

Cambridge Assessment International Education

O LEVEL 5054

PHYSICS

Paper 1 MCQs

TOPICAL with Keys

JUNE 2013 – JUNE 2023

Cambridge 2023-2025 Syllabus

Arranged Sub-Topic Wise

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Book Title: O Level Physics Topical P1 (MCQs)
Syllabus Code: 5054
Compiler: Abdul Hakeem
Syllabus: Syllabus 2023-2025
Edition: 2024
Published by:  Airport Road 0423-5700707
Price: 1900/-

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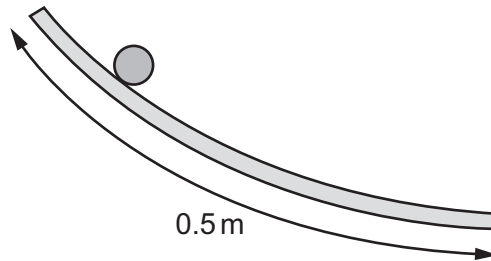
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1.1.1 Unit & Measurements

5054/1&A/>2' /Q%

- 1 In an experiment, a ball is rolled down a curved track that is about half a metre long.



Which measuring device is used to measure the length accurately?

- A metre rule
- B micrometer
- C stop-watch
- D tape measure

5054/1%A/>2' /Q%

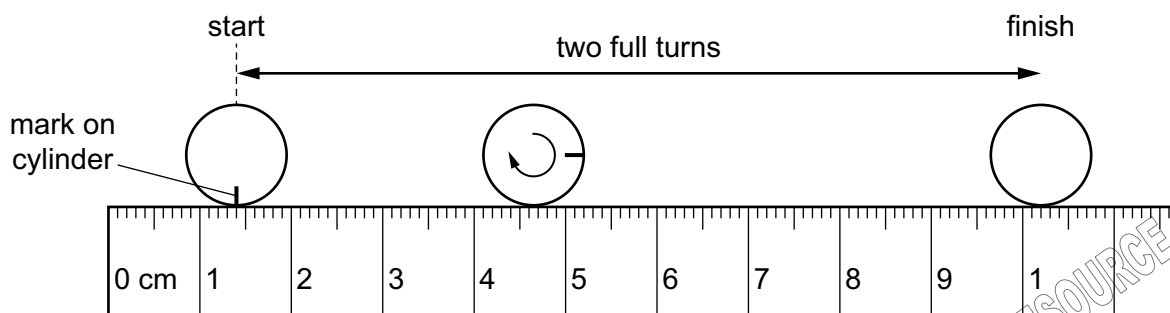
- 2 A student wishes to measure directly the circumference of a football.

What is the most suitable instrument to use?

- A a clock only
- B a measuring tape only
- C a micrometer only
- D a ruler only

5054/\$%GD/&' Q%

- 3 A small cylinder is rolled along a ruler and completes two full turns as shown in the diagram.



What is the circumference of the cylinder?

- A 4.4 cm
- B 5.1 cm
- C 8.8 cm
- D 10.2 cm

)\$) (/1&C/B/2&Q&

4 A teacher measures the length of her classroom.

What is the most appropriate instrument to use?

- A a 30 cm ruler
- B a caliper
- C a micrometer
- D a tape

)\$) (/1&C/B/2&Q'

5 Which value is one-thousandth of a metre?

- A 0.0001 cm
- B 0.001 cm
- C 0.01 cm
- D 0.1 cm

5054/1%A/>/&Q& 5054/1&A/>/&Q%

6 A student determines the circumference of a football.

Which instrument gives a reading that is the circumference of the football?

