**3. ENERGY AND CHANGE**

**STATIC ELECTRICITY**

**Question 1**

1. B
2. C
3. D
4. A
5. A
6. A
7. C

**Question 2**

1. STATIC
2. MORE
3. LESS
4. LESS
5. FRICTION

**Question 3**

1. NEGATIVELY CHARGED ; NEUTRAL
2. Water molecules collect on the surface of an object. This prevents a build- up of electric

charge.

1. Electrons from a negatively charged object jump across to a positively charged object. This movement of the electrons causes sparks to appear as they lose energy whilst moving across the gap.

**CIRCUITS AND CURRENT ELECTRICITY**

**Question 1**

1. An electric current is a flow of charge.
2. a) energy

b) conduct

3. Conductors allow charges to pass through, while insulators prevent charges to pass through.

4. It makes use of symbols to represent electrical components and shows how they are

connected.

**Question 2**

|  |  |  |
| --- | --- | --- |
| **COMPONENT** | **CIRCUIT SYMBOL** | **FUNCTION** |
| Conductor |  | Allows current to pass through |
| Open switch |  | No current passes through |
| Switch closed |  | Current is allowed to pass through |
| Cell |  | Source of electrical energy |
| Battery |  | Made up of more than one cell. Provides energy to circuit |
| Light bulb |  | Converts electrical energy to light energy |
| Fuse | \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Safety device…. |
| Resistor | \_\_\_\_\_\_\_\_\_\_\_\_\_ | Restricts flow of electrical current |

**Question 3**

1. Opposes or hinders the flow of electrical current in a circuit.
2. Light bulb
3. a) Labels should include the following:

glass protective case/ Argon gas/ Filament/ Support/ Electrical contacts/Insulating material

b) tungsten. Has high melting point. Can withstand high temperatures.

c) Argon

d) the filament heats up, becomes very hot to produce light. Electrical energy is converted

into light energy.

**Question 4**

1. smaller
2. greater
3. low
4. high

**Question 5**

1. Copper has a very low resistance and hence allows electrical charges to flow easily.
2. Nichrome
3. Electrical to heat energy.

**SERIES AND PARALLEL CIRCUITS**

**Question 1**

1 a) A series circuit allows for the current to flow one way only. The current strength at any point in

a series circuit is the same. If on bulb fuses, current stops flowing in the circuit.

b) A parallel circuit allows current to move through different paths in the circuit. If bulbs are in

parallel connected and one bulb fuses, the other bulbs in the parallel circuit will still work.

2.

X

X

CIRCUIT DIAGRAM WITH 3 CELLS IN SERIES AND 2 BULBS IN PARALLEL

3.

X

X

CIRCUIT DIAGRAM WITH 2 CELLS IN SERIES AND 2 BULBS IN PARALLEL WITH 2 SWITCHES

**Question 2**

1. a) decreases

b) decreases

2. a) remains the same

b) increases

**Question 3**

1. Whe6n the current does not pass through an appliance but passes through another path.
2. Faulty wiring

Broken insulation

Circuit overload

1. It increases
2. - wiring becomes very hot

- fire

- damage to appliances

- energy drain from cells

**Question 4**

1. A fuse is a component that has a very thin wire with a high resistance. The wire melts when the current is too high, causing the circuit to be broken. This prevents severe damage to the appliances.
2. Prevents damage to the electrical appliances.
3. It is cheap and can be replaced easily from an electrical shop.
4. It has to be replaced at a cost.
5. It is a switch that trips (switches off) when the current flow is too high.
6. - they are quick to restore the electricity.

- are more reliable

- don’t have to replace them. Just switch it on again.

**Question 5**

1. Converts electrical energy into other useful forms of energy.
2. a) electrical energy to light energy

b) electrical energy to sound

c) electrical energy to light, sound heat and kinetic energy

d) electrical energy to sound

e) electrical energy to sound, light, heat, and kinetic energy.

**Question 6**

1. stove/toaster/microwave
2. It is the splitting of a compound into its elements using electricity.
3. a) anode

b) chlorine

c) cathode

d) copper

**Question 7**

1. Electroplating involves using electricity to place a layer of metal over another metal.
2. Car bumpers/bath taps/towel rails
3. Protection of the metal underneath/to have an attractive finish
4. Chromium does not corrode./it can be polished to give an attractive shine/it is a hard metal, hence it does not scratch easily.

**Question 8**

1. Magnetic
2. Iron
3. Temporary magnet
4. Electromagnet
5. By increasing the current in the circuit/ by increasing the number of turns in the coil.
6. Doctors, to remove tiny metal objects from the eye/skin.

Scrap yards, to move large metal vehicles

Telephones/speakers/computers

**VISIBLE LIGHT**

**Question 1**

* Travels at 300 000 km/s
* Light is a form of energy
* Can be seen when light from an object enters the eye
* Light can be reflected, refracted, transmitted or absorbed

**Question 2**

1. a) Luminous objects generate their own light. They have their own source of energy

b) Non-luminous objects receive light from a luminous object and reflects it.

2. a) non-luminous

b) luminous

c) non-luminous

d) non-luminous

e) luminous

f) non-luminous

g) luminous

**Question 3**

1. Materials that allow light to pass through. Hence one can see what is on the other side.
2. Materials that do not allow light to pass through. Hence one cannot see what is on the other side.
3. Materials that allow light to pass through but one cannot see through them.

**Question 4**

1. Incident ray
2. Reflected ray
3. The normal
4. Letter Y
5. Letter X
6. They are equal the each other.
7. The angle of incidence is equal to the angle of reflection
8. Regular
9. Diffuse

**Question 5**

1. Glass/water/air
2. It is the bending of light when light travels from one medium to another.
3. Air is less dense than water. As light passes from air to glass, it bends since it changes its speed. It slows down in glass.
4. Air is less dense than glass.
5. When light passes from a less dense medium to a denser medium, it bends towards the normal.

When light passes from a denser medium to a less dense medium, it bends away from the normal.

1. Normal

Incident ray

AIR i

r Refracted ray

GLASS

AIR

Emergent ray

**Question 6**

1. It represents the 7 colours of light.
2. Red/orange/yellow/green/blue/indigo/violet
3. ROY G BIV
4. Red
5. Violet

**Question 7**



1. a) white

b) black

c) green

**Question 8**

1. label the diagram as indicated in the study guide.
2. a) Sensitive to light. When stimulated, a nerve impulse is sent to optic nerve.

b) focuses light onto the retina

c) sends nerve impulse to the brain where the image is formed.

3. it is inverted. [upside down]