

FORM 5

CHAPTER 6

Paper 1

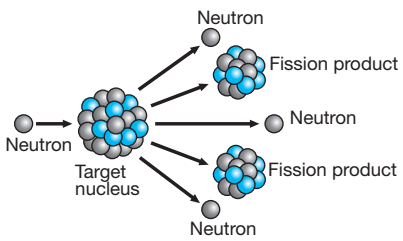
- 1 D 2 D 3 A 4 C 5 B 6 D
7 A 8 B 9 A 10 B 11 B

Paper 2

Structured Question

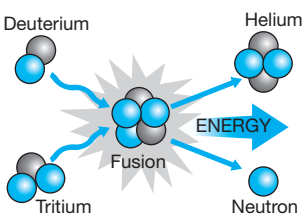
1 (a)

Nuclear fission



Nuclear fission from high mass to two (or more) smaller nuclides

Nuclear fusion



The fusion of two small atoms and produces a heavier nucleus atom

- (b) (i) $X = 56$
 $Y = 46$
(ii) $E = 2.779 \times 10^{-11} \text{ J}$
- (c) (i) Gamma rays
Sufficient energy to penetrate the body.
(ii) 6 hours
Shortest half-life. Faster decay after imaging.
(iii) Fluids
Easily flow into blood vessels and detect obstructions.
(iv) Technetium-99m

- 2 (a) Beta
(b) (i) H has a negative charge.
(ii) F has a positive charge.
(iii) G is neutrally charged
(c) (i) $X = 140$
 $Y = 38$
(ii) $E = 2.958 \times 10^{-11} \text{ J}$

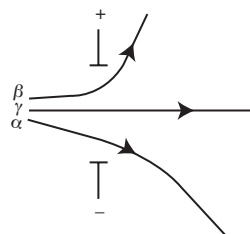
- 3 (a) (i) A nuclear reaction that combines light nuclei to produce a heavy nucleus releasing a lot of energy.
(ii) $E = 2.822 \times 10^{-12} \text{ J}$
(b) (i)

Properties of radioisotopes	Description	
State of matter	Solid	Easy to handle compared to gas and liquid.
Beam type	Beta	Not as dangerous as gamma due to moderate penetrating power.
Half life	Old	No need to replace frequently - saves money
Penetrating power	Simple	Can penetrate paper

The radioisotope C was chosen because in solids, it emits beta radiation, has a half-life of 35 years and moderate penetrating power.

- (ii) • A few millimetres of aluminium/protective clothing.
• Beta particles from (b)(i) can penetrate into body tissues and harm the body because they have a long half-life.

(c) (i)



		Reason
α -particle	A small deflection towards the negative plate.	Positive charge
β -particle	Greater deflection towards the positive plate.	Negative charge
γ -ray	No deflection	No charge