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## BEDOK VIEW SECONDARY SCHOOL **PRELIMINARY EXAMINATION 2022**

NAME

REGISTER NUMBER

CLASS

## SCIENCE (PHYSICS) **Secondary 4 Normal Academic**

Paper 1 Multiple Choice

5105/01 28 July 2022 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 and index number on the Answer Sheet in the spaces provided unless this has been done for you.

There are twenty questions in this section. 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.

Answers to Paper 1 and 2 must be handed in separately. You are advised to spend no more than 30 minutes on Paper 1. You may proceed to answer Paper 2 as soon as you have completed Paper 1.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this paper.

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

Setter(s): Mr Abdul Malek Osman

This document consists of 9 printed pages.

Do not turn over the page until you are told to do so.

- 1 Which item is a scalar quantity?
  - A acceleration
  - B force
  - C displacement
  - D time
- 2 An athlete runs a 100 m race in a straight line. The table shows how his speed changes with time for the first 5.0 s of the race.

speed (m/s)	0	1.7	4.1	5.7	6.5	6.8
time (s)	0	1.0	2.0	3.0	4.0	5.0

What is the average acceleration of the athlete between time 2.0 s and time 3.0 s?

- **A** 0.15 m/s<sup>2</sup>
- **B** 1.6 m/s<sup>2</sup>
- **C** 4.0 m/s<sup>2</sup>
- **D** 5.7 m/s<sup>2</sup>
- 3 The graph shows the first few seconds of a motorcycle journey.



From the graph, the motorcycle travels

- A at constant speed and then stops.
- **B** at constant speed and then slows down.
- **C** with constant acceleration and then slows down.
- **D** with constant acceleration and then at constant speed.

- 4 Which statement is true of a body brought from Earth to the Moon?
  - A The mass of the body stays constant and its weight decreases.
  - **B** The mass of the body increases, and its weight stays constant.
  - **C** The mass of the body decreases and its weight decreases.
  - **D** The mass of the body stays constant, and its weight stays constant as well.
- **5** A wooden cube block of dimension 1 m x 1 m x 1 m has a mass of 400 kg. If the block is cut in half, what is the density of the remaining wooden block?
  - A 200 kg/m<sup>3</sup>
  - **B** 400 kg/m<sup>3</sup>
  - **C** 800 kg/m<sup>3</sup>
  - **D** 1600 kg/m<sup>3</sup>
- 6 A wooden bar is pivoted at its centre so that it can rotate freely. Two equal forces *F* are applied to the bar. In which diagram is the turning effect greatest?



7 A balloon filled with helium and a mass of 3 N are attached to a rod that is pivoted at a fixed-point P. The rod is horizontal and in equilibrium.



What is the upward force provided by the balloon filled with helium?

- **A** 2 N
- **B** 3 N
- **C** 5 N
- **D** 6 N
- 8 A ball is at rest at the top of a hill. The ball rolls down the hill. At the bottom of the hill, the ball encounters a rough patch of road. It slows down and finally stops.

Which energy changes occur?

- A gravitational potential energy  $\rightarrow$  kinetic energy  $\rightarrow$  thermal energy
- **B** gravitational potential energy  $\rightarrow$  thermal energy  $\rightarrow$  kinetic energy
- $\mathbf{C}$  kinetic energy  $\rightarrow$  thermal energy  $\rightarrow$  gravitational potential energy
- **D** kinetic energy  $\rightarrow$  gravitational potential energy  $\rightarrow$  thermal energy
- **9** An object is lifted vertically by a motor.

In which example is the power produced the greatest?

- A lifting it a shorter distance in a longer time
- **B** lifting it the same distance in a longer time
- **C** lifting it a shorter distance at the same time
- **D** lifting it the same distance in a shorter time

- 10 Which statement correctly describes the motion of particles in a solid when it is heated?
  - **A** The particles lose kinetic energy and vibrate faster.
  - **B** The particles lose kinetic energy and vibrate slower.
  - **C** The particles gain kinetic energy and vibrate faster.
  - **D** The particles gain kinetic energy and vibrate slower.
- **11** A hot metal plate is placed near a cold metal plate. Infra-red radiation transfers thermal energy between the plates.



Which choice of colour causes the temperature of the cold metal plate to increase fastest?

	hot plate	cold plate
Α	dull black	dull black
В	dull black	shiny white
С	shiny white	dull black
D	shiny white	shiny white

**12** The figure below shows the main parts of an electric grill. A piece of food is placed under the heating element.



How does thermal energy reach the food?

- A conduction only
- B convection only
- **C** radiation and conduction only
- D conduction and convection only
- **13** The diagram shows a wave.

Which labelled distance is the amplitude?





The speed of sound in sea water is 1500 m/s. What is the depth of the sea water below the ship?

- **A** 750 m
- **B** 1500 m
- **C** 3000 m
- **D** 6000 m
- **15** The speed of X-ray in a vacuum is  $3.0 \times 10^8$  m/s. What is the speed of infra-red radiation in a vacuum?
  - A 1.5 x 10<sup>8</sup> m/s
  - **B** 2.0 x 10<sup>8</sup> m/s
  - **C** 3.0 x 10<sup>8</sup> m/s
  - **D** 3.5 x 10<sup>8</sup> m/s



What is the resistance of the resistor R?

- **A** 0.67 Ω
- **Β** 1.5 Ω
- **C** 5.0 Ω
- **D** 6.0 Ω
- **17** A student uses a length of wire as a resistor. He makes a second resistor from the same material.

To be certain of making a second resistor of lower resistance, he should use a piece of wire that is

- **A** twice as long and twice as thick
- **B** twice as long and half its thickness.
- **C** half as long and twice as thick.
- D half as long and half its thickness.

**18** A circuit contains three lamps and three switches  $S_1$ ,  $S_2$ ,  $S_3$ .



If lamp 1 and lamp 3 are lit but lamp 2 is not lit, which switch or switches are closed?

- A S<sub>1</sub> only
- ${\bm B} \quad S_1 \ and \ S_2 \ only$
- $\mathbf{C}$  S<sub>1</sub> and S<sub>3</sub> only
- $\boldsymbol{D} \quad S_1,\,S_2\,and\,S_3$
- 19 Sam saw an overloaded power sockets.

What is the greatest hazard due to overloaded power sockets?

- A electric shock
- B high electrical consumption
- C appliance not working
- D fire
- **20** The current in an electric heater is 10 A. The heater is connected to a power supply using a wire that is designed to carry a current of 15 A.

Which fuse is most suitable for the heater?

Α	5 A
В	10 A
С	13 A
D	17 A