- A calipers
- B micrometer
- C rule
- D tape

5054/1&C/B/&Q&-

7 What is stored in a battery and what is its unit?

	quantity	unit
A	current	A
B	current	As
C	energy	J
D	energy	J/s

5054/1%A/>/&Q& 5054/1&A/>/&Q'

8 What is measured using a micrometer?

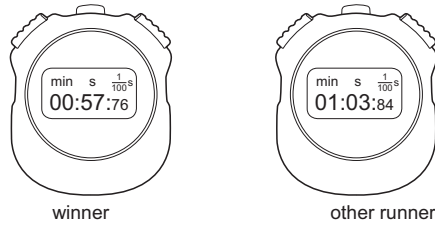
- A area
- B current
- C length
- D mass

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5054/1/A/18/Q

9 Stop-watches are used to time the runners in a race.

The stop-watches show the times recorded for the winner and another runner.



What is the difference in time between the winner and the other runner?

- A 0.4608 s
- B 6.08 s
- C 46.08 s
- D 608 s

5054/1/A/19/Q

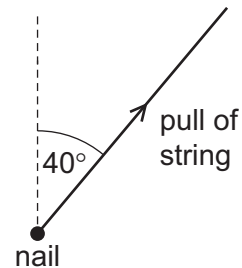
10 In an experiment to measure the power output of a small steam engine, a known load is lifted by the engine.

Which two measuring instruments are also required?

- A measuring cylinder and thermometer
- B measuring cylinder and metre rule
- C metre rule and stop-watch
- D stop-watch and thermometer

5054/1/C/B/20/Q

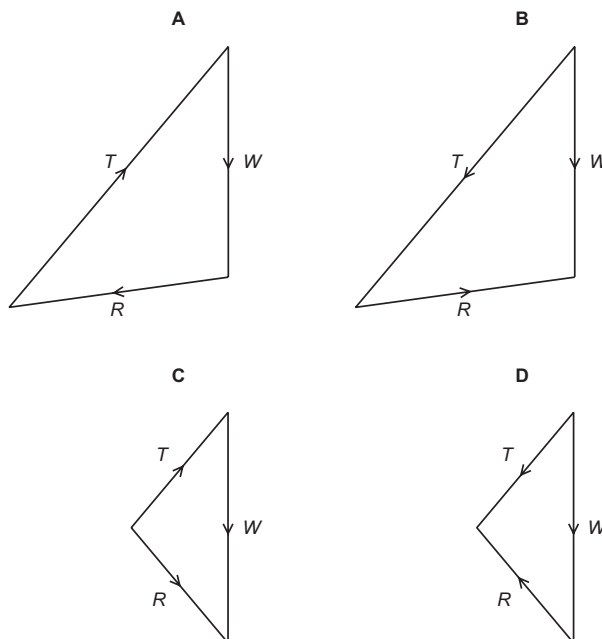
11 A heavy nail is fixed firmly to a wall. It is pulled by a string at 40° to the vertical. The nail does not move.



Three forces act on the nail:

- its weight W ,
- the tension T in the string,
- the force R exerted by the wall.

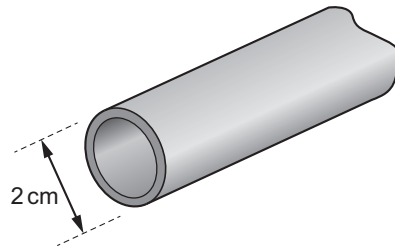
Which diagram, drawn to scale, represents the three forces?



STUDENTS RESOURCE

5054/1/C/B/1- Q' 5054/1/C/B/1- Q(

12 A length of copper pipe, of uniform cross-section and several metres long, carries water to a tap.



Measurements are taken to determine accurately the volume of copper in the pipe.

Which instruments are used?

- A micrometer and rule
- B micrometer and calipers
- C rule and tape
- D tape and calipers

5054/1/C/B/1- Q(

13 What is the correct unit for the quantity shown?

	quantity	unit
A	electromotive force (e.m.f.)	N
B	latent heat	J
C	pressure	kg / m ³
D	weight	kg

5054/1/A/>/1- Q' 5054/1/A/>/1- Q%

14 Which reading is given to one tenth of a millimetre?

- A 3.3 cm
- B 3.31 cm
- C 3.310 cm
- D 3.312 cm

5054/1/A/>/1- Q(

15 The magnitudes of three different electric charges are given below.

What is the correct order of size, from largest to smallest?

