

CAMBRIDGE INTERNATIONAL EXAMINATIONS
General Certificate of Education Ordinary Level

SCIENCE (PHYSICS, CHEMISTRY)

5124/1

PAPER 1 Multiple Choice

OCTOBER/NOVEMBER SESSION 2002

1 hour

Additional Materials:

- Multiple Choice answer sheet
- Soft clean eraser
- Soft pencil (type B or HB is recommended)

TIME 1 hour

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 to be 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.

A copy of the Periodic Table is printed on page 16.

This question paper consists of ? printed pages and ? blank pages.

Questions 1-20 (Physics) are taken from 5152/1 November 2002, Q1-20 with the exception of question 11 as shown below.

Question 21-40(Chemistry) are taken from 5152/1 November 2002 Q21-40

Question 11 5124/1 November 2002

11 Which of the following correctly gives the properties of sound waves?

	nature	car travel in	speed in air
A	longitudinal	vacuum	3×10^8 m/s
B	longitudinal	air	340 m/s
C	transverse	vacuum	3×10^8 m/s
D	transverse	air	340 m/s

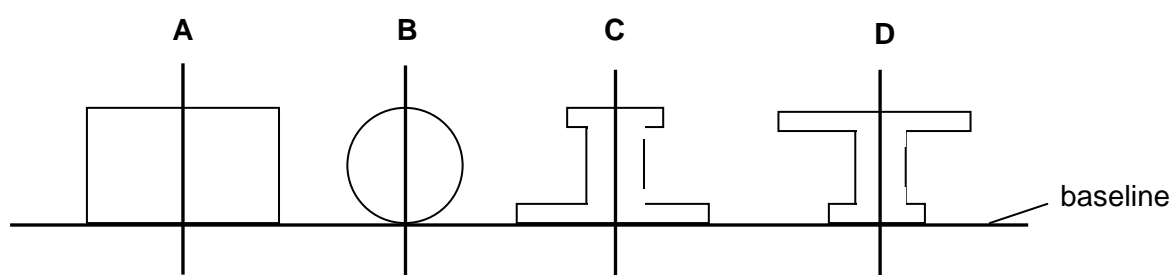
1 A stone is falling through the air. The acceleration of free fall is 10 m/s^2 .

Ignoring air resistance, what happens to the stone every second during its fall?

- A The acceleration of the stone increases by 10 m/s^2 .
- B The speed of the stone increases by 10 m/s .
- C The stone travels a distance of 10 m .
- D The stone travels at a speed of 10 m/s .

2 The diagram shows four shapes, cut from the same piece of card.

Which shape has its centre of gravity nearest to the base line?

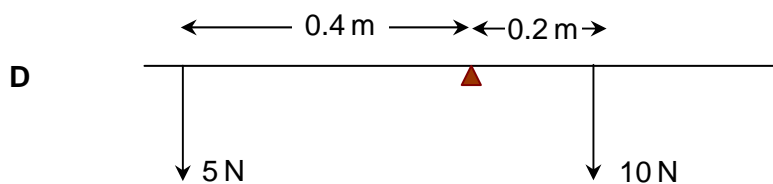
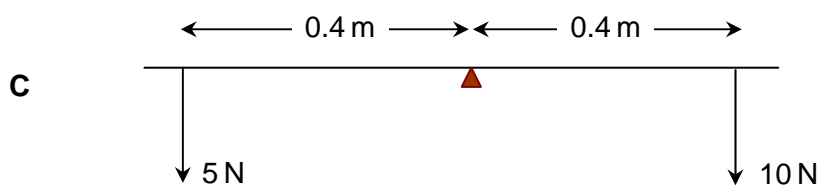
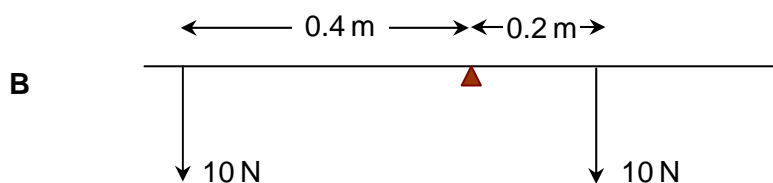
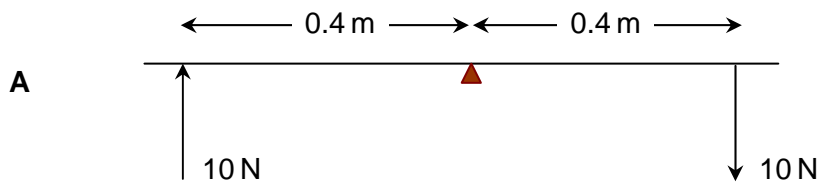


