Oxford Cambridge and RSA

GCSE Physics A (Gateway)

J249/03 Physics A P1-P4 and P9 (Higher Tier)

Question Set 26

Multiple Choice Questions

P2: Forces

1 A car travels 200 km in four hours.

The car **doubles** its speed.

How long would it take for the car to travel 50 km?

A 0.5 hours

B 1.0 hours

C 2.0 hours

D 4.0 hours

Your answer ☐

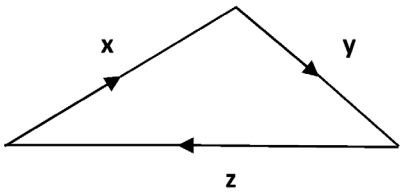
[1]

2 Three forces, **x**, **y** and **z** act on a body.

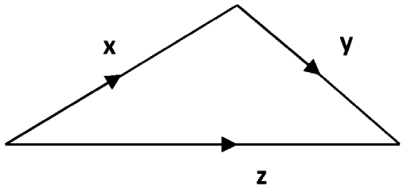
The body is in **equilibrium**.

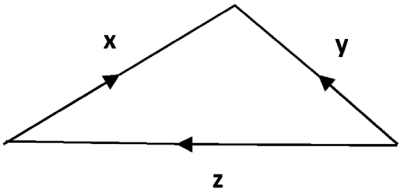
Which vector diagram shows the body in equilibrium?

A



B





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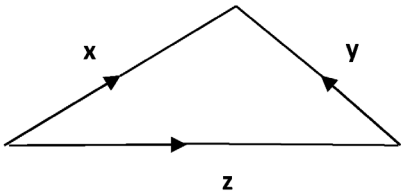
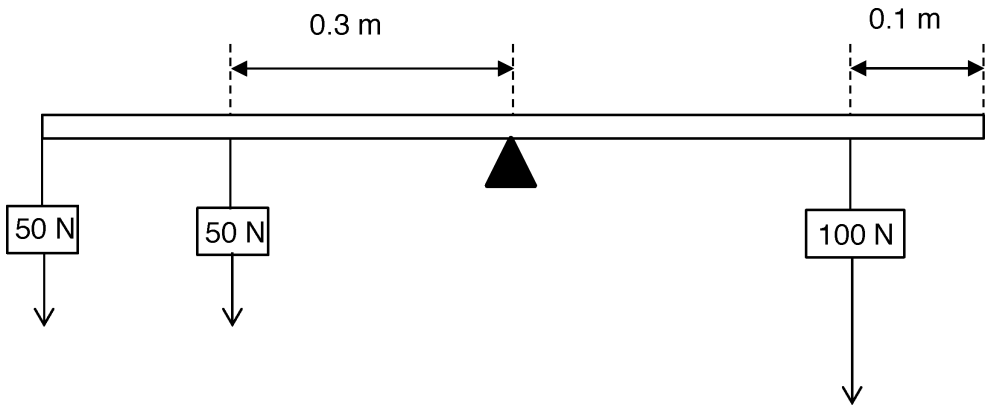


D

Your answer ☐

[1]

3 A uniform 1.0 m rod is pivoted at its centre.



The rod is in equilibrium.

What is the anti-clockwise moment about the pivot?

A 10 N m

B 15 N m

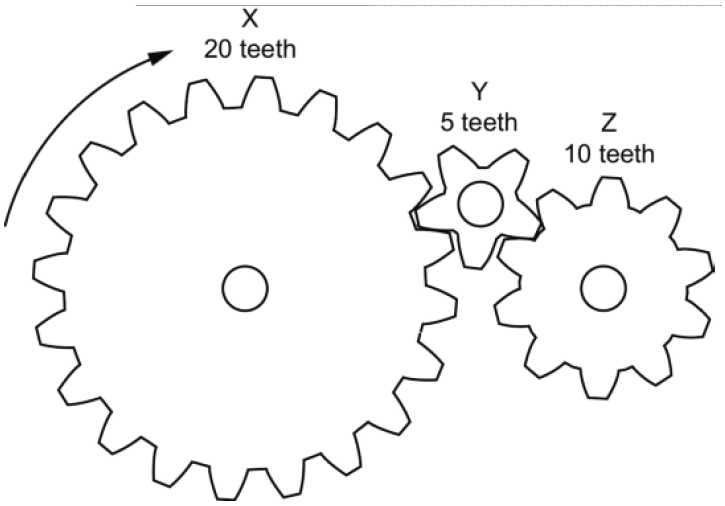
C 40 N m

D 100 N m

Your answer ☐

[1]

4 The diagram shows 3 gears.



Gear **X** is rotated clockwise at 1.0 rotations per second.