- A 1 mC → 1 MC → 1 kC
- B 1 MC → 1 mC → 1 kC
- C 1 MC → 1 kC → 1 mC
- D 1 kC → 1 mC → 1 MC

STUDENTS RESOURCE

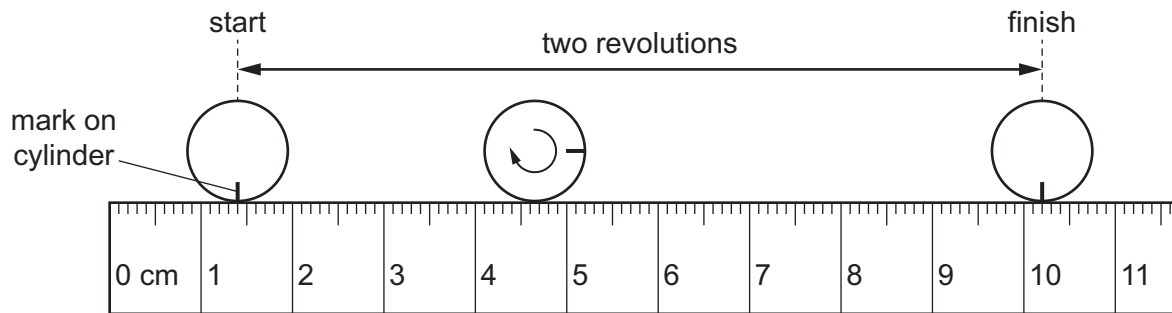
5054/1/C/B/1, Q%

16 What is a possible mass for a normal adult person?

- A 7.5 kg B 75 kg C 750 kg D 7500 kg

5054/1/C/B/1, Q&

17 A small cylinder is rolled along a ruler and completes two revolutions.



The circumference is the distance around the outside of a circle.

What is the circumference of the cylinder?

- A 4.4 cm B 5.2 cm C 8.8 cm D 10.2 cm

5054/1/C/B/1, Q)

18 Which piece of apparatus may be used to compare the masses of two objects?

- A balance
 B manometer
 C measuring cylinder
 D micrometer

5054/1/A/>/1, Q'

19 What is the name and value of the unit of power written as mW?

	name	value
A	megawatt	$10^{-3}W$
B	megawatt	10^6W
C	milliwatt	$10^{-3}W$
D	milliwatt	10^6W

STUDENTS RESOURCE

5054/1&A/>1, Q'

20 What is the name and value of the unit of power written as mW?

	name	value
A	megawatt	10^{-3} W
B	megawatt	10^6 W
C	milliwatt	10^{-3} W
D	milliwatt	10^6 W

5054/1&A/>1, Q(

21 Micrometers, metre rules, tapes and calipers are used for measuring lengths.

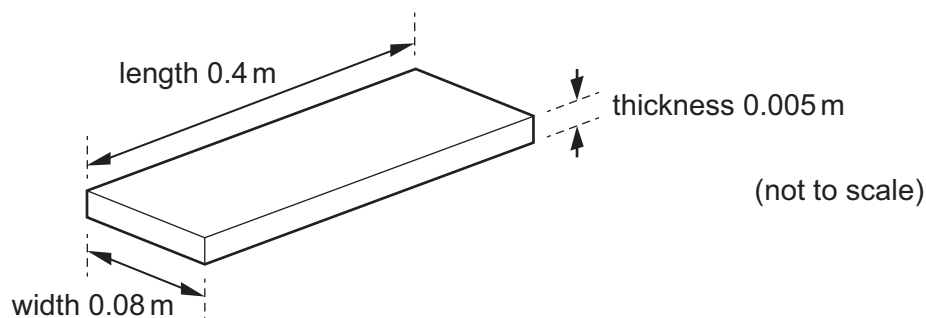
Which row identifies the most suitable device for accurately measuring the stated length?

	length	measuring device
A	0.15 mm	micrometer
B	0.50 mm	metre rule
C	0.15 m	tape
D	0.50 m	calipers

5054/1%&C/B/1+Q& 5054/1&C/B/1+Q&

22 A manufacturer measures the three dimensions of a wooden floor tile using instruments.

The approximate dimensions of the tile are shown.



