CANBERRA SECONDARY SCHOOL

2020 Preliminary Examination

Secondary Four Express / Five Normal Academic

SCIENCE (PHYSICS/CHEMISTRY)
5076/01

31 Aug 2020
1 hour
0830h – 0930h

Name: _____ ( ) **Class:** _____

READ THESE INSTRUCTIONS FIRST

Do not open this booklet until you are told to do so.

Write your full name, class and index number in the spaces provided on the question paper and on any separate writing papers used.
Write in soft pencil.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

There are **forty** 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 (OTAS).

Read the instructions on the Answer Sheet (OTAS) very carefully.

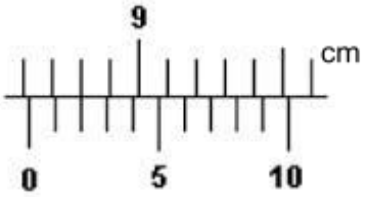
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.
Any rough working should be done in this booklet.
A copy of the Periodic Table is printed on page 16.

FOR MARKER'S USE		
	Marks Awarded	Max Marks
Section A		40
Total		40

This question paper consists of 7 printed pages including the cover page.

Setter: Mrs Olivia Ho & Mrs Zoanne Tay

1 The diagram shows a Vernier caliper after it has been used to measure the diameter of a pipe.

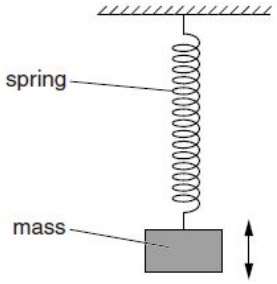


Given that the Vernier caliper has a zero error of -0.02 cm, what is the diameter of the pipe?

A 8.60 cm **B** 8.62 cm

C 8.64 cm **D** 8.72 cm

2 The diagram below shows a mass suspended on a spring. The mass is displaced downwards and released. It takes the mass 0.2 s to move from the lowest to the highest position.



What is the frequency of oscillation?

A 0.20 Hz **B** 1.25 Hz

C 2.50 Hz **D** 5.00 Hz

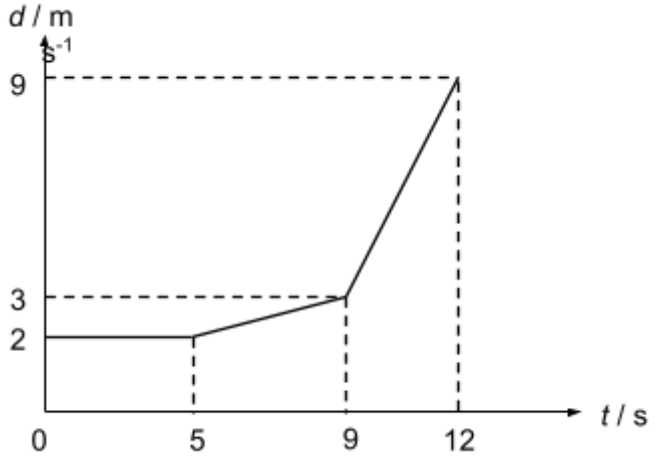
3 A 100 g marble is falling through air as shown below. Assume that air resistance is negligible.

Which of the following is the likely resultant force acting on the marble?

A 0 N **B** 0.7 N

C 1 N **D** 1.7 N

4 The distance-time graph of a toy cart is shown below.

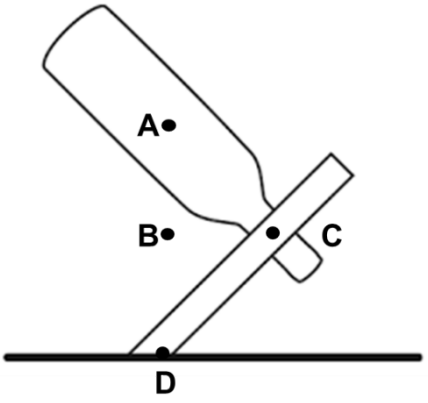


What was the average speed for the entire motion?

