



DUNMAN SECONDARY SCHOOL

CANDIDATE
NAME

CLASS

INDEX
NUMBER

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PRELIMINARY EXAMINATION 2024 SECONDARY 4 NORMAL (ACADEMIC)

SCIENCE (PHYSICS)

5105/01

Paper 1 Multiple Choice

5 August 2024

Paper 1 and 2: 1 hour 15 minutes

Additional Materials: Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, class and index number on the Answer Sheet in the spaces provided unless this has been done for you.

There are **twenty** questions on this paper. Answer **all** questions. For each question there are four possible answers **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Answer to Paper 1 and Paper 2 must be handed in separately.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

You are advised to spend no longer than **30 minutes** on **Paper 1**.

You may proceed to answer Paper 2 as soon as you have completed Paper 1.

Any rough working should be done on this paper.

The use of an approved scientific calculator is expected, where appropriate.

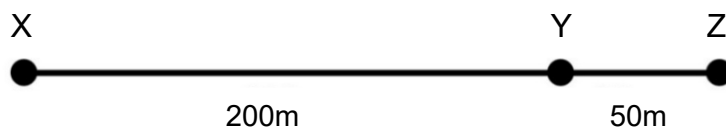
- 1 Which row contains a suitable quantity and unit for measurements made using a digital caliper and a measuring cylinder?

	digital caliper	measuring cylinder
A	length in mm	volume in cm^3
B	length in m	volume in m^3
C	volume in cm^3	length in mm
D	volume in m^3	length in m

- 2 Which set of quantities consists of only vectors?

- A** acceleration, displacement, velocity
B current, mass, power
C energy, distance, force
D energy, weight, work

- 3 In the diagram below, a straight path connects points X, Y and Z. A man travels from point X to point Z, and then reverses and travels to point Y.



What are the total displacement and total distance travelled by the man?

	total displacement	total distance
A	50m	250m
B	150m	250m
C	150m	300m
D	200m	300m

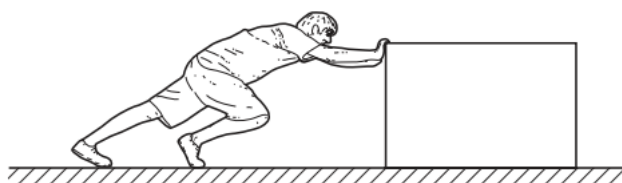
- 4 Which statement about mass and weight is correct?
- A** A mass of 1kg has the same weight on Earth as it has on the Moon.
- B** Mass can be measured in kilograms or newtons.
- C** The mass of an object depends on the effect of a gravitational field acting on it.
- D** Weight is a quantity with direction and magnitude.

- 5 A block of weight W rests on a side of area A . The gravitational field strength is g .

What is the pressure exerted on the ground due to the block?

- A** WA **B** $\frac{W}{A}$ **C** $\frac{WA}{g}$ **D** $\frac{W}{g}$

- 6 A man pushes a heavy box along the ground.



A force acts between the man's hands and the box.

Another force acts between the man's feet and the floor.

In which direction do these forces act on the man?

	force on man's hands	force on man's feet
A	towards the left	towards the left
B	towards the left	towards the right
C	towards the right	towards the left
D	towards the right	towards the right

- 7 A javelin has a mass of 0.70kg.

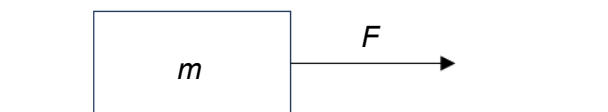
The javelin is released with 280J of kinetic energy.

What is the speed of the javelin?

- A** 14m/s **B** 28m/s **C** 196m/s **D** 800m/s

- 8 The diagram shows a block of mass m pulled in a straight line along a horizontal surface by a force F .

The block moves a distance d in time t . The average speed at which the block moves is v .



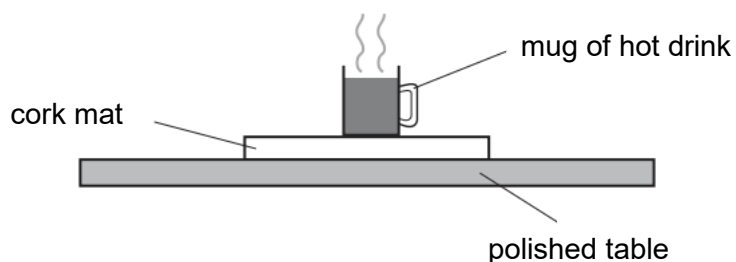
Which two quantities must be known to calculate work done?