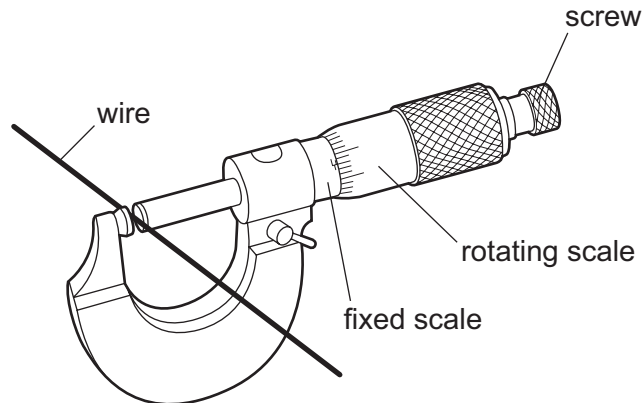
Which instruments are used to measure accurately each of these dimensions?

	length	thickness	width
A	metre rule	micrometer	calipers
B	metre rule	calipers	micrometer
C	micrometer	metre rule	calipers
D	calipers	micrometer	metre rule

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5054/1/A/1+Q% 5054/1/A/1+Q'

- 23 A micrometer is used to measure the diameter of a uniform wire.



What is done to obtain an accurate answer?

- A Make the micrometer horizontal and then use the scales to find the reading.
- B Subtract the fixed-scale reading from the rotating-scale reading.
- C Subtract the rotating-scale reading from the fixed-scale reading.
- D Use the scales to find the reading and add or subtract any zero error.

5054/1/C/B/1* Q% 5054/1/C/B/1* Q%

- 24 A length of copper wire is labelled 'length 30 m' and 'diameter 0.50 mm'.

Which instruments are most suitable to measure accurately the length and the diameter of the wire?

	length	diameter
A	rule	calipers
B	rule	micrometer
C	tape	calipers
D	tape	micrometer

5054/1/A/1* Q' 5054/1/A/1* Q%

- 25 A student determines the circumference of a golf ball.

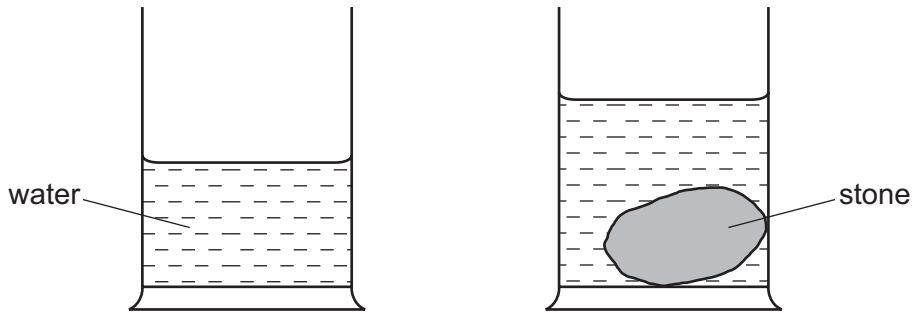
Which instrument gives a reading that is the circumference of the golf ball?

- A calipers
- B micrometer
- C rule
- D tape

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5054/11/O/N/1) Q% 5054/1&O/N/1) Q&

- 26 During an experiment to find the density of a stone, the stone is lowered into a measuring cylinder partly filled with water.

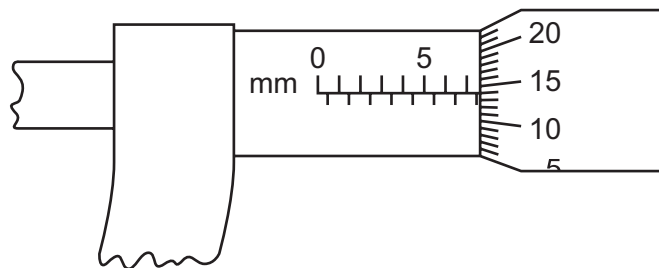


Which statement is correct?