A 0.50 m/s **B** 0.58 m/s

C 0.75 m/s **D** 1.00 m/s

5 The diagram below shows a setup of a novelty wine bottle holder with a bottle of wine. At which of the points shown is likely the centre of gravity of the setup?

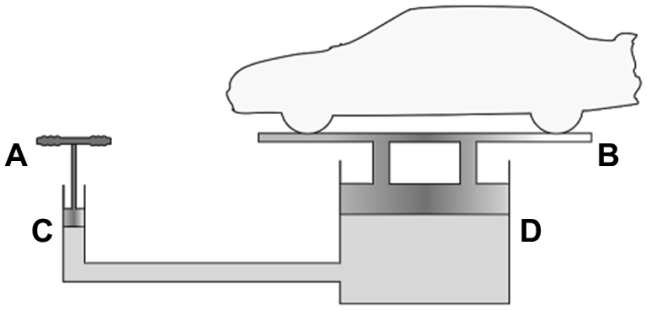


6 A cylindrical container has a base area of **A** and height of **h**. When empty, it has a mass of **m**. When it is fully filled with an unknown liquid, it has a mass of **M**. What is the density of the unknown liquid?

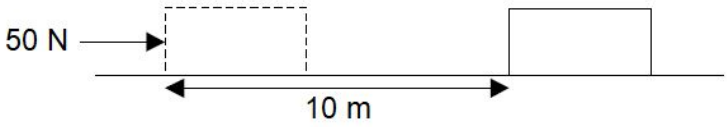
A $\frac{M-m}{A\times h}$ **B** $\frac{M}{A\times h}$

C $(M-m)(A\times h)$ **D** $\frac{A\times h}{M}$

7 A hydraulic jack is used to raise a car as shown in the diagram below. Which one of the following areas must be reduced to enable heavier loads to be lifted if the force applied at the handle remains unchanged?



8 A box is pushed along a smooth surface with a 50 N force over a distance of 10 m in 4 s.



What is the power exerted on the box over this period of time?

A 5 W **B** 125 W

C 500 W **D** 2000 W

9 Which of the following is true when a sample of pure liquid is freezing?

	Internal KE	**Internal PE**
A	decrease	increase
B	increase	remain the same
C	decrease	remain the same
D	remain the same	decrease

10 A space shuttle is normally painted white to ensure the cockpit is **not** overheated by the Sun. This is because

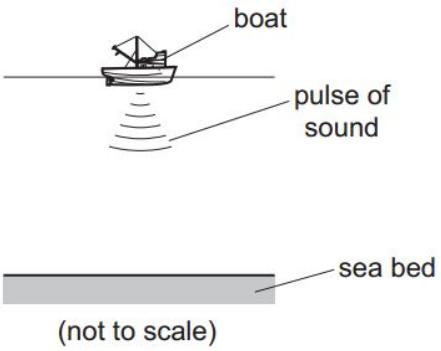
A white color materials are good absorber of radiation.

B white color materials are poor absorber of radiation.

C white color materials are poor emitter of radiation.

D white color materials are good conductor of radiation.

11 Sonar can be used in mapping of underwater terrain. A pulse of sound is emitted and the time taken for the echo to be recorded is 1.5 s.



What is the depth of the seabed given the speed of sound in sea water is 1500 m/s?

A 562 m **B** 1125 m

C 1688 m **D** 2250 m

12 Which of the following electromagnetic wave is the ionizing radiation with the longest wavelength?

A X-ray

B microwave

C gamma ray

D infrared radiation

13 A radio antenna is designed to receive signals with wavelength between 10 mm to 100 mm. What is the frequency range of the signal for this antenna?

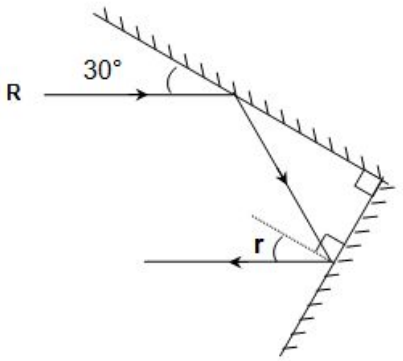
A $3x10^{6}$ Hz to $3x10^{7}$ Hz

B $3x10^{9}$ Hz to $3x10^{10}$ Hz

C $3x10^{10}$ Hz to $3x10^{11}$ Hz

D $3x10^{13}$ Hz to $3x10^{14}$ Hz

14 The figure shows the path of a light ray **R** being reflected by two mirrors placed perpendicularly to each other.



What is the value of **r**?

