Name :	Class	Index no.

DEYI SECONDARY SCHOOL

End - Of - Year Examination 2016
Secondary One Express

SCIENCE

13 October 2016
0800 – 1000h
2 hours

Additional Material: OTAS

READ THESE INSTRUCTIONS FIRST

1. There are **three** sections in this paper: Section **A** (30 marks), Section **B** (40 marks) and Section **C** (30 marks).
2. Answer **ALL** questions in Section **A** on the **OTAS** provided.
3. Answer **ALL** questions in Sections **B** and **C** in the spaces provided.
4. Hand in the **OTAS** separately from the answers to Sections **B** and **C**.

SECTION A (30 marks)

Choose the most appropriate answer and shade it in the OTAS provided.

1 Which of the following warning symbols can be found on a truck transporting petrol?

A 

B 

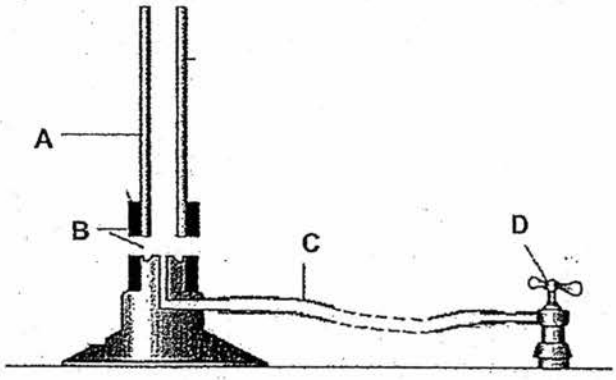
C 

D 

2 Which laboratory apparatus does the symbol below represent?

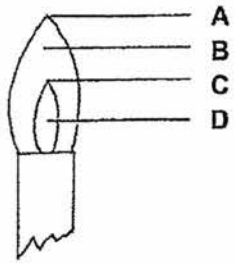
A Beaker
B Conical flask
C Evaporating dish
D Filter funnel

3 The diagram below shows a bunsen burner.



Which part should Mary adjust if she wants to heat an evaporating dish containing salt solution without getting soot on the evaporating dish?

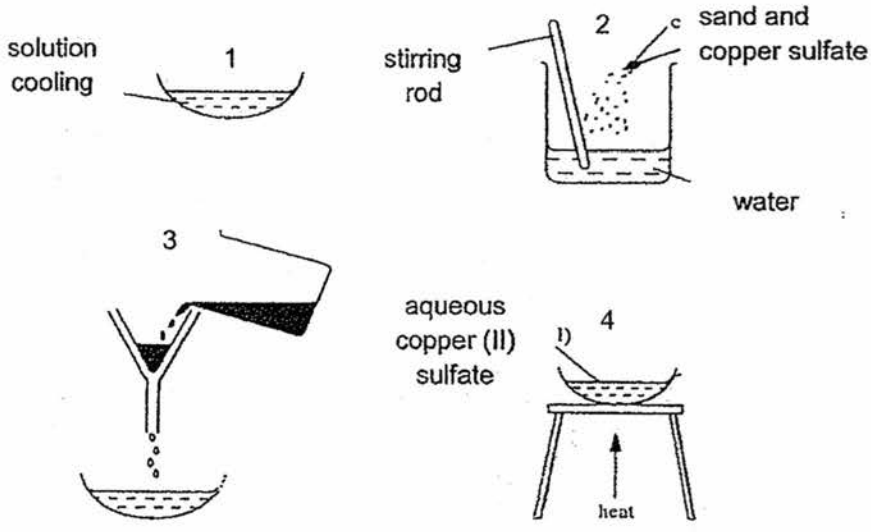
4 At which point of the non-luminous flame is the hottest region?



5 Adrian saw his classmate pouring unused chemicals back into the bottles from which he obtained the chemicals. He then told his classmate that he should not have done that. Why did Adrian say that?

A The chemicals are cheap and should be thrown away.
B The chemicals in the bottles may be contaminated.
C The chemicals in the bottle may explode.
D The concentration of the chemicals may be increased.

6 The diagram represents some stages used in the science laboratory for the preparation of soluble copper (II) sulfate salt crystals from sand.

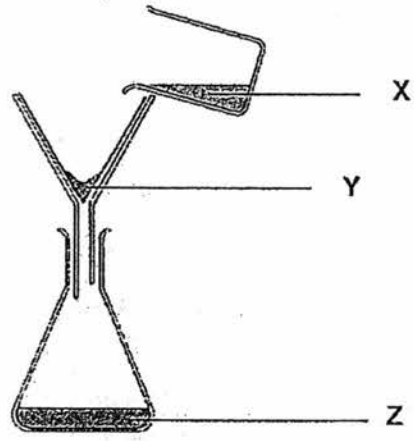


Arrange the following stages in the correct order.

	First			Last
A	1	2	3	4
B	2	3	4	1
C	2	4	3	1
D	4	2	1	3

For questions **7** and **8**, refer to the diagram below.

7 Shirley had to carry out a task in the school laboratory where she had to separate the components of a mixture. The setup was as shown below.



What is the name of this separation technique?

