

1. Details of unit revision and its structure

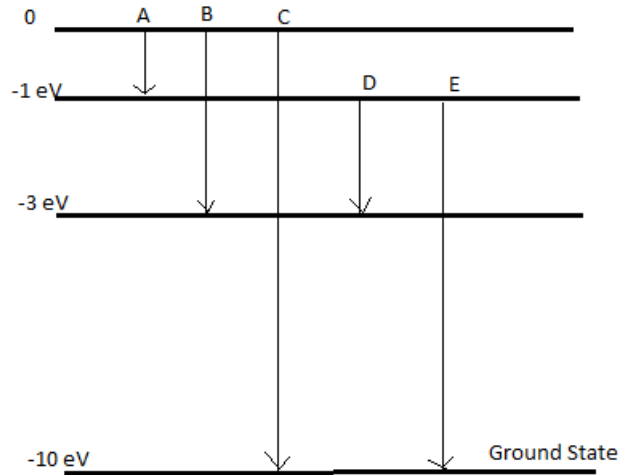
Subject Name	Physics
Course Name	Physics 04 (Physics Part-2, Class XII)
Title	Revision Unit-08_Problems for test & activity
Pre-requisites	Content of Unit 08: Atoms and Nuclei
Objectives	<p>After going through this study guide, the learners will be able to:</p> <ul style="list-style-type: none"> • How to consolidate the unit? • How to prepare notes?

2. Development Team

Role	Name	Affiliation
National MOOC Coordinator (NMC)	Prof. Amarendra P. Behera	Central Institute of Educational Technology, NCERT, New Delhi
Course Coordinator / PI	Anuradha Mathur	Central Institute of Educational Technology, NCERT, New Delhi
Teaching Assistant	Shivam Dixit Chinty Chhawari	Central Institute of Educational Technology, NCERT, New Delhi
Review Team	Prof. V. B. Bhatia (Retd.) Associate Prof. N.K. Sehgal (Retd.) Prof. B. K. Sharma (Retd.)	Delhi University Delhi University DESM, NCERT, New Delhi

Problems for test:

1. The energy levels of an atom of element X are shown in the diagram. Which one of the level transitions will result in the emission of photons of wavelength 620 nm? Support your answer with mathematical calculations. 3 marks



Solutions:

$$E = hc / \lambda = 6.6 \times 10^{-34} \times 3 \times 10^8 / 620 \times 10^{-9} \quad (1)$$

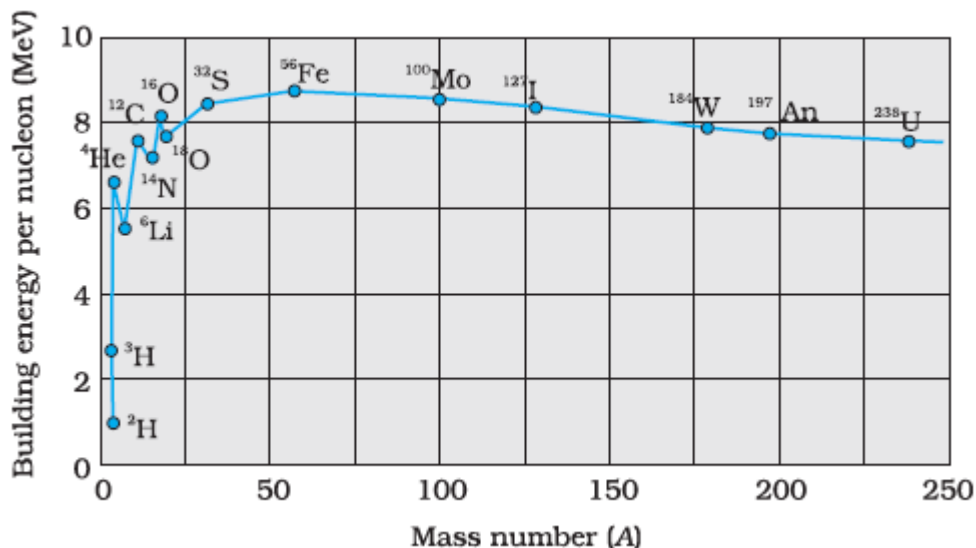
$$= 3.2 \times 10^{-19} \text{ J} \quad (1/2)$$

$$= 3.2 \times 10^{-19} / 1.6 \times 10^{-19} = 2 \text{ eV} \quad (1/2)$$

This corresponds to the transition "D" (1)

2. Draw a graph showing the variation of binding energy per nucleon versus the mass number A. Explain with the help of this graph, the release of energy in the process of nuclear fission and fusion. 3 marks

Answer:



3. How can we predict that nuclear forces are short range?

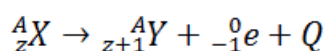
Answer: The nuclear forces between two nucleons falls rapidly to zero as their distance is more than a few femtometer.

4. Both fusion and fission reactions are exothermic?

Answer: In both type of reactions there is a mass defect between the target nuclei and the product nuclei and the energy corresponding to that mass defect releases.

5. Write the equation for β^- decay.

Answer:



Activity

1. Write down at least five uses of radioactivity in medical field.
2. Name at least four isotopes which are used to cure diseases.
3. What is the use of nuclear energy in nuclear power plants to generate electricity?
4. Name five radioactive elements that are freely found in nature?
5. How do we determine the age of a fossil by carbon dating?
6. Find the process which was used in Little Boy bomb dropped on Nagasaki of Japan during World War II.
7. Find out how radioactive rays can adversely affect the human life?
8. Name some of the nuclear reactors working in India.
9. Why gold foil was used in α - particle scattering?
10. How can controlled nuclear fusion be achieved?