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IGCSE PHYSICS 0625 · TOPICAL PAST PAPERS

Physical Quantities & Measurement

Paper 1 — Multiple-Choice Questions (topical compilation)

Fahad H. Ahmad

Contact: +92 323 509 4443

M.Eng NUS Singapore · B.Eng NUST · 15+ years of teaching experience in Singapore, UAE & Pakistan · 60,000+ subscribers and 20 million+ video lecture views.

PHYSICAL QUANTITIES, UNITS, MEASUREMENT TECHNIQUES
PAPER 1 QUESTIONS

Measurement Techniques

QUESTION # 1:

1 A student has been asked to determine, as accurately as possible, the volume of a piece of wire. The wire is about 80 cm long and about 0.2 cm in diameter.

Which measuring instruments should the student use?

	length	diameter
A	metre rule	micrometer
B	metre rule	vernier callipers
C	micrometer	vernier callipers
D	vernier callipers	micrometer

QUESTION # 2:

1 Which instrument is used to measure the internal diameter of a pipe with a single measurement?

A manometer

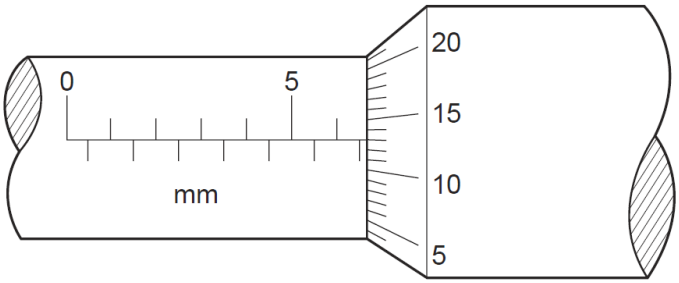
B measuring cylinder

C micrometer

D vernier calipers

QUESTION # 3

1 What is the reading on this micrometer?



A 5.43 mm **B** 6.63 mm **C** 7.30 mm **D** 8.13 mm

QUESTION # 4

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

The length is approximately 80 cm and the internal diameter is approximately 2 cm.

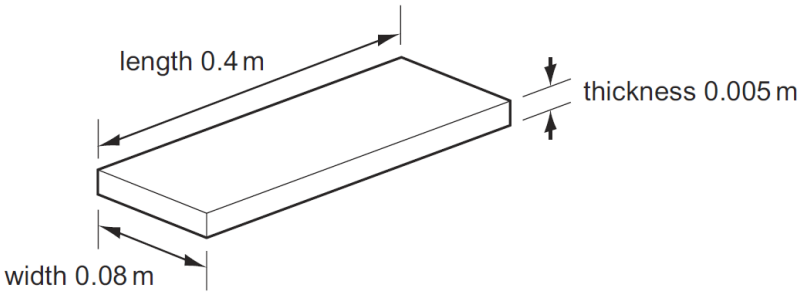
What is the best combination of instruments for the plumber to use?

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

QUESTION # 5

1 A manufacturer measures accurately the dimensions of a wooden floor tile.

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	vernier calipers
B	metre rule	vernier calipers	micrometer
C	micrometer	metre rule	vernier calipers
D	vernier calipers	micrometer	metre rule

QUESTION # 6

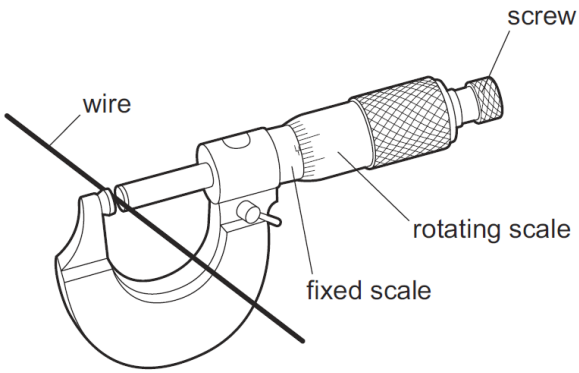
1 A reel of copper wire is labelled 'length 30 m' and 'diameter 2 mm'. A student calculates the volume of the copper wire.

Which instruments does he use 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

QUESTION # 7

2 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.

QUESTION # 8

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

Which instrument is the most appropriate for this purpose?