A Evaporation to dryness
B Filtration
C Chromatography
D Crystallisation

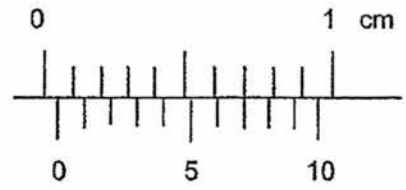
8 Which of the following correctly represents **X**, **Y** and **Z**?

	X	Y	Z
A	solution	residue	filtrate
B	suspension	filtrate	residue
C	suspension	residue	filtrate
D	solvent	suspension	solution

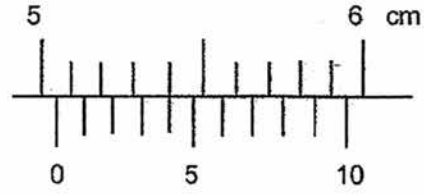
9 Which of the following conversions is **incorrect**?

A 5.7 kg = 5700000 mg
B 10 cm = 100 mm
C 0.6 s = 60.0 ms
D $7.6m^2 = 76000cm^2$

10 Ron measured the diameter of a beaker using a vernier caliper. The reading below shows the reading of the vernier caliper when the jaws are closed.



The vernier caliper is then used to measure the internal diameter of a beaker and the reading is as shown as below.



What is the **corrected** reading of the internal diameter of the beaker?

A 4.70 cm
B 4.97 cm
C 5.04 cm
D 5.11 cm

11 Element **X** is found to have similar chemical properties as nitrogen in the Periodic Table. Which of the following is true regarding element **X**?

A It belongs to Group III in the Periodic Table.
B It does not have good electrical conductivity.
C It has a very high melting point.
D It is a magnetic material.

12 How many atoms are present in the molecule, CH_3CO_2Na?

A 7
B 8
C 9
D 10

13 Some properties of four substances **W**, **X**, **Y** and **Z** are given in the table.

Substance	Upon heating	Percentage composition by mass
W	Melts	Varies
X	Melts	Fixed
Y	Burns	Varies
Z	Breaks down	Fixed

Which of the following classifications of the substances is correct?

	W	X	Y	Z
A	Mixture	Element	Mixture	Compound
B	Compound	Mixture	Element	Mixture
C	Mixture	Element	Compound	Element
D	Element	Mixture	Mixture	Compound

14 The table below shows the solubility of solids **P**, **Q** and **R** in different solvents.

	Does the solid dissolve in the solvent?		
	Solid **P**	Solid **Q**	Solid **R**
Solvent **S**	yes	no	yes
Solvent **T**	no	no	yes
Solvent **U**	no	yes	yes

Which solid(s) dissolve(s) in the most number of solvents?

A Solid **P**
B Solid **Q**
C Solid **R**
D Solid **P** and **Q**

15 The table below shows some differences between a solution and a suspension. Which one correctly describes the difference between a solution and a suspension?

	Solution	Suspension
A	Soluble mixture	Insoluble mixture
B	Does not allow light to pass through	Allows light to pass through
C	Cloudy	Clear
D	Many particles settle at the bottom	No particles seen

16 The liver is an organ because

A it is made of different types of cells performing the same job.
B it is made of different types of organelles performing the same job.
C it is made of several tissues working together to perform a function.
D it is made of several systems working together to perform a function.

17 All the members of the Smith family have dark brown hair. Which part of the cell determines the colour of the hair?

A Cell membrane
B Chromosomes
C Cytoplasm
D Vacuole

18 The diagram shows a specialized cell from a plant.

For which function is the cell modified?

A Absorption of water
B Photosynthesis
C Storage of food
D Support

19 Why can air be pumped into bicycle tyres even though the tyres appear filled?

A Air particles can be pushed apart by pumping action.
B Air particles decreased in size when compressed.
C Spaces between particles can be compressed in a given space.
D The particles of air lose energy and move slowly, so more can be squeezed in.

20 The digestion of food in the human alimentary canal ends at the

A anus.
B large intestine.
C mouth.
D small intestine.

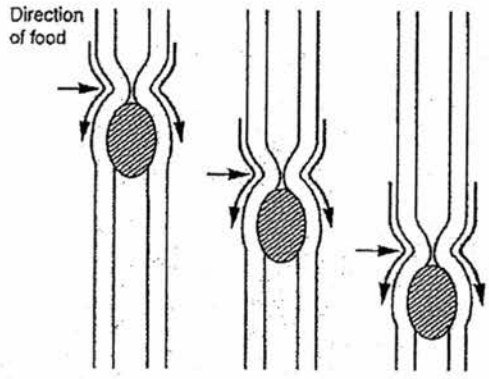
21 A student was given three test tubes, each containing two food substances. The student was asked to identify the food substances present in each test tube. The table below shows the results of the tests.

Test Tube	Biuret's Test	Benedict's Test	Iodine Test
X	Violet solution	Orange-red precipitate	Brown solution
Y	Violet solution	Blue solution	Blue-black solution
Z	Blue solution	Orange-red precipitate	Blue-black solution

Which conclusion is consistent with the results?

A Proteins and reducing sugar are present in test tube **X**.
B Proteins and reducing sugar are present in test tube **Y**.
C Starch and reducing sugar are present in test tube **Y**.
D Starch and proteins are present in test tube **Z**.