- A The difference between the readings gives the density of the stone.
- B The difference between the readings gives the volume of the stone.
- C The final reading gives the density of the stone.
- D The final reading gives the volume of the stone.

5054/11/O/N/1) Q& 5054/1&O/N/1) Q'

- 27 The diagram shows a micrometer scale.



Which reading is shown?

- A 5.64 mm
- B 7.14 mm
- C 7.16 mm
- D 7.64 mm

5054/1&A/>/1) Q& 5054/1&A/>/1) Q&

- 28 The diameter and the length of a thin wire, approximately 50 cm in length, are measured as precisely as possible.

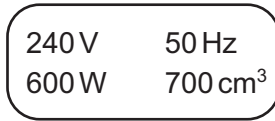
What are the best instruments to use?

	diameter	length
A	micrometer	rule
B	micrometer	vernier calipers
C	rule	tape
D	vernier calipers	rule

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5054/1/A/1(Q)

29 The diagram shows the information found on an electric kettle.



What is the frequency of the electrical supply used to power the kettle?

- A 50 Hz B 240 V C 600 W D 700 cm

5054/1/C/B/1(Q)

30 Which device can be used to measure the thickness of a single sheet of paper?

- A a metre rule B a micrometer C a plastic ruler D a measuring tape

5054/1/C/B/1(Q)

31 In a test, four students linked the quantities on the left with their units on the right. Which student matched them all correctly?

A

frequency — m/s²

acceleration — J

latent heat — Hz

power — W

B

frequency — m/s²

acceleration — J

latent heat — Hz

power — W

C

frequency — m/s²

acceleration — J

latent heat — Hz

power — W

D

frequency — m/s²

acceleration — J

latent heat — Hz

power — W

5054/1/A/1(Q)

32 A workman measures, as **accurately** as possible, the length and internal diameter of a straight copper pipe.

The length is approximately 600 cm and the internal diameter is approximately 2 cm.

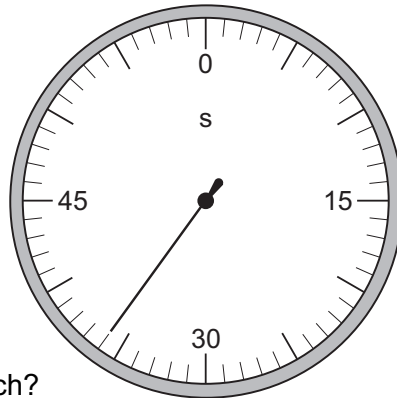
What is the best combination of instruments for the workman to use?

	internal diameter	length
A	ruler	ruler
B	ruler	tape
C	vernier calipers	ruler
D	vernier calipers	tape

STUDENTS RESOURCE

5054/1/A/1/Q&

33 The diagram shows a stopwatch.



What is the reading on the stopwatch?

- A 30.6 s B 33.0 s C 36.0 s D 36.6 s

5054/12/M/J/14/Q3

34 A student measures, as **accurately** as possible, the length and internal diameter of a straight glass tube.

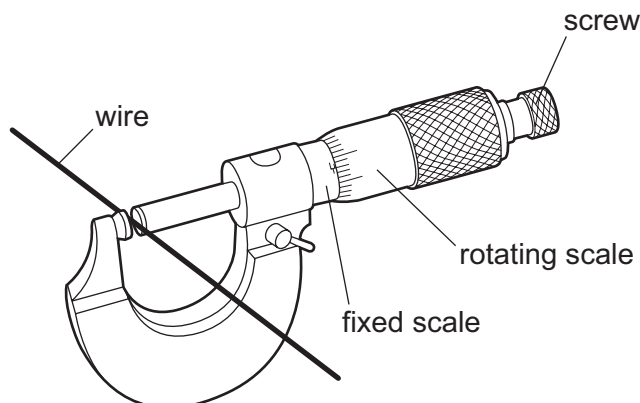
The length is approximately 25 cm and the internal diameter is approximately 2 cm.