A measuring tape

B metre rule

C 30 cm ruler

D micrometer

QUESTION # 9

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

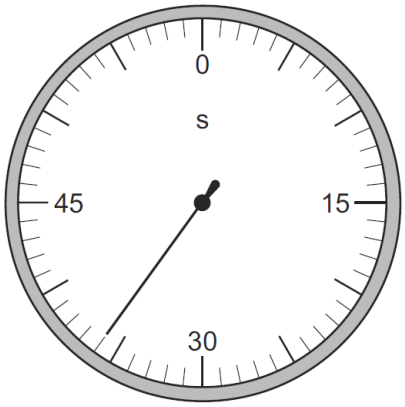
The length is approximately 600 cm and the internal diameter is approximately 2 cm.

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

QUESTION # 10

2 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

QUESTION # 11

2 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

QUESTION # 12

3 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

QUESTION # 13

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

Which is the most suitable instrument to use?

A calipers

B a measuring tape

C a micrometer

D a ruler

QUESTION # 14

4 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

QUESTION # 15

2 What is measured using a micrometer?

A area

B current

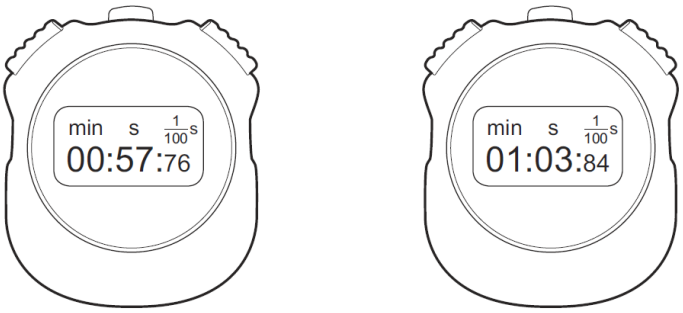
C length

D mass

QUESTION # 16

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

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



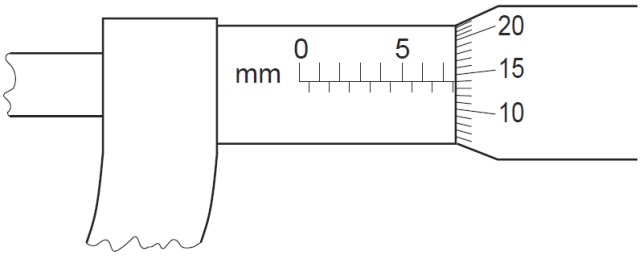
winner other runner

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

QUESTION # 17

1 The diagram shows a micrometer scale.

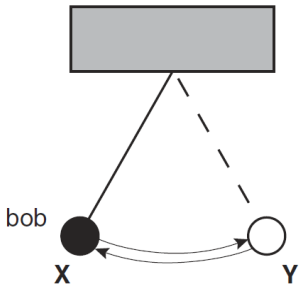


Which reading is shown?

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

QUESTION # 18

1 One oscillation of a swinging pendulum occurs when the bob moves from **X** to **Y** and back to **X** again.



Using a stopwatch, which would be the most accurate way to measure the time for one oscillation of the pendulum?

A Time 20 oscillations and multiply by 20.

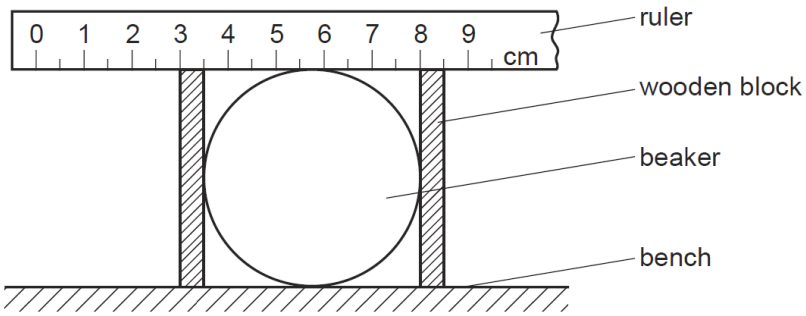
B Time 20 oscillations and divide by 20.

C Time one oscillation.

D Time the motion from **X** to **Y**, and double it.

QUESTION # 19

1 The diagram shows one method of measuring the diameter of a beaker.

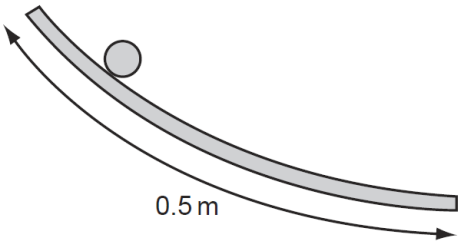


What is the diameter of the beaker?

A 4.5 cm **B** 5.0 cm **C** 5.5 cm **D** 8.0 cm

QUESTION # 20

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



Which measuring device should be used to measure the length accurately?

