Solution 6·4

Year 1

Answer 1

(3 marks)

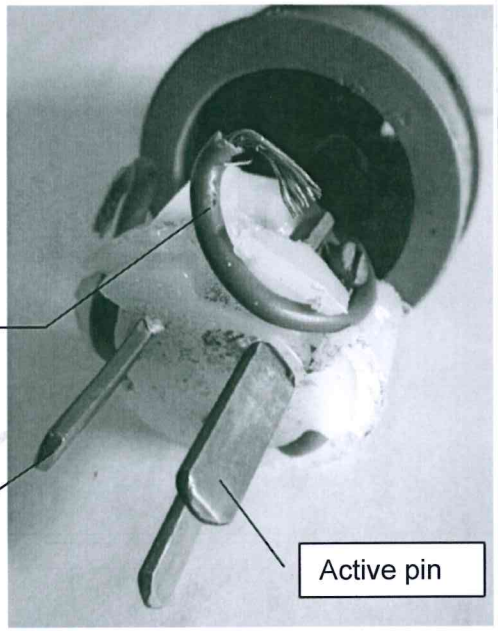
Select one electrical safety device you have studied this year and explain how it works.

Description	Marks
Naming fuse, circuit breaker, RCD	1
Detail on correct function – stops current flow when short circuit (fuse, cct breaker) or imbalance in active/neutral current is detected (RCD)	1–2
	Total 3

Answer 2

(5 marks)

A person complained to an electrician about getting a shock when changing a light globe in a lamp even though the lamp had been switched off. The electrician examined the plug and found the active and neutral wires had been swapped around in the plug and explained that appliance switches are only designed to operate on the active wire.



(a) Describe the conditions that led to the person receiving the shock. (3 marks)

(b) Name a safety feature in modern houses that limits the risk of receiving an electric shock, and describe how it works. (2 marks)

Description	Marks
(a) the switch on the neutral side of the circuit had broken the circuit, so the light was not on.	1
The switch is designed to be on the active wire and not neutral, so by swapping them at the plug the current was delivered to where the globe was. Active wire has the potential to supply current to the globe.	1
Any contact with the metal side, even though it is off, will result in current trying to ground through the person Completes a circuit – acceptable.	1
(b) Any feature, e.g. elcb, rcd, etc. (Acronyms are acceptable.)	1
Good description of the feature, eg measures current in/out and breaks circuit if not equal	1
	Total 5

Solution 6.4 Year 11

Answer 3

(3 marks)

(a) State a cause of excess current being delivered to a device. (1 marks)

Description	Marks
Short circuit or other suitable answer	1
Total	**1**

(b) Explain how a fuse works to prevent damage to a device. (2 marks)

Description	Marks
The fuse wire melts if the current is above a certain value	1
Melting wire causes the circuit in the device to be disconnected protecting the device and user from excess current	1
Total	**2**

Answer 4

(4 marks)

A toaster malfunctions and does not eject the toasted bread. Describe the possible dangers associated with getting the toasted bread out of the toaster with a metal-handled knife.

Description	Marks
The toaster is still plugged in and may have a 'live' element in it	1
The metal knife will act as a contact and you will become conductor	1
A possible pathway for the current to flow is through you and into the ground	1
This could cause serious injuries (e.g. burns, cardiac arrest, etc)	1
Total	**4**

Note: other reasonable descriptions accepted