

Physical quantities - 2018

1. 9702/11/M/J/18/No.1

What is a unit for stress?

- A $\text{kgm}^{-1}\text{s}^{-2}$ B $\text{kgm}^{-2}\text{s}^{-2}$ C Nm^{-1} D Nm

2. 9702/11/M/J/18/No.2

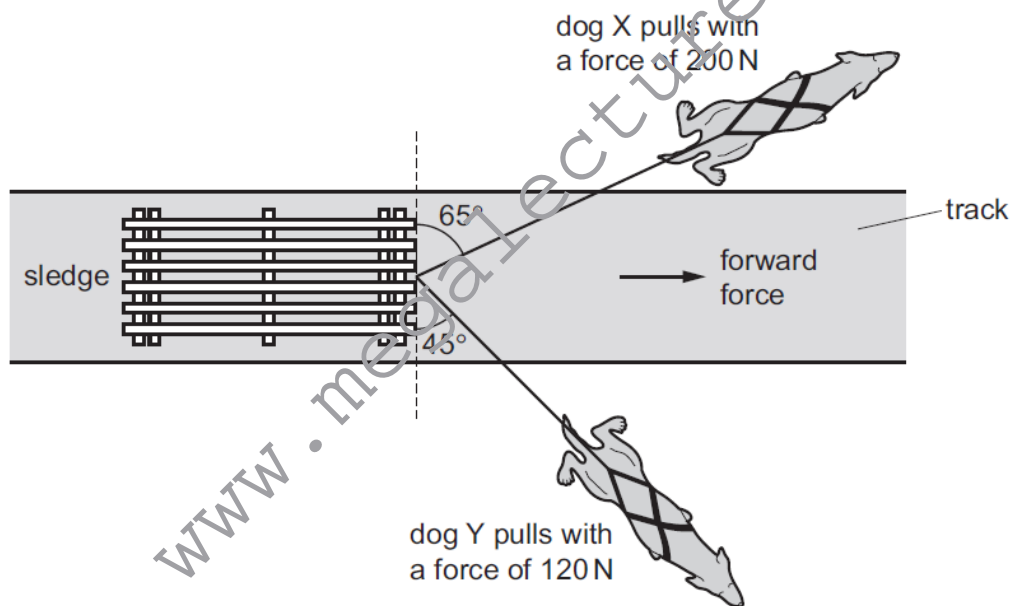
Physical quantities can be classed as vectors or as scalars.

Which pair of quantities consists of two vectors?

- A kinetic energy and force
B momentum and time
C velocity and electric field strength
D weight and temperature

3. 9702/11/M/J/18/No.3

Two dogs pull a sledge along an icy track, as shown.



Dog X pulls with a force of 200 N at an angle of 65° to the front edge of the sledge. Dog Y pulls with a force of 120 N at an angle of 45° to the front edge of the sledge.

What is the resultant forward force on the sledge exerted by the two dogs?

- A 80 N B 170 N C 270 N D 320 N

4. 9702/12/M/J/18/No.1

A sheet of gold leaf has a thickness of $0.125\ \mu\text{m}$. A gold atom has a radius of $174\ \text{pm}$.

Approximately how many layers of atoms are there in the sheet?

- A** 4 **B** 7 **C** 400 **D** 700

5. 9702/12/M/J/18/No.2

The drag coefficient C_d is a number with no units. It is used to compare the drag on different cars at different speeds. C_d is given by the equation

$$C_d = \frac{2F}{v^n \rho A}$$

where F is the drag force on the car, ρ is the density of the air, A is the cross-sectional area of the car and v is the speed of the car.

What is the value of n ?

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

6. 9702/13/M/J/18/No.1

What is the best way of describing a physical quantity?

- A** a quantity with a magnitude and a direction but no unit
B a quantity with a magnitude and a unit
C a quantity with a magnitude but no direction
D a quantity with a unit but no magnitude

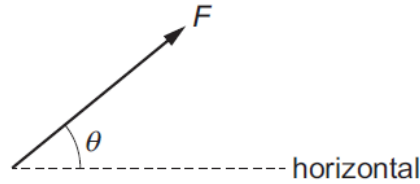
7. 9702/13/M/J/18/No.2

Which pair includes a vector quantity and a scalar quantity?

- A** displacement and acceleration
B force and kinetic energy
C power and speed
D work and potential energy

8. 9702/13/M/J/18/No.3

A force F acts at an angle θ to the horizontal.



What are the horizontal and the vertical components of the force?

	horizontal component	vertical component
A	$F \cos \theta$	$F \cos (90^\circ - \theta)$
B	$F \cos \theta$	$F \sin (90^\circ - \theta)$
C	$F \sin \theta$	$F \cos \theta$
D	$F \sin \theta$	$F \cos (90^\circ - \theta)$

9. 9702/12/F/M/18/No.1

Which unit is equivalent to the coulomb?

- A** ampere per second
- B** joule per volt
- C** watt per ampere
- D** watt per volt

10. 9702/12/F/M/18/No.2

Which row shows a quantity and an **incorrect** unit?

	quantity	unit
A	efficiency	no unit
B	moment of force	Nm^{-1}
C	momentum	Ns
D	work done	J

11. 9702/12/F/M/18/No.3

Two forces of equal magnitude are represented by two coplanar vectors. One is directed towards the east and the other is directed towards the north.

What is the direction of a single force that will balance these two forces?

- A** towards the north-east
- B** towards the north-west
- C** towards the south-east
- D** towards the south-west

12. 9702/12/F/M/18/No.4

The density of paper is 800 kg m^{-3} . A typical sheet of paper has a width of 210 mm and a length of 300 mm.

The thickness of a pack of 500 sheets of paper is 50 mm.

What is the mass of a single sheet of paper?

- A** 0.5g **B** 5g **C** 50g **D** 500g