



QUESTION WORKBOOK

Nuclear reactors and safety

Nuclear physics · Year 13

AQA 3.8.1.7, 3.8.1.8 · OCR A 6.4.4

10 questions · 30 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 State the function of the moderator in a thermal nuclear reactor. [2]

A2 State the function of the control rods. [2]

A3 State the function of the coolant. [2]

SECTION B · Standard

B1 Explain, using the idea of collisions, why a moderator is made from atoms of low mass. [3]

B2 Explain how the control rods are used to keep the reactor operating at a steady rate. [3]

B3 Describe how the moderator, control rods and coolant work together in a thermal reactor. [4]

B4 Explain what is meant by critical mass in the context of a working reactor. [3]

SECTION C · Stretch

C1 Use the elastic-collision model to explain why water or graphite, rather than a heavy material, is chosen as a moderator. [4]

C2 Describe the main safety features of a nuclear reactor and how high-level radioactive waste is handled.

[4]

C3 Explain why spent nuclear fuel must be handled remotely and stored for a long time.

[3]
