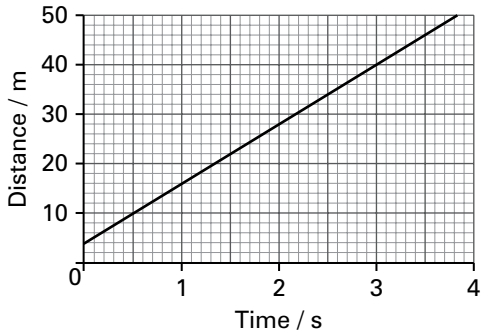
Multiple-choice test
Block 1: Supplement

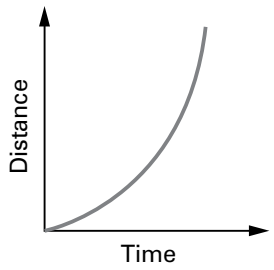
Click on the correct answer to each question.

1 The graph represents the motion of a car along a road. What is the car's speed, in m/s?

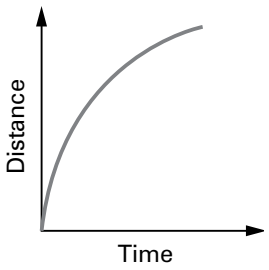


A 10 m/s
B 12 m/s
C 12.5 m/s
D 15 m/s

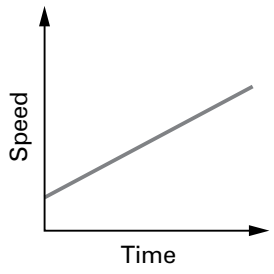
2 Which graph represents the motion of a body that is decelerating?



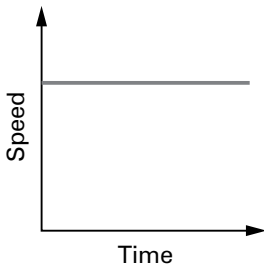
A



B



C



D

3 A train is accelerating as it moves away from a station. As it passes a signal, its speed is 5.0 m/s. Then, 50 s later, its speed has increased to 25.0 m/s.
What is its average acceleration, in m/s^2?

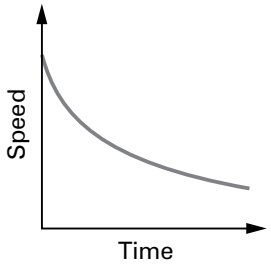
A 0.4 m/s

B 0.5 m/s

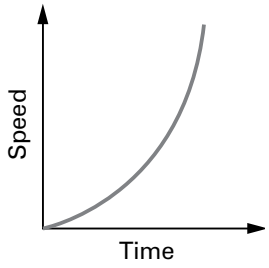
C 2.0 m/s

D 2.5 m/s

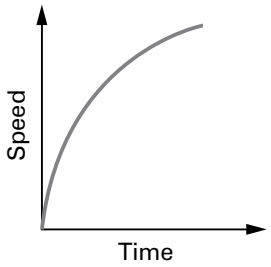
4 A skydiver jumps from an aircraft and falls through the air towards the Earth. Which graph could represent his motion before he opens his parachute?



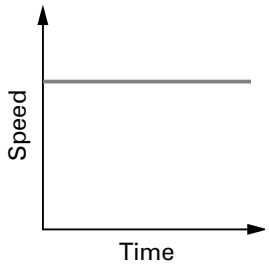
A



B



C

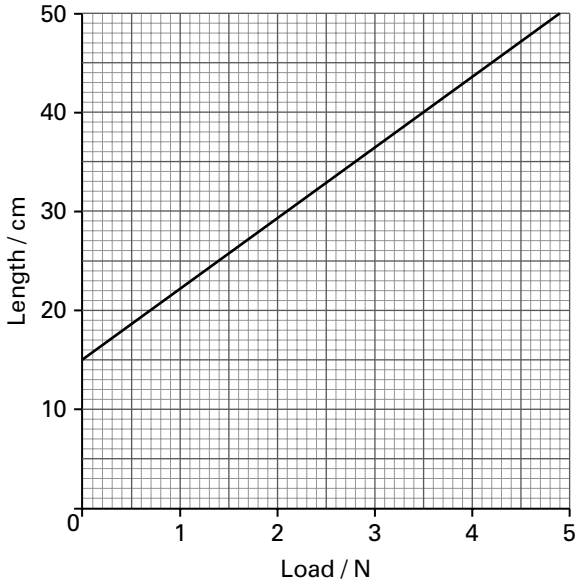


D

5 An astronaut whose mass is 100 kg on Earth travels to the Moon. The gravitational field strength on the surface of the Moon is 1.6 N/kg. Which row in the table shows correctly the astronaut's mass and weight on the surface of the Moon?

	Mass / kg	Weight / N
A	0	0
B	100	0
C	100	160
D	160	160

6 The graph shows how the length of a spring changes as the load on it is increased.



What is the extension of the spring, in cm, when the load is 3.5 N?

A 15 cm

B 25 cm

C 40 cm

D 55 cm

7 Hooke's law describes how the extension of a spring depends on the load on the spring. The law can be written as $F = k\,x$, where k is the stiffness of the spring.
A student tests four springs by adding a load of 20 N to each one in turn. Her results are shown in the table. Which spring has the greatest value of k?

