Quiz- 5 Electrical safety MS

Q.1

The correct answer is **D** because this is the circuit symbol for a relay.

Q.2.

The correct answer is **D** because this is the circuit symbol for a thermistor.

Q.3.

The correct answer is **D** because the putting the fuse on the live wire means that, if it blows, there will be no power delivered to the circuit.

A is incorrect as	both bulbs would remain live if this fuse blew. Meaning they would both be capable of shocking somebody!
B is incorrect as	if this fuse blew, the bulb on the live wire side of the circuit would always be live, this means that it could still shock somebody.
C is incorrect as	current would still flow through the fuse if the switch were open. Blowing this fuse would not break the circuit, it would still work if the switch were closed.

Q.4

The correct answer is **C** because:

- The live wire is the one down which the push and pull from the power source comes. Putting the fuse on this wire means that, if it blows, there will be no power delivered to the circuit.
- When a fuse does its job, a small wire inside the fuse melts. This breaks the circuit, meaning no current can flow through the device.

A is incorrect as	A fuse is not capable of reducing the current in a circuit. It can only break the circuit if too much current flows.
B is incorrect as	The fuse must be positioned on the live wire, otherwise there is a risk of shock if somebody touches a damaged appliance.
D is incorrect as	A fuse is not capable of reducing the current in a circuit. It can only break the circuit if too much current flows.

Q.5

The correct answer is **A** because both fuses and circuit breakers must be connected in series with the live wire, before the first component.

B is incorrect as	the circuit breaker should not be at position Q
C is incorrect as	the fuse should not be at position Q
D is incorrect as	neither device should be at position Q.

Q.6

The correct answer is **B** because:

- The fuse that should be chosen is one which will just allow the correct operating current to flow, but not much more.
- In this case, 1.2 A flows through each bulb, this means that 2.4 A needs to flow through the fuse.
- The fuse must be rated at 2.4 A or more, or it will blow when the lamps are working normally.
- A fuse should not be chosen that is rated for too high a current, or it will not blow under fault conditions.
- Therefore, a 3.0 A fuse is the most suitable one in the list.

A is incorrect as	a 1.0 A fuse would blow under normal operating conditions.
C is incorrect as	a 5.0 A fuse would allow too much current to flow under fault conditions.
D is incorrect as	a 13.0 A fuse would allow too much current to flow under fault conditions.

Q.7

The correct answer is **C** because:

- If a fuse that is designed to carry 3 A of current before it blows is put into an appliance that needs much more current than this under normal operating conditions, it will simply melt as it is being forced to carry too much current.
- The removal of a 13 A fuse gives you a clue that the kettle needs more than 3 A to function correctly.

A is incorrect as	using the wrong fuse will not cause an appliance to explode. This requires significantly more stupidity.
B is incorrect as	this is unlikely. Kettles are high current devices (anything that contains a heater is likely a high current device), and 3 A is quite a small current. The 3 A fuse would certainly blow. Once the fuse has blown the circuit is broken and the kettle cannot work.
D is incorrect as	if the fuse does not blow, the kettle would work normally.

Q.8

The correct answer is **B** because a fuse must be connected in series with the live wire. Only fuse **X** is in the correct position.

A is incorrect as	fuse **Y** is in series with the **neutral** wire. It is in the wrong position.
C is incorrect as	fuse **Z** is connected in parallel with the heating element. This is really badly in the wrong position, would cause a short circuit, and would blow fuse **Z** as soon as the circuit was switched on.
D is incorrect as	**X** is in the correct position but **Z** is badly positioned, in parallel with the heating element. It would cause a short circuit, and would blow fuse **Z** as soon as the circuit was switched on

Q.9

The correct answer is **C** because:

- The problem here is that the wires used to connect the oven are not rated for the amount of current the oven uses. This is an easy mistake to make, as ovens use more current than normal electrical devices.
- Thicker diameter wires are required, since thicker wires have a smaller resistance, and therefore dissipate less heat when current flows through them.

Remember:

$P = I^2R$ gives the power dissipated by a component which has resistance.

A is incorrect as	this would have no effect, as the oven is operating properly.
B is incorrect as	thicker insulation might cause the wires to *feel* cooler, but they would still be just as hot. They would actually be less able to dissipate the heat they are generating, and are in greater danger of causing a fire.
D is incorrect as	thinner wires would exacerbate the problem. They have a higher resistance, and would dissipate more heat, becoming even hotter.

Q.10

The correct answer is **C** because:

- The resistors are connected in **series**.
- Therefore their total resistance is 5.0 + 10.0 = 15.0 Ω
- The current through all the components in the circuit will be the same since they are connected in series.
- To calculate the total circuit current, use $I = \frac{V}{R}$
- $I = \frac{10}{15} = 0.67$ A

The other answers all contain common mistakes.