Question 1

A crane takes 2.0 minutes to lift a 500 kg load to the top of a building that is 12 m high.

What is the useful power developed against gravity by the crane?

A 21 W **B** 50 W **C** 500 W **D** 30 000 W

Question 2

A horizontal force pulls a box along a horizontal surface.

The box gains 30 J of kinetic energy and 10 J of thermal energy is produced by the friction between the box and the surface.

How much work is done by the force?

A 10 J **B** 20 J **C** 30 J **D** 40 J

Question 3

A crane is used to lift loads vertically.

The output power of the crane to lift a car is P.

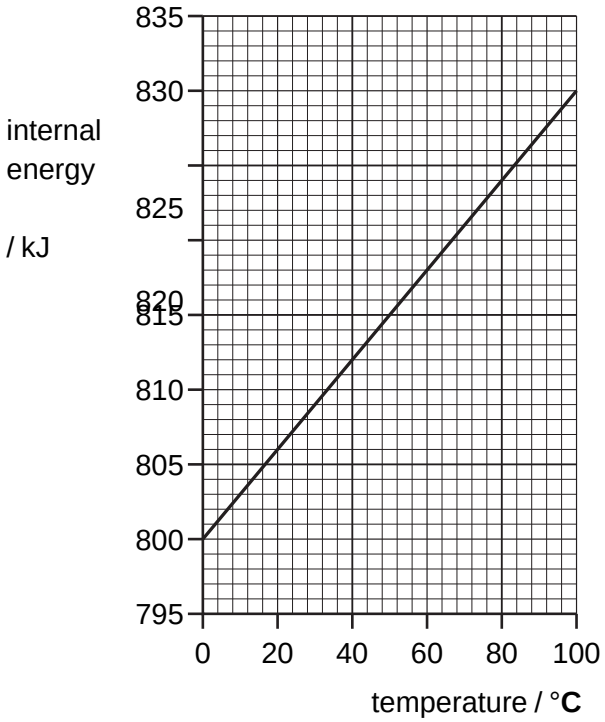
The crane then lifts a lorry, which has 3.0 times the weight of the car, through 0.25 of the distance in 0.50 of the time.

What is the output power of the crane now?

A $\frac{3P}{8}$ **B** $\frac{3P}{2}$ **C** $\frac{8P}{3}$ **D** 6P

Question 4

The graph shows how the internal energy of 1.0 kg of a metal changes with temperature.



What is the increase in the internal energy of a block of the same metal of mass 0.25 kg when its temperature rises from 40 °C to 50 °C?

A 30 J **B** 300 J **C** 750 J **D** 1200 J

Question 5

The equation used to find the change in gravitational potential energy of an object can be written as

$$\Delta E_P = Y \times Z \times \Delta h$$

where ΔE_P is the change in gravitational energy and Δh is the change in height.

Which row gives the quantities Y and Z?

	Y	Z
A	mass	gravitational field strength
B	gravitational field strength	density
C	density	speed
D	speed	mass

Question 6

A car is travelling at a speed of 8.0 m/s.

The kinetic energy stored in the car is 32000 J.

What is the kinetic energy stored in the car when its speed increases to 16 m/s?

A 16000 J **B** 32000 J **C** 64000 J **D** 130000 J

Question 7

A car of mass 500 kg is moving at 10 m/s. The engine does work on the car and the speed increases to 16 m/s.

How much work is done by the engine to increase the speed of the car?

A 3000 J **B** 9000 J **C** 39000 J **D** 78000 J

Question 8

An engine produces 240 kJ of energy in 2.0 minutes.

What is the power output of the engine?

A 2.0 kW **B** 120 kW **C** 480 kW **D** 28800 kW

Question 9

The power input to an electric motor is 400 W. The efficiency of the motor is 85%.

How much power is wasted?

A 60 W **B** 85 W **C** 340 W **D** 470 W

Question 10

The energy input to a device is E.

The amount of energy wasted by the device is W.

Which expression gives the efficiency of the device?

A $\frac{W - E}{W} \times 100\%$

B $\frac{W}{E} \times 100\%$

C $\frac{E - W}{E} \times 100\%$

D $\frac{E - W}{W} \times 100\%$

Question 11

A builder lifts 30 bricks from the ground onto a platform 2.0 m high.

Each brick has a mass of 4.0 kg.

What is the work done against gravity by the builder in lifting the bricks onto the platform?

A 80 J **B** 120 J **C** 240 J **D** 2400 J