Name : _____( ) Class : _____

DAMAI SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2016

Secondary One Normal Academic

LOWER SECONDARY SCIENCE

Tuesday 11 October 2016 8.15 am – 10.05 am 1 hour 50 minutes

INSTRUCTIONS TO CANDIDATES

1. Write your full name, register number and class in the spaces provided on the cover of this question paper and on the answer booklet.

2. This paper consists of four sections.
   a. Section A – Multiple choice questions
      Answer **ALL** questions. Shade all answers on the answer sheet provided.

   b. Section B, C and D – Structured questions
      Answer **ALL** questions. Write all answers in the answer booklet provided.

3. Hand in the answer sheet, question paper and answer booklet separately at the end of the examination.

INFORMATION FOR CANDIDATES

The number of marks is given in the brackets [ ] at the end of each question.

Mistakes in spelling may be penalised in any part of the paper.

Electronic calculators may be used for this paper.

Periodic table is provided.

This question paper consists of 10 printed pages including this page.

[Turn over

Section A (30 marks)

Answer all questions. Shade all answers on the answer sheet provided.

A1 Which of the following correctly shows the prefixes from the smallest value to the largest?

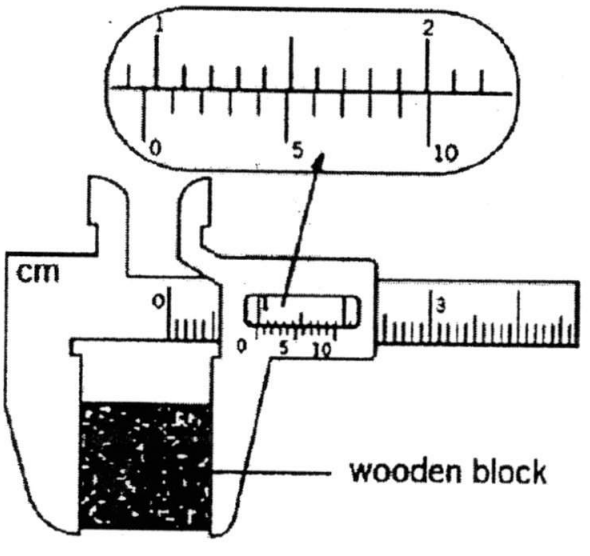
A mega, kilo, milli, nano

B kilo, mega, nano, milli

C milli, kilo, mega, nano

D nano, milli, kilo, mega

A2 The diagram below shows a wooden block being measured with a vernier calipers.

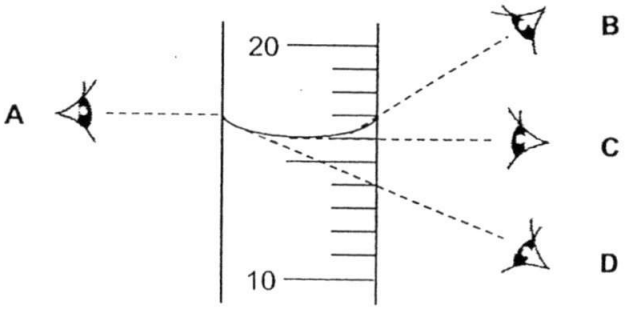


What is the reading of the vernier calipers?

A 0.88 cm **B** 0.98 cm

C 1.80 cm **D** 1.88 cm

A3 In the diagram below, where should the eye be placed so that the reading can be taken accurately?

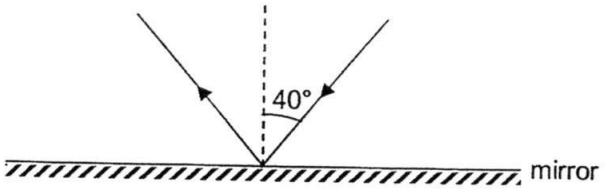


A4 Which of the following is the hardest material?

A graphite **B** steel

C glass **D** diamond

A5 The diagram below shows a ray of light reflected in a plane mirror.



Which of the following shows the correct values for the angle of reflection?

A 40° **B** 50°

C 80° **D** 100°

A6 Amy noticed a mirror at the corner of a shop and she is able to see many other customers in shop, but they looked smaller.

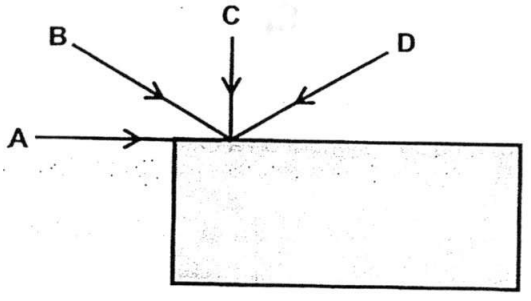
What type of mirror is being described here?

A concave mirror **B** convex mirror

C plane mirror **D** rough mirror

A7 The diagram below shows four light rays hitting the surface of a glass block in different directions.

Which of the following light rays changes speed but will **not** refract?



A8 Which of the following two colours form white light when combined?

A red and yellow **B** cyan and green

C cyan and magenta **D** green and magenta

[Turn over

A9 Which of the following best explains why a red object appears red when a mixture of red and blue light is shone on it?

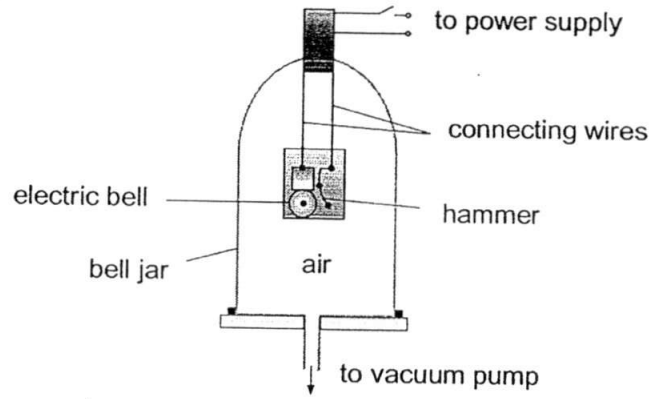
A Both lights are absorbed by the object and no light is reflected to the eyes.

B No light is absorbed by the object and both lights are reflected to the eyes.

C The blue light is absorbed by the object and red light is reflected to the eyes.

D The red light is absorbed by the object and blue light is reflected to the eyes.

A10 The diagram below shows an electric bell placed in a bell jar that is attached to a vacuum pump.



The vacuum pump is then switched on and air is slowly removed from the bell jar.

Which of the following statements is **incorrect**?

A The sound from the electric bell gets softer and softer.

B The sound from the electric bell can only travel through the air in the bell jar.

C The sound from the electric bell is produced by the vibrations of the electric bell.

D The hammer in the electric bell will continue to move even when the air in the bell jar is removed totally.

A11 The diagram shows a hazard symbol on a chemical bottle.

What will be the harmful effect if the person does not handle the substance carefully?

A The substance can cause an explosion because it can be burnt easily.

B The substance can irritate the person's skin, eyes and respiratory system.

C The substance can corrode other substances that it comes into contact with.

D The substance can emit radiation and destroy the person's body cells and tissues.

A12 The parts of the Bunsen burner and their respective functions are listed below.

