Energy – 2021/20 GCSE Gateway Physics Combined Science A

1. Nov/2021/Paper_J250/06/No.3

   A 2.5 kW electric radiator is used for 2 hours.

   Calculate the energy transferred.

   Use the equation: energy transferred = power × time

   A 1.25 kWh

   B 5 kWh

   C 1250 kWh

   D 5000 kWh

   Your answer ☐   [1]

2. Nov/2021/Paper_J250/06/No.4

   The braking distance for a car is 25 m. The braking force is 4000 N.

   Calculate the work done by the brakes.

   Use the equation: work done = force × distance

   A 1.6 J

   B 100 J

   C 160 J

   D 100 000 J

3. Nov/2021/Paper_J250/05/No.12(b, c)

(b) Explain how **Fig. 12.1** shows the law of conservation of energy.

....

....

....

.... **[2]**

(c) Complete these sentences about energy stores.

You can use each word once, more than once, or not at all.

chemical   gravitational   kinetic   magnetic   nuclear   thermal

• A student rolls a ball up a hill. The ball stops at the top of the hill.

   A kinetic store decreases. A .... store increases.

• A car accelerates.

   A chemical store decreases. A .... store increases.

• Uranium fuel rods are used in a power station to produce electricity.

   An electric kettle boils water.

   A nuclear store decreases. A .... store increases.

[3]

4. Nov/2020/Paper_J250/06/No.2

A man weighs 700 N and climbs a staircase 5 m high.

How much work does he do?

Use the equation: work done = force × distance

A   140 J

B   350 J

C   695 J

D   3500 J

Your answer   [1]

5. Nov/2020/Paper_J250/06/No.5

A heater transfers 150 000 J of energy in 120 s.

Calculate the power of the heater.

Use the equation: energy transferred = power × time

A   0.80 W

B   1.25 W

C   1250 W

D   18 000 W

Your answer   [1]

6. Nov/2020/Paper_J250/06/No.6

Which row in the table is correct?

Use the equation: efficiency = useful output energy transfer / input energy transfer

	Useful output energy transfer (J)	Input energy transfer (J)	Efficiency
A	900	1500	0.6
B	900	1500	1.7
C	1500	900	0.6
D	1500	900	600.0

Your answer ☐ [1]

7. Nov/2021/Paper_J250/12/No.10

An 800 W microwave oven is used for 30 minutes.

What is the energy transferred in kWh?

Use the equation: energy transferred = power × time

A 0.4 kWh

B 24 kWh

C 240 kWh

D 400 kWh

Your answer ☐ [1]

8. Nov/2021/Paper_J250/12/No.13

(a) State the law of conservation of energy.

....

....

....

.... [2]

(b) **Fig. 13.1** shows the experiment a student sets up on the ground to investigate energy stores.
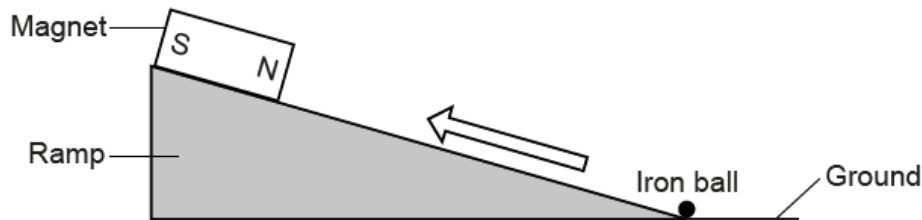

Fig. 13.1

- The student places a magnet at the top of a small ramp.
- They place a small iron ball at the bottom of the ramp.
- The iron ball is attracted up the ramp.
- The iron ball 'sticks' to the magnet.

The table describes how the energy stores change.

Complete the table using the words **MAXIMUM** and **MINIMUM**.

Type of store	At the bottom of the ramp	At the top of the ramp
Magnetic energy store	....	....
Gravitational energy store	....	....
Thermal energy store	....	....

[4]

(c) The magnet and iron ball are removed. A marble is instead rolled down the ramp, as shown in **Fig. 13.2**.
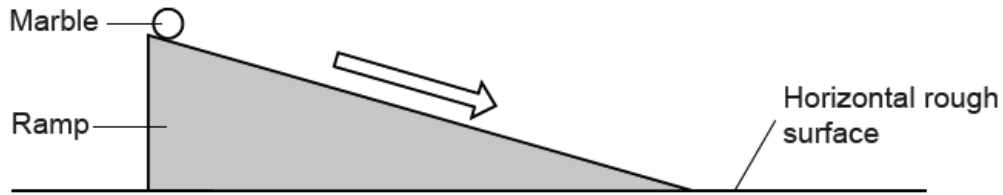
Marble ─○

Ramp ─

Horizontal rough surface

Fig. 13.2

(i) The mass of the marble is 0.003 kg.

The kinetic energy of the marble is 0.024 J at the bottom of the ramp.

Calculate the speed of the marble at the bottom of the ramp.

Use the equation: kinetic energy = 0.5 × mass × (speed)^2

Speed = ... m/s **[3]**

(ii) The marble rolls to a stop on the horizontal rough surface after it leaves the ramp.

Explain what happens to the kinetic energy store of the marble.

....

....

....

.... **[2]**

9. Nov/2020/Paper_J250/12/No.4

A ball is thrown vertically into the air.
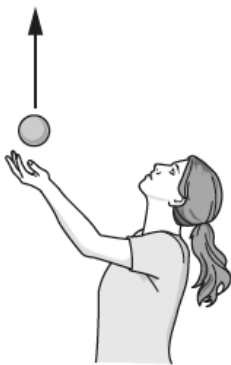
Energy is transferred from a chemical store in the girl.

Which store is the useful energy transferred to?

A   A chemical store only.

B   A gravitational store only.

C   A gravitational store and a chemical store only.

D   A thermal store and a chemical store only.

Your answer ☐   [1]

10. Nov/2020/Paper_J250/12/No.7

How can the efficiency of an energy transfer be increased?

A   Decrease the total energy input.

B   Decrease the wasted energy.

C   Increase the total energy input.

D   Increase the wasted energy.

Your answer ☐   [1]

11. Nov/2020/Paper_J250/12/No.8

A 1500 W heater is used for 1.5 hours.

What is the energy transferred in kWh?

Use the equation: energy transferred = power × time

A 2.25 kWh

B 135 kWh

C 2250 kWh

D 135 000 kWh

Your answer ☐ **[1]**