SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Sc.Physics - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - V
22UPHCT5011 - Nuclear Physics

Total Duration : 2 Hrs.30 Mins.   Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks$)$

1. Discuss semi empirical mass formula explaining of each term in it and state its limitations.

2. What is the magic about magic number? Explain how the shell model of the nucleus accounts or the existence of magic numbers .

3. Deduce the relationship between half-life and mean life period of radio decay.

4. Give the theory of successive disintegration of radioactive substances.

5. Describe the construction and working of the Betatron.

6. Give an account of the mode of operation of a scintillation counter and describe how it may be utilised in the study of nuclear reactions.

7. What are cosmic rays? How the intensity of cosmic rays varies with respect to latitude and altitude?

8. What are Quarks? Give an account of composition of hadrons according to quark model.

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks$)$

9. Describe liquid drop model of the nucleus. Point out its usefulness and limitations in understanding the nuclear phenomena.

10. Explain with the help of Gamow's theory how the α particles with energy less than height of the potential barrier are emitted from a radioactive nucleus.

11. Describe the construction and action of a cyclotron and discuss its limitations.

12. Explain the working of a Wilson cloud chamber. How is it used to determine the energy of a particle passing through it?

13. Discuss in detail about the four types of fundamental interactions between the elementary particles.

*****