A metre rule

B micrometer

C tape measure

D vernier calipers

QUESTION # 21

1 Vernier calipers read to one tenth of a millimetre.

Which reading is given to this precision?

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

QUESTION # 22

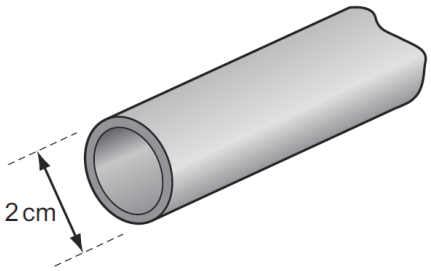
1 The level of water in a measuring cylinder is 75 cm^3. A stone of volume 20 cm^3 is lowered into the water.

What is the new reading of the water level?

A 20 cm^3 **B** 55 cm^3 **C** 75 cm^3 **D** 95 cm^3

QUESTION # 23

1 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

B micrometer and rule

C rule and tape

D tape and calipers

QUESTION # 24

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

A a metre rule

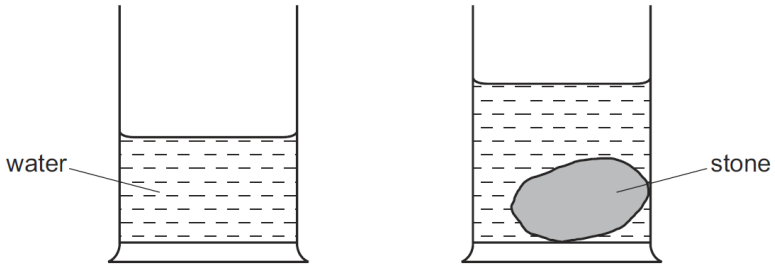
B a micrometer

C a plastic ruler

D a measuring tape

QUESTION # 25

2 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.

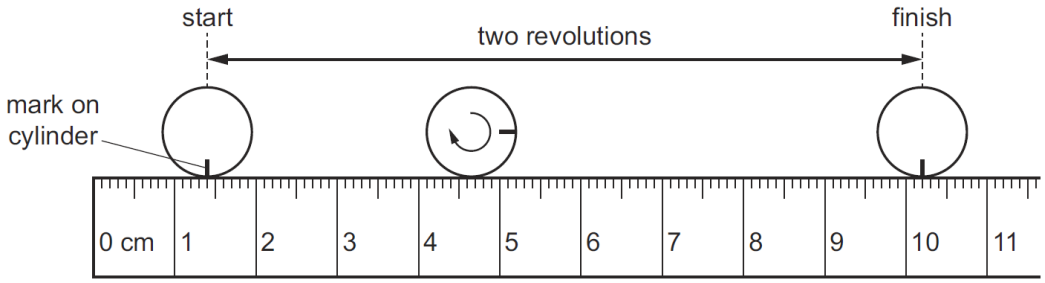
B The difference between the readings gives the volume of the stone.

C The final reading gives the density of the stone.

D The final reading gives the volume of the stone.

QUESTION # 26

2 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

Units

QUESTION # 1:

1 Power is measured in watts.

What is the correct symbol for millions of watts?

A mw **B** mW **C** Mw **D** MW

QUESTION # 2:

2 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

QUESTION # 3

3 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

QUESTION # 4

3 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

QUESTION # 5

4 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

QUESTION # 6

2 A quantity is quoted as having a value of 6.2 ms.

In what units is it measured?

A metres

B metres per second

C microseconds

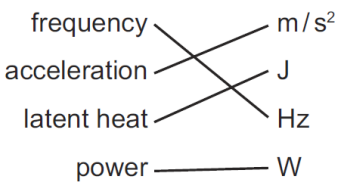
D milliseconds

QUESTION # 7

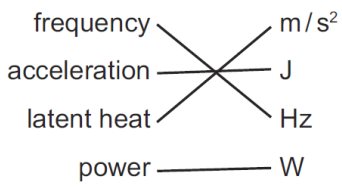
3 In a test, four students linked the quantities on the left with their units on the right.

Which student matched them all correctly?

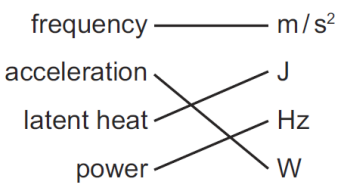
A



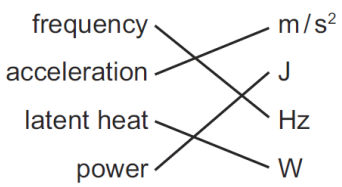
B



C



D



QUESTION # 8

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

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

QUESTION # 9

4 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

Scalars and Vectors

QUESTION # 1:

8 Which of the following groups of physical quantities consists only of scalars?

A acceleration, force, velocity

B acceleration, mass, speed

C force, time, velocity

D mass, speed, time

QUESTION # 2:

9 Which is the correct statement about force and velocity?

A Force and velocity are both scalars.

