Oxford Cambridge and RSA

GCSE Physics A (Gateway)

J249/01 Physics A P1-P4 and P9 (Foundation Tier)

Question Set 26

Multiple Choice Questions

P2: Forces

1 A bus takes 1.8 hours to travel 24 km.

What is the average speed of the bus?

A 43.2 km/h

B 25.8 km/h

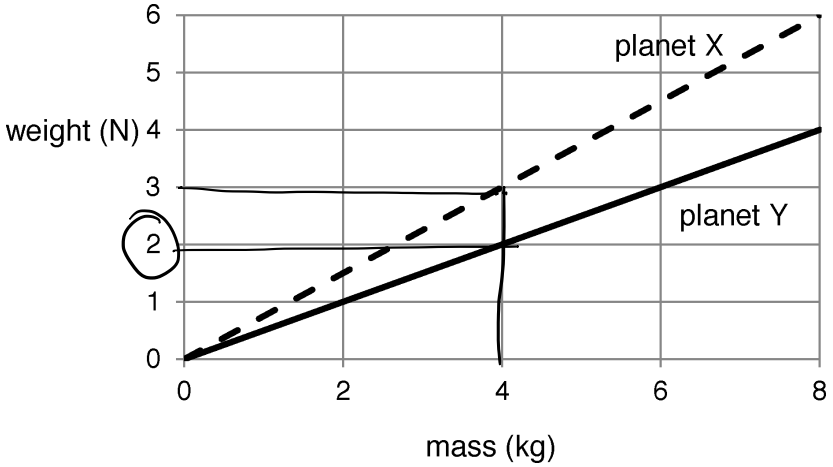
C 22.2 km/h

D 13.3 km/h

$S = \frac{d}{t} = \frac{24}{1.8} = 13.3$

Your answer D **[1]**

2 The graph shows the relationship between mass and weight on two different planets.



The weight of an object on planet **X** is 3.0 N.

What is the weight of the same object on planet **Y**?

A 1.5 N

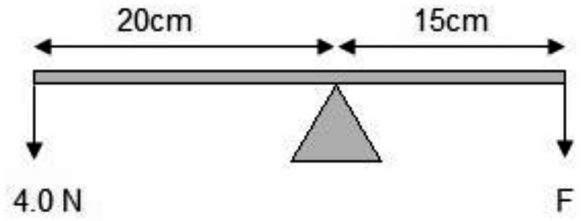
B 2.0 N

C 4.0 N

D 6.0 N

Your answer B **[1]**

3 A see-saw is in equilibrium.



$4 \times 0.2 = 0.15 \times F$

$\frac{4 \times 0.2}{0.15} = F = 5.\dot{3}$

What is the value of force F?

A 3.0 N

B 3.5 N

C 5.0 N

D 5.3 N

Your answer D **[1]**

4 Which sentence is the definition of the power of a machine?

A The amount of work done by the machine.

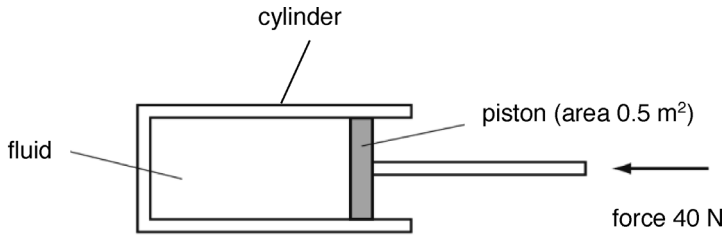
B The efficiency of the machine.

C The number of joules of energy the machine requires to work.

D The rate at which energy is transferred by the machine.

Your answer D **[1]**

5 A piston is pushed in a cylinder containing a fluid.



pressure = force ÷ area.

What is the pressure on the fluid?

$P = \frac{F}{A} = \frac{40}{0.5} = 80$

A 20 Pa

B 80 Pa

C 160 Pa

D 200 Pa

Your answer B **[1]**

6 A firework rocket has a mass of 0.1 kg.

A resultant force of 2 N acts on the rocket.

What is the acceleration of the rocket?

A 0.2 m/s²

B 0.5 m/s²

C 20 m/s²

D 200 m/s²

$F = ma$

$2 = 0.1 \times a$

$a = \frac{2}{0.1} = 20$

Your answer C **[1]**

7 What is the **minimum** number of forces needed to compress a spring?

A 1

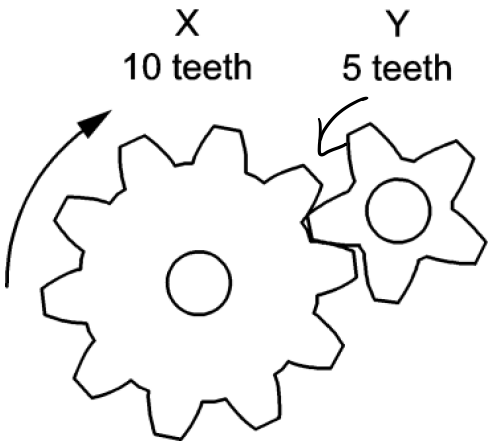
B 2

C 3

D 4

Your answer B **[1]**

8 The diagram shows 2 gears.



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

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

	direction of rotation	rotations per second
A	anticlockwise	0.5
B	anticlockwise	2.0
C	clockwise	0.5
D	clockwise	2.0