3 Which of the following describes the density of a material?

- A the amount of matter in the material
- B the mass per unit volume of the material
- C the pull of gravity on the material
- D the volume per unit mass of the material

4 Forces are applied to a beam pivoted at its centre.

Which example demonstrates the Principle of Moments?

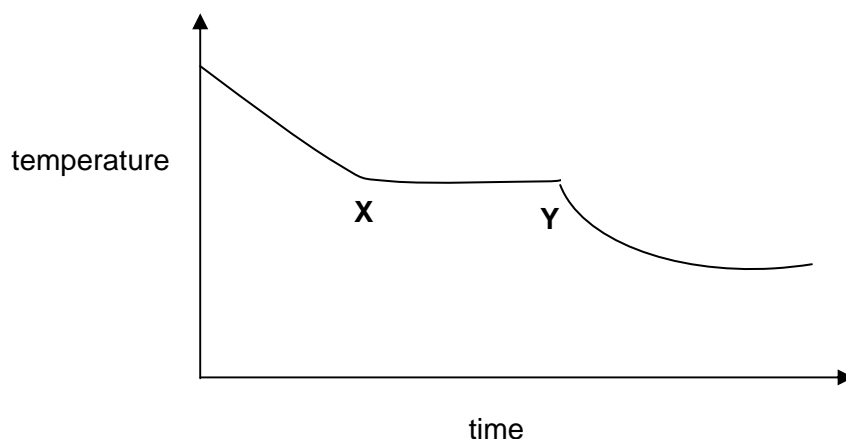


5 An electric motor can lift a weight of 2000 N through a height of 10 m in 20 s.

What is the power of the motor?

- A** 10 W **B** 1000 W **C** 4000 W **D** 400000 W

- 6 A waxy solid is melted in a boiling tube and then allowed to cool at room temperature. The graph shows the cooling curve.



What is happening between points X and Y?

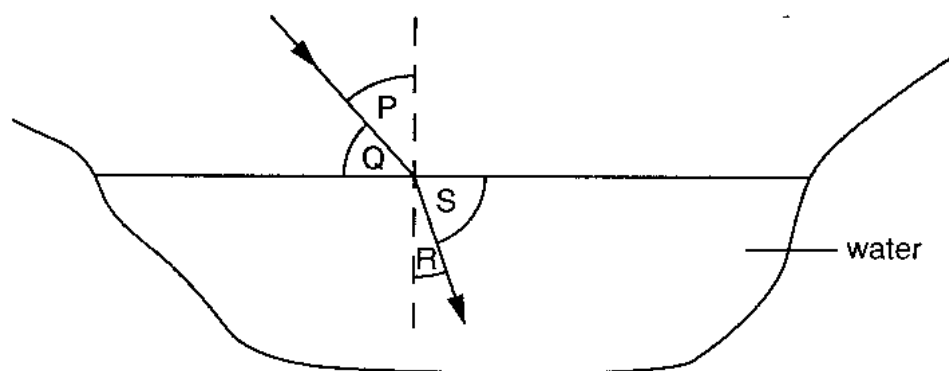
- A liquid is cooling
 - B liquid is turning to solid
 - C solid is cooling
 - D solid has stopped cooling
- 7 In solids, thermal energy is transferred by conduction. What is the cause of conduction?
- A change in density
 - B expansion
 - C infra-red radiation
 - D molecular vibrations
- 8 A VHF radio station broadcasts at a frequency of 60 MHz (6.0×10^7 Hz). The speed of radio waves is 3.0×10^8 m/s. What is the wavelength of the waves broadcast by the station?
- A 5.0 m B 2.0 m C 0.5 m D 0.2 m

9 Which of the following correctly describes the image formed by a thin converging lens when used as a magnifying glass?

- A real erect magnified
- B real inverted magnified
- C virtual erect magnified
- D virtual inverted magnified

10 The diagram shows the path of a ray of light travelling towards and into a pool of water.

Four angles are labelled.