B Force and velocity are both vectors.

C Force is a scalar, velocity is a vector.

D Force is a vector, velocity is a scalar.

QUESTION # 3

2 Which of the following correctly lists one scalar and one vector quantity?

	scalar quantity	vector quantity
A	displacement	work
B	energy	force
C	force	acceleration
D	velocity	mass

QUESTION # 4

2 Which statement about scalars and vectors is correct?

A A scalar has direction but no size.

B A scalar has size but no direction.

C A vector has direction but no size.

D A vector has size but no direction.

QUESTION # 5

2 The following statements are about motion.

1 A plane flies due East for 600 km.

2 A runner's average speed in a race around a track is 5 m / s.

3 A snail crawls at 3 mm / s in a straight line towards a lettuce.

4 A tourist travels 500 km on a journey.

Which statements describe vector quantities?

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 2 and 4

QUESTION # 6

2 Which pair of quantities includes one scalar and one vector?

A mass time

B temperature time

C temperature velocity

D velocity weight

QUESTION # 7

2 Which row correctly shows examples of a vector quantity and a scalar quantity?

	vector	scalar
A	area	force
B	mass	density
C	velocity	acceleration
D	weight	volume

QUESTION # 8

1 Each row contains a vector and a scalar.

In which row is the size of the vector equal to the size of the scalar?

	vector	scalar
A	displacement of a car	speed of the car
B	velocity of a car	distance travelled by the car
C	velocity of a car	speed of the car
D	weight of a car	mass of the car

QUESTION # 9

1 Is mass a scalar or a vector, and is acceleration a scalar or a vector?

	mass	acceleration
A	scalar	scalar
B	scalar	vector
C	vector	scalar
D	vector	vector

QUESTION # 10

1 Which quantity is a scalar?

A acceleration

B force

C temperature

D velocity

QUESTION # 11

2 Which set of quantities are all vectors?

A acceleration, displacement, velocity

B chemical energy, mass, power

C extension, force, gravitational potential energy

D weight, kinetic energy, work

QUESTION # 12

2 A car's acceleration and maximum speed are improved by using an engine of smaller mass and greater driving force.

How many of the underlined quantities are vectors?

A 1 **B** 2 **C** 3 **D** 4

QUESTION # 13

1 A car accelerates at 5.0 m/s^2 along a straight, horizontal road and reaches a velocity of 20 m/s in a time of 4.0 s.

During this time, its total displacement is 40 m.

Which quantity is a scalar?

A a displacement of 40 m

B a time of 4.0 s

C a velocity of 20 m/s

D an acceleration of 5.0 m/s^2

QUESTION # 14

1 Which is a vector quantity?

A a mass of 2.0 kg

B a temperature of –10 °C

C a weight of 15 N

D an average speed of 20 m/s

QUESTION # 15

1 Which quantities are both vectors?

A acceleration and length

B distance and velocity

C length and distance

D velocity and acceleration

QUESTION # 16

1 Which quantity is a vector?

A acceleration

B distance

C speed

D time

QUESTION # 17

2 A student studies some equations.

power = work / time

force = mass × acceleration

velocity = displacement / time

How many vector quantities are contained in the equations?

A 1 **B** 2 **C** 3 **D** 4

QUESTION # 18

2 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

QUESTION # 19

1 Which list contains only scalar quantities?

A acceleration, displacement, velocity

B distance, force, speed

C force, length, time

D length, mass, speed

QUESTION # 20

1 Which word is the name of a vector quantity?

A density

B displacement

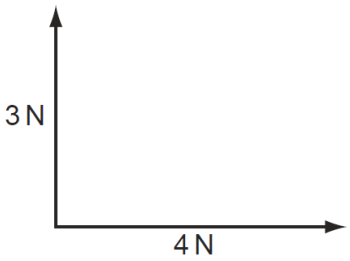
C energy

D speed

Resultant of vectors

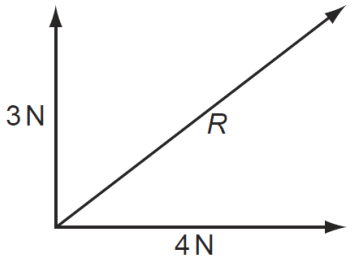
QUESTION # 1:

10 Forces of 3 N and 4 N are acting as shown in the diagram.

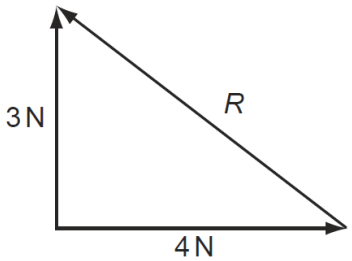


Which diagram may be used to find the resultant *R* of these two forces?

