

GCSE Physics A (Gateway)

J249/02 Physics A P5-P8 and P9 (Foundation Tier)

Question Set 29

Multiple Choice Questions

P7: Energy

- 1 Which wall would allow the **most** heat transfer through the wall?
- A A **thick** wall made from a material with **high** thermal conductivity.
- B A **thick** wall made from a material with **low** thermal conductivity.
- C A **thin** wall made from a material with **high** thermal conductivity.
- D A **thin** wall made from a material with **low** thermal conductivity.

Your answer

C

[1]

- 2 A radio transfers 30 J of potential energy to 27 J of useful energy.

What is the efficiency and energy loss for the radio?

	Efficiency	Energy loss
A	10%	3J
B	10%	27J
C	90%	3J
D	90%	27J

$$\frac{30-27}{30} \times 100$$

$$= \frac{3}{30} \times 100$$

$$= 10\%$$

so 90% efficient

Your answer

C

[1]

- 3 A boy kicks a football with a mass of 400 g.

What is the potential energy of the football when it is 0.8 m above the ground?

gravitational field strength (g) = 10 N / kg.

- A 0.032 J
- B 3.2 J
- C 320 J
- D 3 200 J

$$GPE = mgh$$

$$= 0.4 \times 10 \times 0.8$$

$$= 3.2 \text{ J}$$

$$400\text{g} = 0.4\text{kg}$$

Your answer

B

[1]

- 4 A student wants to find out which heater produces the largest temperature rise.

Look at the results she collects and the calculations she makes.

Heater	Starting temperature (°C)	Finishing temperature (°C)	Change in temperature (°C)
A	18	28	20
B	18	36	16
C	18	44	26
D	18	51	23

Which heater has results that are correctly calculated?

Your answer

C

[1]

- 5 A vehicle has an input power from fuel of 20 kW and a useful output power of 6 kW.

Calculate the power it wastes.

- A 3 kW
B 6 kW
C 14 kW
D 20 kW

$$20 - 6 = 14 \text{ kW}$$

Your answer

C

[1]

- 6 A wooden block has a mass of 2 kg and a specific heat capacity of 2000 J/kg °C.

Calculate the energy needed to raise its temperature by 6 °C. Use the equation:

$$\text{Change in thermal energy} = \text{Mass} \times \text{Specific Heat Capacity} \times \text{Change in Temperature}$$

- A 1 200 J
B 2 400 J
C 12 000 J
D 24 000 J

$$\begin{aligned}\Delta E &= 2 \times 2000 \times 6 \\ &= 24000\end{aligned}$$

Your answer

D

[1]

- 7 A lorry has a mass of 3500 kg. It travels at a speed of 30 m/s.

Use the equation: Kinetic Energy = 0.5 × Mass × Speed²

Calculate the kinetic energy of this lorry.

- A 10 500 J
B 52 500 J
C 1 575 000 J
D 3 150 000 J

$$\begin{aligned}KE &= 0.5 \times 3500 \times 30^2 \\ &= 1\,575\,000\text{ J}\end{aligned}$$

Your answer

C

[1]

8 A boiler has an input energy of 720 kJ from the gas it burns.

It transfers 540 kJ of useful energy to the home. What is the efficiency of the boiler?

Use the equation: $\text{efficiency} = \frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$

A 0.12

B 0.75

C 0.90

D 1.33

$$\text{eff} = \frac{540}{720} = 0.75$$

Your answer

B

[1]

9 A runner has a mass of 80 kg and moves at a speed of 5 m/s.

Calculate the kinetic energy of the runner.

Use the equation: $\text{kinetic energy} = 0.5 \times \text{mass} \times (\text{speed})^2$

A 200 J

B 1000 J

C 2000 J

D 40 000 J

$$\begin{aligned} \text{KE} &= 0.5 \times 80 \times 5^2 \\ &= 1000 \text{ J} \end{aligned}$$

Your answer

B

[1]

Total Marks for Question Set 29: 9

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