KATWA COLLEGE

SEM-VI (HONOURS)

INTERNAL ASSESSMENTEXAMINATION-2024

SUBJECT: PHYSICS

PAPER: DSE-3

Time: 1h FM-10

Answer any five questions:

1. A nucleus with A=235 splits into two fragments whose mass numbers are in the ratio 3:2. Find the separation between the fragments at the time of splitting. Take r_0=1.4 fm.
2. Predict the ground state and parity of$1841Ar$.
3. Using the semi-empirical mass formula, find the atomic number of the most stable nucleus for a given mass number A. Hence explain which is the most stable among $26He$, $46Be$ and $36Li$.
4. The masses of the hydrogen atom and neutron are 1.008142 and 1.008982 u respectively. Calculate the packing fraction and the binding energy per nucleon of $816O$ nucleus.
5. What do you mean by nuclear reactions? Write down the name of different types of nuclear reactions.
6. Write down the name of the different quantities/properties which are conserved in nuclear reactions.
7. What do you mean by Q-value of nuclear reactions? Find out the Q value of the following nuclear reaction; $^{14}N_7(\alpha,p)^{17}O_8$, take ^{4}He =4.0026u, ^{14}N=14.0031u, ^{1}H=1.0078u, ^{17}O=16.9994u .

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