

## 2.1 Mains electricity

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

**Total: 19 marks**

### Objective

Cover mains electricity (2.2–2.6): insulation and protection devices, heating in resistors,  $P = IV$ ,  $E = IVt$ , a.c. and d.c. Original IGCSE-level practice.

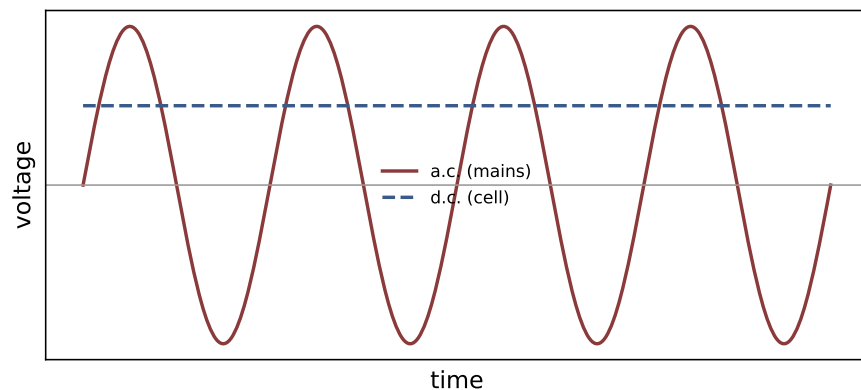
### 1 Key knowledge and worked examples

#### ■ Choose the fuse from the current

**Worked check.** A 230 V hairdryer rated 920 W:  $I = 920/230 = 4$  A – fit a 5 A fuse (the next standard rating above). A fuse rated below the operating current blows constantly; far above fails to protect.

#### ■ Why appliances warm

Current in a resistor transfers electrical energy to thermal energy – useful in heaters and kettles, wasteful elsewhere. Insulation, double insulation, earthing, fuses and circuit breakers protect the device and the user.



## 2 Practice

**2.1** State two differences between mains a.c. and battery d.c. [2]

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**2.2** Explain how a fuse protects a device. [2]

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**2.3** A 230 V lamp draws 0.5 A. Calculate its power. [2]

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**2.4** The lamp runs for 2 hours. Calculate the energy transferred in joules. [3]

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**2.5** Name the protection device that can be reset without replacement. [1]

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## 3 Exam-style questions

**3.1** Explain why a heater with a metal casing must be earthed, but one with a double-insulated plastic casing need not be. [3]

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**3.2** An electric kettle is rated 2.2 kW at 230 V. Calculate the current and choose a fuse from 3 A, 5 A, 13 A, justifying the choice. [4]

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**3.3** Explain why the same heater is cheaper to run for 30 minutes than for 1 hour, using  $E = IVt$ . [2]

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