Spring	Original length / cm	Final length / cm
A	10	40
B	20	30
C	30	50
D	40	60

8 What force, in N, is needed to give a ball of mass 0.5 kg an acceleration of 4.0 m/s^2?

A 0.125 N

B 2.0 N

C 4.5 N

D 8.0 N

9 What is the unit of the impulse of a force?

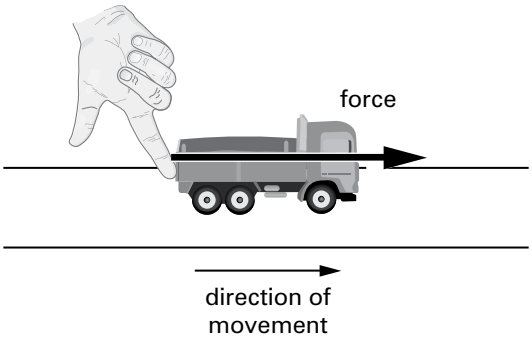
A N

B N s

C kg m/s^2

D N/kg

10 A toy truck of mass 0.5 kg is moving with a speed of 2.0 m/s. A child pushes it with a force of 2.5 N for 2 s, as shown.



What is the truck's momentum, in kg m/s, after it has been pushed?

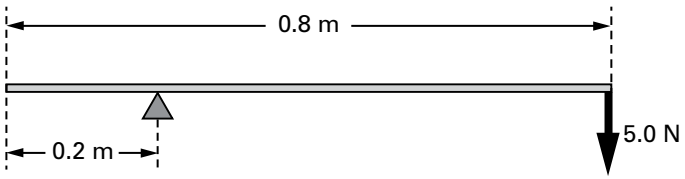
A 1.0 kg m/s

B 4.0 kg m/s

C 5.0 kg m/s

D 6.0 kg m/s

11 A force of 5.0 N acts on a beam as shown.



What is the moment of the force about the pivot?

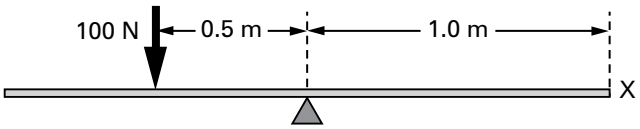
A 3.0 N m clockwise

B 3.0 N m anticlockwise

C 4.0 N m clockwise

D 4.0 N m anticlockwise

12 A beam is pivoted at its midpoint as shown.



What force must be applied at end X to balance the beam?

A 50 N upwards

B 50 N downwards

C 200 N upwards

D 200 N downwards

13 Which row in the table gives correct examples of scalar and vector quantities?

	Scalar quantity	Vector quantity
A	mass	kinetic energy
B	distance	velocity
C	weight	acceleration
D	force	momentum

14 A stone of mass 3.0 kg is moving with a speed of 4.0 m/s. What is its kinetic energy, in joules?

A 12 J

B 24 J

C 36 J

D 72 J

15 Most of our energy resources depend on radiation from the Sun. Which of the following energy resources does **not** depend on solar radiation?

A wind energy

B hydro-electricity

C tidal power

D biomass

16 By what process is energy released in the Sun?

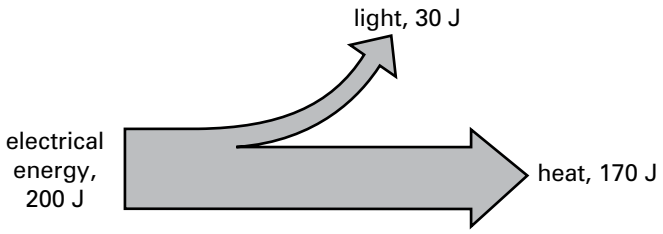
A solar power

B radiation

C nuclear fission

D nuclear fusion

17 The diagram represents the energy transformations that happen in a light bulb each second.



What is the efficiency of the light bulb?

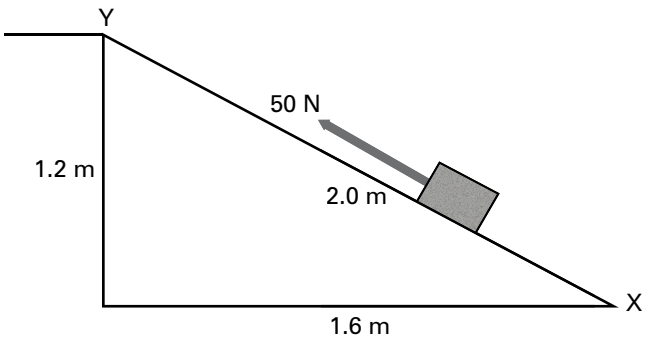
A 15%

B 30%

C 100%

D 170%

18 A force of 50 N is used to push a box up a slope XY, as shown.



How much work, in J, is done by this force in moving the box from X to Y?

A 0 J

B 60 J

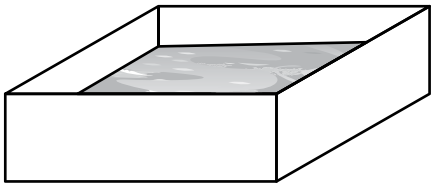
C 80 J

D 100 J

19 A crane lifts a load of bricks of weight 20 000 N to a height of 10.0 m in a time of 20 s. Which row in the table shows correctly the energy transferred to the bricks and the power of the crane?

	Energy transferred / J	Power / W
A	2 000	100
B	2 000	40 000
C	200 000	1 000
D	200 000	10 000

20 The tank shown contains liquid of density 800 kg/m^3. (Assume that the Earth's gravitational field strength g = 10 N/kg).



Atmospheric pressure on the surface of the liquid is 100 000 N/m^2. The pressure on the base of the tank is 140 000 N/m^2. What is the depth of liquid in the tank, in m?

A 0.5 m

B 5.0 m

C 15 m

D 50 m