Which two angles would be correctly used in the equation $\frac{\sin i}{\sin r} = \text{constant}$?

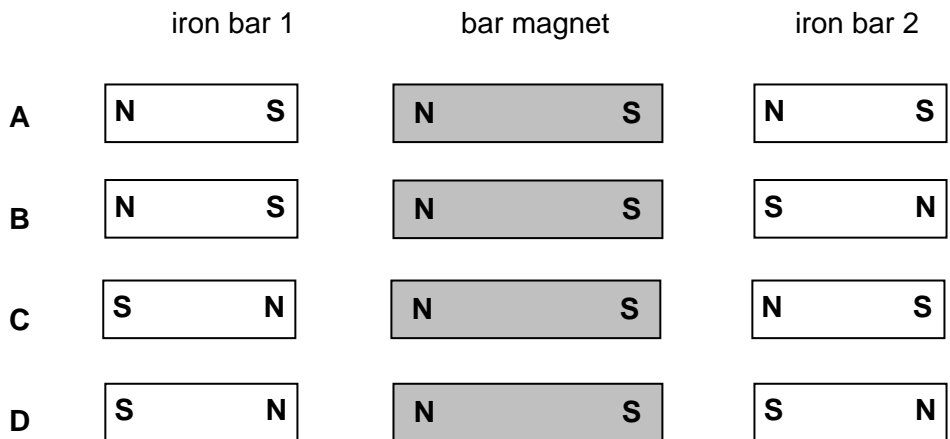
- A P and R
- B P and S
- C Q and R
- D Q and S

11 Which of the following correctly gives the properties of sound waves?

	<i>nature</i>	<i>can travel in</i>	<i>speed in air</i>
--	---------------	----------------------	---------------------

12 A bar magnet is placed between two iron bars.

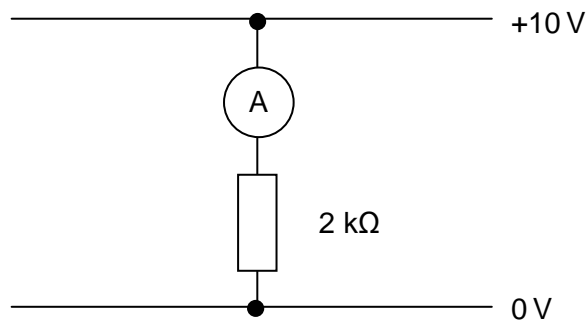
Which diagram correctly shows the poles induced in both iron bars?



13 Which of the following describes the e.m.f. of a cell?

- A the difference in energy between that needed to drive unit charge through the load resistors and through the cell
- B the energy used to drive unit charge through all the load resistors in the circuit
- C the energy used to drive charge through the resistance of the cell
- D the total energy used to drive unit charge round the complete circuit

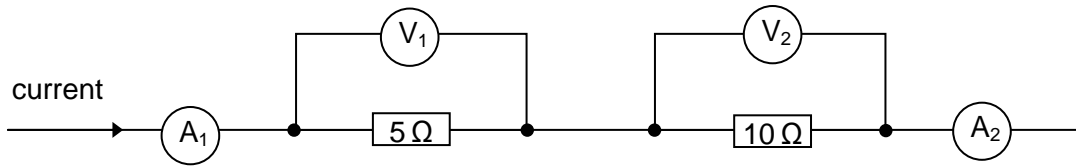
14 An ammeter is connected in the simple circuit as shown.



Which current flows through the ammeter?

