SERANGOON SECONDARY SCHOOL
PRELIMINARY EXAMINATION
SECONDARY 4 EXPRESS

CANDIDATE NAME		CLASS			
INDEX NUMBER					

SCIENCE (PHYSICS, CHEMISTRY)

5086/01

Paper 1 Multiple Choice

28 August 2024
1 hour

Additional Materials: Multiple Choice Answer Sheet

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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 **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.

Read the instructions on the Answer Sheet 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 Data Sheet is printed on page 17.
A copy of the Periodic Table is printed on page 18.

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

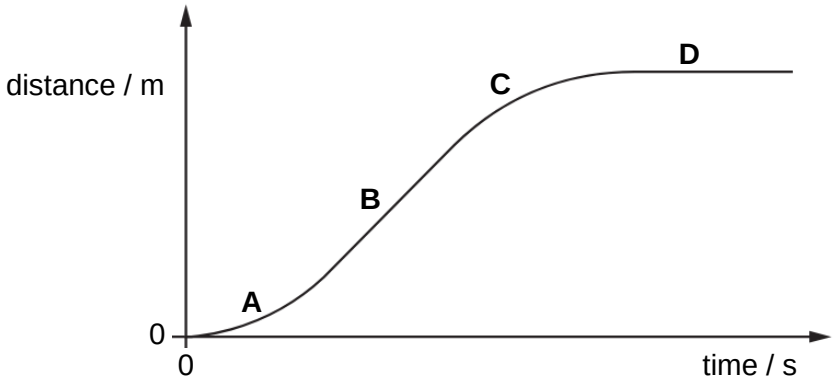
1 A length of copper wire is labelled: length 0.50 m and diameter 0.50 mm.

Which instruments are most suitable to measure accurately the length and the diameter of the wire?

	length	diameter
A	metre rule	digital calipers
B	metre rule	digital micrometer
C	digital calipers	metre rule
D	digital calipers	digital micrometer

2 The diagram shows a distance-time graph for a car travelling in a straight line.

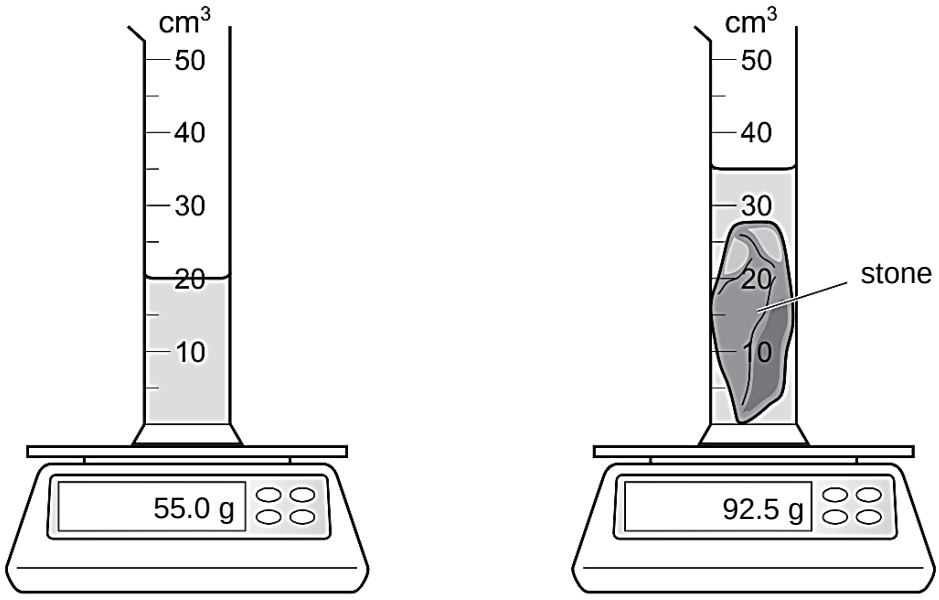
In which region is the car decelerating?



3 A measuring cylinder containing water is placed on a balance.

A stone is placed into the water.

The diagram shows the readings on the balance and on the measuring cylinder.



What is the density of the stone?

A 1.1 g/cm^3 **B** 1.5 g/cm^3 **C** 2.5 g/cm^3 **D** 2.6 g/cm^3

4 Newton's third law describes a pair of forces.

Which row shows whether the two forces are of the same type and whether they act on the same object?

	the type of forces in the pair	the objects which they act
A	different	different
B	different	same
C	same	different
D	same	same

5 Each tyre of a car has an area of 250 cm^2 in contact with the ground.

The car has a mass of 1600 kg. The weight of the car is equally distributed amongst the four tyres. What is the pressure exerted on the ground?