22 The diagram below shows a process that takes place in the oesophagus.



What is the process?

A Choking
B Lubrication
C Peristalsis
D Swallowing

23 Which process(es) is/are involved in the uptake of mineral salt in plants?

	diffusion	osmosis	active transport
A	√	X	√
B	√	√	X
C	√	√	√
D	X	√	X

24 What are blood vessels made up of?

I arteries
II nerves
III veins
IV capillaries

A I, II and III only
B I, III and IV only
C II, III and IV only
D All of the above

25 Which of the following correctly represents the process of respiration?

A Glucose + oxygen → carbon dioxide + water + energy
B Glucose + water → carbon dioxide + oxygen + energy
C Glucose + oxygen + energy → carbon dioxide + water
D Glucose + water + carbon dioxide → oxygen + energy

26 Aerobic respiration requires

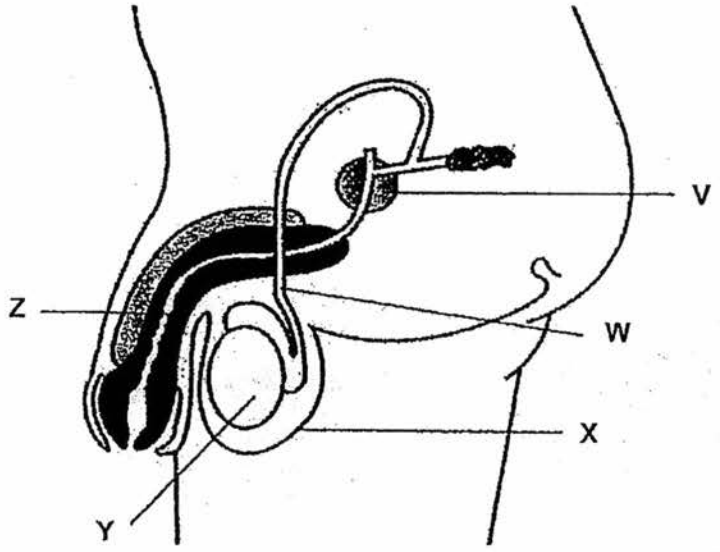
A carbon dioxide.
B energy.
C oxygen.
D water.

27 Which of the following changes are associated with a boy when he reaches puberty?

I Deepening of voice.
II Growth of pubic hair.
III Height spurt.
IV Widening of hips.

A I, II, III
B I, II, IV
C I, III, IV
D II, III, IV

For questions **28** and **29**, refer to the diagram below.



28 Which part produces sperms and male sex hormones?

A V
B W
C X
D Y

29 Alex decides to undergo a vasectomy. Which part is affected by this?

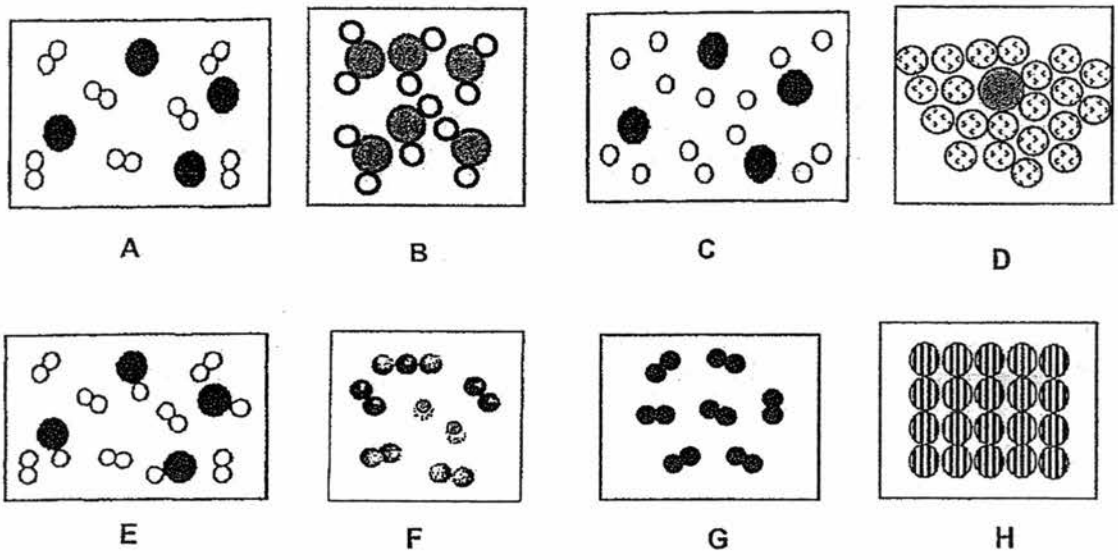
A W
B X
C Y
D Z

30 In which part of the female reproductive system does fertilisation occur?

A Cervix
B Oviduct
C Uterus
D Vagina

SECTION B (40 marks)
Answer ALL questions in the spaces provided.

1 The figure below shows how particles are arranged in different substances.



Using only letters **A** to **H**, choose the diagram that best describe(s) the statements below. [4]
Each letter can be used once, more than once, or not at all.

