

TIME 45 minutes

INSTRUCTIONS TO CANDIDATES

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

Write your name, Centre number and candidate number on the answer sheet in the spaces provided unless this has already been done for you.

There are forty questions in 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 very carefully the instructions on the answer sheet.

INFORMATION FOR CANDIDATES

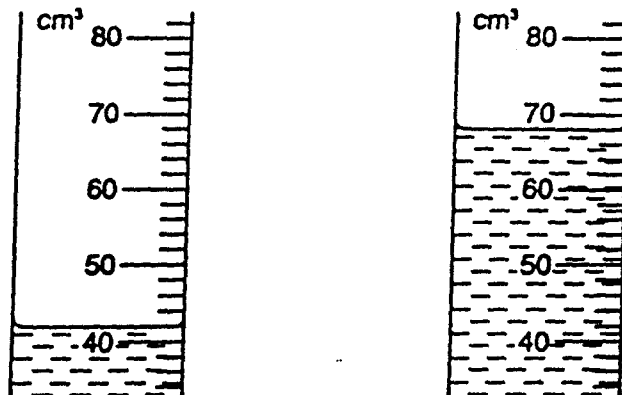
Each correct answer will score one mark. A mark will not be deducted for a wrong answer.

Any rough working should be done in this booklet.

This question paper consists of 17 printed pages and 3 blank pages.

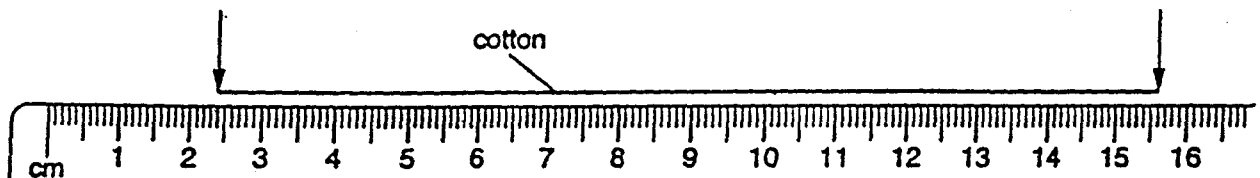
- 1 Several lumps of ice were added to a measuring cylinder containing water and were allowed to melt.

The diagrams show the liquid level before the ice was added and after it had melted.

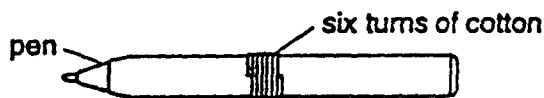


What was the volume of the melted ice?

- A 68 cm³ B 64 cm³ C 26 cm³ D 23 cm³
- 2 A piece of cotton is measured between two points on a ruler.



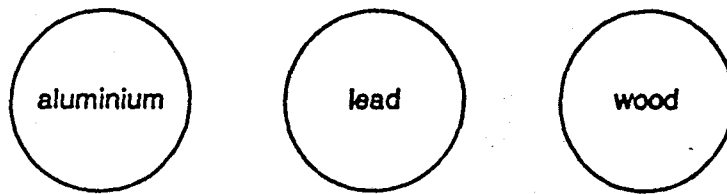
When the length of cotton is wound closely around a pen, it goes round six times.



What is the distance once round the pen?

- A 2.2 cm B 2.6 cm C 13.2 cm D 15.6 cm

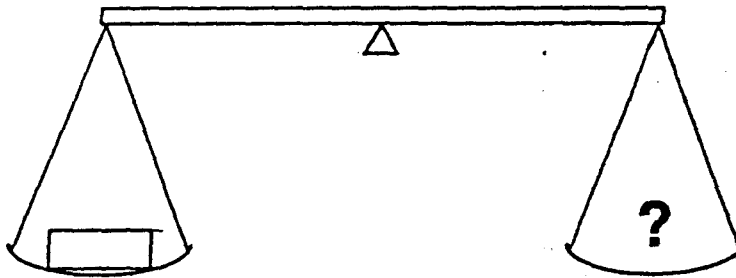
- 3 The three balls shown were dropped from a bench.



Which balls had the same acceleration?

- A aluminium and lead only
 - B aluminium, lead and wood
 - C aluminium and wood only
 - D lead and wood only
- 4 An unopened packet of tea has a total mass of 150 g. It contains 125 g of tea leaves.

