

Quiz E24

Nuclear fission

1. What happens in a nuclear fission reaction?
  - A Neutrons decay into protons and electrons.
  - B A large unstable nucleus decays into two smaller nuclei
  - C Two small nuclei join into a larger nucleus.
  - D A large nucleus splits into two smaller nuclei.
  
2. What is the reason that neutrons are used to initiate fission?
  - A Neutrons are attracted by large unstable nuclei.
  - B Neutrons are not affected by the strong nuclear force.
  - C Neutrons are neutral and so can approach and penetrate a nucleus.
  - D Neutrons are unstable and the energy released in their decay starts fission.
  
3. The energy directly produced in a fission reaction is
  - A kinetic.
  - B thermal.
  - C electrical.
  - D nuclear.
  
4. How many neutrons are produced in the fission reaction  ${}_0^1\text{n} + {}_{92}^{235}\text{U} \rightarrow {}_{37}^{96}\text{Rb} + {}_{55}^{138}\text{Cs} + x{}_0^1\text{n}$ ?

A 1                      B 2                      C 3                      D 4
  
5. What is the role of the moderator in a nuclear fission reactor?
  - A To ensure that neutrons do not escape the core of the reactor.
  - B To ensure that electromagnetic radiation does not escape the core of the reactor.
  - C To accelerate neutrons.
  - D To decelerate neutrons.

6. What is correct about the material of control rods and fuel rods?

	Control rods	Fuel rods
A	Must absorb neutrons	Must be penetrable by neutrons
B	Must absorb neutrons	Must be opaque to neutrons
C	Must reflect neutrons	Must be penetrable by neutrons
D	Must reflect neutrons	Must be opaque to neutrons

7. What is the role of the heat exchanger in a nuclear fission reactor?

- A To convert the heat generated in the moderator into electricity.
- B To convert the kinetic energy of neutrons into electricity.
- C To transfer the thermal energy in the moderator into water producing steam.
- D To transfer the kinetic energy of neutrons into thermal energy of water.

8. A fission reactor has a power output of 1 GW. One of the nuclei uranium fissions into is strontium ( ${}_{38}^{94}\text{Sr}$ ). In one fission reaction 185 MeV of energy is released. What is an estimate of the mass of strontium produced in one year?

- A 20 kg      B 200 kg      C 400 kg      D 4000 kg

9. In a nuclear fission reaction 190 MeV of energy is released. What is the mass that was converted into energy in this reaction?

- A 0.2 kg      B 0.2 u      C 2 kg      D 2 u

10. Three statements are made for the radioactive waste of nuclear reactors:

- I They emit dangerous amounts of radiation decades after being removed from reactors
- II They may cause fires
- III They may enter water reserves

Which is correct?

- A I and II
- B I and III
- C II and III
- D I, II and III

<b>Quiz E24 Answers</b>	
<b>1</b>	<b>D</b>
<b>2</b>	<b>C</b>
<b>3</b>	<b>A</b>
<b>4</b>	<b>B</b>
<b>5</b>	<b>D</b>
<b>6</b>	<b>A</b>
<b>7</b>	<b>C</b>
<b>8</b>	<b>B</b>
<b>9</b>	<b>B</b>
<b>10</b>	<b>D</b>