Which of the following is **incorrect**?

	part	function
A	air-hole	to control the amount of air entering the burner
B	barrel	to raise the flame to a suitable height for heating
C	base	to support the entire burner and make it more stable
D	collar	to open or close the air-holes to change the type of flame

A13 Which of the following is **not** a pair of metallic and non-metallic elements?

A *Al* and Ne **B** Ca and Cl

C Mg and C **D** Li and Fe

A14 Which of the following lists consists of only compounds?

A sand, steam, water **B** air, diamond, iron

C ice, table salt, bronze **D** crude oil, helium, seawater

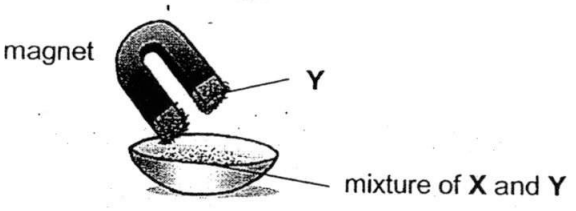
A15 Lead nitrate is a colourless crystalline solid that is toxic and must be handled with care.

How many oxygen atoms are there in one unit of lead nitrate, $Pb(NO_3)_2$?

A 1 **B** 2

C 3 **D** 6

A16 The diagram below shows the observation when a magnet is placed near a mixture of **X** and **Y**.



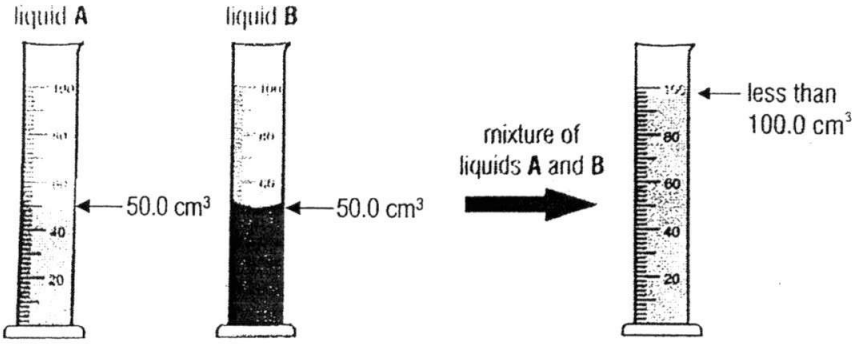
Which of the following gives the possible identities of **X** and **Y**?

	X	Y
A	aluminium	nickel
B	cobalt	carbon
C	iron	steel
D	sulfur	copper

A17 Which of the following methods is used to obtain desalinated water in Singapore?

A distillation
B reverse osmosis
C filtration
D evaporation to dryness

A18 In an experiment, as shown in the diagram below, a student form a mixture by mixing 50.0 cm^3 of liquid **A** with 50.0 cm^3 of liquid **B**. She found that the total volume of the mixture is less than 100.0 cm^3



Assuming that there is no spillage or loss in any liquid while mixing, which of the following best explains the objective of this experiment?

A To show the random motion of particles in liquids.
B To show the random arrangement of particles in liquids.
C To show the presence of space between particles in liquids.
D To show the presence of attractive force of particles in liquids.

A19 Which of the following best explains why an object expands when it is heated?

A The particles become faster.
B The particles become bigger.
C The particles become denser.
D The particles become further apart.

A20 Which of the following changes occur when a solid at 50°C becomes a liquid at 120°C?

	attractive force between particles	separation of particles	energy of particles
A	decreases	decreases	increases
B	decreases	increases	increases
C	increases	decreases	decreases
D	increases	increases	decreases

A21 Which of the following organelles listed below form the protoplasm?

I nucleus

II chloroplast

III cytoplasm

IV cell membrane

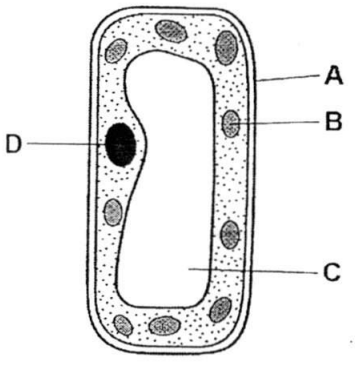
A I and III only

B I, II and III only

C I, III and IV only

D I, II, III and IV

The diagram below shows a cell from a leaf. Refer to it and answer questions **A22** and **A23**.



A22 Which of the labelled structures produces oxygen?

A23 Which of the labelled structures contains genetic material?

A24 The information below shows a sequence of how a multicellular organism is formed.

Cell → P → Organ → Q → Multicellular Organism

Which of the following gives the possible examples of **P** and **Q**?

	P	Q
A	heart	blood vessels
B	neural tissue	nervous system
C	mouth	large intestine
D	muscle tissue	stomach

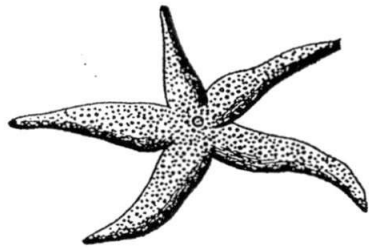
[Turn over

A25 The Scientific Classification System is a method which scientists use to categorise living things. Living things are first grouped into kingdoms, then into phyla.

Some characteristics of the animal phyla as shown below.

phyla	**Characteristics**
porifera	animals with lots of pores on their bodies, e.g. sponges
annelida	animals with lots of segments on their bodies, e.g. worms
arthropda	animals with segmented bodies and possess exoskeleton, e.g. crab
cnidaria	animals with tentacles and stinging cells with a radial symmetry, e.g. jellyfish
mollusca	animals with soft body, with many having radula, shell and muscular foot, e.g. clam
echinodermata	animals with water vascular system, usually having five lines of symmetry, e.g. sea urchin

In which phyla does the following animal most likely belong to?



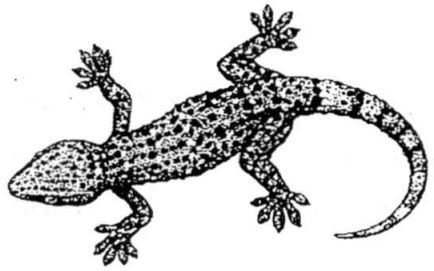
A porifera

B cnidaria

C mollusca

D echinodermata

A26 The diagram below shows two classes of animals.



Which of the following statements is correct?

A They both are cold-blooded and have moist skin.

B They both are warm-blooded and have moist skin.

C They both are cold-blooded and breathe through lungs.

D They both are warm-blooded and breathe through lungs.

A27 Which of the following shows how we can preserve the biodiversity on earth?

A Reduce harvesting of fishes in the ocean.

B Clear rainforests to build houses for humans.

C Hunt endangered species to sell for greater profits.

D Release unwanted pets into the wild to avoid killing them.

A28 Which of the following statements about animals' adaptations are **incorrect**?

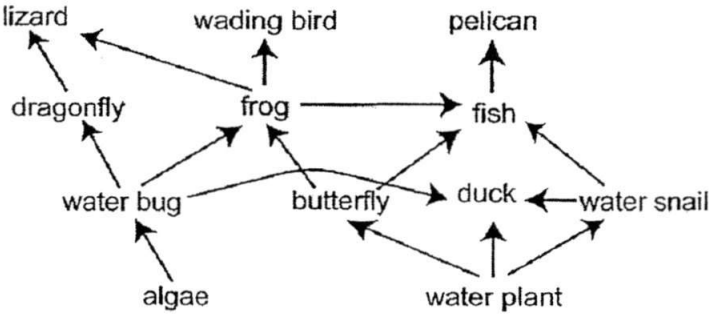
A The cactus has needle-like leaves to store water in the desert.