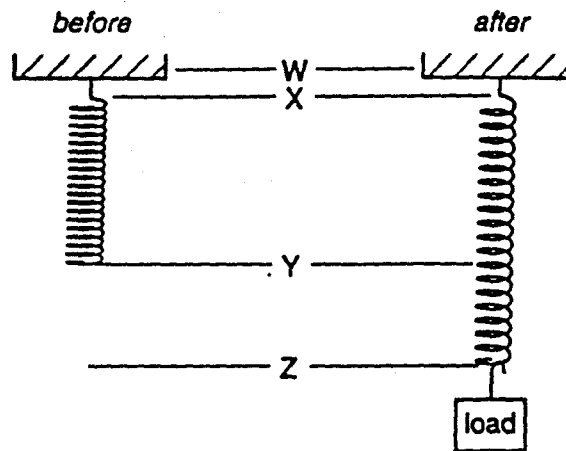
The unopened packet is put on one side of the balance shown.



Which masses on the other side would balance the unopened packet of tea?

- A 20g + 5g
- B 100g + 50g
- C 100g + 10g + 10g + 5g
- D 200g + 50g + 20g + 5g

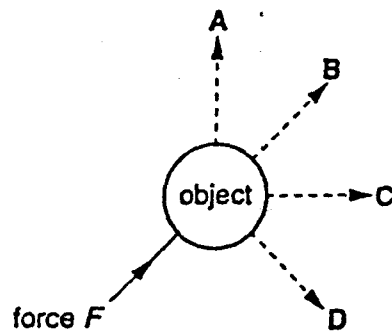
- 5 The diagram shows a spring hanging from a support before and after a load is hung from it.



Which distance represents the extension of the spring?

- A WZ B XY C XZ D YZ
- 6 A force F is applied to an object, as shown.

In which direction does the object start to move?



- 7 Which unit is a unit of work?

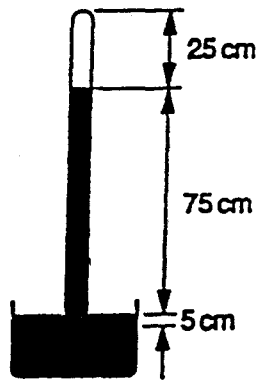
- A joule
 B kilogram
 C newton
 D watt

- 8 Which statement best describes how nuclear energy is released in a nuclear power station?
- A Atoms join together to make molecules.
 - B Molecules break down into atoms.
 - C Heavy nuclei split into lighter nuclei.
 - D Light nuclei join together to form heavier nuclei.

- 9 Brakes are used to stop a moving car.

Into which form of energy is most of the energy of motion converted?

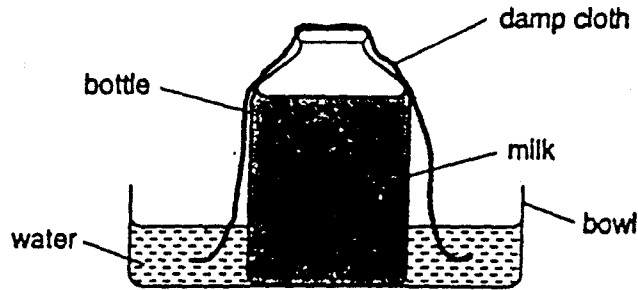
- A chemical energy
 - B heat energy
 - C sound energy
 - D strain energy
- 10 The diagram shows a mercury barometer.



Which distance can be used to find atmospheric pressure?

- A 25 cm B 75 cm C 80 cm D 100 cm

- 11 To keep a bottle of milk cold without a refrigerator on a hot day, the bottle can be covered with a damp cloth in a bowl of water.



How does this method keep the milk cold?

- A Milk condenses on the cloth.
 B Milk evaporates from the cloth.
 C Water condenses on the cloth.
 D Water evaporates from the cloth.
- 12 What is the effect of a temperature rise on the gas molecules in a sealed container?

