TB146670A   Reg. No………………………….

                                                         Name………………………....

B. Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2017
SEMESTER VI - PHYSICS
PHY6NPP - NUCLEAR AND PARTICLE PHYSICS

Time: Three Hours   **Maximum Marks: 60**

PART A

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

1.   What is packing fraction?
2.   Explain the terms half life and average life of a radioactive sample
3.   How do you measure the decay constant of a short period sample?
4.   What is internal conversion process?
5.   What is meant by a fertile material?
6.   Define critical mass.
7.   What is an antiparticle?
8.   What is hyper charge?

                                                         (8x1=8)

PART B

II.   Answer any six questions. Each question carries 2 marks.

9.   What is the significance of binding energy curve?
10. Write a short note on electric quadrupole moment.
11. Give the principle of ionization chamber.
12. How the age of the earth can be determined using radioactive dating?
13. Discuss the neutrino theory of   dacay.
14. State and explain Geiger Nuttal Law.
15. What is multiplication factor in nuclear fission? Give its significance.
16. Briefly explain toroidal confinement.
17. What is meant by colour of a quark?
18. What is east west asymmetry in cosmic rays?

                                                         (6x2=12)

PART C

III.   Answer any four questions. Each question carries 4 marks.

19. Why electrons cannot be present inside the nucleus?
20. Give meson theory of nuclear forces.
21. The numbers of disintegrations per minute of a certain radioactive substance are 6050 and 4465 at the 2nd and 3rd hour. Calculate the decay constant and half life of the substance.

22. A carbon specimen found in a cave contained 1/8 as much as C^{14} as an equal amount of carbon in living matter. Calculate the approximate age of the specimen. Half life period of C^{14} is 5568 years.
23. Assuming that a helium nucleus is formed by the fusion of two deuterium nuclei, calculate the energy released.
24. Give quark model of elementary particles.

(4x4=16)

PART D

IV. Answer any two questions. Each question carries 12 marks.

25. Write an essay on nuclear shell model.
26. Give an account of experiments to determine the energy and range of α particles.
27. Explain Bohr- Wheeler theory of nuclear fission.
28. Explain the conservation laws and symmetries in particle physics.

(2x12=24)