





5105/01

CHUNG CHENG HIGH SCHOOL (YISHUN)

2022 Preliminary Examination Secondary Four Normal (Academic)

CANDIDATE NAME

CLASS

SCIENCE (PHYSICS)

Paper 1 Multiple Choice

27 July 2022 Paper 1 and 2: 1 hour 15 minutes

INDEX

NUMBER

Additional Materials: OTAS

READ THESE INSTRUCTIONS FIRST

Write your name, class and index number in the spaces at the top of this page and on the OTAS provided. Shade your index number on the OTAS clearly.

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 OTAS.

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 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 in this booklet.

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

Setter: Mr Thong Nai Kee

1 In an experiment, a student has to measure the width and the thickness of a glass slide as precisely as possible by using standard laboratory apparatus.



Which row gives the most appropriate instruments for these measurements?

	width of glass slide	thickness of glass slide
Α	half-metre rule	vernier calipers
В	half-metre rule	micrometer screw gauge
С	vernier calipers	vernier calipers
D	vernier calipers	micrometer screw gauge

2 Which of the following best describes the distance-time graph below?



- A an object at rest
- **B** an object moving with a constant speed of 2.0 m/s
- **C** an object moving with a constant velocity of 2.0 m/s
- **D** An object moving with a constant acceleration of 2.0 m/s²

- **3** Which list contains only scalar quantities ?
 - A acceleration, displacement, velocity
 - **B** distance, force, speed
 - **C** force, length, time
 - D length, speed, time
- 4 A car is moving forward with two forces acting on the car as shown.

resistance force <i>R</i>	forward force F

Which statement is true when the car is moving with a constant velocity?

- **A** The forward force F is greater than the resistance force R.
- **B** The resultant of the forward force F and resistance force R is zero.
- **C** There is lesser resistance force F acting on the car.
- **D** The car will continue to move with uniform velocity when the resistance force R is removed.
- **5** A space probe weighing 3000 N on Earth is sent to planet Jupiter. The gravitational strength of Earth and the planet Jupiter are assumed to be 10 N/kg and 30 N/kg respectively.

What is the weight of the space probe when it lands on the planet Jupiter?

- **A** 900 N
- **B** 9000 N
- **C** 90 000 N
- **D** 900 000 N

6 The diagrams below show four similar sets of books placed in vertical book cases. If the books were pushed a little, which book case is most likely to fall forward?



7 A solid triangle made of copper is cut into three pieces P, Q and R.



Which pieces have the greatest density ?

- A all pieces have the same density
- **B** pieces of P and R only
- **C** piece P only
- **D** piece Q only
- 8 According to the kinetic particle theory, matter is made up of very small particles in a constant random motion.

Which row best describes the particles in liquid state?

	arrangement of particles	forces between particles
Α	closely packed in disorderly manner	strong
в	far apart in a disorderly arrangement	strong
С	closely packed in disorderly manner	weak
D	far apart in a disorderly arrangement	weak

9 A coin is dropped from a height into a beaker of water as shown below.



At which point does the coin have the most kinetic energy?

10 The diagram shows a flight of stairs.



What is the work done against gravity by a person weighing 600 N when climbing the stairs?

- **A** 120 J
- **B** 1800 J
- **C** 2400 J
- **D** 3000 J

11 A substance was heated in an enclosed space until it became a gas. It was then allowed to cool down to room temperature.

The graph shows the temperature plotted against time as it cools.



Which statement about the substance is correct?

- **A** At P, the substance is undergoing boiling.
- **B** At Q, the substance is only in liquid state.
- **C** At R, heat is absorbed by the substance.
- **D** At S, the substance is at its freezing point.
- 12 A heating element is to be positioned in a narrow sealed tube of liquid as shown.



At which position should the heating element be placed in order to obtain the best circulation of the liquid throughout the tube?

13 To protect a polished table from getting a burnt mark, a cork mat may be put on the table underneath a mug containing hot liquid



Why is this method 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.

14 The waveforms of two different sounds are shown below.



How does sound 2 compare to sound 1?

- A Sound 2 is louder than sound 1.
- **B** Sound 2 is softer than sound 1.
- **C** Sound 2 has a higher pitch than sound 1.
- **D** Sound 2 has a lower pitch than sound 1.

- 15 Which statement is true of electromagnetic waves?
 - A Radio waves are longitudinal waves.
 - **B** The wavelength of infra-red radiation is longer than ultraviolet radiation.
 - **C** All electromagnetic waves travel at the same speed in water.
 - **D** Ultraviolet radiation has a higher frequency than radio waves.
- 16 The reading on the ammeter of the circuit is 1.0 A.A second ammeter is connected in the circuit. It also reads 1.0 A.

At which labelled point is the ammeter connected?



- 17 Which statement defines the potential difference across a fixed resistor?
 - **A** The power needed to drive a unit charge across the resistor.
 - **B** The power needed to drive a unit charge through the cell.
 - **C** The work done in driving a unit charge across the resistor.
 - **D** The work done in driving a unit charge through the cell.
- **18** A person uses a 3 kW electric fire for 2 hours and a 2 kW heater for 4 hours.

What is the total cost if the price of electrical energy is 23 cents per unit (kilowatt-hour)?

- **A** \$2.53
- **B** \$3.22
- **C** \$13.80
- **D** \$18.40

19 In each of the circuits below, a short circuit occurs.



In which circuit would the fuse blow and make the circuit safe to repair?

20 Many electrical appliances have metal cases.

To prevent the case from becoming "live", with the possibility of an electric shock, the earth wire of the electric cable is attached to the case.

How does the earth wire prevent an electric shock?

- A It allows a current to flow to earth, so that the appliance continues working.
- **B** It allows a large current to flow to earth, blowing the fuse.
- **C** It prevents the fuse from blowing.
- **D** It reduces the current to a safe level.