PHYSICS

BOOKS - BETTER CHOICE PUBLICATION

STRUCTURE OF NUCLEUS

Very Short Answer Type Questions

1. Define isotones.

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2. What are Isotones ?

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3. What do you mean be mass defect of a nucleus?

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4. What are isobars ?

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5. What are Isotopes ?

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6. Define isotopes.

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7. Select the pair of isobars and isotones from the following:

$_{6}^{14}C, _{7}^{14}N, _{8}^{16}O, _{7}^{13}N$

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8. Select the pair of isobars and isotones from the following:

$_{12}^{24}Mg, _{1}^{3}H, _{2}^{4}H, _{11}^{23}Na$

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9. Select the pair of isobars and isotones from the following:

$_{11}^{23}Na, _{12}^{24}Mg, _{11}^{24}Na, _{10}^{23}Ne$

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10. One atomic mass unit is equal to $1.67 \times 10^{-27} g$.

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Short Answer Type Questions

1. What is meant by size of nucleus? do all nuclei are of same size?

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2. What are the constituents of the nucleus? Give four properties of neutrons.

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3. In heavy nuclei, the number of neutrons is higher than the number of protons. Why ?

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4. Why is the mass of nucleus less than sum of masses of nucleons present in it ?

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5. What do you mean by binding energy ? Explain the significance of binding energy per nucleon in the stability of nucleus.

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6. For greater stability,a nucleius hsold have greater value of binding energy per nucleon.Why?

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7. Natural radioactive nuclei are nuclei of high mass number.Why?

8. Heavy stable nuclie have more neutrons than protons. This is because of the fact that

9. All protons in an atom remain packed in a small nucleius inspite of the electrostatic repulsive force among them.Why?

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10. Write four characteristics of any natural force.

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11. Differentiate between Isobars and Isotones with suitable examples.

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12. ifferentiate between Isotopes and Isobars with suitable examples.

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13. Differentiate between Isotones and Isotopes with suitableexamples.

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14. What it Einstein's mass energy relation?

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Short Answer Type Question

1. What do you mean by binding energy ? Explain the significance of binding energy per nucleon in the stability of nucleus.

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2. Define Binding energy of the nucleus. Draw and explain curve between Binding Energy per nucleon and mass number.

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3. Define binding energy, binding energy per nucleon. Draw and explain a curve between binding energy per nucleon and mass number.

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4. Draw the graph showing variation of binding energy per nucleon with mass number. Write the inferences drawn from the graph.

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5. What are nuclear forces ? State their four properties.

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Long Answer Type Questions

1. What are nuclear forces ? State theirfour properties.Explain the possible cause of these forces.

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Numerical Problems

1. Find binding energy per nucleon for helium nuclei. Given that mass of helium nucleus = 4.001509 amu, mass of proton=1.007277 amu and mass of neutron = 1.0086666 amu.

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2. Calculate mass defect, binding energy and binding energy per nucleon of deuteron ($_1H^2$)

nucleus. Given mass of proton=1.007275 a.m.u., mass of neutron = 1.008665 a.m.u. and mass of deuteron =2.013553 a.m.u.

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3. Find out binding energy and binding energy per nucleon of $_3Li^7$ nucleus. Given mass of proton = 1.00782 amu mass of a neutron = 1.00866 amu and mass of "_3Li^7"_3(Lithium)^7` nucleus = 7.01599 amu.

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4. Calculate the binding energy per nucleon of $_3Li^7$ nucleus. Given mass of $_3Li^7$ nucleus = 7.01599 a.m.u., mass of proton =1.007825 a.m.u., mass of neutron = 1.008665 a.m.u. and 1 a.m.u. = 931.5 MeV

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5. Calculate the binding energy per nucleon of nucleus. $_{}(6)C^{12}$ Given mass of $_{}(6)C^{12}$ nucleus = 12.000000 a.m.u., mass of proton =

1.007825 a.m.u., mass of neutron= 1.008665 a.m.u. and 1 a.m.u.= 931.5 MeV

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6. Calculate the binding energy per nucleon of $_{20}Ca^{40}$ nucleus. Given mass of $_{20}Ca^{40}$ nucleus = 39.962589 a.m.u., mass of proton = 1.007825 a.m.u., mass of neutron = 1.008665 a.m.u. and 1 a.m.u. = 931.5 MeV.

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Most Expected Questions

1. Is free neutron a stable particle?

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2. What it Einstein's mass energy relation?

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3. Express unified atomic mass unit in kg.

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4. State and explain binding energy of a nucleus.

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