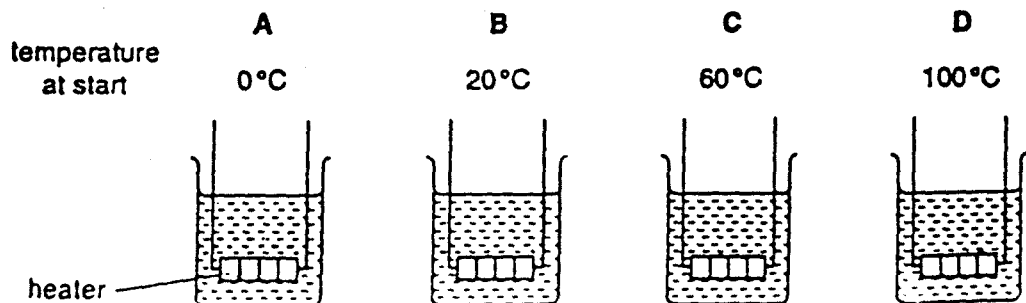
*average speed
of gas molecules*

*number of collisions per
second by gas molecules
on container walls*

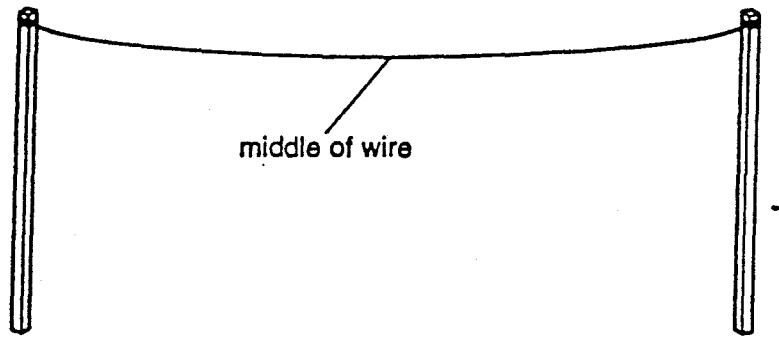
- A more than before the same as before
 B more than before more than before
 C the same as before the same as before
 D the same as before more than before
- 13 Four beakers contain equal volumes of water, but at different temperatures, as shown.

The four samples of water are heated by similar electric heaters.

In which beaker does the water temperature stay the same?



- 14 A telephone wire is held up by two poles. When the weather gets hotter, the position of the middle of the wire moves.

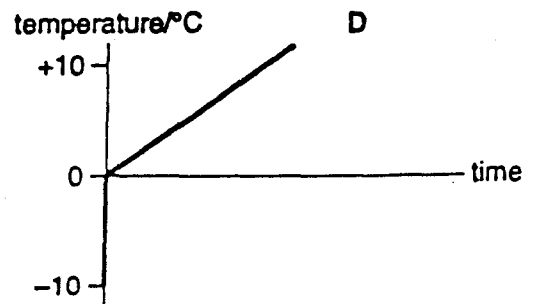
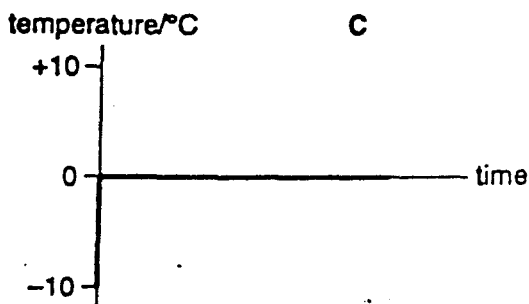
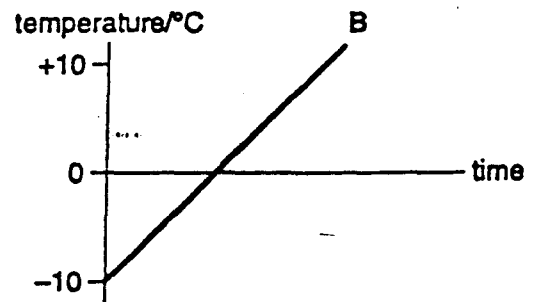
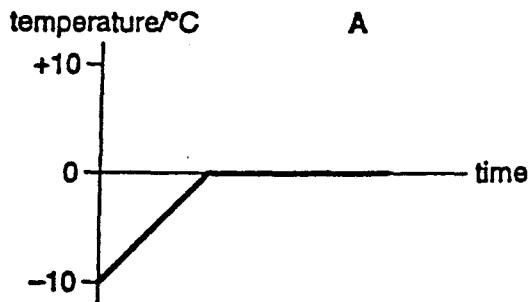


In which direction does the wire move, and why?

