# UG (CBCS) Even Semester Examination, May 2025

## EDUCATION
## (B.Sc. B.Ed.)

8th Semester

## Course No. : BSPH - 802

( Nuclear and Particle Physics, Digital Electronics & Solid State Device )

Full Marks : 50

Pass Marks : 20

Time : 2 hours

*The figures in the margin indicate full marks for the questions*

(*Answer five questions*)

1. (a) $t_{1/2}$ of some elements is 2.3 days. Find out the value of $\lambda$

   (b) For a certain element $\lambda = \lambda_0$ year$^{-1}$. If $N_O$ is the intital particle numbers, then calculate the number of particles after 13 days.

   (b) Show that 1 amu $\simeq$ 931.5 Mev/$e^2$. 4+4+2=10

Or

2. (a) Describe Alpha particles fine structure.

   (b) Explain the experimental set up to detect anti-neutrino. 5+5=10

3. (a) Calculate the binding energy per particles in $^{12}_{6}c$. $M_n$ = 1.008665 amu, $M_H$ = 1.007825 amu. n, H represents neutron and hydrogen respectively.

(b) Derive expressions for Q-values in α and β decay in terms of atomic maser.

(c) Describe the splittins of nuclear '1d' level according to shell model. 3+6+1=10

Or

4. Describe the working mechanism of : 5+5=10

(a) Betatron (b) GM counter

5. (a) Calculate the density of $^{12}_{6}c$ nucleus. Given that $r_0 \simeq 1.2\ fm$.

(b) Calculate the rest mass energy of electron.

(c) Write short notes on : 3+1+2x3=10

(i) Internal conversion

(ii) Mossbauer effect

(iii) Compound nucleus

Or

6. Write short notes on : 3+3+4=10

(a) Chain reaction

(b) p - p cycle

(c) quark model

7. (a) Determine the binary equivalent of

(i) 13 (ii) 12.935

(b) Explain the De-Morgan's theorem.

(c) State and explain De Morgan's theorem. 2x2+6=10

Or



8. Write short notes on : 5+5=10

(a) RAM (Random Acces Memory)

(b) CD RM

9. Write short notes on : 5+5=10

(a) tunnel diode

(b) solar cell

Or

10. Write short notes on : 5+5=10

(a) Cathod ray oscilloscope

(b) MOSFET

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