B The bat has a keen sense of hearing to navigate itself in the dark.

C The polar bear has thick fur to reduce heat loss to the cold artic surroundings.

D The red mangrove has stilt roots to prop itself above the water level to absorb air through the pores in its bark.

The diagram below shows a food web in a wetlands ecosystem. Refer to it and answer questions **A29** and **A30**.



A29 Which of the following organisms is a tertiary consumer?

A duck **B** frog

C lizard **D** water bug

A30 Which of the following organisms is both a primary and a secondary consumer?

A duck **B** frog

C lizard **D** water bug

~ End of Section A ~

[Turn over

The Periodic Table of the Elements

Group I	Group II											Group III	Group IV	Group V	Group VI	Group VII	Group 0
							1 H hydrogen 1										4 He helium 2
7 Li lithium 3	9 Be beryllium 4											11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
23 Na sodium 11	24 Mg magnesium 12											27 Al aluminium 13	28 Si silicon 14	31 P phosphorus 15	32 S sulfur 16	35.5 Cl chlorine 17	40 Ar argon 18
39 K potassium 19	40 Ca calcium 20	45 Sc scandium 21	48 Ti titanium 22	51 V vanadium 23	52 Cr chromium 24	55 Mn manganese 25	56 Fe iron 26	59 Co cobalt 27	59 Ni nickel 28	64 Cu copper 29	65 Zn zinc 30	70 Ga gallium 31	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
85 Rb rubidium 37	88 Sr strontium 38	89 Y yttrium 39	91 Zr zirconium 40	93 Nb niobium 41	96 Mo molybdenum 42	– Tc technetium 43	101 Ru ruthenium 44	103 Rh rhodium 45	106 Pd palladium 46	108 Ag silver 47	112 Cd cadmium 48	115 In indium 49	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
133 Cs caesium 55	137 Ba barium 56	139 La lanthanum 57 *	178 Hf hafnium 72	181 Ta tantalum 73	184 W tungsten 74	186 Re rhenium 75	190 Os osmium 76	192 Ir iridium 77	195 Pt platinum 78	197 Au gold 79	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	209 Bi bismuth 83	– Po polonium 84	– At astatine 85	– Rn radon 86
– Fr francium 87	– Ra radium 88	– Ac actinium 89 †															

*58-71 Lanthanoid series

†90-103 Actinoid series

140 Ce cerium 58	141 Pr praseodymium 59	144 Nd neodymium 60	– Pm promethium 61	150 Sm samarium 62	152 Eu europium 63	157 Gd gadolinium 64	159 Tb terbium 65	162 Dy dysprosium 66	165 Ho holmium 67	167 Er erbium 68	169 Tm thulium 69	173 Yb ytterbium 70	175 Lu lutetium 71
232 Th thorium 90	– Pa protactinium 91	238 U uranium 92	– Np neptunium 93	– Pu plutonium 94	– Am americium 95	– Cm curium 96	– Bk berkelium 97	– Cf californium 98	– Es einsteinium 99	– Fm fermium 100	– Md mendelevium 101	– No nobelium 102	– Lr lawrencium 103

Key: a – relative atomic mass; X – atomic symbol; b – proton (atomic) number

The volume of one mole of any gas is 24 dm^3 at room temperature and pressure (r.t.p.).

Name : _____ ( ) Class : _____

Parent's Signature

DAMAI SECONDARY SCHOOL
END-OF-YEAR EXAMINATION 2016

Secondary One Normal Academic

LOWER SECONDARY SCIENCE

ANSWER BOOKLET

For Teacher's Use only:

Topics	Section A	Section B, C, D	Marks
Physics	A1-10	B1 – B10	
Chemistry	A11-20	C1 – C10	
Biology	A21-30	D1 – D10	
		TOTAL	**90**

This answer booklet consists of 11 printed pages including this page.

[Turn over

Section B (20 marks)

Answer **all** questions. Write your answers in the spaces provided.

B1 Complete Fig. B1.1 to show the properties of glass considered when making laboratory apparatus.

	Transparency	Strength	Heat conductivity	Electrical conductivity	Melting point
Glass	Opaque		Poor	Poor	

Fig. B1.1

[2]

B2 Fig. B2.1 shows a steel cube of volume 4.0 cm^3 lowered into a measuring cylinder partially filled with water. The density of water and steel are 1.0 g/cm^3 and 8.0 g/cm^3 respectively.

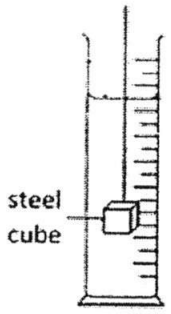


Fig. B2.1

(a) Find the mass of the water taken up by the steel cube.

Mass = ... [2]

(b) The steel cube is cut into 10 smaller pieces and then placed into the water in the measuring cylinder. Will the pieces of steel float or sink? Explain your answer.

.....

.....

..... [2]

B3 Fig. B3.1 shows a double-headed arrow **XY** placed in front of a plane mirror.

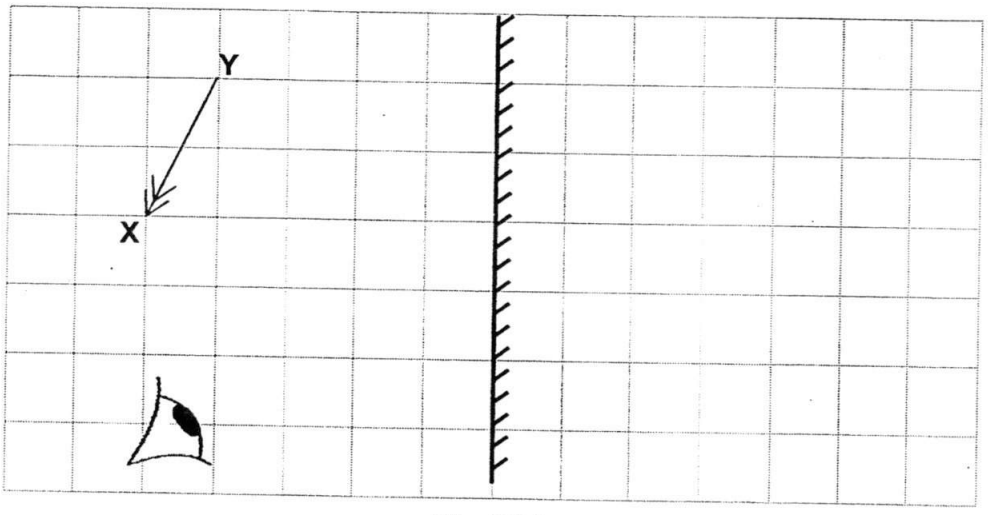


Fig. B3.1

On Fig. B3.1, draw

(a) the image of the arrow, as seen by the eye. [1]

(b) the path of two rays of light leaving point **Y** and then reflecting at the mirror before entering the eye. [2]

B4 Fig. B4.1 shows a light ray passing from material **P** to material **Q**.