Which row describes the movement of gear **Z**?

	Direction of rotation	Rotations per second
A	anticlockwise	0.5
B	anticlockwise	2.0
C	clockwise	0.5
D	clockwise	2.0

Your answer ☐

[1]

5 A car and driver with a total mass of 1 000 kg is travelling at 20 m/s.

The driver applies the brake and the car comes to a stop in 4 seconds.

What is the mean force on the car?

A 12.5 N

B 200 N

C 5 000 N

D 80 000 N

Your answer ☐

[1]

6 A spring, of spring constant 16 N / m, is stretched by 50 cm.

What is the work done?

A 2.0 J

B 8.0 J

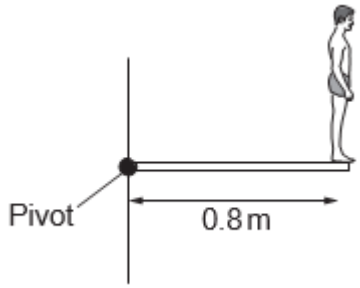
C 12.5 J

D 25.0 J

Your answer ☐

[1]

7 A diver stands on a diving board. He weighs 400 N.



What is the moment of the force provided by the diver around the pivot?

A 320 Nm anti-clockwise

B 320 Nm clockwise

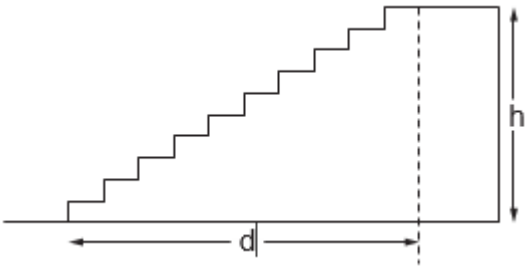
C 500 Nm anti-clockwise

D 500 Nm clockwise

Your answer ☐

[1]

8 A student of weight W runs up a flight of stairs..



She moves a distance d metres horizontally and h metres vertically.

What is the work done against gravity running up the stairs?

A $W \times d$

B $W \times h$

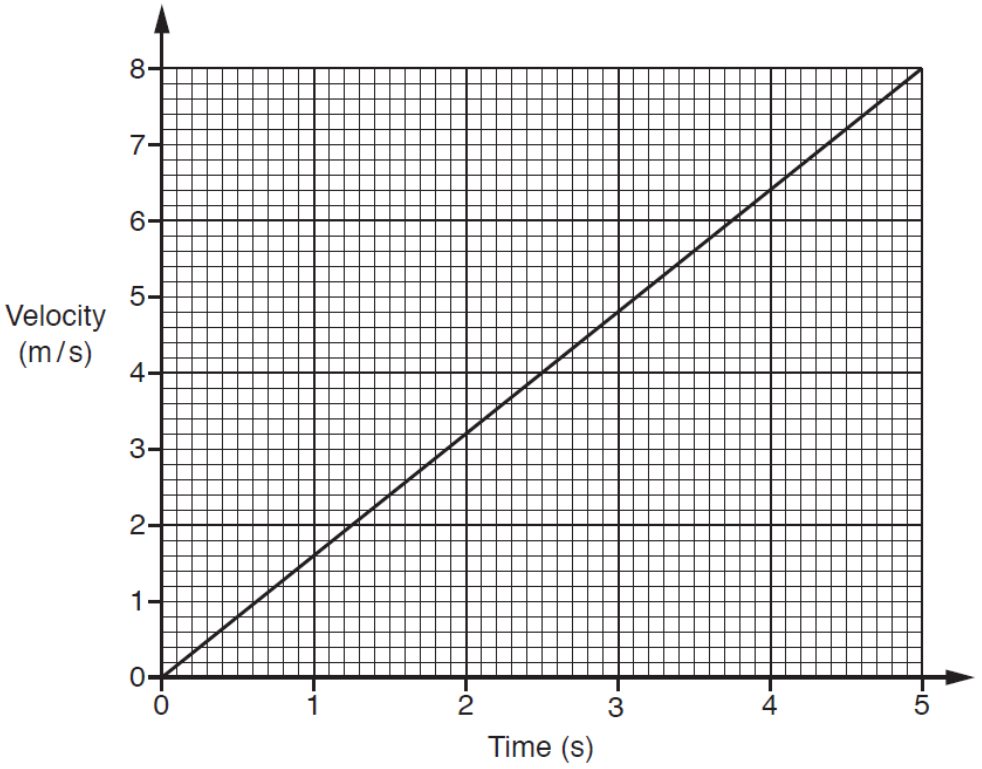
C $(W \times d) + (W \times h)$

D $W \times \frac{h}{d}$

Your answer

[1]

9 Look at the velocity-time graph of an object.



What is the distance travelled by the object in 5s?

