7.2 Fission and fusion

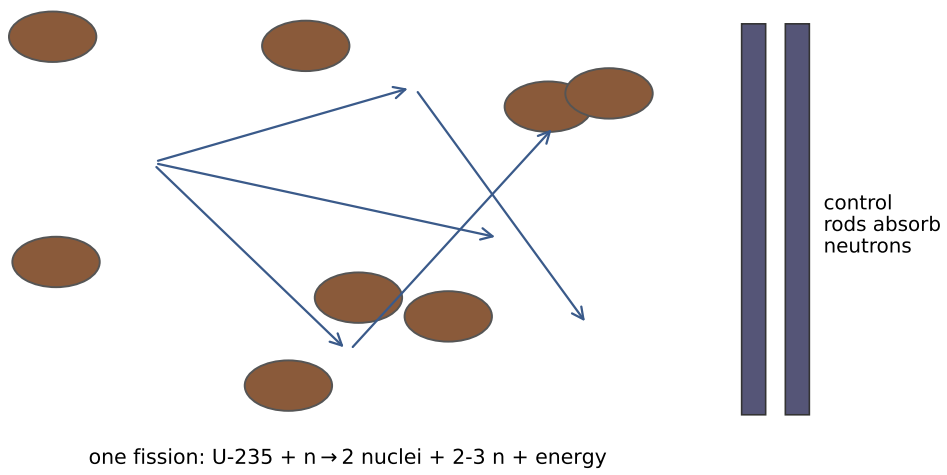
Name: _____ Class: _____ Date: _____ **Total: 16 marks**

Objective

Cover fission and fusion (3.7.3–3.7.4): induced fission of U-235/Pu-239, chain reactions with control rods, waste and disposal, and (P) fusion in stars with the temperature requirement. Original OxfordAQA practice.

1 Key knowledge and worked examples

■ Split, chain, contain



U-235 + n → two smaller nuclei + 2–3 neutrons + energy; control rods hold the chain steady; waste stays radioactive for its half-life.

■ (P) Fusion in the stars

Light nuclei join; mass converts to energy; proton repulsion demands extreme temperature and pressure.

2 Practice

2.1 Which nuclide must absorb a neutron before fission can occur? [1]

2.2 Name the three products of fission besides energy. [3]

2.3 What do control rods do? [1]

2.4 Why is fission waste dangerous for a long time? [1]

2.5 (P) What powers the stars? [1]

3 Exam-style questions

3.1 Describe how a chain reaction builds and how a reactor keeps it steady. [3]

3.2 Compare the energy released per kilogram in fission with a chemical reaction, and give one reason nuclear waste is a disposal problem. [3]

3.3 (P) Explain why fusion reactors are harder to build than fission reactors. [3]