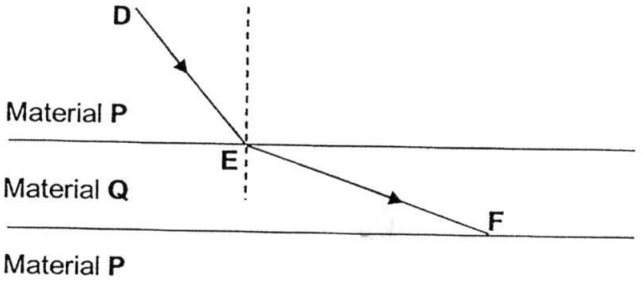


Fig. B4.1

(a) Explain why the light ray **EF** behaves in the manner shown in Fig. B4.1.

.....

.....

.....[2]

(b) On Fig. B4.1,

(i) draw the angle of refraction and label it as '*r*'. [1]

(ii) draw how the light ray behaves when it goes into material **P** again. [1]

[Turn over

B5 Fig. B5.1 shows the loudness for various sources of noises.

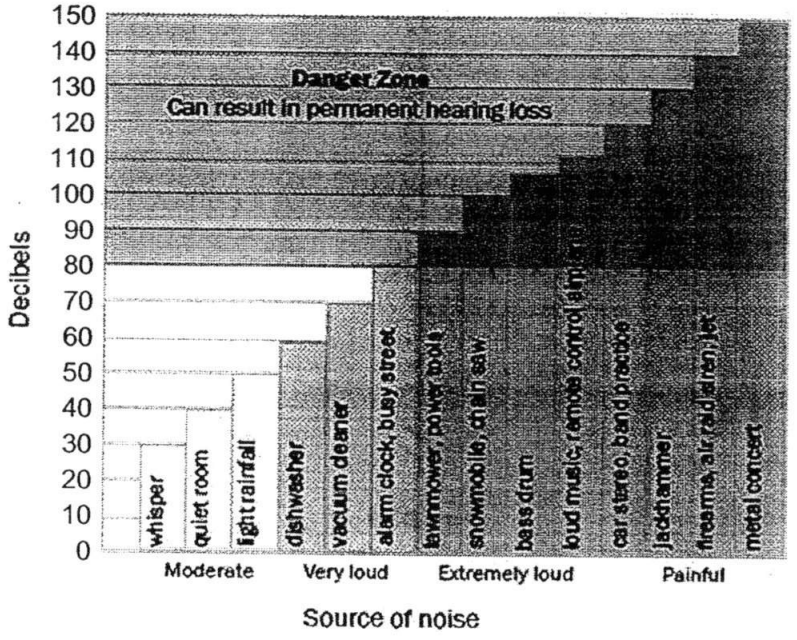


Fig. B5.1

It is recommended that single hearing protection (earplugs OR earmuffs) be used for any sound over 85 dB and double hearing protection (earplugs AND earmuffs) for any level over 105 dB.

(a) From Fig. B5.1, which source of noise can produce the loudest sound without causing any permanent damage to hearing?

.....[1]

(b) If a person uses a lawnmower to cut the grass in his backyard, what sort of ear protection would be recommended for him? Using information from Fig. B5.1, explain your answer.

.....

.....

.....[2]

B6 Fig. B6.1 shows a large diameter steel pipe 900 m long. Student **A** strikes one end of the pipe with a hammer and Student **B** listens for the sound reaching him.

Fig. B6.1

Student **B** hears two sounds: one coming through the air and the other through the pipe.

(a) Explain why Student **B** will hear the sound coming through the pipe first.

.....

..... [1]

(b) What is the speed of the sound in air if Student **B** heard it 3.0 s after the hammer struck the pipe?

Speed = ...[2]

(c) Suggest a way to increase the accuracy of the experimental result found in **(b)**.

.....

..... [1]

~ End of Section B ~

[Turn over

Section C (20 marks)

Answer **all** questions. Write your answers in the spaces provided.

C1 Ahmad and Aiman were given two unknown elements: **X** and **Y**. **X** is a silvery solid while **Y** is a yellowish solid at room temperature. From the appearance, Ahmad concluded that **X** is a metal while **Y** is a non-metal. However, Aiman disagreed that the conclusion should only be based on the appearance and conducted a series of experiments himself.

(a) **(i)** Aiman connected **X** to an electrical circuit with a light bulb. If **X** is a metal, what will he see?

.....

..... [1]

(ii) Aiman dropped **X** onto the hard floor. If **X** is a metal, what will he hear?

.....

..... [1]

(b) State one difference between the physical properties of **X** and **Y**, other than the one mentioned in **(a)** and the question above.

.....

.....[1]

(c) Fig. C1.1 shows the arrangement of three different types of particles. They are represented by ◯, ◍ and ⊛.

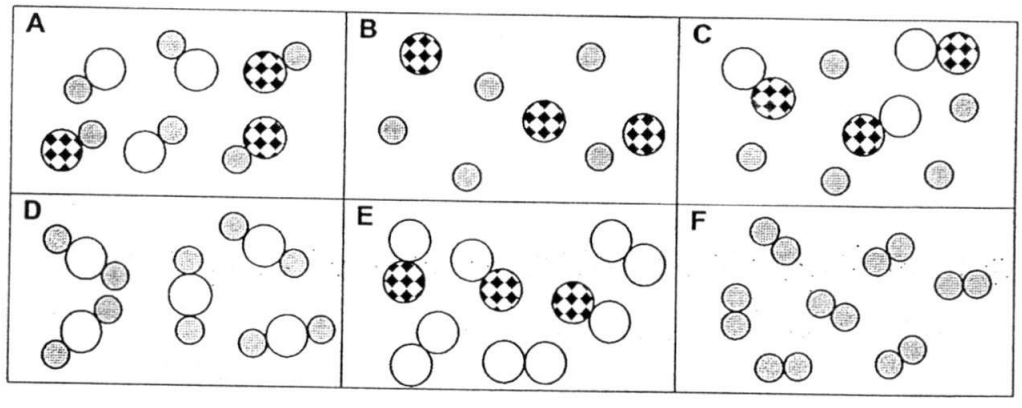


Fig. C1.1

From Fig. C1.1, which diagram best represents

(i) a mixture of **X** and **Y**, ...

(ii) a compound of **X** and **Y** when **X** reacts with **Y**? .....

[2]

C2 Fig. C2.1 shows an experimental setup to investigate how the rate of dissolving of a sugar cube in water is affected by a certain factor.

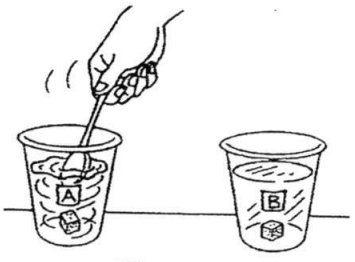


Fig. C2.1

(a) State the factor that is being investigated in the experiment.

.....[1]

(b) In which cup will the sugar dissolve faster?

.....[1]

(c) State one variable to be kept constant so that the experiment is fair.

.....[1]

(d) Suggest **another** way to dissolve the sugar faster.

.....[1]

C3 The apparatus in Fig. C3.1 shows how a mixture of ethanol and water can be separated using simple distillation.

