carey Foster's bridge.

31. Discuss the classification of elementary particles.

(2 x 8 =16 marks)

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