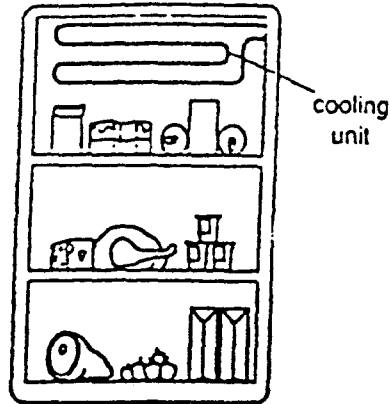
	<i>direction of movement</i>	<i>reason</i>
A	down	the wire expands
B	down	the wire contracts
C	up	the wire expands
D	up	the wire contracts

- 15 A beaker of ice has been kept at -10°C (minus 10°C) for a long time. It is then put in a warm room until some of the ice has melted.

Which graph shows the temperature changes?



- 16 The diagram shows a cooling unit in a refrigerator.

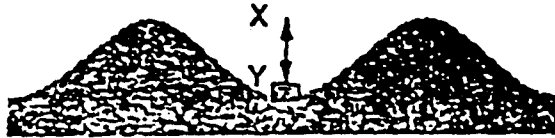


Why is the cooling unit placed at the top?

- A Cold air falls and warm air is displaced upwards.
 - B Cold air is a bad conductor so external heat is not conducted into the refrigerator.
 - C Cold air is a good conductor so internal heat is conducted out of the refrigerator.
 - D Cold air stops at the top and so prevents convection.
- 17 A cook can put his hand inside an oven containing air at 160°C without being burnt. However, if he touches the metal tray inside the oven, his hand will be burnt.

Why is this?

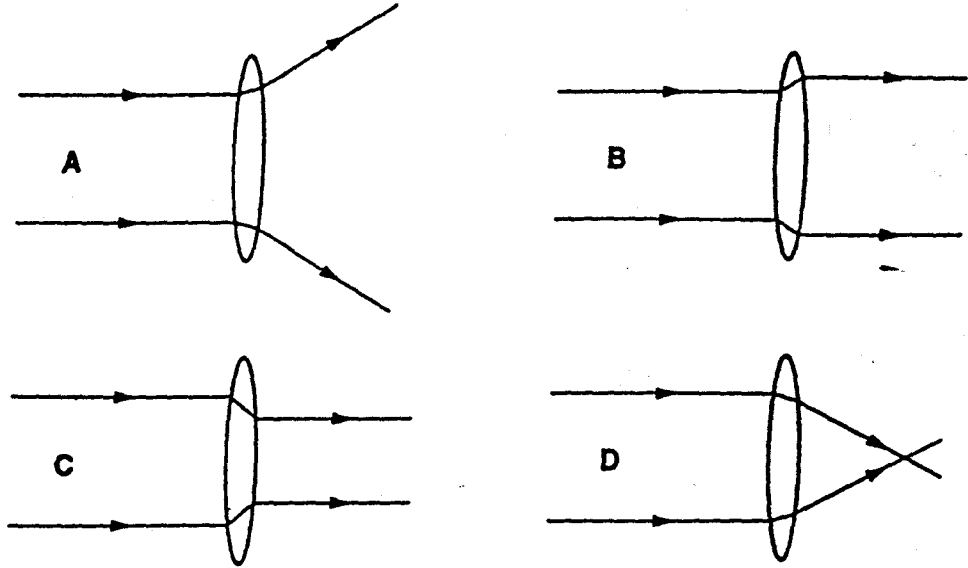
- A Convection currents in the air take the heat away from his hand.
 - B Convection currents in the tray take the heat to his hand.
 - C The temperature of the tray is greater than 160°C .
 - D The tray is a better conductor of heat than the air.
- 18 A water wave passes under a floating cork, causing the cork to move along the line XY, as shown.