The gravitational field strength *g* is 10 N/kg.

A 4.0 N/cm^2 **B** 16 N/cm^2 **C** 40 N/cm^2 **D** 160 N/cm^2

6 Some water is heated from room temperature to its boiling point using an electric kettle.

What is the principal energy transfer taking place during this period?

A internal store to chemical potential store

B internal store to kinetic store

C chemical potential store to kinetic store

D chemical potential store to internal store

7 A 1 kW, 240 V electrical device is switched on.

How much energy does it use in 5.0 minutes?

A 5000 J

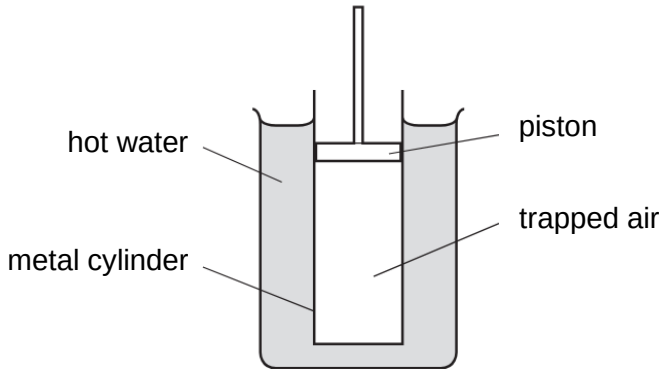
B 12 000 J

C 72 000 J

D 300 000 J

8 Air is trapped in a metal cylinder by a piston. The piston is free to move and the trapped air is at atmospheric pressure.

The cylinder is in hot water.



The cylinder is taken out of the hot water and left to cool.

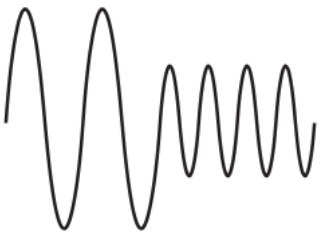
What happens to the mass of the air in the cylinder and the position of the piston as it cools?

	mass of air	position of piston
A	does not change	does not change
B	does not change	changes
C	changes	does not change
D	changes	changes

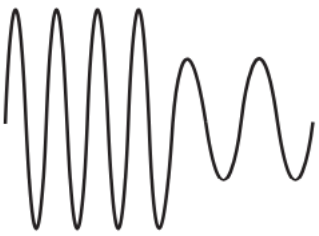
9 Sound waves are displayed as a trace on the screen of an oscilloscope.

Which trace shows a sound that becomes quieter with a higher pitch?

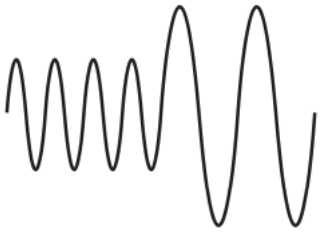
A



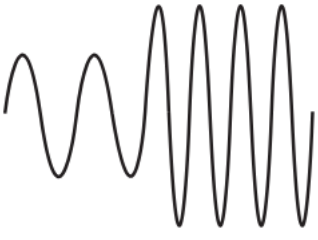
B



C



D

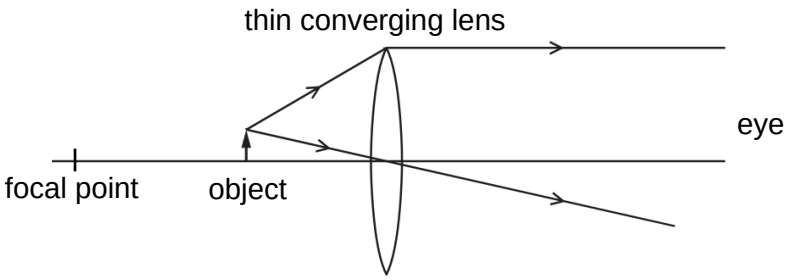


10 Which characteristics describe the image formed by a plane mirror?

A real and upside down
B virtual and upright
C real and larger than the object
D virtual and smaller than the object

11 An object is viewed through a thin converging lens.

The diagram shows the paths of two rays from the top of the object to an eye.



How does the image compare with the object?

A It is larger and inverted.
B It is larger and upright.
C It is smaller and inverted.
D It is smaller and upright.

12 Ultraviolet radiation is a component of the electromagnetic spectrum.

Which application uses ultraviolet radiation?

A Bluetooth technology
B prenatal scanning
C sterilising water
D thermal imaging

13 When the flash on a camera is used, a charge of 1.5 C flows for 0.0030 s through the flash lamp.

The average voltage across the flash lamp is 3600 V.