10 = 1 rotation
5 = 2 rotation

Your answer B **[1]**

9 What is the gravitational field strength at the Earth's surface?

A 10 N/kg

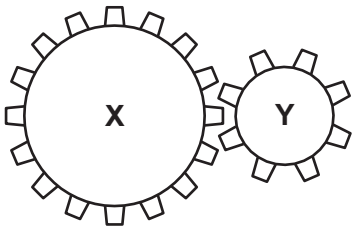
B 16 N/kg

C 50 N/kg

D 230 N/kg

Your answer A **[1]**

10 Cog **X** has 16 teeth and cog **Y** has 8 teeth.



Cog **X** is turned around **two** times.

How many times does cog **Y** turn around?

A 1

B 2

C 4

D 8

Your answer C **[1]**

11 What is the **smallest** number of forces needed to bend an object?

A 1

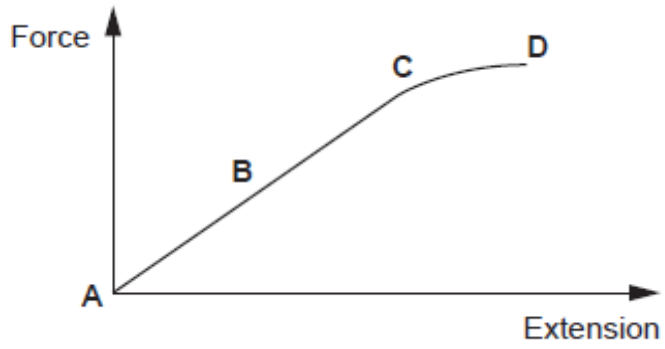
B 2

C 3

D 4

Your answer B **[1]**

12 The diagram shows the relationship between force and extension for a spring.



Which letter on the graph shows the **elastic limit** of the spring being stretched?

Your answer C **[1]**

13 An object travelled 800 m in 40 seconds.

Use the equation: distance travelled (m) = speed (m/s) × time (s)

What is the speed of the object?

A 0.05 m / s

B 20 m / s

C 840 m / s

D 32 000 m / s

$S = \frac{800}{40} = \frac{80}{4} = 20$

Your answer B **[1]**

14 An object moved 20 cm with a force of 20 N.

Use the equation: work done = force × distance

$0.2 \times 20 = 4$

Which is the correct calculation of work done?

