(b) Explain the working mechanism of a multimeter.

Or

10. Explain the working mechanism of : 6+4=10

(a) MOSFET

(b) Cathod Ray socilloscope

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UG (CBCS) EVEN SEMESTER EXAMINATION, 2023

EDUCATION (B.Sc. B.Ed.)

PHYSICS (HONOURS)

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

1. (a) Evaluate the velocity and mass of a beta particle whose kinetic energy is 0.5 Mev.

If the kinetic energy is decreased to a value of 0.25 Mev then calculate the percentage changes in velocity and mass.

(b) If a gram of radium is reduced by 5mg in 5 years then calculate its half life.

(c) Describe the process of radioactive dating with example. 6+2+2=10

Or

2. (a) Write short notes on 'α' ray spectrum and fine structure.

(b) Write short notes on pair production, internal conversion. 5+5=10

3. (a) Physical parameters of a betatron is mentioned below :

B = 0.4 wb/m^2

f = 50 Hz,

r = 2 m

Calculate the energy gain per revolution and hence the final energy.

(b) Explain the origin and nature of mass parabola for a odd A nuclei. 5+5=10

Or

4. Explain the working mechanism of 5+5=10

(a) Ioxization chamber

(b) Seintillation counter

5. (a) Calculate the binding energies of the following nuclei

(i) $_6C^{12}$ (ii) $_8O^{16}$

Here $m_P = 1.0078$ U

$m_N = 1.0087$ U

$m_C = 12$ U

$m_O = 16$ U

symbols have their usual meaning.

(b) Write short notes on chain reaction. 4+4+2=10

Or

6. (a) Calculate the Q value of the following Fusion reaction.

$1H^2 + 1H^2 \rightarrow 2He^4 + Q$

$M\left(1H^2\right) = 2.014102$ U

M (He) = 4.002604 U

(b) Explain the Quark composition of proton.

(c) What is a Baryons? 4+4+2=10

7. (a) Derive the binary equivalent of the following numbers :

(i) $(425.350)_8$ (ii) $(3Eg)_{16}$

(b) Using Karnaugh map, simplify the Boolean Algebra. (2x2)+2+4=10

(i) $Y = \overline{A}\,B + A\,B$

(ii) $Y = \overline{A}\,\overline{B}\,\overline{C} + \overline{A}\,B\,C + \overline{A}\,B\,\overline{C}$

Or

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

(a) Half adder

(b) RS Flip-flop

9. (a) Write short notes on : 3+3+4=10

(i) Tunnel diode

(ii) Solar cell