- A 5 mA
- B 20 mA
- C 0.2 A
- D 5 A

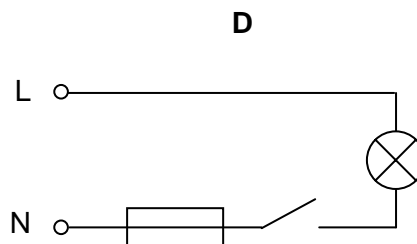
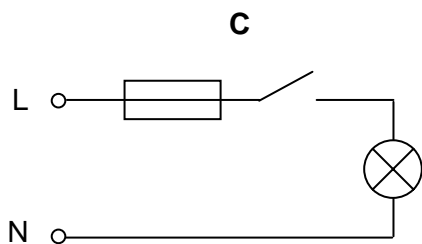
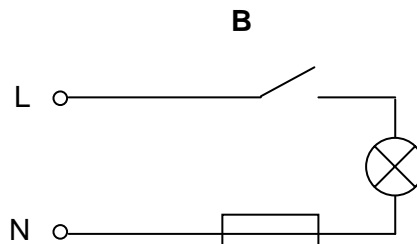
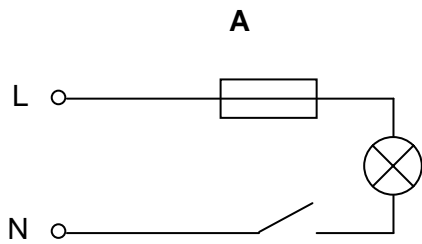
- 15 A current flows in two resistors connected in series as shown. A_1 and A_2 are the readings on the ammeters. V_1 and V_2 are the readings on the voltmeters.



Which of the following correctly describes the ammeter and the voltmeter readings?

- | | <i>ammeter readings</i> | <i>voltmeter readings</i> |
|----------|-----------------------------|---------------------------|
| A | A_1 is equal to A_2 | V_1 is equal to V_2 |
| B | A_1 is equal to A_2 | V_1 is less than V_2 |
| C | A_1 is greater than A_2 | V_1 is equal to V_2 |
| D | A_1 is greater than A_2 | V_1 is less than V_2 |

- 16 Which circuit shows the correct positions for the fuse and switch in the lighting circuit of a house?



key

L = live wire

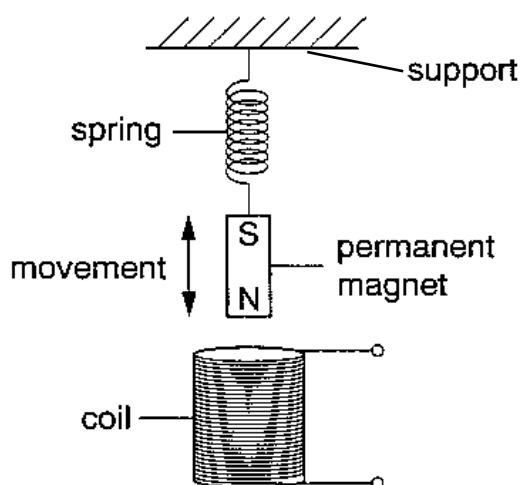
N = neutral wire

- 17 A potential difference of 4 V drives a current of 3 A through a resistor.

How much electrical energy is converted into heat during 10 s?

- A** 12 J **B** 30 J **C** 40 J **D** 120 J

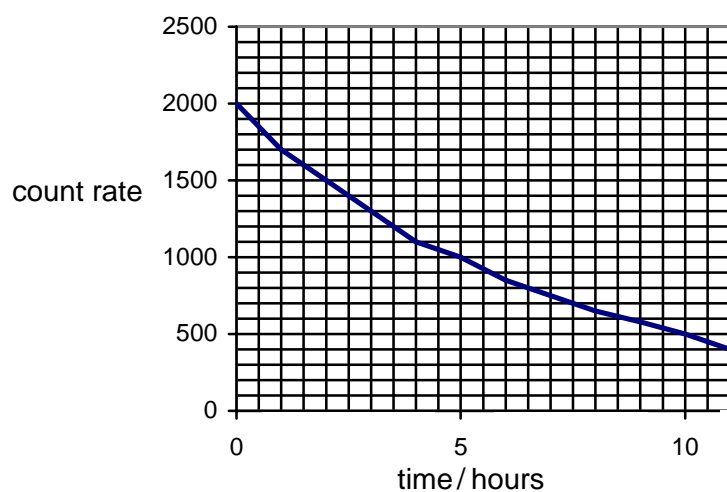
18 A permanent magnet moving up and down on the end of a spring induces an e.m.f. in a coil.