A 0.4 J

B 4.0 J\

C 40 J

D 400 J

Your answer B **[1]**

15 In which situation does the force cause a rotation?

A Bouncing on a trampoline

B Hitting a nail with a hammer

C Pushing a friend on a swing

D Sitting on a chair

Your answer C **[1]**

16 Which is a scalar?

A Acceleration

B Displacement

C Force

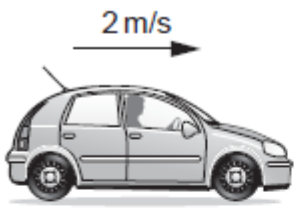
D Speed

Your answer D **[1]**

17 Which of the following has the **most** kinetic energy?

$KE = \frac{1}{2}mv^2$

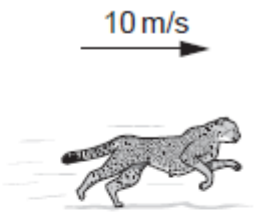
A



500 kg

KE = 1000

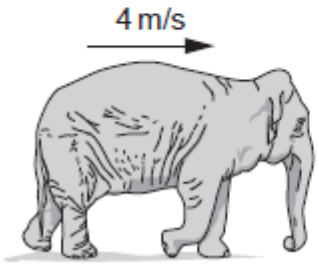
B



80 kg

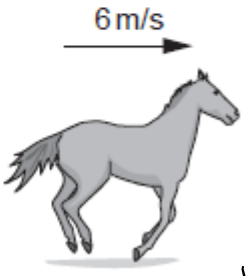
KE = 4 000

C



3000 kg KE = 24 000

D



750 kg

KE = 13 500

Your answer C **[1]**

18 Which distances are the **same**?

A 1×10^{-3} m and 1 µm

B 1×10^{-6} m and 1 mm

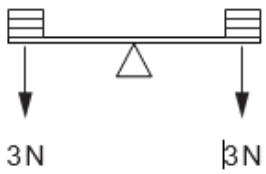
C 1×10^{-9} m and 1 nm

D 1×10^{-12} m and 1 Gm

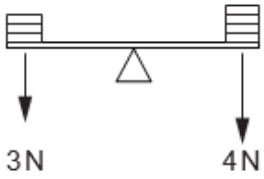
Your answer C **[1]**

19 A student puts different weights on four balances.

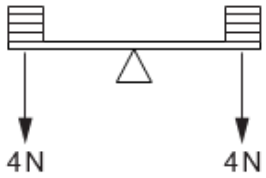
A



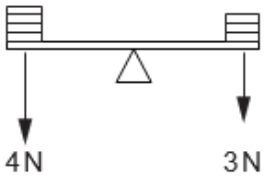
B



C



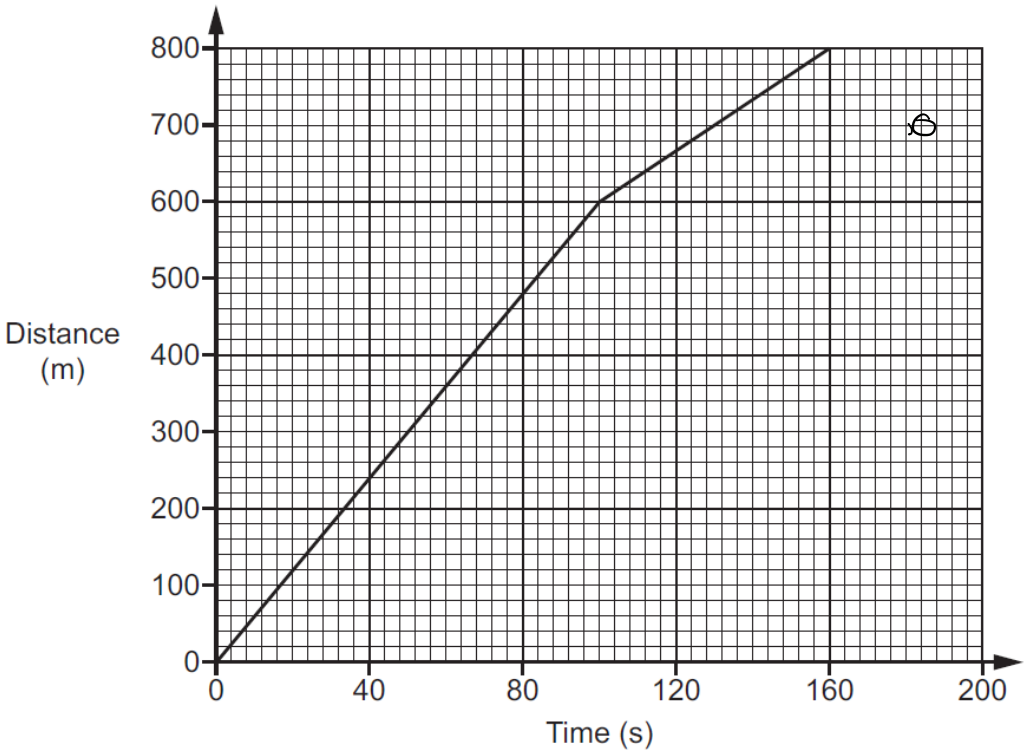
D



Which balance will give a **clockwise** moment?

Your answer B **[1]**

20 Look at the distance-time graph for a journey to school.



What is the average speed for the journey?

Use the equation: average speed = distance travelled ÷ time

A 0.2 m / s

B 5.0 m / s

C 6.0 m / s

D 50 m / s

800 ÷ 160 = 5

Your answer B **[1]**

21 Which of the following is Newton's Third Law?

A For every action there is an equal and opposite reaction.

B What goes up must come down.

C The acceleration that a resultant force produces depends on the size of the force and mass of the object.

D An object will continue to stay at rest or move with uniform speed unless a force acts on it.

Your answer A **[1]**

22 On Mars the gravitational field strength is 4.0 N / kg.

How much would a 60 kg person weigh on Mars?

Use the equation: weight = mass × gravitational field strength

A 15 N $4 \times 60 = 240$

B 64 N

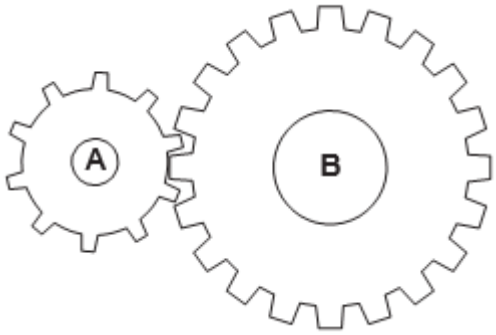
C 240 N

D 600 N

Your answer C **[1]**

23 A student sets up two cogs.

Cog **A** has 10 teeth and cog **B** has 20 teeth.



Cog **A** is turned **2** times.

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

A 0.5 times

B 1 time

C 2 times

D 20 times

Your answer B **[1]**

24 A car travels at 72 km / h.

How fast is this in metres per second (m / s)?

1km = 1000m 1hr = 60min = 3600s

$\frac{72\,km}{1hr} = \frac{72000m}{3600s} = \frac{720}{36}\ m/s$

$= 20\ m/s$

A 1.2 m / s

B 20 m / s

C 120 m / s

D 1200 m / s

Your answer B **[1]**

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

A Lowering a book vertically from a shelf 1

B Opening a door

C Lifting a book vertically onto a shelf

D Sitting in the centre of a see-saw

Your answer B **[1]**

Total Marks for Question Set 26: 25

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