A 20º **B** 30º

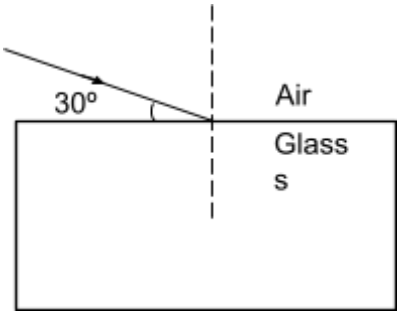
C 45º **D** 60º

15 The speed of light in a clear plastic is 1.2 x 10^8 m/s. What is the refractive index of the plastic?

A 0.40 **B** 1.20

C 1.80 **D** 2.50

16 A red light was shone into the glass block as shown in the diagram below. It strikes the glass block with an angle of 30º to the air-glass boundary.

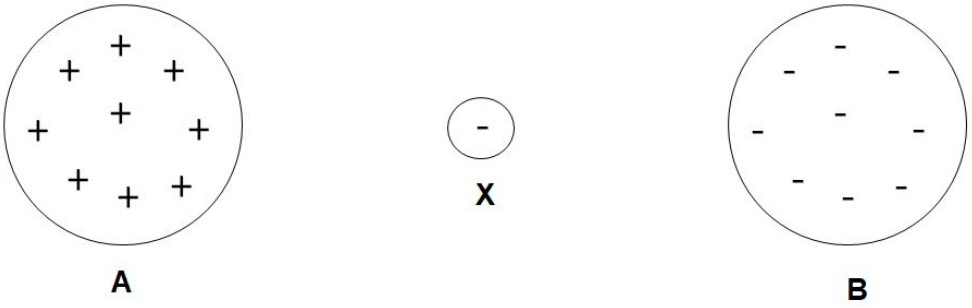


Given that the glass block has a refractive index of 1.35, what is the angle of refraction as the red light enters into the glass block?

A 39.9º **B** 21.7º

C 42.5º **D** 10.5º

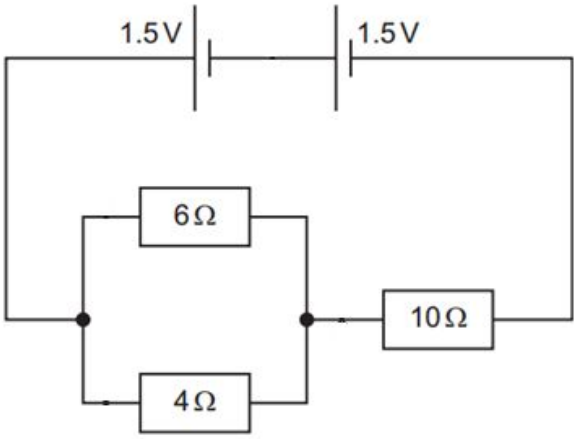
17 A positive charge **A** and a negative charge **B** are placed a short distance apart and a small negative charge **X** is placed between them.



In which direction does **X** move, and what is the force between **A** and **B**?

	movement of **X**	force between **A** and **B**
A	towards **A**	attraction
B	towards **B**	attraction
C	towards **A**	repulsion
D	towards **B**	repulsion

18 The diagram shows a circuit.

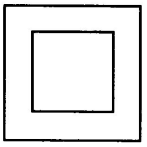


What is the amount of current flowing through the 10Ω resistor?

A 0.10 A **B** 0.15 A

C 0.24 A **D** 0.30 A

19 An electrical appliance has the following symbol on it.



Which of the following electrical safety device is **not** necessary?

A fuse

B circuit breaker

C earth wire

D switch

20 How many “100 W, 240 V” lamps can be connected in parallel to a socket fitted with a 13 A fuse?

A 5 **B** 6

C 31 **D** 32

END OF PAPER