Which factor, on its own, would **decrease** the maximum value of the induced e.m.f.?

- A increasing the number of turns in the coil
- B increasing the strength of the magnet
- C raising the coil
- D raising the support of the spring

19 The graph shows the count rate for a radioactive source over a few hours.



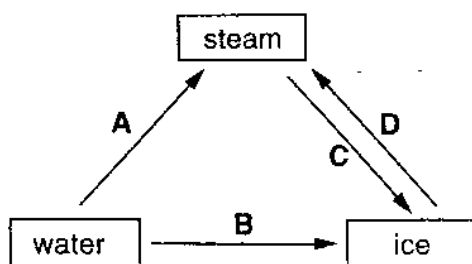
What will be the count rate after 20 hours?

- A 0
- B 62.5 units
- C 125 units
- D 250 units

20 What is the nucleon number (mass number) of a nuclide?

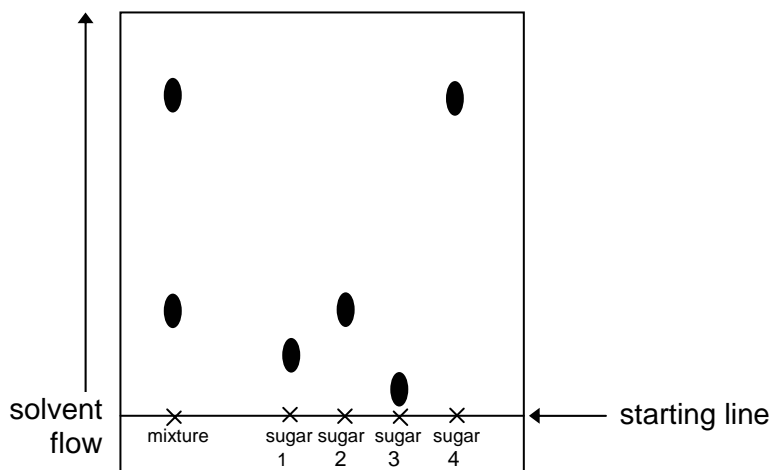
- A the number of neutrons
- B the number of protons
- C the number of neutrons and protons
- D the number of protons and electrons

21 Which change, A, B, C, or D, can involve both condensation and freezing?



22 A mixture of two sugars was compared with four different sugars using chromatography.

The results are shown in the diagram.



Which two sugars does this mixture contain?

- A 1 and 2
- B 1 and 4
- C 2 and 3
- D 2 and 4

23 The atoms of element **X** have the electronic configuration 2,8,6.

Which statement about element **X** is correct?

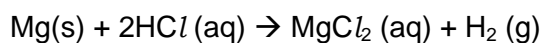
- A It forms an ionic compound with sodium.
- B It forms an ion of charge 2+.
- C It has 6 protons in the outer shell of an atom.
- D It only reacts with non-metals.

24 The elements X and Y form the compound X_2Y .

What is the correct electronic configuration of the atoms X and Y?

	electronic configuration	
	atom of X	atom of Y
A	2,1	2,7
B	2,2	2,7
C	2,1	2,6
D	2,2	2,6

25 Magnesium reacts with hydrochloric acid.



What volume of hydrogen at r.t.p. is produced if 6 g of magnesium reacts with an excess of the acid?