A 0.63 m

B 1.6 m

C 20 m

D 40 m

Your answer ☐

[1]

10 Which statement is equivalent to the mass of an object?

A The ratio of acceleration over force

B The ratio of force over acceleration

C The ratio of velocity over acceleration

D The ratio of displacement over acceleration

Your answer ☐

[1]

11 Two cars head towards each other on a road.

What velocity does the driver of car **Q** see car **P** travelling towards him at?

A 10 m / s

B 15 m / s

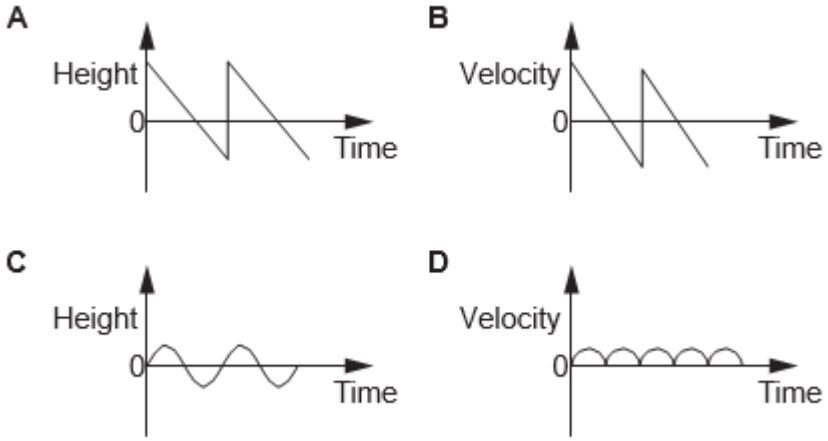
C 25 m / s

D 40 m / s

Your answer ☐

[1]

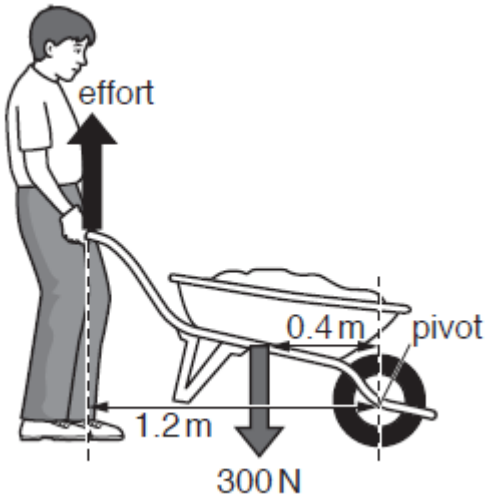
12 Which graph shows a bouncing ball?



Your answer ☐

[1]

13 A man lifts a load using a wheelbarrow.



What is the effort needed to lift the load using the wheelbarrow?

A 100 N

B 120 N

C 250 N

D 144 N

Your answer ☐

[1]

14 A 2.0 kg object moves at a velocity of 40 m / s.

What is the momentum of the object?

Use the equation: momentum = mass × velocity

A 20 kg m / s

B 38 kg m / s

C 42 kg m / s

D 80 kg m / s

Your answer ☐

[1]

15 Which one of the following uses of forces causes a rotation?

A Lowering a book vertically from a shelf

B Opening a door

C Lifting a book vertically onto a shelf

D Sitting in the centre of a see-saw

Your answer ☐

[1]

16 On the Moon, a 10 kg mass has a weight of 16 N.

What is the gravitational field strength on the Moon?

A 1.6 N / kg

B 6.0 N / kg

C 26 N / kg

D 160 N / kg

Your answer ☐

[1]

17 Which object has the **most** gravitational potential energy?

A 1 kg bag on a shelf 1 m above the ground

B 2 kg bag on a shelf 1 m above the ground

C 2 kg bag on a shelf 2 m above the ground

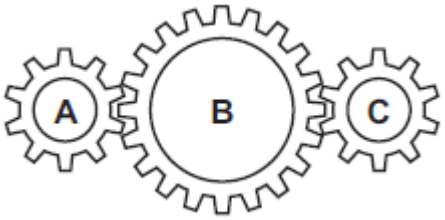
D 1 kg bag on a shelf 2 m above the ground

Your answer ☐

[1]

18 A student investigates cogs and gears.

Cogs **A** and **C** have 10 teeth. Cog **B** has 20 teeth.



