23105172

QP CODE: 23105172

Reg No : .....

Name : .....

B.Sc DEGREE (CBCS) REGULAR / REAPPEARANCE EXAMINATIONS, MARCH 2023

Sixth Semester

CORE COURSE - PH6CRT11 - NUCLEAR, PARTICLE AND ASTROPHYSICS

Common for B.Sc Physics Model I, B.Sc Physics Model II Applied Electronics, B.Sc Physics Model II Computer Applications & B.Sc Physics Model III Electronic Equipment Maintenance

2017 Admission Onwards

FDB209D9

Time: 3 Hours Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. What are isomers?
2. What is mass defect?
3. What is meant by short range of nuclear forces?
4. What is the application of Van de Graaff generator?
5. Write down the relation between half life period and decay constant.
6. Give an example of branched disintegration in Thorium series.
7. What is meant by electron capture?
8. How energy is produced in stars?
9. What is east – west effect in cosmic rays?
10. What is meant by Parity?
11. Name a particle which can take part in all the four types of interaction.
12. What is meant by nebula?

(10×1=10)

Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. Explain Mass defect.
14. What is propotional counter?
15. Explain Wilson Cloud Chamber.
16. Derive the frequency of ions in a cyclotron.
17. Find the age of death of an organism from the following data. Half life of ${}_6C^{14}$ = 5600 years. Ratio of amount of ${}_6C^{14}$ at the death and present time is 10^8.
18. Draw and explain the K- and L- conversion lines obtained along with the continuous β – emission spectrum.
19. Distinguish between laboratory frame of reference and center of mass frame of reference.
20. Write a note on the elementary particle quantum numbers.
21. Are hotter stars brighter than cooler stars? Give reason.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Explain the postulates of liquid drop model. Derive Weizsacker semi empirical mass formula.
23. What is nuclear shell model and explain the evidences for shell model?
24. What is nuclear fission? Describe the components and working of a nuclear reactor with a simplified figure. Explain the peculiarities of a breeder reactor.
25. Describe Hadrons and Leptons. Write down the classification of elementary particles.

(2×10=20)