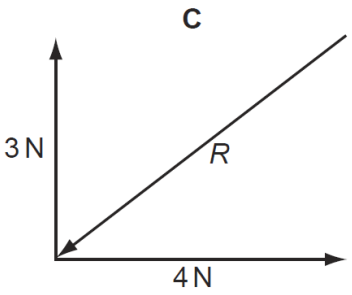
A



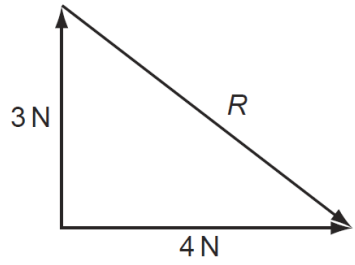
B



C

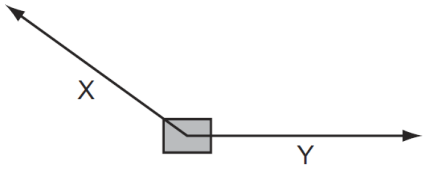


D

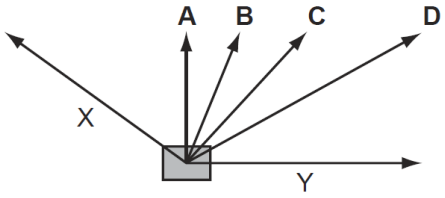


QUESTION # 2:

4 Forces X and Y act on a block in the directions shown on the scale diagram.

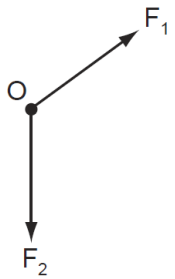


In which direction is the resultant force acting?



QUESTION # 3

2 Two forces F_1 and F_2 act on an object O in the directions shown.

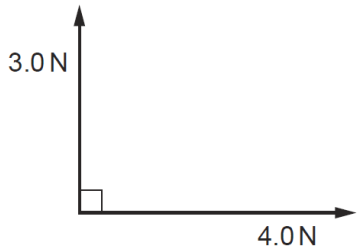


What is the direction of the resultant force?

A **B** **C** **D**

QUESTION # 4

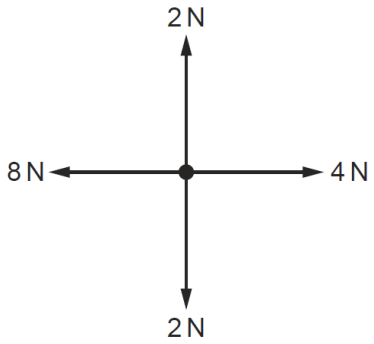
2 What is the size of the resultant of the two forces shown in the diagram?



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

QUESTION # 5

6 Four forces act at a point as shown.



What is the size of the resultant force?

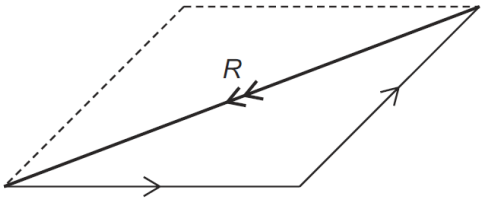
A 0 N **B** 4 N **C** 6 N **D** 8 N

QUESTION # 6

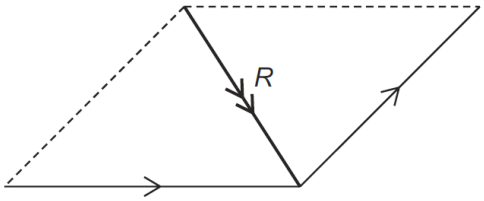
1 The diagram shows arrows representing two vector quantities.