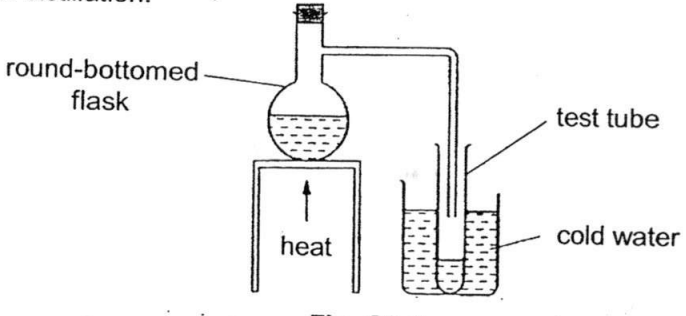


Fig. C3.1

(a) Name the two physical processes that are required for this method of separation to take place.

.....[2]

(b) What is the liquid collected in the test tube?

.....[1]

(c) On Fig. C3.1, use 'X' to indicate the position of the bulb of a thermometer in the round-bottomed flask to show the identity of the liquid in the test tube. [1]

[Turn over

C4 The apparatus in Fig. C4.1 was used to find out the number of different dyes present in an ink mixture.

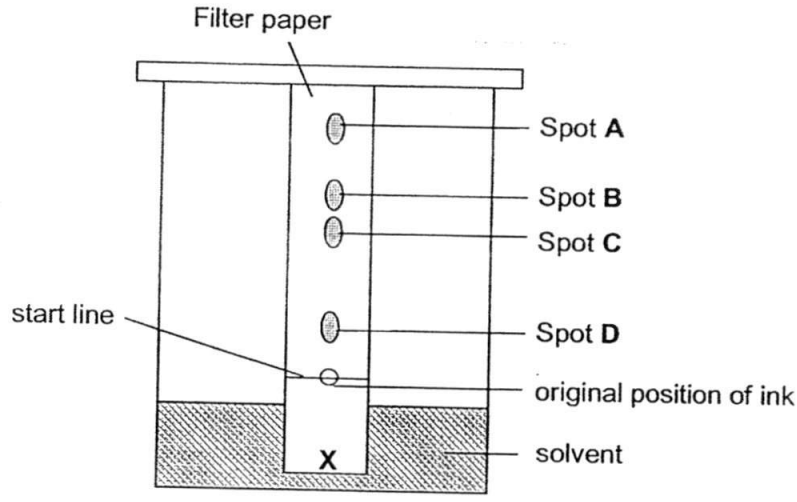


Fig. C4.1

(a) What is this method of separation called?

.....[1]

(b) How many different dyes did the ink mixture contain?

.....[1]

(c) Which dye was the most soluble in the solvent?

.....[1]

(d) Describe what would be observed if the ink mixture had been placed at **X** on the filter paper instead.

.....

.....[1]

C5 Substance **P** has a very high density, a fixed shape and a fixed volume.

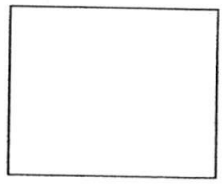


Fig. C5.1

(a) On Fig. C5.1, draw how the particles look like in substance **P**. [1]

(b) Describe the arrangement and the motion of the particles in substance **P**.

.....

.....[2]

~ End of Section C ~

Section D (20 marks)

Answer **all** questions. Write your answers in the spaces provided.

D1 Fig. D1.1 shows the anatomy of an amoeba.

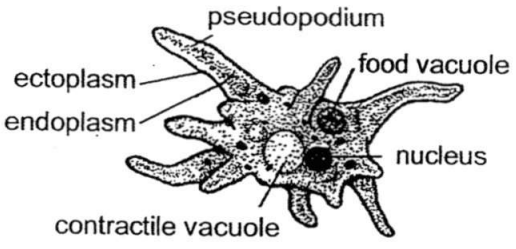


Fig. D1.1

(a) From D1.1, state one similarity between the amoeba and a plant cell.

.....

..... [1]

(b) Amoeba is a unicellular organism that can take any shape that it likes. Explain why a plant cell is **not** able to do so.

.....

..... [1]

D2 Fig. D2.1 shows the structure of typical human cheek cells seen through a microscope.

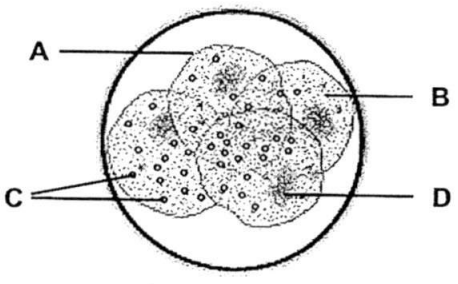


Fig. D2.1

(a) Name the structures labelled **A** and **B**.

(i) **A** .....

(ii) **B** .....

[2]

(b) State the functions of structures labelled **C** and **D**.

(i) **C:** .....

(ii) **D:** .....

[2]

[Turn over

D3 **(a)** Explain what is meant by '*division of labour*' in a multicellular organism.

.....

..... [1]

(b) State briefly the benefits of division of labour among cells, tissues, organs and systems in a multicellular organism.

.....

..... [1]

D4 **(a)** Explain why it is necessary to classify living things.

.....

..... [1]

(b) Complete Fig. D4.1 to show how animals can be classified.

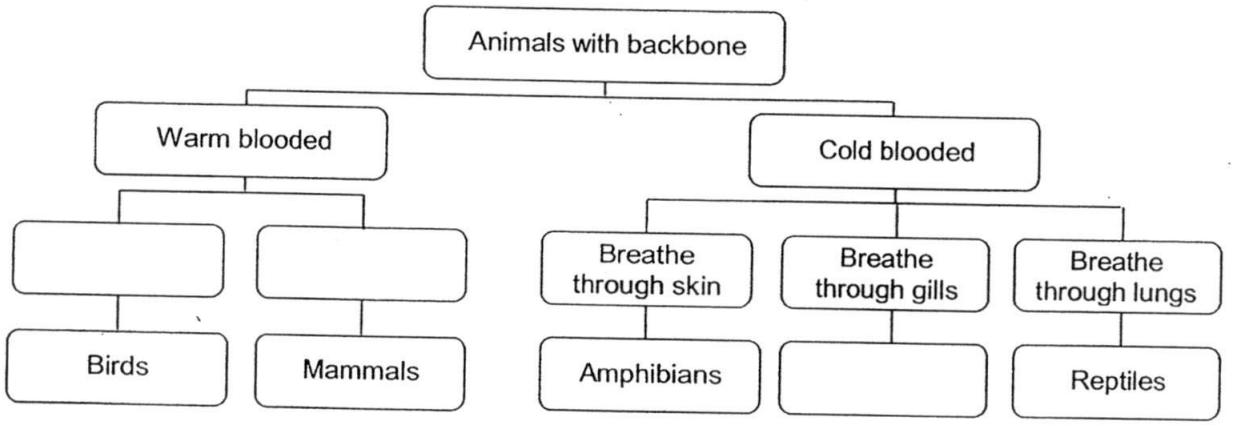


Fig. D4.1 [3]

(c) Explain why the classification shown in Fig. D4.1 is **not** a dichotomous key.

.....

..... [1]

D5 Fig. D5.1 shows some organisms found in a particular habitat.

