

PHYSICS

PAPER 1 2017 — 2023

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Physics 9702

TOPICAL PAST PAPER WORKSHEETS

2017 - 2023 | Questions + Mark scheme

AVAILABLE PAPERS

P1

1734 Questions

P2

431 Questions

P4

376 Questions

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TOPICS	P1	P2	P4
PHYSICAL QUANTITIES & UNITS	86	29	2
MEASUREMENT TECHNIQUES	81	18	0
KINEMATICS	132	43	0
DYNAMICS	170	46	2
FORCES, DENSITY & PRESSURE	153	32	1
WORK, ENERGY & POWER	163	38	0
MOTION IN CIRCLE	1	1	11
GRAVITATIONAL FIELDS	0	0	26
DEFORMATION OF SOLIDS	73	16	0
IDEAL GASES	5	1	25
TEMPERATURE	0	0	14
THERMAL PROPERTIES OF MATERIALS	1	0	19
OSCILLATIONS	3	0	26
WAVES	228	38	6
SUPERPOSITION	164	36	0
COMMUNICATION	1	0	25
ELECTRIC FIELDS	68	19	24
CAPACITANCE	0	0	16
CURRENT OF ELECTRICITY	179	44	3
D.C. CIRCUITS	115	29	2
ELECTRONICS	4	0	21
MAGNETIC FIELDS	0	0	34
ELECTROMAGNETIC INDUCTION	0	0	28
ALTERNATING CURRENTS	2	0	14
QUANTUM PHYSICS	2	0	34
PARTICLE & NUCLEAR PHYSICS	103	41	27
MEDICAL IMAGING	0	0	10
ASTRONOMY & COSMOLOGY	0	0	6

1 - (9702/11_Summer_2017_Q1) - *Physical Quantities & Units*

A student creates a table to show reasonable estimates of some physical quantities.

Which row is **not** a reasonable estimate?

	quantity	value
A	current in a fan heater	12 A
B	mass of an adult person	70 kg
C	speed of an Olympic sprint runner	10 m s^{-1}
D	water pressure at the bottom of a garden pond	10^6 Pa

2 - (9702/12_Summer_2017_Q1) - *Physical Quantities & Units*

What is the approximate average speed of a winning female Olympic athlete running a 100 m race?

- A** 6 m s^{-1} **B** 9 m s^{-1} **C** 12 m s^{-1} **D** 15 m s^{-1}

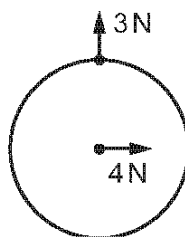
3 - (9702/13_Summer_2017_Q1) - *Physical Quantities & Units*

What is the best estimate of the kinetic energy of a family car travelling at 50 km h^{-1} ?

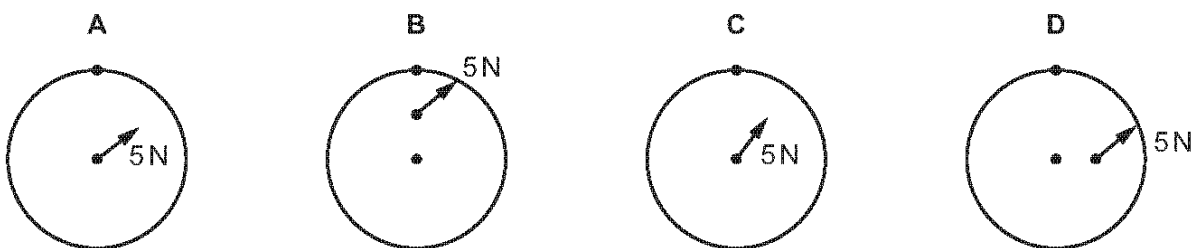
- A** $1.5 \times 10^3 \text{ J}$ **B** $1.5 \times 10^5 \text{ J}$ **C** $1.5 \times 10^7 \text{ J}$ **D** $1.5 \times 10^9 \text{ J}$

4 - (9702/12_Summer_2017_Q2) - *Physical Quantities & Units*

Two forces act on a circular disc as shown.

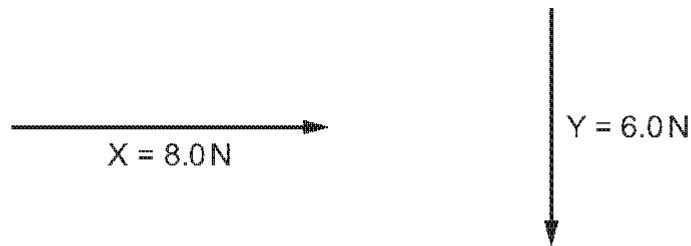


Which diagram shows the line of action of the resultant force?



5 - (9702/13_Summer_2017_Q2) - *Physical Quantities & Units*

The diagram shows two vectors X and Y. The vectors are perpendicular to one another.



What is the magnitude and direction of vector $(X - Y)$?

- A 10.0 N at an angle of 37° downwards from the direction of X
- B 10.0 N at an angle of 37° upwards from the direction of X
- C 14.0 N at an angle of 53° downwards from the direction of X
- D 14.0 N at an angle of 53° upwards from the direction of X

6 - (9702/11_Summer_2017_Q3) - *Physical Quantities & Units*

The speed v of a liquid leaving a tube depends on the change in pressure ΔP and the density ρ of the liquid. The speed is given by the equation

$$v = k \left(\frac{\Delta P}{\rho} \right)^n$$

where k is a constant that has no units.