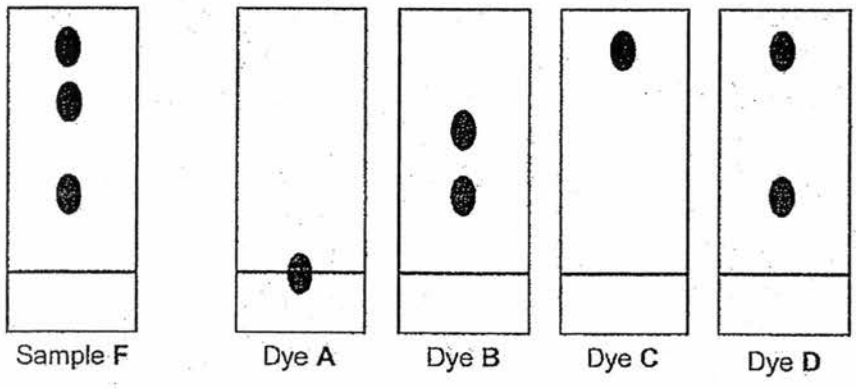
(a) Water molecules _____

(b) Neon and argon atoms _____

(c) Chlorine gas molecules _____

(d) Air molecules _____

2 Paper chromatography was used to identify the dyes found in food sample **F**. Sample **F** is therefore compared to known and safe dyes **A**, **B**, **C** and **D**. The resulting chromatograms are shown below.

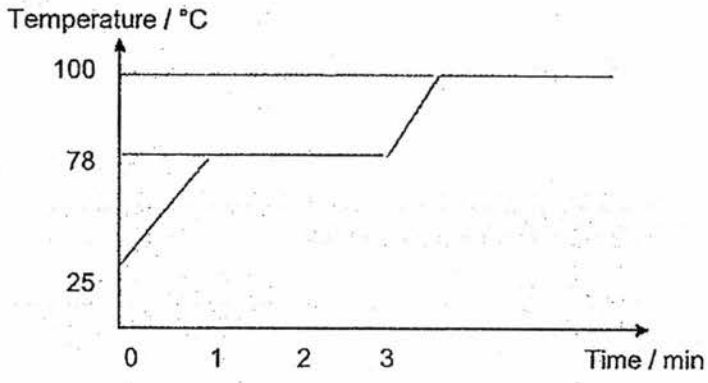


(a) Which of the dyes **A**, **B**, **C** and **D** are present in **F**? [1]

(b) Suggest why a chromatogram did not form for dye **A**. [1]

(c) Is it safe to consume food dye **F**? Explain your answer. [2]

3 The graph below shows how the temperature varies with time as solid **X** is heated.

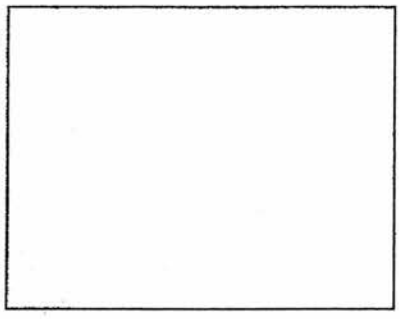


(a) State the melting point of substance **X**. [1]

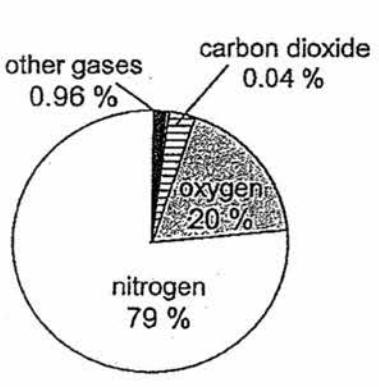
(b) Explain why the temperature remains constant at 100 °C. [2]

(c) Use kinetic particle theory to describe the change in terms of motion and arrangement of the particles during 0 – 3 minutes. [3]

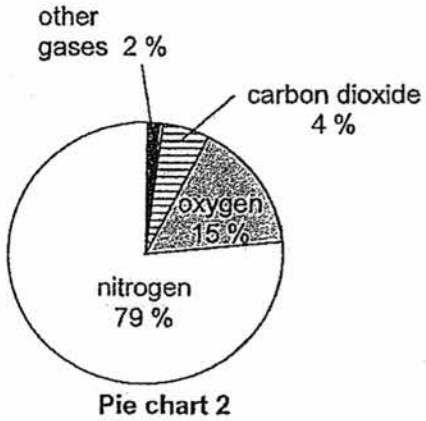
(d) Draw the arrangement of the particles of substance **X** at 85 °C in the space provided below. [1]



4 The two pie charts below show the percentage composition of exhaled air and inhaled air obtained from a student.



Pie chart 1



Pie chart 2

(a) Which pie chart most likely represents a sample of exhaled air? Explain your answer. [2]

_____

_____

(b) Explain why the percentage of nitrogen gas does not change in both pie charts. [1]

_____

_____

(c) Explain why exhaled air is warmer than inhaled air. [1]