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

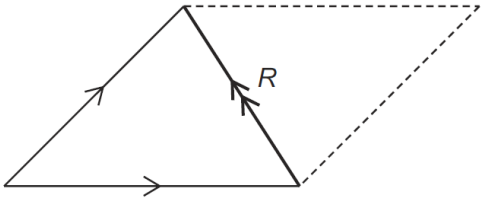
A



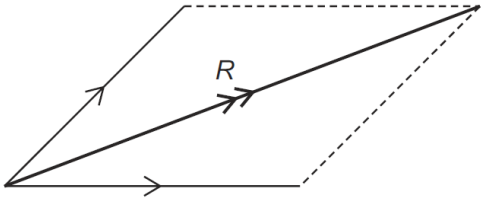
B



C

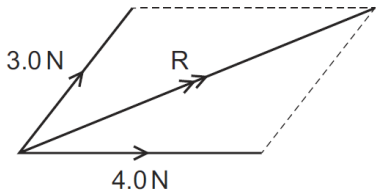


D



QUESTION # 7

3 The diagram shows the resultant R of a 3.0 N force and a 4.0 N force acting at a point.



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?

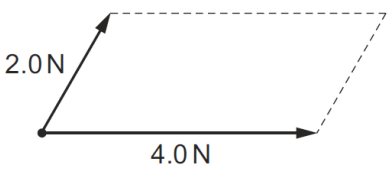
A 4.0 N **B** 5.0 N **C** 6.0 N **D** 7.0 N

QUESTION # 8

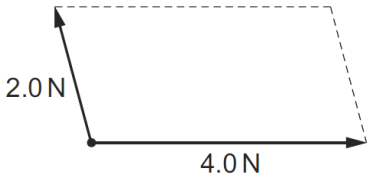
11 Forces of 4.0 N and 2.0 N act at a point.

Which scale diagram shows the forces that have a resultant of 4.0 N?

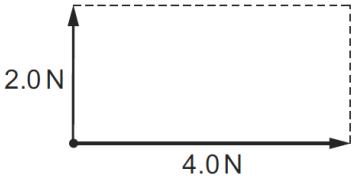
A



B



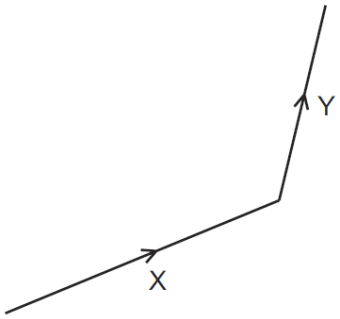
C



D

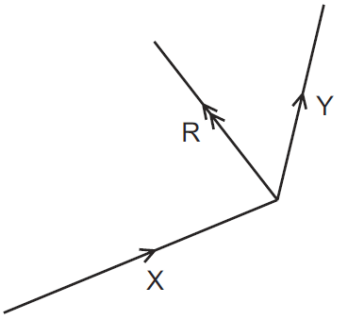
QUESTION # 9

2 Two forces X and Y act as shown.

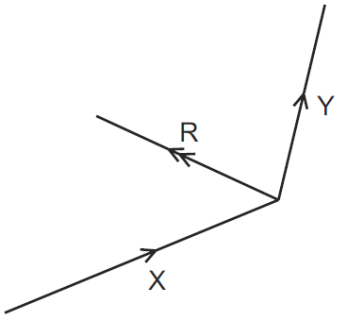


Which diagram shows the resultant force R of X and Y?

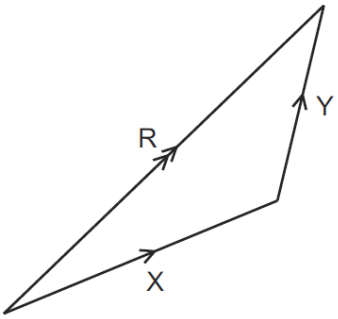
A



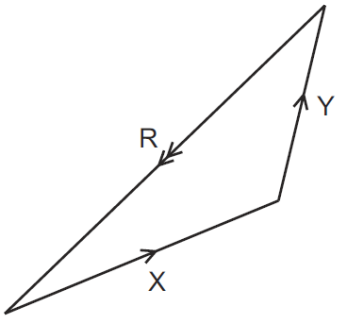
B



C



D



QUESTION # 10

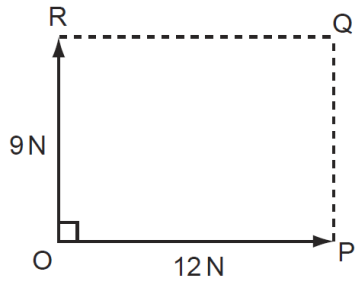
7 When two forces are combined, the size of the resultant depends on the angle between the two forces.

Which of the following can **not** be the magnitude of the resultant when forces of magnitude 3 N and 4 N are combined?