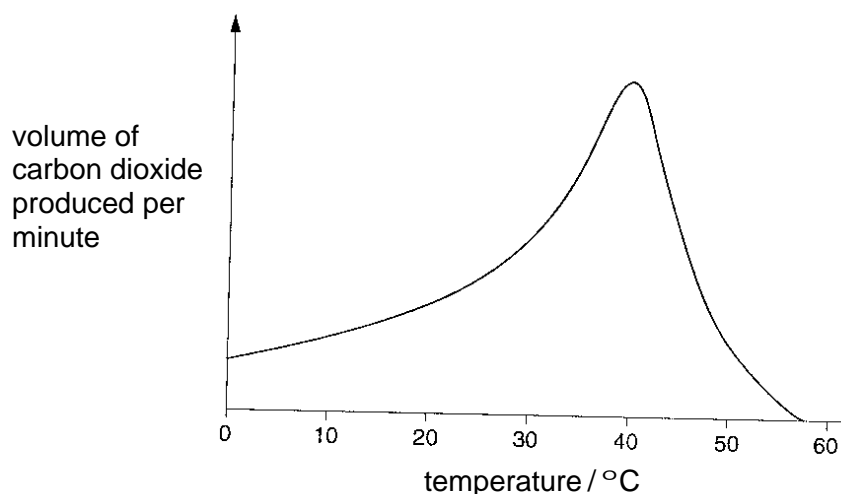
- A 1 dm³
- B 6 dm³
- C 12 dm³
- D 24 dm³

26 Which process is endothermic?

- A the formation of a hydrogen-chlorine bond
- B the formation of rust
- C the formation of water from ice
- D the formation of water from oxygen and hydrogen

27 Ethanol is produced by the fermentation of sugar. During the reaction carbon dioxide is given off.

The graph shows how the volume of carbon dioxide produced per minute varies with temperature.



Using the graph, decide which statement is correct.

- A The rate of reaction always increases with temperature.
- B The rate of reaction reaches a maximum at about 40°C.
- C The reaction is slowest at 0°C.
- D The reaction takes a long time to begin.

28 The approximate pH values of aqueous solutions of four substances commonly used in cooking are shown.

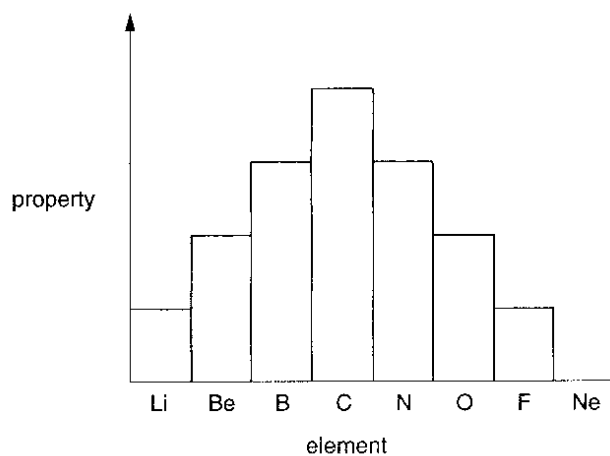
Which substance could be taken to neutralise excess acid in the stomach?

	substance	pH
A	baking soda	9
B	salt	7
C	lemon juice	4
D	vinegar	3

29 Which of the following does **not** react with dilute sulphuric acid?

- A magnesium hydroxide
- B magnesium metal
- C magnesium nitrate
- D magnesium oxide

30 The bar chart shows the period of elements from lithium to neon.



Which property of these elements is shown on the chart?

- A the number of electrons used in bonding
- B the number of orbits holding electrons
- C the proton (atomic) number
- D the relative atomic mass

31 Four elements in Group VII of the Periodic Table are shown.

chlorine bromine iodine astatine

Which combination of properties is most likely for astatine?

	state at r.t.p.	colour of vapour
A	gas	dark
B	liquid	pale
C	solid	dark
D	solid	pale

32 Which metal can be extracted by heating an ore containing its oxide with carbon?

- A calcium
- B iron
- C magnesium
- D potassium

33 The table shows some metals and their uses.

For which metal is the correct reason given for the stated use?

	metal	use	reason
A	aluminium	manufacture of aeroplane wings	strength and high density
B	copper	electrical wiring	good conductor of heat
C	iron	manufacturing stainless steel	rusts
D	zinc	galvanising iron	zinc is more reactive than iron

34 In which tube is hydrogen formed?

dilute hydrochloric acid dilute sulphuric acid dilute sulphuric acid dilute hydrochloric acid

zinc copper copper (II) oxide zinc carbonate

A **B** **C** **D**

35 Carbon monoxide is a pollutant emitted from car exhausts.

Which of its properties makes it harmful to humans?