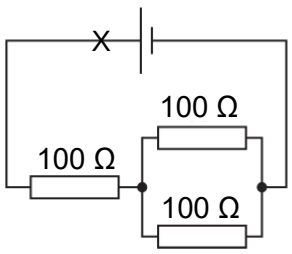
What is the energy supplied to the flash lamp and what is the average power supplied?

	energy / J	power / W
A	2400	7.2
B	2400	800 000
C	5400	16.2
D	5400	1 800 000

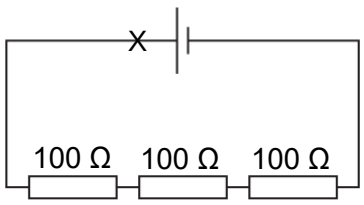
14 The diagrams show four circuits. Each circuit contains three 100 Ω resistors.

Which circuit has the largest current flowing at point X?

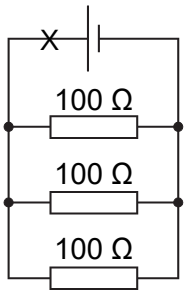
A



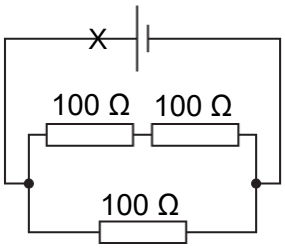
B



C



D



15 A metal wire of length l and cross-sectional area A has resistance R.

A second wire is made from the same material. It has a length of $2l$ and a cross-sectional area $4A$.

What is the resistance of the second wire?

A $8R$ **B** $2R$ **C** $\frac{R}{2}$ **D** $\frac{R}{8}$

16 The cost of electricity is $0.2989 per kWh.

It takes 0.060 hours and costs 4.0 cents to boil the water in a kettle.

What is the power rating of the kettle?

A 0.45 kW **B** 2.2 kW **C** 120 kW **D** 2000 kW

17 A three-pin mains plug contains a fuse. A device with double insulation has a cable connected to the plug.

Which part of the plug is **not** connected to the cable?

A earth pin

B fuse

C live pin

D neutral pin

18 One end of each of two bars is marked with an X or a Y, as shown.

bar 1 bar 2

End X of bar 1 is brought close to the N-pole and then to the S-pole of a magnet.

End Y of bar 2 is brought close to the N-pole and then to the S-pole of the magnet.

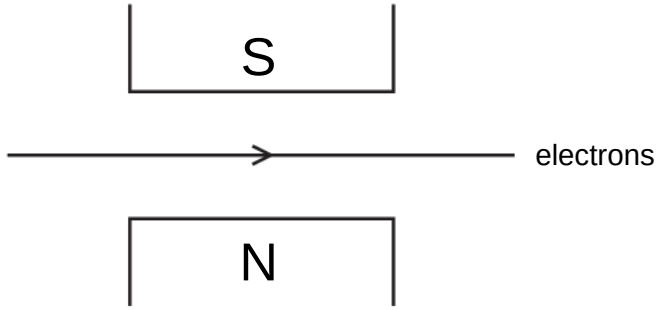
The table shows what happens.

	end X of bar 1	end Y of bar 2
N-pole of magnet	attracted	attracted
S-pole of magnet	attracted	repelled

What materials are bar 1 and bar 2 made from?

	bar 1	bar 2
A	iron	steel
B	copper	steel
C	steel	copper
D	steel	iron

19 A beam of electrons travels through a vacuum. The beam passes between the poles of a magnet as shown.



What are the directions of the conventional current, the magnetic field, and the force acting on the beam of electrons?

	direction of the conventional current	direction of the magnetic field	direction of the force
A	→	↓	into the page
B	→	↑	out of the page
C	←	↓	out of the page
D	←	↑	into the page

20 $^{14}_{6}C$ is a natural radioactive isotope of carbon and is present in all living things. It has a half-life of 5700 years.

The initial mass of this radioactive isotope of carbon in a sample of an old bone is thought to be 448 g.

How old is this sample of bone if the mass of the radioactive isotope of carbon in it is found to be 28 g?

A 5700 years

B 11 400 years

C 17 100 years

D 22 800 years

SSS 4E Sci Physics P1 Answers

Question	Answer
1	**A**
2	**C**
3	**C**
4	**C**
5	**B**
6	**D**
7	**D**
8	**B**
9	**A**
10	**B**
11	**B**
12	**C**
13	**D**
14	**C**
15	**C**
16	**B**
17	**A**
18	**A**
19	**D**
20	**D**