

# EDGEFIELD SECONDARY SCHOOL NA 2022 PRELIMINARY EXAMINATION Syllabus Secondary 4

## **SCIENCE (PHYSICS)**

Paper 1 Multiple choice

Additional Materials: OTAS

Aug 2022

5105/01

Paper 1 and 2 1 hour 15 minutes

### READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the box above and the OTAS sheet. Write in soft pencil.

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

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.

Answers 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 more than 30 minutes on Paper 1. You may proceed to Paper 2 as soon as you have completed Paper 1. Any rough working should be done in this booklet. The use of an approved scientific calculator is expected, where appropriate. Acceleration due to gravity, g, is assumed to be 10 m/s<sup>2</sup> unless otherwise stated.

#### FOR EXAMINER'S USE

My target grade/mark:

TOTAL

/ 20

Parent's Signature

This document consists of **8** printed pages.

1 A pendulum makes 50 complete swings in 2 min 40 s.

What is the period of the pendulum?

- **A** 1.6 s **B** 3.2 s **C** 4.8 s **D** 6.4 s
- A car is moving along a straight, level road, with a constant acceleration.Which graph shows the motion of the car?



**3** A mass of 20 kg is held stationary by a rope passing over a frictionless pulley.



EFSS2022/PRELIM/SC/4NA/TCS

[Turn over

4 The gravitational field strength is 2 N / kg on the Moon and 10 N / kg on the Earth.

An astronaut returns from the Moon to the Earth.

What effect does this have on the astronaut's mass and weight?

	mass	weight	inertia
Α	less on Earth	same on Earth and Moon	more on Earth
В	more on Earth	more on Earth	same on Earth and Moon
С	same on Earth and Moon	less on Earth	more on Earth
D	same on Earth and Moon	more on Earth	same on Earth and Moon

**5** Three liquids P, Q and R have different densities and do not mix. The liquids are placed in a measuring cylinder and allowed to settle. A small block is then dropped into the measuring cylinder and comes to rest, as shown.



Which statement about the density of the block is correct?

- **A** It is equal to the density of Q
- **B** It is greater than the density of P.
- **C** It is greater than the density of R.
- **D** It is less than the density of Q.

6 A hole is drilled in a square tile. The diagram shows the tile hanging freely on a nail.

Where is the centre of gravity of the tile?



7 A woman has a weight of 600 N. She stands on a horizontal floor. The area of her feet in contact with the floor is 0.050 m<sup>2</sup>.

What is the pressure she exerts on the floor?

- **C**  $1.2 \times 10^{4} \text{ N} / \text{m}^{2}$
- **D**  $2.4 \times 10^4 \text{ N}/\text{m}^2$
- 8 A car of mass 800 kg moves from point X to point Y along a section of level road, down a hill, and along another section of level road. The diagram shows the distances moved. The acceleration of free fall is 10 m / s<sup>2</sup>.



20 m

How much gravitational potential energy has the car lost in moving from point X to point Y?

- **A** 240 000 J
- **B** 320 000 J
- **C** 400 000 J
- **D** 720 000 J

**9** A 300 N force is applied to a box to move it up a ramp, as shown.



How much work is done by the force when moving the box from X to Y?

Α	900 J	В	1200 J	С	1500 J	D	3000 J
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10 Why can a gas be compressed easily into a smaller volume?

- A The molecules are far apart.
- **B** The molecules do not attract each other.
- **C** The molecules move randomly.
- **D** The volume of each molecule can be reduced.
- **11** On a cold day, a metal front-door knob X and a similar plastic knob Y are at the same temperature.

Why does X feel cooler to the touch than Y?

- **A** X convects thermal energy better than Y.
- **B** X is a better thermal conductor than Y.
- **C** X is a better insulator than Y.
- **D** X is a better radiator of thermal energy than Y.

**12** To protect a polished table from gaining heat, a cork mat may be put on the table underneath a mug containing hot liquid.



Why is this effective?

- **A** Cork is a good conductor.
- **B** Cork is a good radiator.
- **C** Cork is a poor conductor.
- **D** Cork is a poor radiator.
- **13** When a liquid evaporates, some molecules escape. The temperature of the remaining liquid changes.

What is the effect on the temperature and from where do the molecules escape?

	temperature of liquid	molecules escape from
Α	decreases	everywhere within the liquid
В	decreases	the surface only
С	increases	everywhere within the liquid
D	increases	the surface only

- 14 Where are gamma-rays used?
  - A in fluorescent tubes
  - **B** in killing cancerous cells
  - **C** in pre-natal scanning
  - **D** in sunbeds

#### **15** What is ultrasound?

- A sound waves that are so loud that they damage human hearing
- B sound waves that are too high-pitch for humans to hear
- C sound waves that are too low-pitch for humans to hear
- D sound waves that are too quiet for humans to hear

**16** The diagram shows a cork with a weight attached so that the cork floats upright in water.



In which direction do the waves make the cork move?

- A \_\_\_\_\_ right and left
- **B** | up and down
- **C** *---* only to the right
- D <--- only to the left
- 17 Which of the following may be given as joules / coulomb?

A amps B ohms C volts D wa
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**18** 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 higher resistance, he should use a piece of wire that is

- A longer and thicker
- **B** longer and thinner.
- **C** shorter and thicker.
- **D** shorter and thinner.

**19** A 6.0 V battery is connected to a network containing five identical resistors. A voltmeter has one lead connected to point K as shown.

At which point should lead L be connected so that the voltmeter reads 3.0 V?



20 The diagram shows a fuse, a lamp and a heater.



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