- A** It has no colour, taste or smell.
- B** It has a corrosive action on lung tissue.
- C** It forms a stable compound with blood.
- D** It combines with oxygen in the lungs.

36 Which statement about an homologous series is **not** correct?

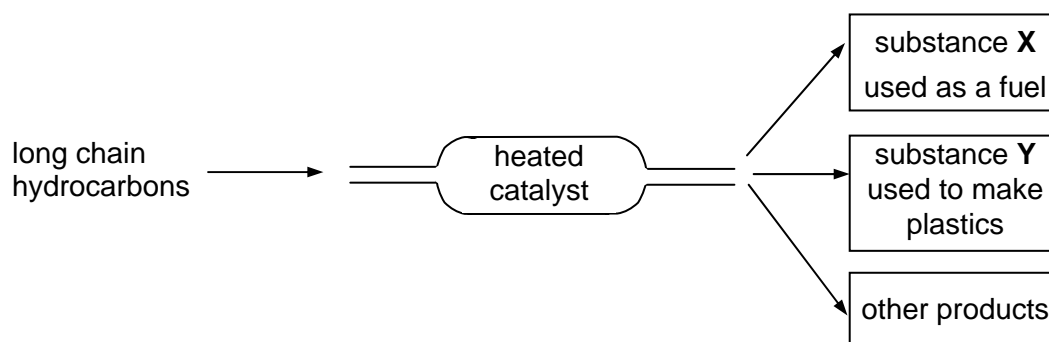
All the members of the series have the same

- A chemical reactions.
- B functional group.
- C general formula.
- D physical properties.

37 What product is formed when hydrogen reacts with an alkene?

- A an alcohol
- B an alkane
- C an organic acid
- D a polymer

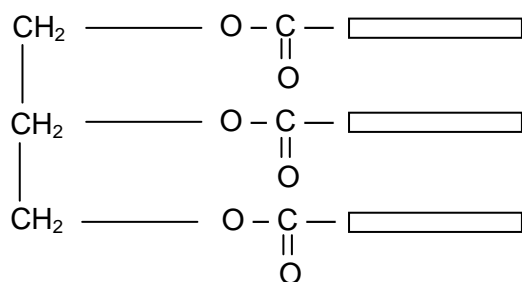
38 The diagram shows how useful products can be obtained by cracking long chain hydrocarbons.



What are **X** and **Y**?

	substance X	substance Y
A	ethanol	propene
B	hydrogen	ethene
C	methane	ethane
D	steam	ethene

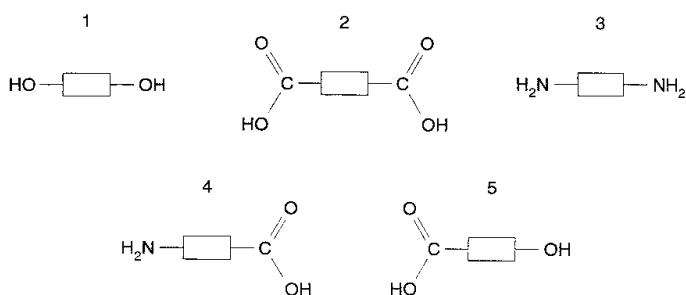
39 A fat molecule can be represented by the diagram shown.



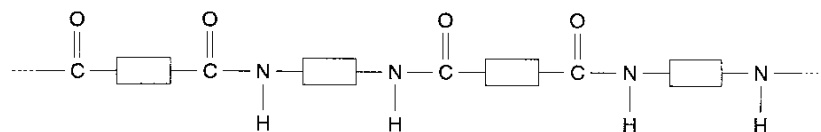
Which other macromolecule possesses the same linkage as a fat?

- A nylon
- B protein
- C starch
- D *Terylene*

40 The structure of five monomers are shown.



Which pair of monomers will form a polyamide with the following structure?



- A 1 and 2
- B 1 and 3
- C 2 and 3
- D 4 and 5