- A** F and d **B** F and m **C** F and t **D** F and v

- 9 Which row describes the arrangement of particles and the forces between particles in a gas?

	arrangement of particles	forces between particles
A	irregular	strong
B	irregular	weak
C	regular	strong
D	regular	weak

- 10** A cork mat is placed under a mug containing a hot drink to protect a polished table.



Why is cork chosen for the mat?

- A** Cork is a good conductor of heat.
 - B** Cork is a good emitter of heat.
 - C** Cork is a poor conductor of heat.
 - D** Cork is a poor emitter of heat.
- 11** A longitudinal wave passes along a spring. The coils of the spring vibrate from side to side. The diagram shows the positions of the coils at one particular time.



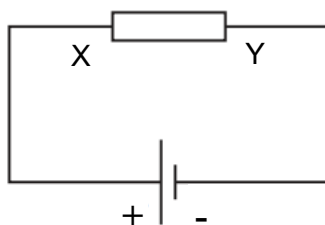
Which positions are one wavelength apart?

- A** P and Q
 - B** P and S
 - C** Q and R
 - D** Q and S
- 12** A hospital needs to sterilise medical equipment for a surgery.

Which electromagnetic waves can be used?

- A** infrared radiation
- B** microwaves
- C** radio waves
- D** ultraviolet radiation

- 13** The diagram shows a simple electric circuit.



Which row describes the charge on an electron and the direction of electron flow through the resistor?

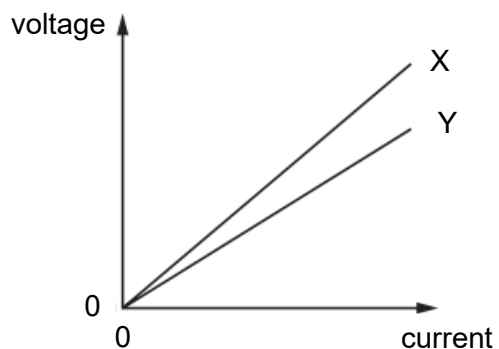
	charge on an electron	direction of electron flow
A	negative	X to Y
B	negative	Y to X
C	positive	X to Y
D	positive	Y to X

- 14** A current of 0.50A flows in an electrical circuit for 1 minute.

How much charge flows through the electrical circuit?

- A** 0.50C **B** 2.0C **C** 30C **D** 120C

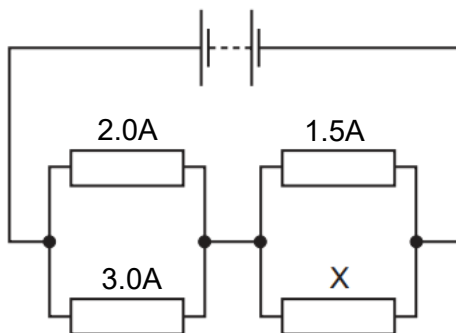
- 15** The voltage-current graph for two resistance wires X and Y is shown. The wires are made from the same material and have the same lengths.



Which wire has a greater resistance and which wire has a larger cross-sectional area?

	greater resistance	larger cross-sectional area
A	X	X
B	X	Y
C	Y	X
D	Y	Y

- 16** A circuit consists of a battery and four resistors.



The current in three of the resistors is shown.

What is the current in X?

- A** 1.5A **B** 3.0A **C** 3.5A **D** 5.0A

- 17** Electrical appliances should not be used in damp conditions.

What is the main hazard?

- A** The appliance may become too hot and this may lead to an electrical fire.
- B** The fuse of the appliance keeps melting.
- C** The insulation of the appliance becomes damaged.
- D** The user may experience an electric shock.

- 18** A 100W lamp is switched on for eight hours each day for three weeks. The cost of electricity is \$0.26 per kWh.

How much does it cost to run the lamp for this period of time?

- A** \$0.63
- B** \$4.37
- C** \$6.24
- D** \$43.68

- 19** A nucleus contains 90 protons and 234 nucleons.

Which symbol represents this nucleus?

- A** ${}^{144}_{90}\text{Th}$
- B** ${}^{234}_{90}\text{Th}$
- C** ${}^{324}_{90}\text{Tbq}$
- D** ${}^{324}_{144}\text{Tbq}$

- 20** A radioactive material gives a count rate of 8000 counts per minute. After 15 days, it gives a count rate of 1000 counts per minute.

What is the half-life of the material?

- A** 4 days
- B** 5 days
- C** 8 days
- D** 15 days