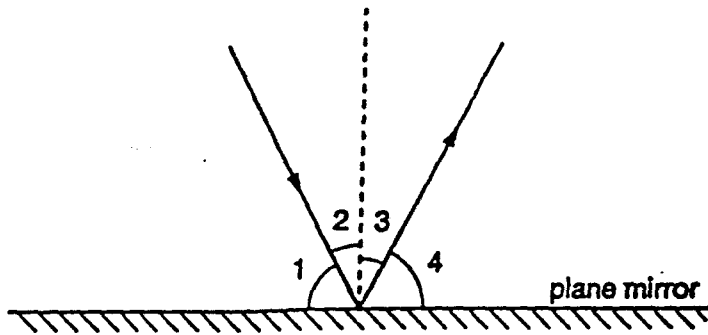
What must happen as the frequency of the wave increases?

- A The cork oscillates more rapidly.
- B The cork oscillates more slowly.
- C The distance XY decreases.
- D The distance XY increases.

19 Which diagram shows the effect of a converging lens on parallel rays of light?



20 The diagram shows a ray of light being reflected from a plane mirror.



Which angles are the angle of incidence and the angle of reflection?

	<i>angle of incidence</i>	<i>angle of reflection</i>
A	1	2
B	1	4
C	2	3
D	3	1

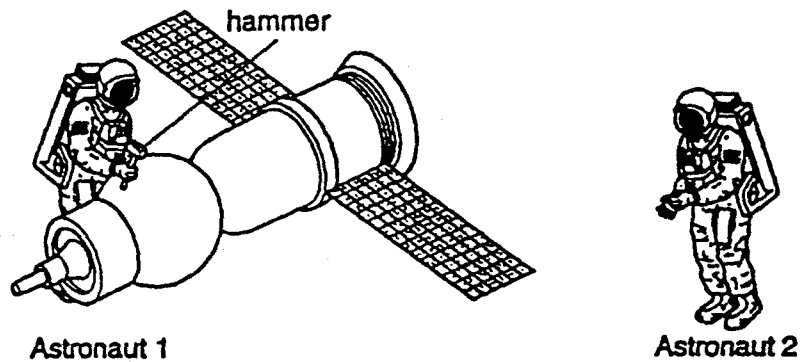
21 The diagram represents the electromagnetic spectrum.



Which part of the spectrum is found in region O?

- A infra-red radiation
- B radio waves
- C visible light
- D X-rays

22 Astronaut 1 uses a hammer to mend a satellite in space. Astronaut 2 is nearby. There is no atmosphere in space.

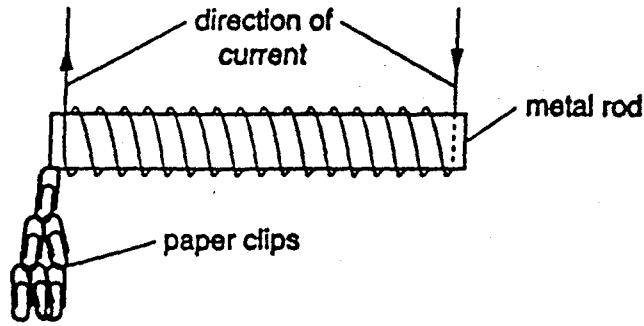


Compared with the sound heard if they were working on Earth, what does astronaut 2 hear?

- A a louder sound
 - B a quieter sound
 - C a sound of the same loudness
 - D no sound at all
- 23 Which change would make a sound wave louder?
- A decreasing the amplitude
 - B increasing the amplitude
 - C decreasing the wavelength
 - D increasing the wavelength

- 24 The diagram shows an experiment in which a metal rod was placed inside a coil of insulated copper wire carrying an electric current.

The experiment was repeated using rods of different metals to act as the core of an electromagnet.

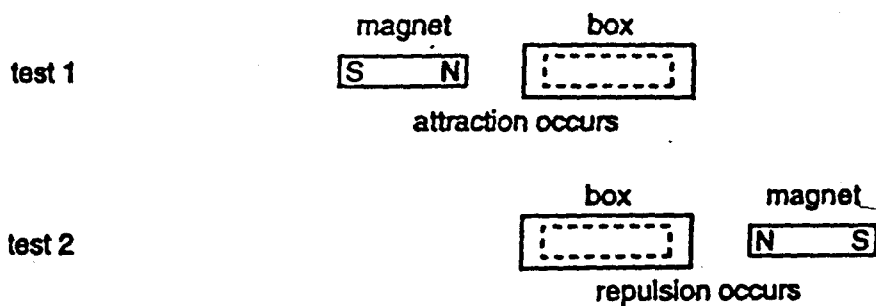


The table shows the results of the experiments.