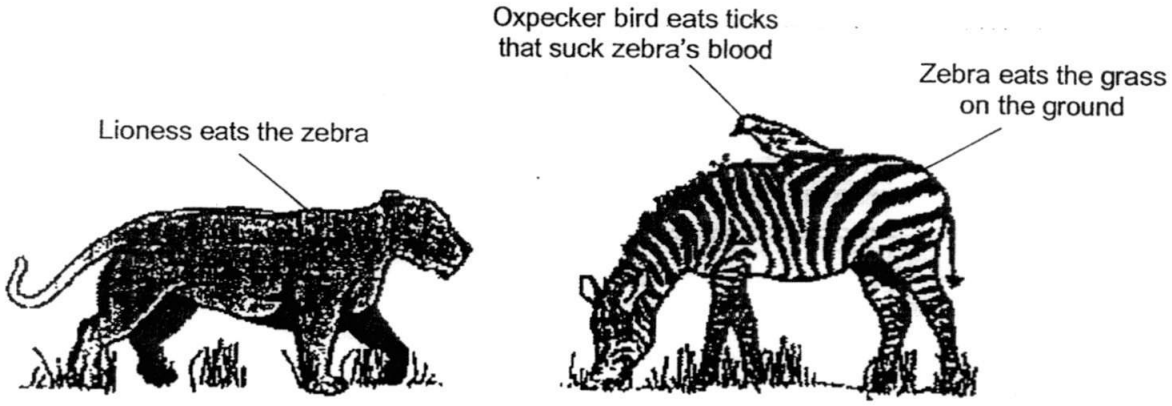


Fig. D5.1

(a) Based on the organisms shown and described in Fig. D5.1, draw a four-level food chain in the space provided below.

[1]

(b) State the type of relationship between the following organisms:

(i) zebra and tick .....

(ii) zebra and oxpecker bird .....

[2]

(c) Which organism shown in Fig. D5.1 has the largest population? Explain your answer.

.....

..... [2]

(d) How is the population of the grass affected when the most of the lioness suddenly die due to a disease? Explain your answer.

.....

.....

..... [2]

~ End of Section D ~

~ END OF PAPER ~

Name of Setter: Mr Tan Wei Zhi

ANSWER SCHEME

Section A

1	2	3	4	5	6	7	8	9	10
D	B	C	D	A	B	C	D	C	B
11	12	13	14	15	16	17	18	19	20
C	A	D	A	D	A	B	C	D	B
21	22	23	24	25	26	27	28	29	30
C	B	D	B	D	C	A	A	C	A

Section B (20 marks)

B1 Complete Fig. B1.1 to show the properties of glass considered when making laboratory apparatus.

	Transparency	**Strength**	**Heat conductivity**	**Electrical conductivity**	**Melting point**
Glass	Opaque	**High [1]**	Poor	Poor	**High [1]**

Fig. B1.1

[2]

B2 Fig. B2.1 shows a steel cube of volume 4.0 cm^3 lowered into a measuring cylinder partially filled with water. The density of water and steel are 1.0 g/cm^3 and 8.0 g/cm^3 respectively.

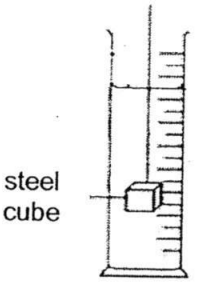


Fig. B2.1

(a) Find the mass of the water taken up by the steel cube.

Mass of water = Density x Volume = 1.0 g/cm^3 x 4.0 cm^3 [1] = 4.0 g [1]

(b) Describe what will be observed if the steel cube is cut into 10 smaller pieces and then placed into the water in the measuring cylinder. Explain your answer.

The steel will still sink [1]. The density remains the same [1].

B3 Fig. B3.1 shows a double-headed arrow **XY** placed in front of a plane mirror.

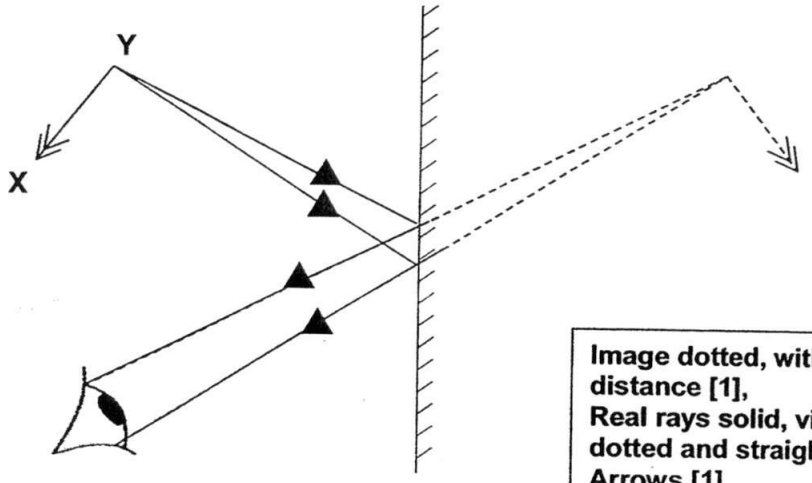


Fig. B3.1

Image dotted, with correct distance [1],
Real rays solid, virtual rays dotted and straight [1]
Arrows [1]

On Fig. B3.1, draw

(a) the image of the arrow, as seen by the eye. [1]

(b) the path of two rays of light leaving point **Y** and then reflecting at the mirror before entering the eye. [2]

B4 Fig. B4.1 shows a light ray passing from material **P** to material **Q**.

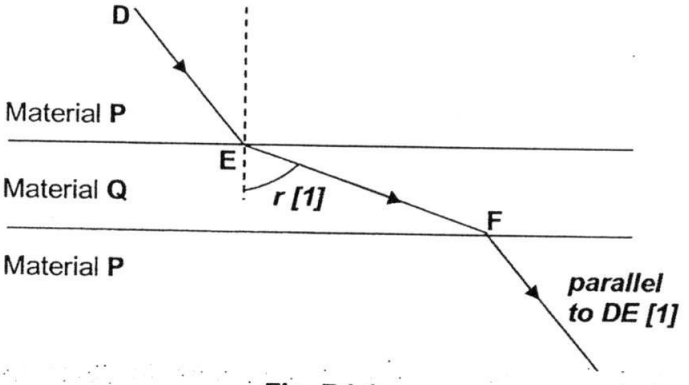


Fig. B4.1

(a) Explain why the light ray **EF** behaves in the manner shown in Fig. B4.1.

The light EF is travelling from optically denser to optically less dense medium [1], and it travels faster [1].

(b) On Fig. B4.1,

(i) draw the angle of refraction and label it as '***r***'. [1]

(ii) draw how the light ray behaves when it goes into material **P** again. [1]

B5 Fig. B5.1 shows the loudness for various sources of noises.

It is recommended that single hearing protection (earplugs OR earmuffs) be used for any sound over 85 dB and double hearing protection (earplugs AND earmuffs) for any level over 105 dB.

(a) From Fig. B5.1, which source of noise can produce the loudest sound without causing any permanent damage to hearing?

Alarm clock / busy street [1]

(b) If a person uses a lawnmower to cut the grass in his backyard, what sort of ear protection would be recommended for him? Explain your answer.

Single hearing protection / Earplugs / Earmuffs [1].

The volume of lawnmower is between 85 dB and 105 dB [1].