A 1 N **B** 3 N **C** 7 N **D** 8 N

QUESTION # 11

10 Two forces act at right angles at a point O as shown.



What is the resultant of the forces?

	magnitude	direction
A	15 N	OQ
B	15 N	PR
C	21 N	OQ
D	21 N	PR

QUESTION # 12

2 Forces of 30 N and 50 N act on the same body, but in different directions.

Which value could **not** be the resultant force on the body?

A 10 N **B** 30 N **C** 50 N **D** 70 N

QUESTION # 13

2 The diagram shows three forces acting on a block.

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

A 3 N to the left

B 6 N to the right

C 9 N to the left

D 13 N to the right

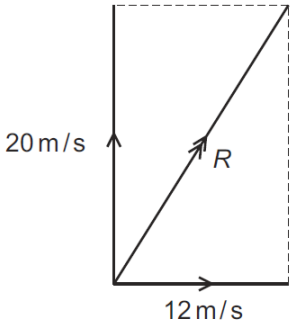
QUESTION # 14

1 When there is no wind, the engines of an airship push it due north at 20 m/s.

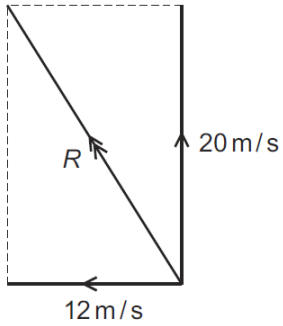
The wind is blowing from the west at 12 m/s.

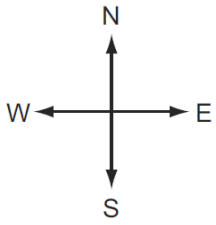
Which vector diagram correctly shows how the resultant velocity *R* of the airship is obtained?

A

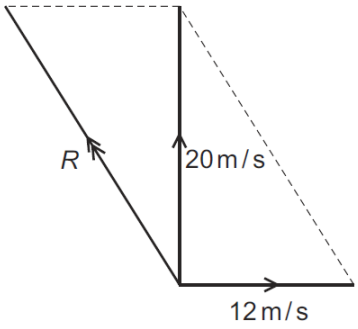


B

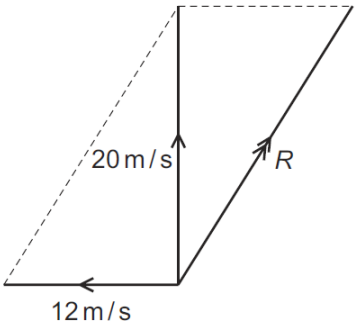




C

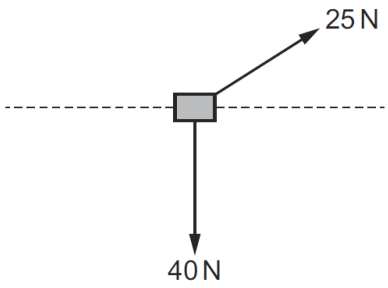


D

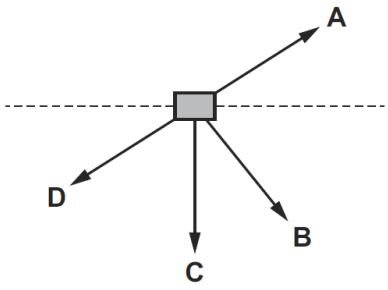


QUESTION # 15

1 Forces of 25 N and 40 N act on an object in the directions shown.

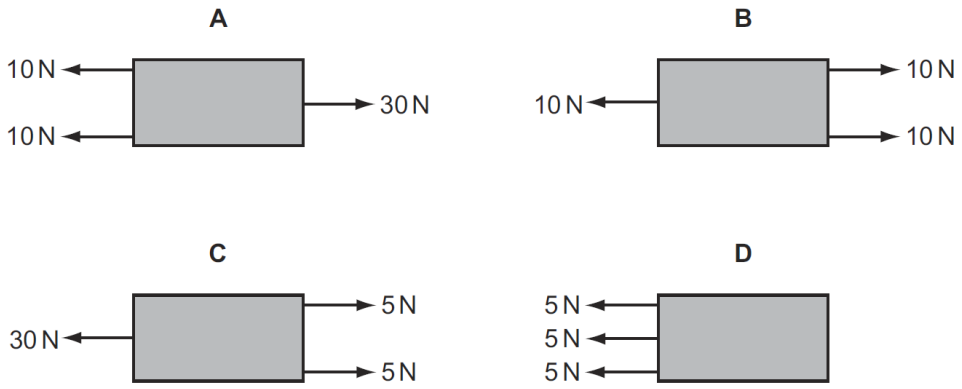


Which arrow shows the direction of the resultant force on the object?



