

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 NOVEMBER -2023

SEMESTER - V

20UPHCT5011 - Nuclear Physics

Total Duration : 2 Hrs 30 Mins.

Total Marks : 60

Section B

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

1. Discuss about mass defect, binding energy and packing fraction in nucleus.
2. Elucidate spin-orbit coupling in nucleus.
3. Describe the process of k-shell electron capture.
4. A radioactive element has a half-life of 2500 years. In how many years 90% of its mass will decay.
5. Explain the working of betatron.
6. Discuss the working of Wilson cloud chamber.
7. Explain the quantum numbers of elementary particles.
8. Write an account on particles and antiparticles.

Section C

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

9. Discuss Weizacker semi empirical mass formula.
10. (i) Discuss law of successive disintegration and radioactive equilibrium.
(ii) Explain transient and secular equilibrium.
11. (i) Explain in details the principle, construction and working of synchrocyclotron.
(ii) List out the applications of cyclotrons.
12. (i) Discuss about the interaction between energetic particles and matter.
(ii) Explain the principle, construction and working of Geiger-Muller counter.
13. (i) Explain the latitude effect, azimuth effect and altitude effect on cosmic rays.
(ii) what is Van Allen belt? Mention its significance.