Cog **A** is turned 5 times.

How many times does cog **C** turn?

A 5 times

B 10 times

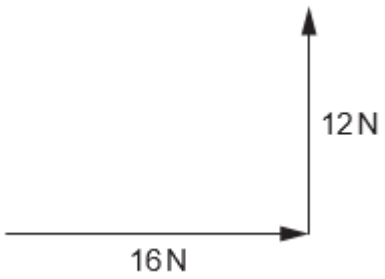
C 20 times

D 50 times

Your answer ☐

[1]

19 Two forces act at right angles to each other.



What is the magnitude of the resultant force?

A 18 N

B 20 N

C 22 N

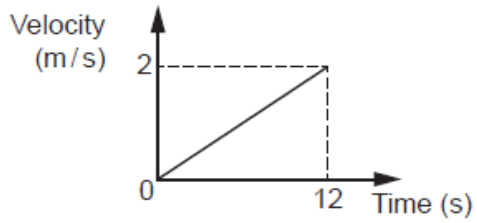
D 24 N

Your answer ☐

[1]

20 Look at the motion graphs.

A



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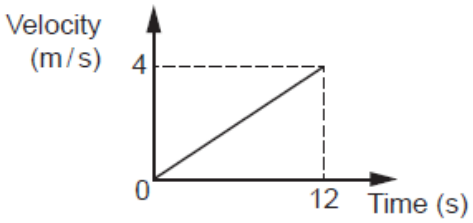

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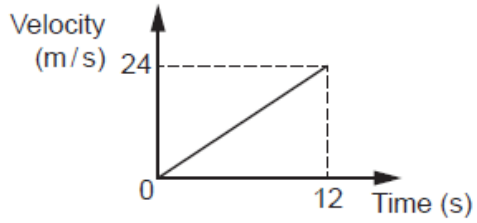

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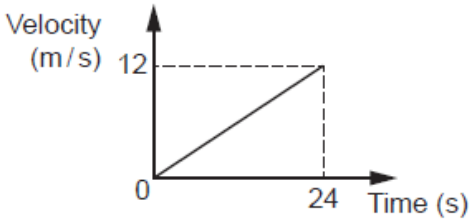


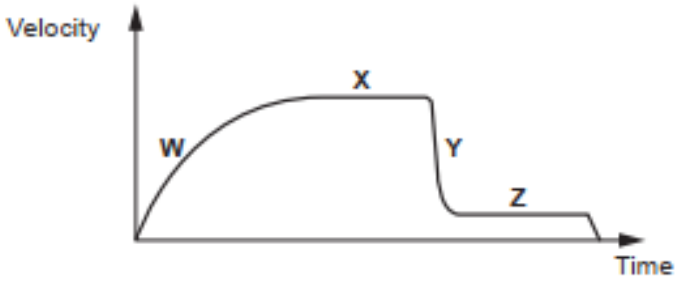
Which graph shows a journey with a distance of 24 m?

Your answer ☐

[1]

21 A skydiver falls from a plane. His parachute opens and he lands safely.

Look at the velocity-time graph of his journey.



Which parts of the graph show balanced forces on the skydiver?

A **X** only

B **Y** and **Z**

C **X** and **Z**

D **Y** only

Your answer ☐

[1]

22 A spring stretches by 2.0 cm when a force is added.

The spring constant is 60 N / m.

Calculate the energy transferred to the spring when it is stretched.

A 0.012 J

B 0.024 J

C 120 J

D 240 J

Your answer ☐

[1]

Total Marks for Question Set 26: 22

Equations in physics

(final velocity)^2 – (initial velocity)^2 = 2 × acceleration × distance

change in thermal energy = mass × specific heat capacity × change in temperature

thermal energy for a change in state = mass × specific latent heat

energy transferred in stretching = 0.5 × spring constant × (extension)^2

potential difference across primary coil × current in primary coil = potential difference across secondary coil × current in secondary coil

Higher tier only –

force on a conductor (at right angles to a magnetic field) carrying a current = magnetic flux density × current × length

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