

Nuclei

1. An element A decays into an element C by a two step process $A \rightarrow B + {}_2\text{He}^4$ and $B \rightarrow C + 2e^-$.

Then,

- (a) A and C are isotopes
- (b) A and C are isobars
- (c) B and C are isotopes
- (d) A and B are isobars

▼ Answer

Answer: a

2. The equation $4{}_1^1\text{H}^+ \rightarrow 2{}_2^4\text{He}^{2+} + 2e^- + 26 \text{ MeV}$

represents

- (a) β -decay
- (b) γ -decay
- (c) fusion
- (d) fission

▼ Answer

Answer: c

3. Light energy emitted by star is due to

- (a) breaking of nuclei
- (b) joining of nuclei
- (c) burning of nuclei
- (d) reflection of solar light

▼ **Answer**

Answer: b

4. In nuclear reaction, there is conservation of

- (a) mass only
- (b) energy only
- (c) momentum only
- (d) mass, energy and momentum

▼ **Answer**

Answer: d

5. In nuclear reactors, the control rods are made of

- (a) cadmium
- (b) graphite
- (c) krypton
- (d) plutonium

▼ **Answer**

Answer: a

6. The set which represent the isotope, isobar, and isotone respectively is

- (a) (${}^2_1\text{H}$, ${}^3_1\text{H}$), (${}^{197}_{79}\text{Au}$, ${}^{198}_{80}\text{Hg}$) and (${}^2_1\text{H}$, ${}^2_1\text{H}$)
- (b) (${}^3_2\text{He}$, ${}^1_1\text{H}$), (${}^{197}_{79}\text{Au}$, ${}^{198}_{80}\text{Hg}$) and (${}^1_1\text{H}$, ${}^3_1\text{H}$)
- (c) (${}^3_2\text{He}$, ${}^3_1\text{H}$), (${}^2_1\text{H}$, ${}^3_1\text{H}$) and (${}^{197}_{79}\text{Au}$, ${}^{198}_{80}\text{Hg}$)
- (d) (${}^2_1\text{H}$, ${}^3_1\text{H}$), (${}^3_2\text{He}$, ${}^3_1\text{H}$) and (${}^{197}_{79}\text{Au}$, ${}^{198}_{80}\text{Hg}$)

▼ **Answer**

Answer: d

▼ **Answer**

Answer: c

7. The mass number of iron nucleus is 56 the nuclear density is

- (a) $2.29 \times 10^{16} \text{ kg m}^{-3}$
- (b) $2.29 \times 10^{17} \text{ kg m}^{-3}$
- (c) $2.29 \times 10^{18} \text{ kg m}^{-3}$
- (d) $2.29 \times 10^{15} \text{ kg m}^{-3}$

▼ Answer

Answer: b

8. Order of magnitude of density of uranium nucleus is

- (a) $10^{20} \text{ kg m}^{-3}$
- (b) $10^{17} \text{ kg m}^{-3}$
- (c) $10^{14} \text{ kg m}^{-3}$
- (d) $10^{11} \text{ kg m}^{-3}$

▼ Answer

Answer: b

9. The radius of a spherical nucleus as measured by electron scattering is 3.6 fm. What is the mass number of the nucleus most likely to be?

- (a) 27
- (b) 40
- (c) 56
- (d) 120

▼ Answer

Answer: a

10. The half life of a radioactive substance is 30 days. What is the time taken to disintegrate to $3/4^{\text{th}}$ of its original mass?

- (a) 30 days
- (b) 15 days
- (c) 60 days
- (d) 90 days

▼ Answer

Answer: c

11. The number of beta particles emitted by a radioactive substance is twice the number of alpha particles emitted by it. The resulting daughter is an

- (a) isomer of parent
- (b) isotone of parent
- (c) isotope of parent
- (d) isobar of parent

▼ Answer

Answer: c

12. During negative β -decay, an antineutrino is also emitted along with the emitted electron. Then,
- (a) only linear momentum will be conserved
 - (b) total linear momentum and total angular momentum but not total energy will be conserved
 - (c) total linear momentum, and total energy but not total angular momentum will be conserved
 - (d) total linear momentum, total angular momentum and total energy will be conserved

▼ Answer

Answer: d

13. An electron emitted in beta radiation originates from

- (a) inner orbits of atom
- (b) free electrons existing in the nuclei
- (c) decay of a neutron in a nuclei
- (d) photon escaping from the nucleus

▼ Answer

Answer: c

14. Complete the series ${}^6\text{He} \rightarrow e^- + {}^6\text{Li} +$

- (a) neutrino
- (b) antineutrino
- (c) proton
- (d) neutron

▼ Answer

Answer: b

15. Consider α and β particles and γ -rays each having an energy of 0.5 MeV. In the increasing order of penetrating power, the radiation are respectively

- (a) α , β , γ
- (b) α , γ , β
- (c) β , γ , α
- (d) γ , β , α

▼ **Answer**

Answer: a

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