QUESTION # 16

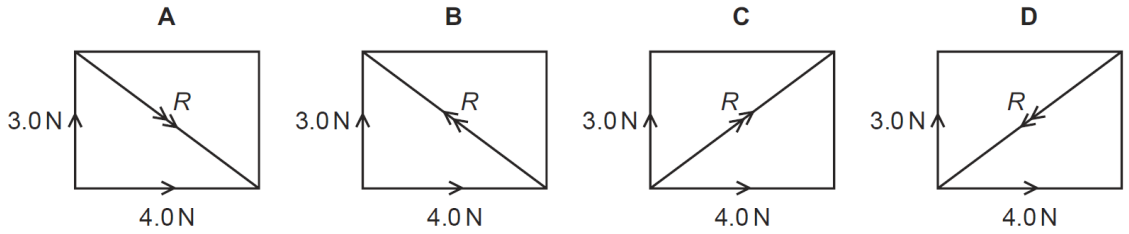
4 Which object has the largest resultant force?



QUESTION # 17

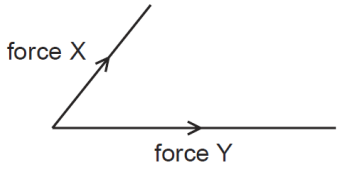
7 Two forces of 3.0 N and 4.0 N act at right-angles to each other.

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



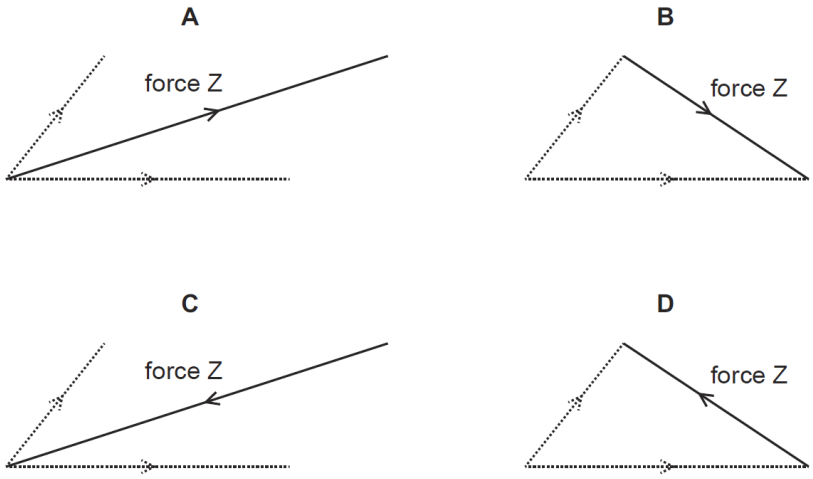
QUESTION # 18

10 Two forces, X and Y, act on an object and produce a resultant force. The scale diagram represents the sizes and directions of forces X and Y.



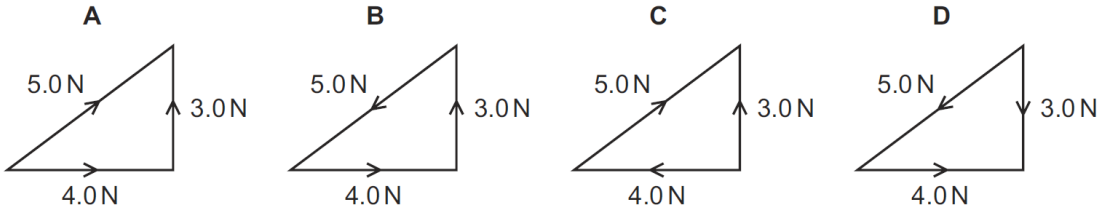
Force Z balances the resultant force due to X and Y and keeps the object stationary.

Which arrow represents force Z?



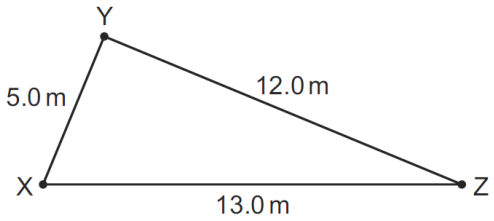
QUESTION # 19

8 Which diagram shows the addition of the 4.0 N and the 3.0 N forces?



QUESTION # 20

9 Paths are laid as shown between points X, Y and Z.



A person walks along the paths from X to Y to Z and then back to X.

What is the value of the total displacement and of the total distance travelled?

	total displacement / m	total distance travelled / m
A	0	0
B	0	30
C	30	0
D	30	30