What is the best combination of instruments for the student to use?

	internal diameter	length
A	ruler	micrometer
B	ruler	ruler
C	vernier calipers	micrometer
D	vernier calipers	ruler

5054/1/A/1/Q&

35 A micrometer is used to measure the diameter of a uniform wire.



What is done to obtain an accurate answer?

- A Find the reading and add or subtract the zero error.
 B Make the micrometer horizontal.
 C Subtract the fixed scale reading from the rotating scale reading.
 D Subtract the rotating scale reading from the fixed scale reading.

5054/1&A/>/1' /Q&

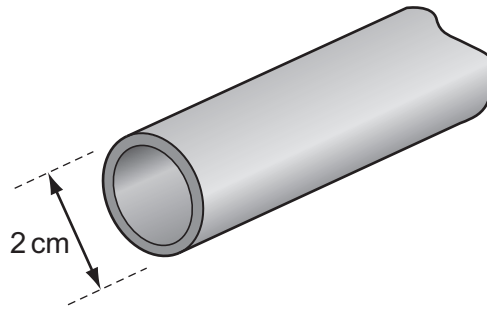
- 36 Before marking the finishing line on a running track, a groundsman measures out its 100m length.

Which instrument is the most appropriate for this purpose?

- | | |
|------------------|---------------|
| A measuring tape | C 30 cm ruler |
| B metre rule | D micrometer |

5054/11/O/N/13/Q2 5054/1&C/B/13/Q%

- 37 A length of copper pipe, of uniform cross-section and several metres long, carries water to a tap.



Measurements are taken to determine accurately the volume of copper in the pipe.

Which instruments are used?

- | | |
|---------------------------|---------------------|
| A calipers and micrometer | C rule and tape |
| B micrometer and rule | D tape and calipers |

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1.1.2 Vector & Scalar

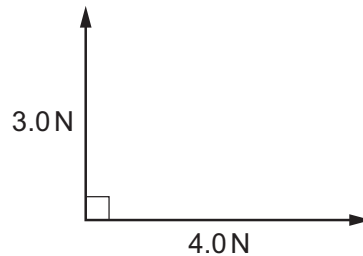
5054/1/A/2' IQ&

1 Which row describes acceleration, displacement, distance and speed?

	acceleration	displacement	distance	speed
A	scalar	scalar	vector	scalar
B	scalar	vector	scalar	vector
C	vector	scalar	vector	vector
D	vector	vector	scalar	scalar

5054/1/A/2' IQ'

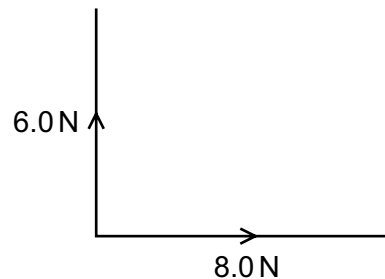
2 What is the size of the resultant of the two forces shown?



- A** 1.0 N **B** 3.5 N **C** 5.0 N **D** 7.0 N

5054/1/A/2' IQ'

3 Forces of 6.0 N and 8.0 N act as shown.



Which diagram shows the resultant *R* of these two forces?

A

B

C

D

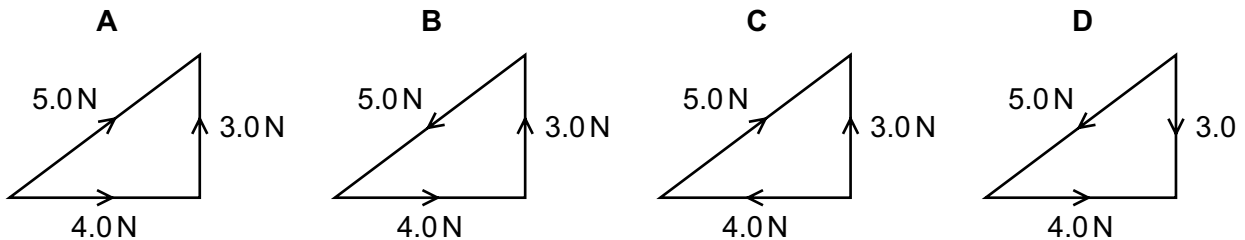
5054/1/A/2' /Q&

4 Which equation contains two vector quantities?

- A acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$
- B average speed = $\frac{\text{distance travelled}}{\text{time taken}}$
- C density = $\frac{\text{mass}}{\text{volume}}$
- D volume = length \times width \times height