_____

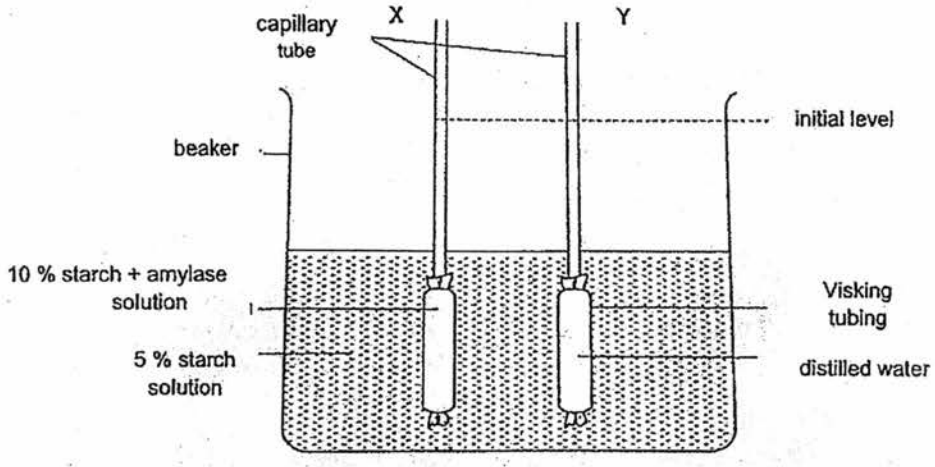
_____

(d) Suggest a gas that could be classified under "other gases". [1]

_____

5 (a) State two main differences between osmosis and diffusion. [4]

(b) The figure below shows an experimental setup using Visking tubing which only allows glucose to pass through.

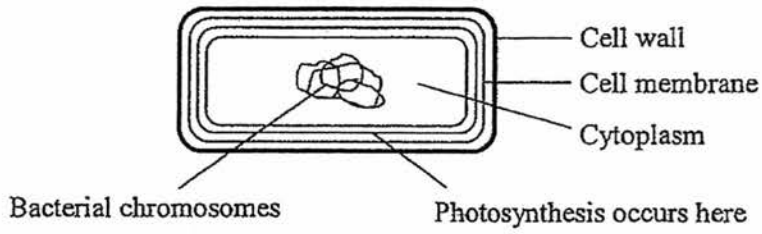


Visking tubing **X** contains 10% starch solution with amylase and Visking tubing **Y** contains distilled water. They are both placed in 5 % starch solution for 12 hours.

(i) State and explain what would happen to the solution level in the capillary tube of Visking tubing **Y**. [4]

(ii) At the end of the experiment, the solution from Visking tubing **X** was withdrawn and heated. State the expected observation when Benedict's test is conducted. [1]

6 The diagram shows the structure of a type of bacterium.



(a) Explain how it resembles a plant cell. [2]

(b) State two ways in which it is different from a typical plant cell. [2]

7 **(a)** Mr and Mrs Smith are interested in starting a family and are therefore monitoring the menstrual cycle of Mrs Smith to increase their chance of success. She has a regular menstrual cycle which lasts 28 days. The first day of her menstruation is 2nd September.

SEPTEMBER 2016

M	T	W	T	F	S	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

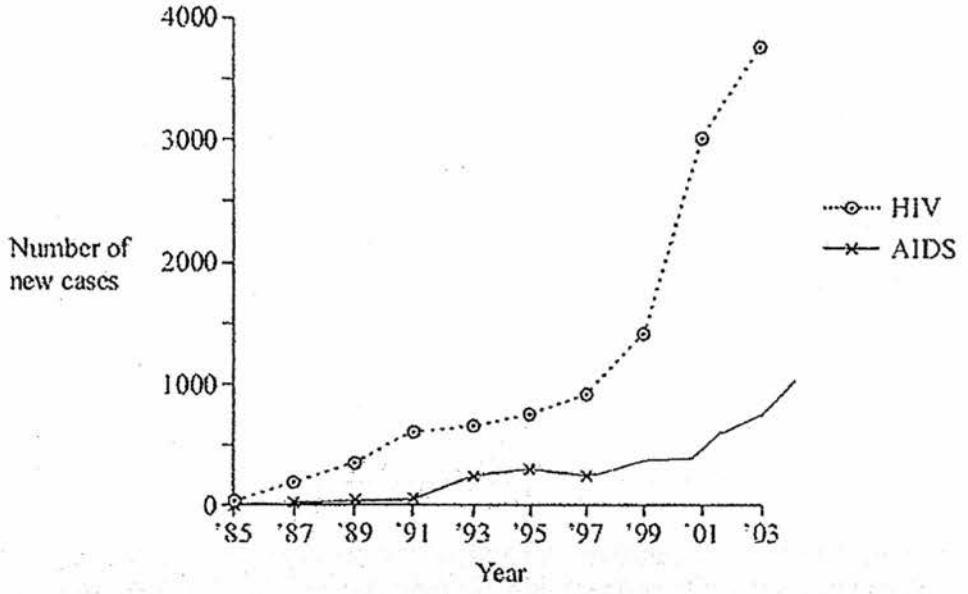
(i) When will Mrs Smith ovulate? [1]

(ii) During which period will Mrs Smith be most fertile? [1]

(iii) On which date will Mrs Smith's next menstrual cycle begin? [1]

_____

(b) AIDS can develop after infection by the human immunodeficiency virus (HIV). The graph shows the number of people newly infected with HIV and newly diagnosed with AIDS between 1985 and 2003.