B6 Fig. B6.1 shows a large diameter steel pipe 900 m long. Student **A** strikes one end of the pipe with a hammer and Student **B** listens for the sound reaching him.

Fig. B6.1

Student **B** hears two sounds: one coming through the air and the other through the pipe.

(a) Explain why Student **B** will hear the sound coming through the pipe first.

Sounds travel <u>faster in solids than in gases</u> [1]. *do not accept travel faster in pipe than in air

(b) What is the speed of the sound if he heard it 3.0 s after the hammer struck the pipe?

Speed = Distance / Time = 900 m / 3.0 s [1] = 300 m/s [1]

(c) Suggest a way to increase the accuracy of the experimental result found in **(b)**.

Repeat the experiment and take the average [1]

Section C (20 marks)

C1 Ahmad and Aiman were given two unknown elements: **X** and **Y**. **X** is a silvery solid while **Y** is a yellowish solid at room temperature. From the appearance, Ahmad concluded that **X** is a metal while **Y** is a non-metal. However, Aiman disagreed that the conclusion should only be based on the appearance.

(a) **(i)** Aiman connected **X** to an electrical circuit with a light bulb. If **X** is a metal, what will he see?

The light bulb will light up [1].

(ii) Aiman dropped **X** onto the hard floor. If **X** is a metal, what will he hear?

A ringing sound [1].

(b) State one difference between the physical properties of **X** and **Y**, other than the one mentioned in **(a)** and the question above.

General properties	Metals	Non-metals
Ability to withstand stress	Malleable, Ductile	Brittle, Non-ductile
Density	High	Low
Melting & Boiling points	High	Low
Conductor of heat	Good	Poor

***must be different from part a** **[1]**

(c) Fig. C1.1 shows the arrangement of three different types of particles. They are represented by ◯, ◎ and ⊛.

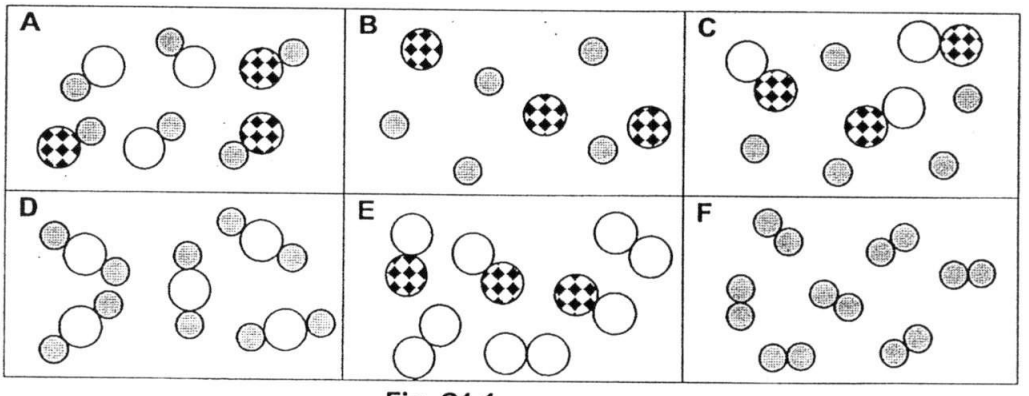


Fig. C1.1

From Fig. C1.1, which diagram best represents

(i) a mixture of **X** and **Y**, **B [1]**

(ii) a compound of **X** and **Y** when **X** reacts with **Y**? **D [1]**

C2 Fig. C2.1 shows an experimental setup to investigate how the rate of dissolving of a sugar cube in water is affected by the rate of stirring.

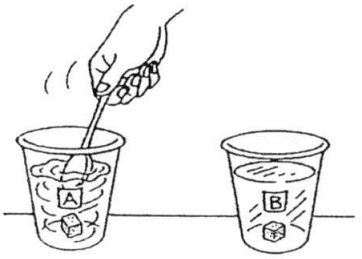


Fig. C2.1

(a) State the factor that is being investigated in the experiment.

The rate of stirring [1]

(b) In which cup will the sugar dissolve faster?

A [1]

(c) State one variable to be kept constant so that the experiment is fair.

Same volume of water / Same mass of sugar cube / Same temperature of water [1]

(d) Suggest **another** way to dissolve the sugar faster.

Crush the sugar cube into fine sugar / Heat the water [1].

C3 The apparatus in Fig. C3.1 shows how a mixture of ethanol and water can be separated.

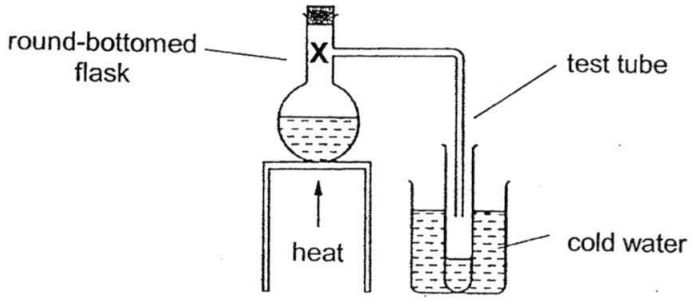


Fig. C3.1

(a) Name the two physical processes required for this method of separation to work.

Boiling [1], condensation [1]

(b) What is the liquid collected in the test tube?

Ethanol [1].

(c) On Fig. C3.1, use 'X' to indicate the position of the bulb of a thermometer in the round-bottomed flask to show the identity of the liquid in the test tube. [1]

C4 The apparatus in Fig. C4.1 was used to find out the number of different dyes present in an ink mixture.

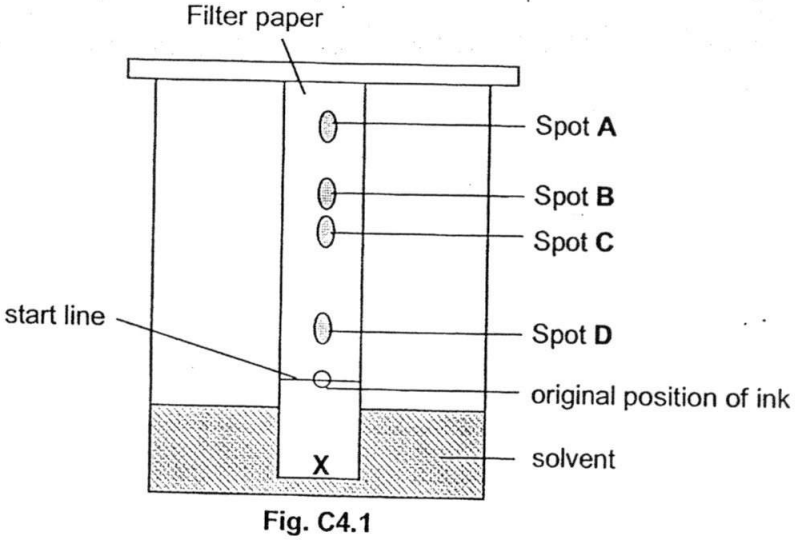


Fig. C4.1

(a) What is this method of separation called?

Paper chromatography [1].

(b) How many different dyes did the ink mixture contain?

4 [1]

(c) Which dye was the most soluble in the solvent?

Dye A [1]

(d) Describe what would be observed if the ink mixture had been placed at **X** on the filter paper instead.

