KATWA COLLEGE
SEM-VI (HONOURS)
INTERNAL ASSESSMENT EXAMINATION-2023
SUBJECT: PHYSICS
PAPER: DSE-3
NUCLEAR PHYSICS

Time: 1h FM-10

Answer any five questions:

1. Assuming the constancy of nuclear charge density show that radius of a nucleus is proportional ta $A^{1/3}$ where A is mass number of the nucleus.
2. Predict the ground state and parity of $^{41}_{20}Ca$.
3. Cite two examples of doubly magic nuclei. What is the origin of $p_{3/2}$ and $p_{1/2}$ nuclear energy levels in the shell model?
4. Show the mass difference of two 'mirror nuclei'of odd A and with N and Z differing by one unit is given by $M_p—M_n+a_cA^{2/3}$.
5. What is a nuclear reaction? What are the different types of nuclear reactions?
6. What do you mean by Q-value and threshold energy of a nuclear reaction?
7. Write down about Cerenkov radiation, pair production and stopping power of a medium.
8. Calculate the energy generated in M eV when 0.1 kg of ^{7}Li is converted into ^{4}He by proton bombardment. [Given masses of ^{7}Li, ^{4}He and ^{1}H in u are 7.0183, 4.0040 and1.0081 respectively]

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