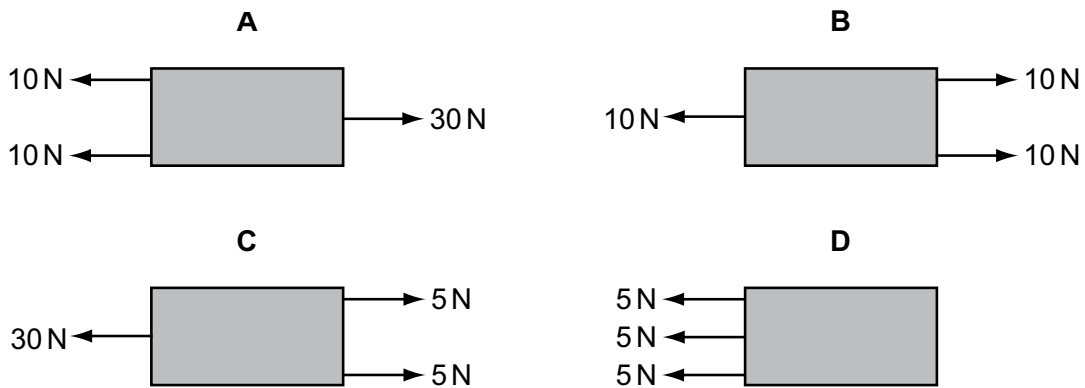
5054/\$%GD/&' Q&

5 Which diagram shows the vector addition of a 4.0 N force and a 3.0 N force?



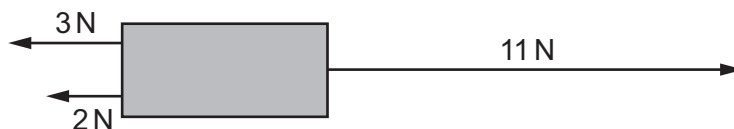
5054/\$%GD/&' Q)

6 Which object has the largest resultant force acting on it?



) \$) (/1&C/B/2&Q%

7 The diagram shows three forces acting on a block. The resultant force is 6 N to the right.



Which additional force produces a resultant force of 3 N to the left?

- A 3 N to the left
- B 9 N to the left
- C 6 N to the right
- D 13 N to the right

8) \$) (/1%C/B/2&Q&

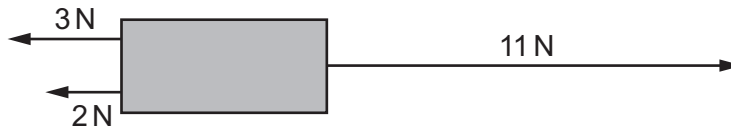
8 Velocity is given by the change in displacement divided by the change in time.

How many vector quantities appear in this statement?

- A 0 B 1 C 2 D 3

9) \$) (/1%C/B/2&Q%

9 The diagram shows three forces acting on a block. The resultant force is 6 N to the right.

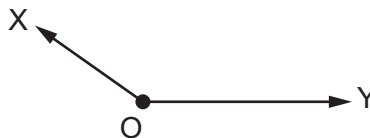


Which additional force produces a resultant force of 3 N to the left?

- A 3 N to the left
 B 9 N to the left
 C 6 N to the right
 D 13 N to the right

5054/1%C/B/8%Q&

10 Two forces, X and Y, act upon an object O. The arrows represent the magnitudes and directions of the forces.



Which arrow shows the direction of the resultant force?