No spots will be on the filter paper [1] / The solvent becomes the colour of the ink mixture [1].

C5 Substance **P** has a very high density, a fixed shape and a fixed volume.

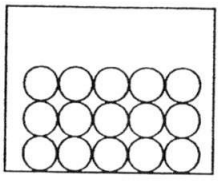


Fig. C5.1

(a) On Fig. C5.1, draw how the particles look like in substance **P**. [1]

(b) Describe the arrangement and the motion of the particles in substance **P**.

The particles are <u>very closely packed</u> in <u>orderly</u> manner [1].

The particles <u>vibrate</u> about their <u>fixed</u> positions [1].

Section D (20 marks)

D1 Fig. D1.1 shows the anatomy of an amoeba.

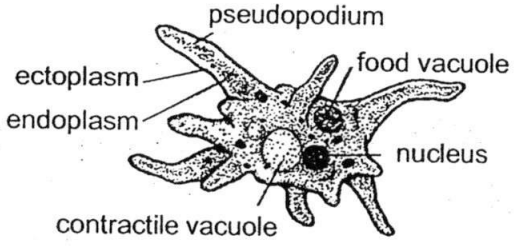


Fig. D1.1

(a) From D1.1, state one similarity between the amoeba and a plant cell.

They both have nucleus / vacuole [1].

(b) Amoeba is a unicellular organism that can take any shape that it likes. Explain why a plant cell is **not** able to do so.

A plant cell has a cell wall [1].

D2 Fig. D2.1 shows the structure of typical human cheek cells seen through a microscope.

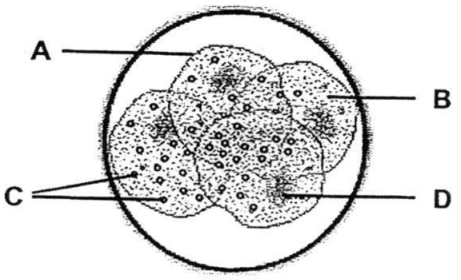


Fig. D2.1

(a) Name the structures labelled **A** and **B**.

(i) A **cell membrane [1]**

(ii) B **cytoplasm [1]**

(b) State the functions of structures labelled **C** and **D**.

(i) C: **Store water and nutrients [1]**

(ii) D: **Controls cell activities / contains chromosomes [1]**

D3 **(a)** Explain why is meant by '*division of labour*' in a multicellular organism.

It is the <u>breakdown of workload into smaller and specialised tasks</u> to be done by the cells, tissues, organs, and systems [1].

(b) State briefly the benefits of division of labour among cells, tissues, organs and systems in a multicellular organism.

It allows tasks to be performed quickly and <u>efficiently</u> [1].

D4 **(a)** Explain why it is necessary to classify living things.

To allow easier identification of living things / To identify relationship between living organisms / To allow systematic way of studying living things [1]

(b) Complete Fig. D4.1 to show how animals can be classified.

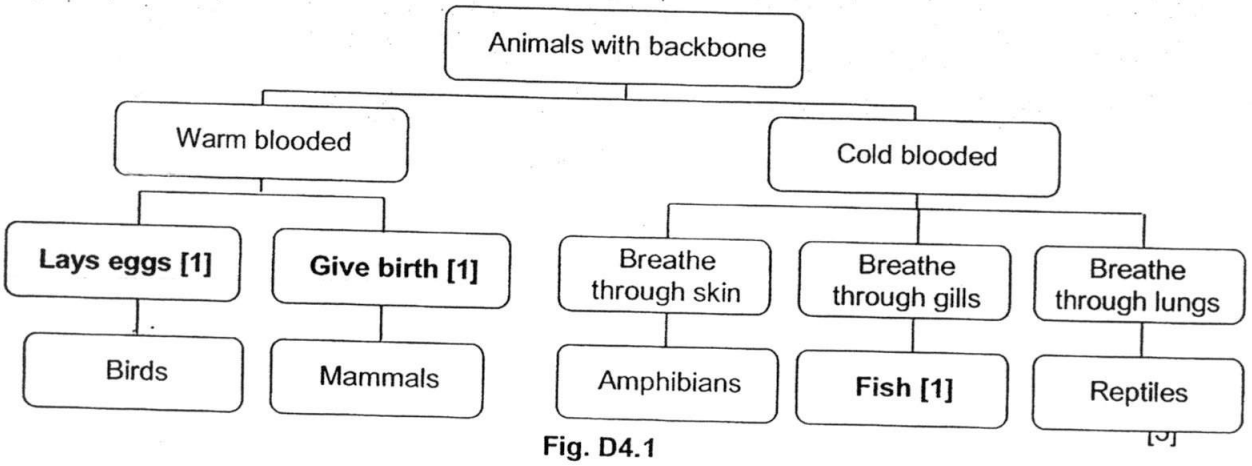


Fig. D4.1

[5]

(c) Explain why the classification shown in Fig. D4.1 is **not** a dichotomous key.

The animals are <u>not divided into two</u> at every level [1]

D5 Fig. D5.1 shows some organisms found in a particular habitat.

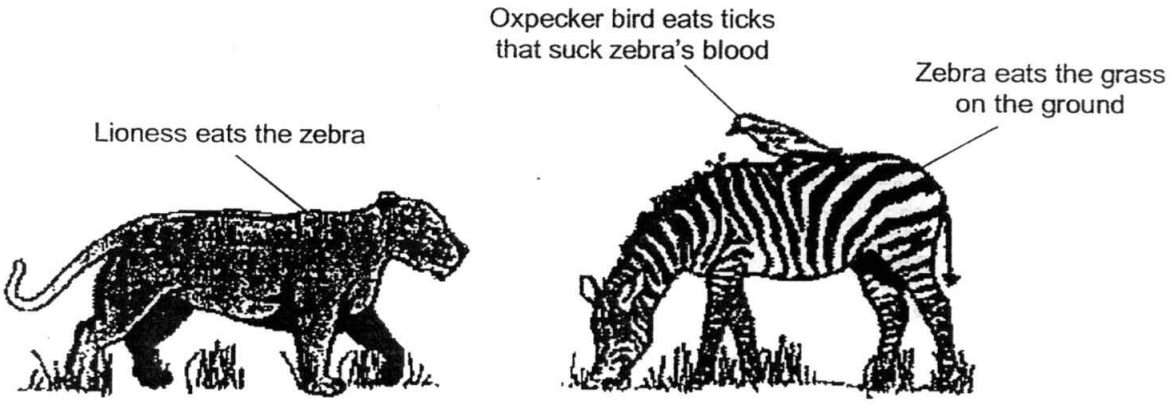


Fig. D4.1

(a) Based on the organisms shown and described in Fig. D9.1, draw a four-level food chain in the space provided below.

grass ==> zebra ==> tick ==> oxpecker bird [1]

(b) State the type of relationship between the following organisms:

(i) zebra and tick **parasitism [1]**

(ii) zebra and oxpecker bird **mutualism [1]**

(c) Which organism shown in Fig. D9.1 has the largest population? Explain your answer.

Grass [1]. It is provide enough energy for all organisms in the food chain [1]

(d) How is the population of the grass affected when the most of the lioness suddenly die due to a disease? Explain your answer.

Grass will decrease [1]. Lesser lioness means lesser predators to eat zebra, thus more zebras will eat up the grass [1].