(i) The curve for AIDS does not follow the same pattern as that for HIV. Describe the difference and explain why there is such a difference. [2]

_____

_____

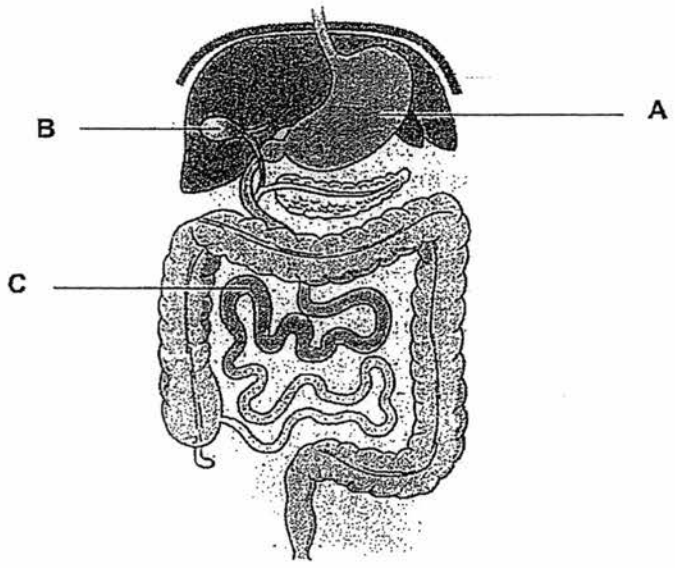
_____

(ii) AIDS, gonorrhea and syphilis are examples of STIs. State two ways STIs can be prevented. [2]

_____

SECTION C (30 marks)
Answer ALL questions in the spaces provided.

1 The diagram below shows the parts of the human digestive system.



(a) Name organs **A** and **B**. [2]

A: _____

B: _____

(b) (i) State the names of the three enzymes which participate in the digestion process in organ **C**. [3]

_____

_____

(ii) Michael had a slice of bread for lunch. In which part(s) of the alimentary canal will digestion occur? [1]

_____

(c) Mr Chan is suffering from cancer and had to undergo an operation where most of organ **A** was removed.

(i) How will this affect the digestion of food in his body? [1]

_____

_____

(ii) What changes would Mr Chan have to make in terms of his food choices? [1]

_____

(d) Organ **B** stores a yellowish – greenish liquid which flows to organ **C** to aid in digestion. [2]
Identify the yellowish – greenish liquid and state its function.

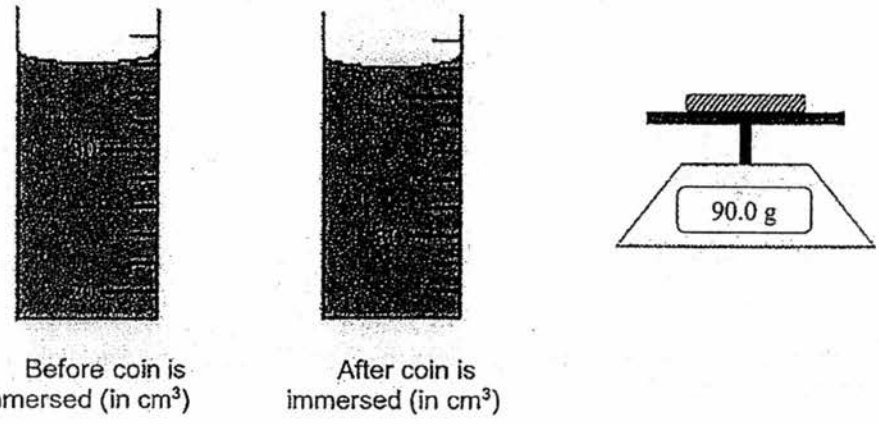
_____

_____

2 (a) A man went to a pawnshop to purchase a gold coin. Using a mass balance, the shopkeeper shows that the gold coin has a mass of 90.0 g. The shopkeeper further claims that the gold coin is made of pure gold.

The man suspects that the gold coin contains impurities and tries to determine the purity of the gold coin by measuring its actual density.
The man knows that the actual density of pure gold is 19.30 g/cm^3.

The figure below shows some of the measurements taken by the man.



(i) Define the term density. [1]