5054/1&C/B/8%Q&

11 A student investigates the motion of a ball falling through the air.

Which quantity is a vector?

- A the diameter of the ball
 B the gravitational force on the ball
 C the distance from which the ball is dropped
 D the speed at which the ball hits the ground

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5054/1/A/18/Q%

12 A list of various quantities is shown.

- acceleration
- displacement
- force
- length
- mass
- velocity

How many of these quantities are vectors?

- A 2 B 3 C 4 D 5

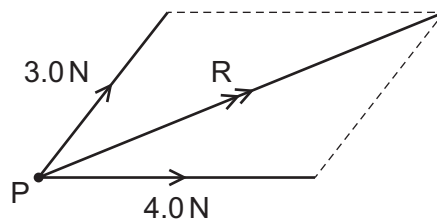
5054/1/C/B/18/Q%

13 Which quantity is a vector?

- A speed C mass
 B force D distance

5054/1/A/18/Q% 5054/18/A/18/Q&

14 The diagram shows the resultant R of a 3.0 N force and a 4.0 N force that act at a point P.



The angle between the 3.0 N force and the 4.0 N force can be any value from 0° to 90°.

Which value of R is **not** possible?

- A 4.0 N B 5.0 N C 6.0 N D 7.0 N

5054/18/A/18/Q%

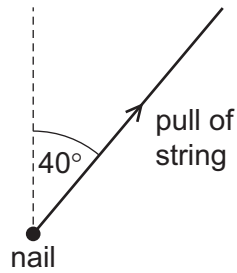
15 Which quantity is a vector?

- A acceleration C speed
 B distance D time

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5054/1/C/B/1-Q%

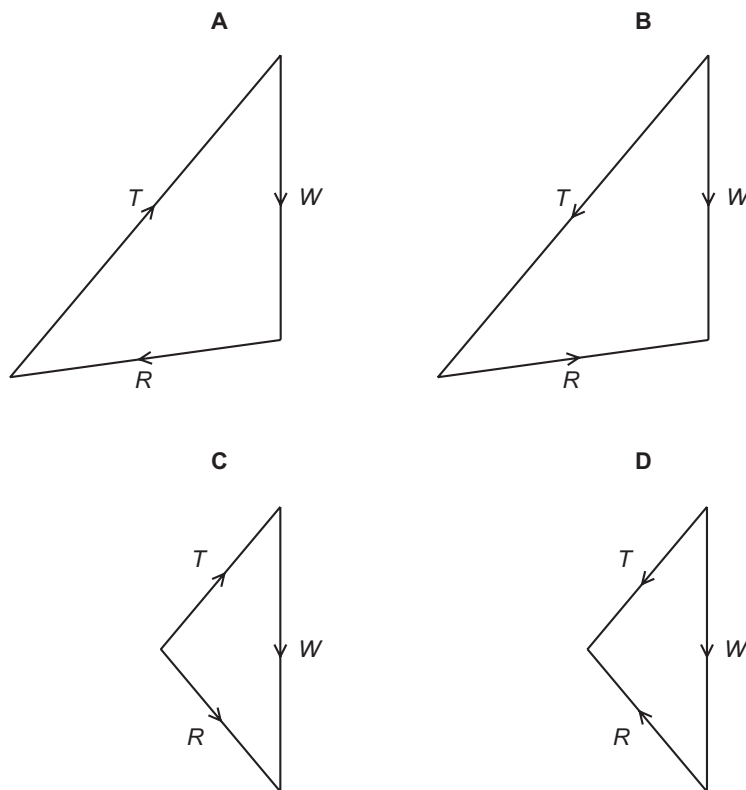
- 16 A heavy nail is fixed firmly to a wall. It is pulled by a string at 40° to the vertical. The nail does not move.



Three forces act on the nail:

- its weight W ,
- the tension T in the string,
- the force R exerted by the wall.

Which diagram, drawn to scale, represents the three forces?



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- 17 Which word is the name of a vector quantity?
- A density
 - B displacement
 - C energy
 - D speed

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