



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

PRINT 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]

---

---

---

---