











**Page 37 (Question 21)**

(a)

(i) **Reason energy output varies during the day:** Solar energy output depends on sunlight intensity, which changes with the position of the Sun in the sky.

(ii) **Duration motor runs at full speed (0.7 kJ/s):** 8 hours

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**Question 17**

(a)

(i) A and F (2 marks)

(ii) A (1 mark)

(iii) C (1 mark)

(b)

(i) Gravity (gravitational force) (1 mark)

(ii) Water resistance (drag) (1 mark)

(c)

- Gravitational potential
- Sound
- Thermal (3 marks)

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**Question 18**

(a)

- Oil
- Natural gas (2 marks)

(b)

(i)

- Wind
- Solar (2 marks)

(ii) Order: C, E, A, B, D (2 marks)

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**Question 19**

(a)

(i) Electrical to chemical (1 mark)

(ii) Chemical to electrical to sound (1 mark)

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**Question 20**

(a) Ethanol (1 mark)

(b) Hydrogen does not produce carbon monoxide or sulfur dioxide. (1 mark)

(c) Hydrogen (1 mark)

(d) Oxygen (1 mark)

(e) Sugarcane is renewable because it can be replanted and grows back quickly. (1 mark)

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### Question 21

(a)

(i) The energy output varies because sunlight is stronger during the middle of the day and weaker at the beginning and end of the day. (1 mark)

(ii) Approximately 6 hours (1 mark)

(b)

(i) Curve for mid-winter should be lower and peak around noon.

(ii) Solar panel turns  $180^\circ$  over 12 hours;  $180 \div 12 = 15^\circ$  per hour. (1 mark)

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#### Question 22

(a)

(i) Potential (1 mark)

(ii) Sound (1 mark)

(b) The spring unwinds faster because more energy is required to produce a louder sound. (1 mark)

(c) The solar cell reduces the energy demand on the spring. Sunlight provides additional electrical energy. (1 mark)

(d) Wind-up radios are useful in poor countries because they do not rely on electricity or batteries, making them cost-effective and accessible. (1 mark)

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#### Question 23

(a)

1. Coal

2. Petrol (2 marks)

(b)

(i) Sunlight (1 mark)

(ii) The solar panel cannot work at night as there is no sunlight. (1 mark)

(c) Wind makes the blades turn. (1 mark)

(d) Solar energy (1 mark)

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#### Question 24

(a)

(i) Electrical (1 mark)

(ii) Kinetic (1 mark)

(iii) Gravitational potential; thermal (1 mark)

(b)

Advantage: Solar cells are renewable and produce no pollution.

Disadvantage: Solar cells depend on sunlight and may not work efficiently in cloudy weather. (2 marks)