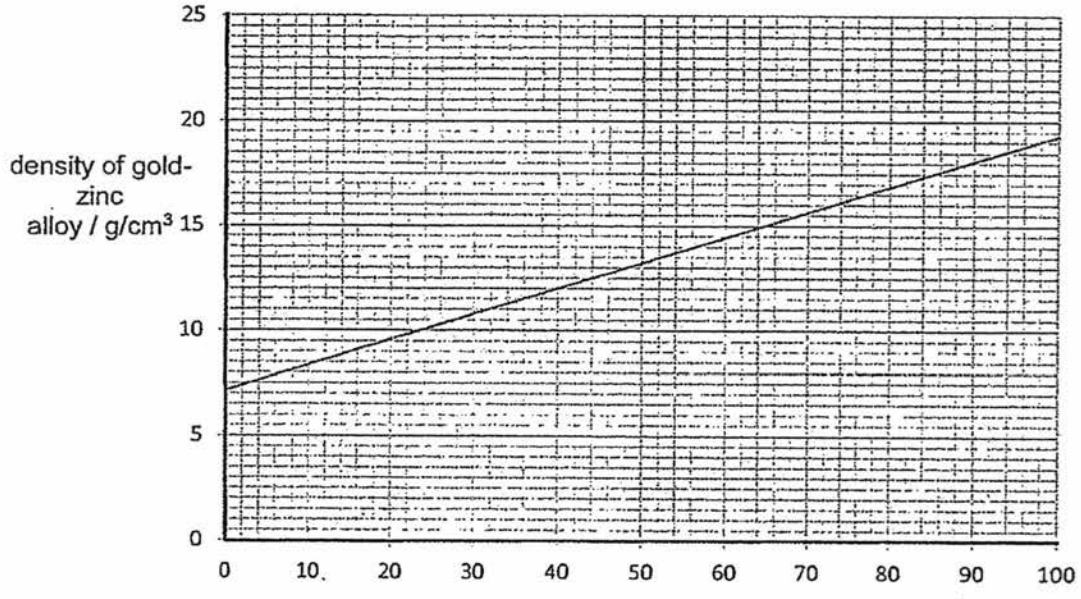
_____

_____

(ii) Using the data provided, determine the volume of the coin. [1]

(iii) Hence, determine the density of the coin and deduce whether the coin is made entirely of pure gold. [2]

(b) The man suspects the shopkeeper had mixed a small amount of zinc into the gold coin.
The figure below shows a graph which indicates the resulting densities of the gold-zinc alloy coin against the percentage mass of gold in the coin.



(i) Using the graph, determine the percentage mass of gold present in the coin for the density calculated in **(a)(iii)**. [1]

_____

(ii) When measuring the volume of the gold coin, the man must ensure that the coin is <u>lowered gently</u> into the water and that the coin is <u>submerged completely</u>. Explain the need for the procedures represented by the two underlined phrases. [2]

_____

_____

_____

(c) Mary conducted an experiment to investigate the various factors which affect the rate of solubility of salt. She set up two beakers, **A** and **B** as follows.

Variable	Beaker A	Beaker B
Mass of water	100 g	100 g
Temperature of water	85 °C	10 °C
Size of salt crystals	Big lumps of salt	Fine salt powder
Mass of salt	50 g	50 g

(i) Mary realized that her experiment was not a fair one. Why is this so? [1]

_____

_____

(ii) The solubility of salt is 50 g of salt in 100 g of water at 10 °C. If Mary used 100 g of salt for Beaker **B** instead, explain why the salt would not be able to dissolve completely. [1]

_____

_____

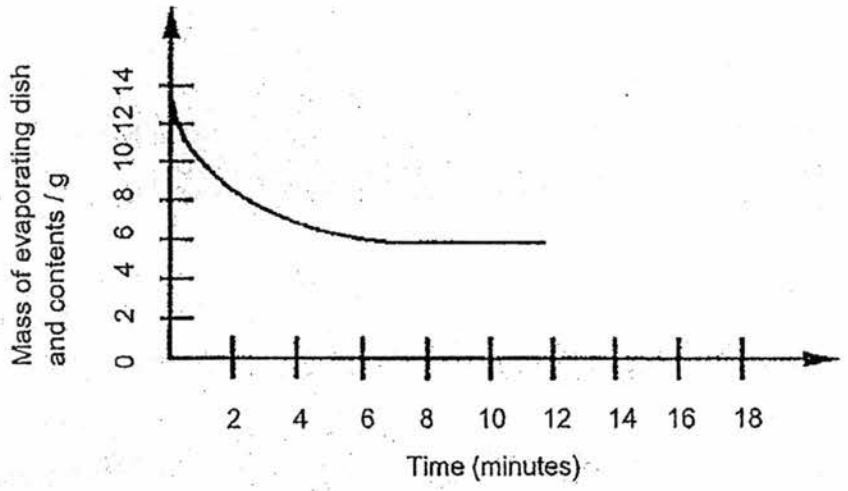
(iii) How does the size of the salt crystals affect the rate of dissolving? [1]

_____

3 Excess hydrochloric acid was made to react with excess granulated zinc in a beaker, which was placed on the pan of an electronic balance. The chemical equation of this reaction is shown below.

hydrochloric acid + zinc → zinc chloride + hydrogen gas

The mass of the beaker and its contents was recorded every half a minute.
The results are shown in the graph below.



(a) Describe and explain the shape of the graph above. [3]

(b) Explain why there is a decrease in mass. [1]

(c) What is the total loss in mass after the reaction was completed? [1]

(d) Why did the reaction stop? [1]

(e) A second experiment was carried out using a more concentrated solution of hydrochloric acid.

(i) Will the reaction be faster or slower? Explain your answer using the collision theory of particles. [3]

(ii) Sketch a graph on the same figure representing this second experiment. Label the graph **X**. [1]

The Periodic Table of Elements

I	II											III	IV	V	VI	VII	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	99 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	226 Ra Radium 88	227 Ac Actinium 89 †															

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

*58-71 Lanthanoid series
†90-103 Actinoid series

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

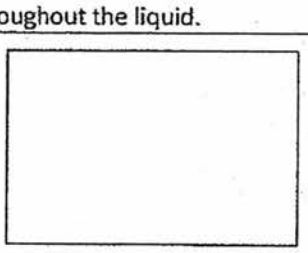
The volume of one mole of any gas is 24 dm^3 at room temperature and pressure.

