**SECTION A - Core Technical Principles**

Questions 1-10 are multiple choice questions. For multiple choice questions you should shade in one lozenge. If you make a mistake, cross through the incorrect answer and shade the correct response.

# 1: Which of the following power sources is classed as a fossil fuel? [1 mark]

⬨ Hydroelectric

⬨ Natural gas

⬨ Nuclear

⬨ Tidal

# 2: Figure 1 shows an inflated balloon being held.

# 

**Figure 1**

What is the force that is acting upon the air inside the balloon? [1 mark]

⬨ Compression

⬨ Shear

⬨ Tension

⬨ Torsion

# 3: What is the voltage of a single cell found in a non-rechargeable AA battery? [1 mark]

⬨ 1.5 volts

⬨ 3 volts

⬨ 5 volts

⬨ 12 volts

# 4: Which of the following materials change state in response to ultraviolet light? [1 mark]

⬨ Graphene

⬨ Photochromic pigment

⬨ Shape memory alloy

⬨ Thermochromic pigment

# 5: Which of the following is used as an output component? [1 mark]

⬨ Heat sensor

⬨ Lamp

⬨ Pressure sensor

⬨ Switch

# 6: Which motion best describes a child’s swing in use? [1 mark]

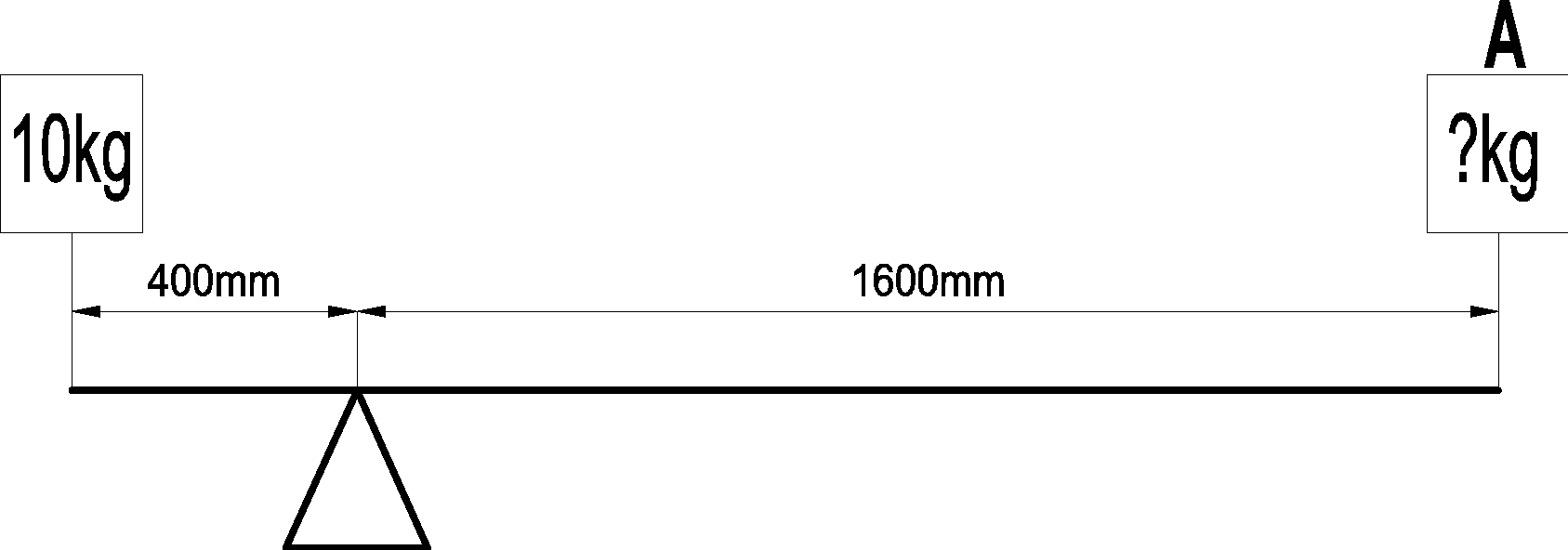
⬨ Linear

⬨ Oscillating

⬨ Reciprocating

⬨ Rotary

# 7: State the value of the weight needed at point A in figure 2 for the scales to balance? [1 mark]



**Figure 2**

⬨ 2.5kg

⬨ 3.3kg

⬨ 5kg

⬨ 10kg

# 8: Which one of the following cams can only be rotated in a single direction? [1 mark]

⬨ Eccentric

⬨ Heart

⬨ Pear

⬨ Snail

# 9: Which of the following is a ferrous metal? [1 mark]

⬨ Aluminium

⬨ Low carbon steel

⬨ Tin

⬨ Zinc

# 10: Figure 3 shows a rotary system.



**Figure 3**

# What is the name of the rotary system in figure 3 above? [1 mark]

⬨ Chain and sprocket

⬨ Crank and slider

⬨ Gear train

⬨ Pulley and belt

# 11: State two properties or characteristics that make medium density fibreboard (MDF) suitable for use in flatpack furniture. [2 marks]

1.

2.

12: State **two** reasons why high-speed steel (HSS) is used for cutting tools. [2 marks]

1.

2.

# 13.1: The Committee on Climate Change state that 40% of the UK’s emissions come from households. In 1990 each household produced an average of 12.8 tonnes of C02, in 2014 this had reduced to 8.1 tonnes.

Give **two** reasons why the amount of CO2 per household has reduced   
during this period. [2 marks]

1.

2.

13.2: The target for household emissions by 2030 is 4.5 tonnes per household.

Explain how households could change their behaviours to help meet   
this target. [2 marks]

13.3: If the target for 2030 of 4.5 tonnes per household is met, what would be the percentage reduction from the 1990 level of 12.8 tonnes per household? [2 marks]

Show your working out and give your answer to 1 decimal point.