Which rod would be best to use for the core of the electromagnet?

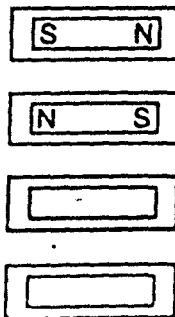
metal rod	number of paper clips picked up when there is a current in the coil	number of paper clips still attracted when the current is switched off
A	5	0
B	20	19
C	20	2
D	35	0

- 25 A small cardboard box contains a solid which is tested using a bar magnet. The diagrams show the tests and the results.

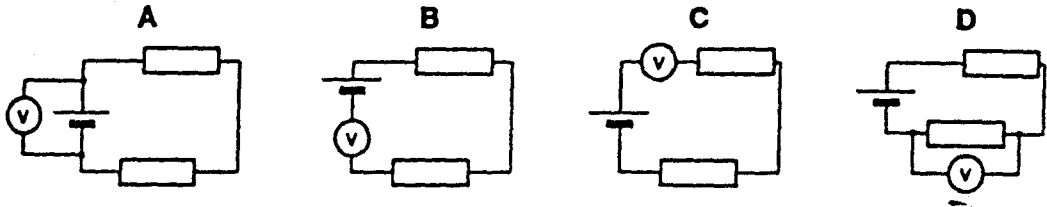


What could be inside the box?

- A a bar magnet
- B a bar magnet
- C a bar of aluminium
- D a bar of soft iron



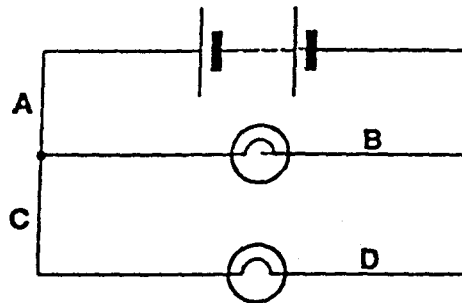
26 Which circuit shows a voltmeter connected correctly to measure the potential difference across the cell?



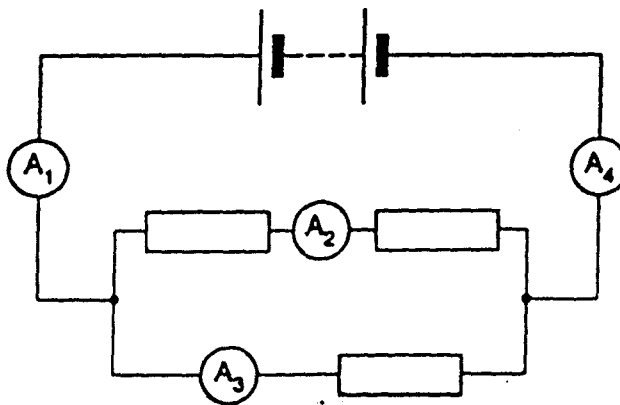
27 An electric current in a metal is caused by the

- A movement of atoms.
- B movement of electrons.
- C movement of ohms.
- D movement of volts.

28 In which position on the circuit shown should a switch be placed so that both lamps can be switched on and off at the same time?



29 The diagram shows a circuit with four ammeters, together with three resistors each of the same resistance.



Which two ammeters show the same current?