Answers for EOY 2016 1E Science

MCQ (30 marks)

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

Section B (40 marks)

Qn		Answers	Marks
1	(a)	B	[1]
	(b)	C	[1]
	(c)	G	[1]
	(d)	F	[1]
2	(a)	Dyes C and D.	[1]
	(b)	Dye A was not soluble in the solvent used.	[1]
	(c)	No It contains a dye which is unidentifiable / not present in Dyes A-D.	[1] [1]
3	(a)	78 °C	[1]
	(b)	The energy which is absorbed is used to overcome the forces of attraction between the liquid particles and the kinetic energy of the particles remain constant.	[1] [1]
	(c)	During the 0 – 1 minute, the particles gain kinetic energy and move more vigorously . During the 1st to the 3rd minute, the particles have gained enough energy to overcome the strong forces of attraction between themselves. They are now able to slide past each other and move throughout the liquid.	[1] [1] [1]
	(d)		[1]
4	(a)	Pie Chart 2 It contains a higher percentage of carbon dioxide gas as compared to pie chart 1. OR Lower percentage of O_2.	[1] [1]
	(b)	Nitrogen is not involved in breathing or respiration.	[1]
	(c)	The heat comes from the energy released during respiration.	[1]
	(d)	Water vapour / helium / hydrogen/argon / neon	[1]

5	(a)	Osmosis involves only the movement of water molecules but diffusion involves all kinds of molecules. Osmosis takes place with a partially permeable membrane but diffusion can take place without a membrane.	[2] [2]
	(b)(i)	The level will decrease/drop/become lower. There is <u>higher water potential</u> in the visking tubing Y compared to the water potential in the beaker. / <u>Lower water potential</u> in the beaker. <u>Water flows out/ moves out of</u> the Visking tubing by <u>osmosis</u>.	[1] [1] [1]
	(b)(ii)	As <u>digestion of starch molecules occurs to form glucose</u>, , glucose molecules are small enough to <u>move out of the visking tubing by diffusion</u>, it will react with the Benedict's solution to give a <u>brick red precipitate</u>.	[1] [1]
6	(a)	It has a cell wall. It is able to photosynthesize.	[1] [1]
	(b)	It has a bacterial chromosomes which are in the middle of the cell, unlike a typical plant cell which is in between the vacuole and the cell membrane. / chromosomes not inside nucleus / no nucleus The cytoplasm seems to take the place of a typical vacuole space in a plant cell. / no large central vacuole	[1] [1]
7	(a)(i)	15th September 2016	[1]
	(ii)	Between 12th to 18th September 2016	[1]
	(iii)	30th September 2016	[1]
	(b)(i)	The number of HIV cases are more than the number of AIDS cases. This is because AIDS is the final stage of HIV and it takes a long time for a person to contract AIDS.	[1] [1]
	(ii)	Condoms / abstinence from sex / stick to one partner / using sterilised needles. any 2 other acceptable answers	[2]

<u>Section C (30 marks)</u>

Qn			Answers	Marks
1	(a)	A – stomach B – gall bladder		[1] [1]
	(b)(i)	Lipase, carbohydrase and protease -Accept maltase, pancreatic juice, amylase		[3]
	(ii)	Mouth, small intestine		[1]
	(c)(i)	The digestion of proteins will take place much slower than before.		[1]
	(ii)	He will have to reduce his protein intake.		[1]
	(d)	Bile Breaks down large droplets of fats into smaller ones (emulsifies fats)		[1] [1]
2	(a)(i)	Density is the mass per unit volume.		[1]

	(ii)	$42 - 36 = 6\ cm^3$	[1]
	(iii)	Mass = 90.0 g Density = 90.0 / 6 = 15.0 g/cm^3 Gold coin is not pure as pure gold has a density of 19.3 g/ cm^3	[1] [1]
	(b)(i)	From graph, 64%	[1]
	(ii)	Lowered gently: To avoid splashing of water / less water in the cylinder Submerged completely: To add the total volume of the coin to the liquid, as only the volume of the submerged portion displaces the water. (Accept any other appropriate term in place of **displace**)	[1] [1]
	(c)(i)	She has more than one variable which are different OR She is comparing 2 factors at the same time.	[1]
	(ii)	As 100g of water can only dissolve 50 g of salt, the 100 g of salt would be in excess as it would be twice the amount that 100 g of water could dissolve.	[1]
	(iii)	The smaller the size of the particles, the larger the total surface area which would increase the rate of dissolving.	[1]
3	(a)	The graph was the steepest during the first 2 minutes which shows the rate of reaction is the fastest then. The slope gradually became less steep indicating that the rate of reaction had slowed down Until finally when the graph was a horizontal line at 6 minutes, indicating that the reaction had stopped.	[1] [1] [1]
	(b)	Hydrogen gas which is produced escapes into the surroundings.	[1]
	(c)	8 g	[1]
	(d)	The reaction stopped because all of the magnesium was completely used up.	[1]
	(e)(i)	Speed of reaction will increase. When a more concentrated acid is used, there are more particles per unit volume of acid. This would increase the frequency of effective collisions between particles.	[1] [1] [1]
	(ii)		[1]