What is the value of n ?

- A $\frac{1}{2}$
- B 1
- C $\frac{3}{2}$
- D 2

7 - (9702/12_Summer_2017_Q3) - *Physical Quantities & Units*

What correctly expresses the volt in terms of SI base units?

- A $A\Omega$
- B WA^{-1}
- C $\text{kg m}^2 \text{s}^{-1} \text{A}^{-1}$
- D $\text{kg m}^2 \text{s}^{-3} \text{A}^{-1}$

8 - (9702/13_Summer_2017_Q3) - *Physical Quantities & Units*

Which expression using SI base units is equivalent to the volt?

- A $\text{kg m}^2 \text{s}^{-1} \text{A}^{-1}$
- B $\text{kg m s}^{-2} \text{A}$
- C $\text{kg m}^2 \text{s}^{-1} \text{A}$
- D $\text{kg m}^2 \text{s}^{-3} \text{A}^{-1}$

9 - (9702/12_Summer_2017_Q13) - *Physical Quantities & Units, Forces, Density & Pressure*

What are the SI base units of the quantity $\frac{\text{pressure}}{\text{density}}$?

- A s^{-2}
- B $\text{kg}^2 \text{s}^{-2}$
- C $\text{kg}^2 \text{m}^2 \text{s}^{-2}$
- D $\text{m}^2 \text{s}^{-2}$

10 - (9702/12_Summer_2017_Q20) - *Physical Quantities & Units, Deformation Of Solids*

What are the units of stress, strain and the Young modulus?

	stress	strain	Young modulus
A	newton	metre	pascal
B	newton	no unit	newton
C	pascal	metre	newton
D	pascal	no unit	pascal

11 - (9702/11_Winter_2017_Q1) - *Physical Quantities & Units*

Which SI unit, expressed in base units, is **not** correct?

- A unit of force, kg m s^{-2}
- B unit of momentum, kg m s^{-1}
- C unit of pressure, $\text{kg m}^{-2} \text{s}^{-2}$
- D unit of work, $\text{kg m}^2 \text{s}^{-2}$

12 - (9702/12_Winter_2017_Q1) - *Physical Quantities & Units*

Which pair of units are **not** the same when expressed in SI base units?

- A m s^{-2} and N kg^{-1}
- B Ns and kg m s^{-1}
- C Pa and N m^{-2}
- D V m^{-2} and NC^{-1}

13 - (9702/13_Winter_2017_Q1) - *Physical Quantities & Units*

How many cubic nanometres, nm^3 , are in a cubic micrometre, μm^3 ?

- A 10^3
- B 10^6
- C 10^9
- D 10^{12}

14 - (9702/11_Summer_2018_Q1) - *Physical Quantities & Units, Deformation Of Solids*

What is a unit for stress?

- A $\text{kg m}^{-1} \text{s}^{-2}$
- B $\text{kg m}^{-2} \text{s}^{-2}$
- C N m^{-1}
- D Nm

15 - (9702/12_Summer_2018_Q1) - *Physical Quantities & Units*

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

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

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

16 - (9702/13_Summer_2018_Q1) - *Physical Quantities & Units*

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

17 - (9702/11_Summer_2018_Q2) - *Physical Quantities & Units*

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

18 - (9702/12_Summer_2018_Q2) - *Physical Quantities & Units*

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

19 - (9702/13_Summer_2018_Q2) - *Physical Quantities & Units*

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

20 - (9702/12_Winter_2018_Q1) - *Physical Quantities & Units, Measurement Techniques*

A car is travelling at a speed of 20 m s^{-1} . The table contains values for the kinetic energy and the momentum of the car.

Which values are reasonable estimates?

	kinetic energy / J	momentum / kg m s^{-1}
A	3×10^5	3×10^4
B	3×10^5	5×10^6
C	2×10^7	3×10^4
D	2×10^7	5×10^6

21 - (9702/11_Winter_2018_Q2) - *Physical Quantities & Units*

When a beam of light is incident on a surface, it delivers energy to the surface. The intensity of the beam is defined as the energy delivered per unit area per unit time.

What is the unit of intensity, expressed in SI base units?

- A $\text{kg m}^{-2} \text{s}^{-1}$ B $\text{kg m}^2 \text{s}^{-3}$ C kg s^{-2} D kg s^{-3}

ANSWERS

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1 - (9702/11_Summer_2017_Q1) - *Physical Quantities & Units*

D

2 - (9702/12_Summer_2017_Q1) - *Physical Quantities & Units*

B

3 - (9702/13_Summer_2017_Q1) - *Physical Quantities & Units*

B

4 - (9702/12_Summer_2017_Q2) - *Physical Quantities & Units*

A

5 - (9702/13_Summer_2017_Q2) - *Physical Quantities & Units*

B

6 - (9702/11_Summer_2017_Q3) - *Physical Quantities & Units*

A

7 - (9702/12_Summer_2017_Q3) - *Physical Quantities & Units*

D

8 - (9702/13_Summer_2017_Q3) - *Physical Quantities & Units*

D

9 - (9702/12_Summer_2017_Q13) - *Physical Quantities & Units, Forces, Density & Pressure*

D

10 - (9702/12_Summer_2017_Q20) - *Physical Quantities & Units, Deformation Of Solids*

D