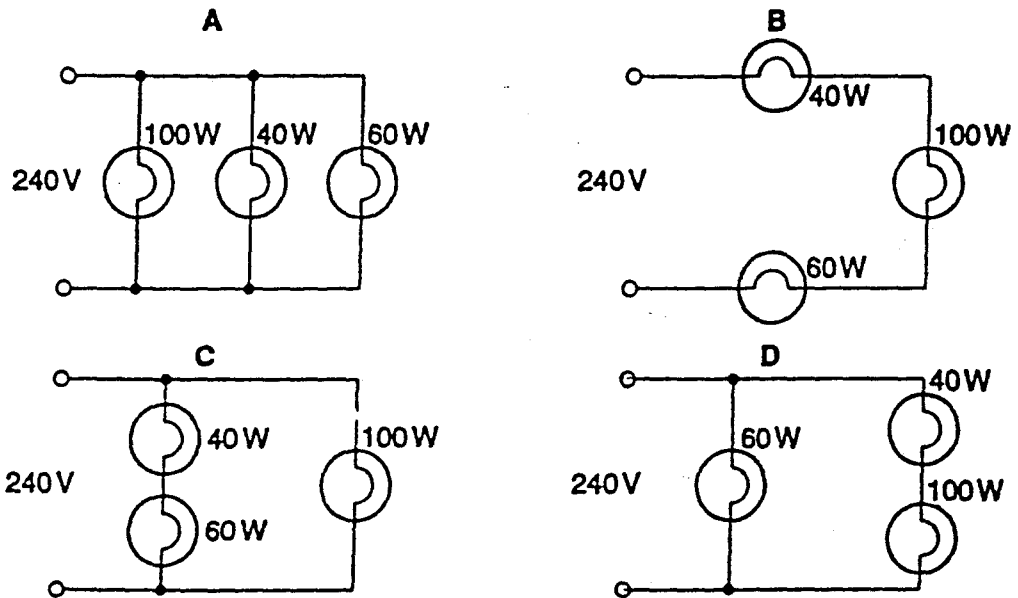
- A A_1 and A_2
- B A_2 and A_3
- C A_3 and A_4
- D A_4 and A_1

30 Why are electric circuits often fitted with fuses?

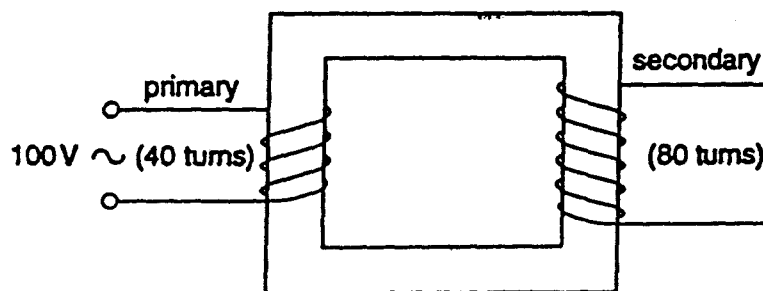
- A Fuses break the circuit if the current is too high.
- B Fuses only allow the current through in the correct direction.
- C Fuses return any excess current to earth.
- D Fuses use up any spare current.

31 Three 240 V lamps, of different power ratings, are connected to a 240 V supply.

In which arrangement do the three lamps light up, each at its normal brightness?



32 The diagram shows a transformer with an alternating voltage of 100 V applied to the primary coil.



What is the voltage produced across the secondary coil?

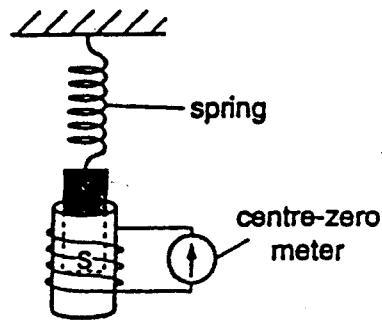
- A 50V
- B 100V
- C 200V
- D 8000V

33 Electrical energy is transmitted from power stations to homes. The cables used are very long.

What conditions are used to keep energy losses low?

- | | <i>voltage</i> | <i>current</i> |
|---|----------------|----------------|
| A | low | low |
| B | low | high |
| C | high | low |
| D | high | high |

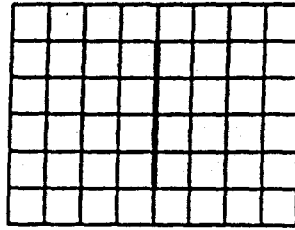
34 A magnet is suspended from a spring so that it can move freely inside a coil which is connected to a sensitive centre-zero meter.



What does the meter show when the magnet oscillates slowly up and down?

