7.2 Fission and fusion

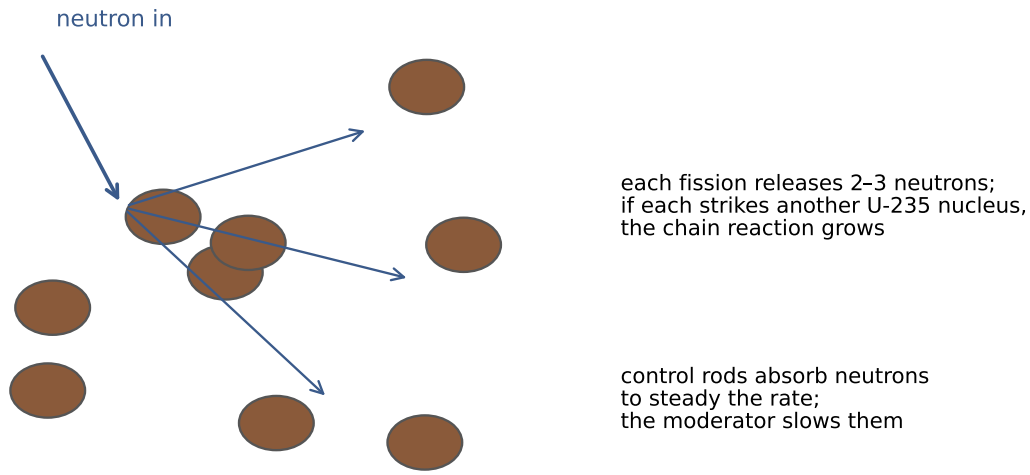
Name: _____ Class: _____ Date: _____ **Total: 16 marks**

Objective

Cover fission and fusion (7.17–7.26): energy from nuclear reactions, U-235 fission, chain reactions with moderator, control rods and shielding, and fusion in stars. Original IGCSE-level practice.

1 Key knowledge and worked examples

■ The chain, managed



One U-235 + n → two daughter nuclei + 2–3 neutrons + kinetic energy. Moderator slows neutrons; control rods absorb them; shielding protects.

■ Fusion: joining nuclei

Small nuclei fuse to a larger one with a loss of mass and release of energy – the Sun's power. Proton repulsion demands extreme temperature and pressure.

2 Practice

2.1 State what bombards U-235 to cause fission. [1]

2.2 Name the three products of a U-235 fission besides energy. [3]

2.3 State the role of the control rods. [1]

2.4 State the role of the moderator. [1]

2.5 What provides the Sun's energy? [1]

3 Exam-style questions

3.1 Describe how a chain reaction builds in a mass of U-235, and how control rods keep it steady. [3]

3.2 Explain the difference between nuclear fission and nuclear fusion, naming where each is used. [3]

3.3 Explain why fusion reactors need much higher temperatures than fission reactors produce. [3]