- A a reading repeatedly changing from left to right and right to left
- B a steady reading to the left
- C a steady reading to the right
- D a steady zero reading

35 The diagram shows the trace on the screen of a cathode-ray oscilloscope.

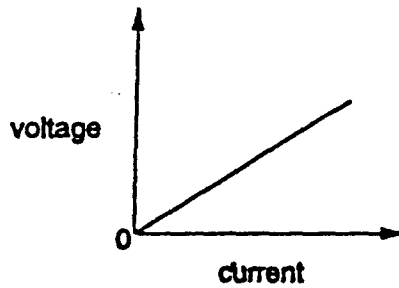
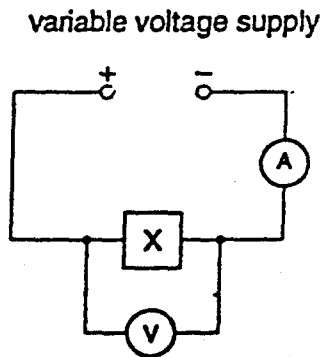


Which conditions produce this trace?





- | | <i>time base</i> | <i>p.d. connected to the Y-plates</i> |
|---|------------------|---------------------------------------|
| A | off | alternating |
| B | off | direct |
| C | on | alternating |
| D | on | direct |

36 The circuit shown in the diagram contains an unknown component X, hidden in a box.

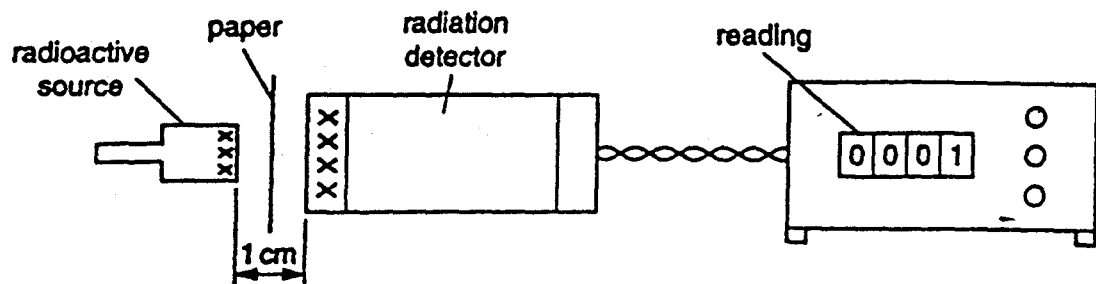
The voltage-current graph for X is as shown.



What is the component X?

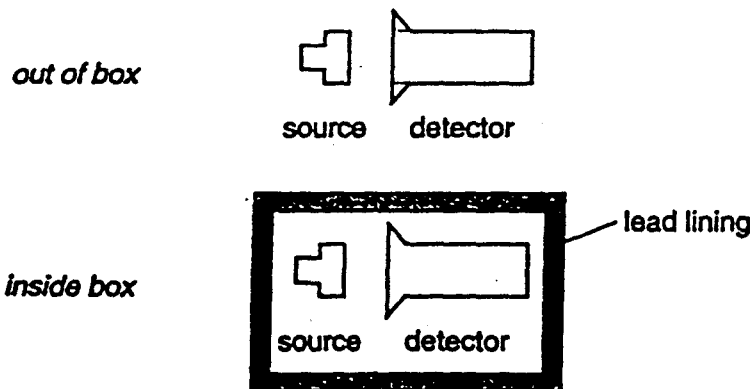
- A a capacitor 
- B a closed switch 
- C a metallic resistor 
- D an open switch 

- 37 A sheet of paper is put between a radioactive source and a radiation detector. The reading drops almost to zero.



Which type of radiation is given out by the source?

- A α -particles
 - B β -particles
 - C γ -rays
 - D radio waves
- 38 The half-life of a weak radioactive source is 5000 years.
- The count rate of the source is measured first out of, and then inside, a lead-lined box.



When the source and detector are inside the box, why is the count rate a little less than when they are out of the box?

- A The box screens the detector from background radiation.
- B The detector does not work as well in the dark.
- C The lead lining of the box absorbs some of the radiation from the source.
- D The strength of the source has decayed measurably.

39 What is the charge on an electron, and its mass compared with a neutron?

- | | <i>charge of electron</i> | <i>mass of electron</i> |
|---|---------------------------|-------------------------|
| A | negative | the same |
| B | negative | very much smaller |
| C | positive | the same |
| D | positive | very much smaller |

40 The structure of a nuclide is shown by A_ZX .

What are the proton number and the nucleon number of this nuclide?

	<i>proton number</i>	<i>nucleon number</i>
A	A	X
B	X	Z
C	Z	A
D	Z	X