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**BEATTY SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2024
SECONDARY FOUR EXPRESS**

CANDIDATE
NAME

CLASS

REGISTER
NUMBER

SCIENCE (CHEMISTRY, BIOLOGY)

5088/01

Paper 1

Multiple Choice

28 August 2024

Setters:

Ms Ling Pei Ling
Mdm Siti Zubaidah

1 hour

Additional Materials:
Multiple Choice Answer Sheet

READ THESE INSTRUCTIONS FIRST

Write in soft pencil.

Do not use staples, paper clips, glue or correction fluid.

Write your name, class and register number on the Multiple Choice Answer Sheet provided.

There are **forty** questions on this paper. Answer **all** questions. For each question there are four possible answers, **A, B, C** and **D**.

Choose the **one** you consider correct and record your choice in **soft pencil** on the separate Answer Sheet.

Read the instructions on the Answer Sheet very carefully.

Each correct answer will score one mark. A mark will not be deducted for a wrong answer. Any rough working should be done in this booklet.

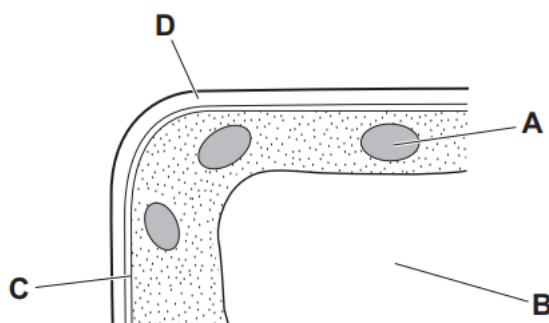
A copy of the Data Sheet is printed on page **14**.

A copy of the Periodic Table is printed on page **15**.

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

21 The diagram shows part of a plant cell.

Which labelled part controls the substances entering and leaving the cell?



22 Below are several statements on osmosis.

- Water particles move down a water potential gradient.
- Energy is required in osmosis.
- Osmosis can happen with or without a partially permeable membrane.
- An increase in surface area to volume ratio will increase rate of osmosis.
- Movement of water up the xylem is an example of osmosis.

How many of these statements is/are true?

A 1

B 2

C 3

D 4

23 Samples of glucose, maltase and sucrose were tested with Benedict's solution.

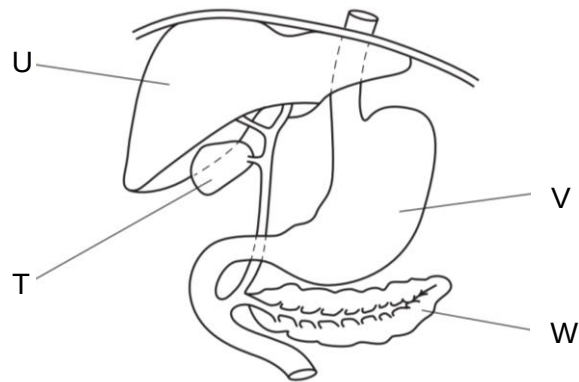
Which row shows the correct observation for each of the sample?

	glucose	maltase	sucrose
A	blue	blue	brick-red
B	brick-red	blue	blue
C	brick-red	blue	brick-red
D	brick-red	brick-red	blue

24 What are the substrates and products of pancreatic amylase and pancreatic protease, respectively?

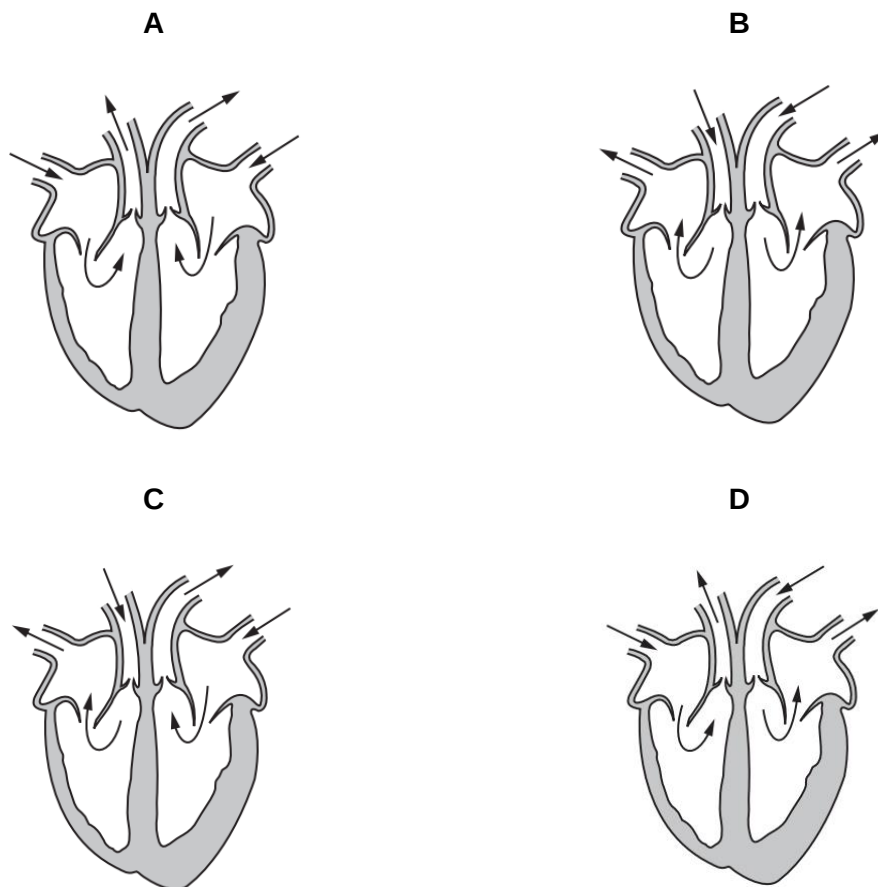
	pancreatic amylase		pancreatic protease	
	substrate	product	substrate	product
A	maltose	glucose	polypeptide	amino acid
B	starch	glucose	protein	polypeptide
C	starch	maltose	polypeptide	amino acid
D	starch	maltose	protein	polypeptide

- 25 The diagram shows part of the alimentary canal and associated organs.



Which structures are involved in the digestion of fats?

- A T, U and W
 - B T and V
 - C U and W
 - D V and W
- 26 Which diagram shows the correct direction of the flow of blood through the heart?



- 27 Which row correctly identifies the organ(s) that receive(s) blood from both an artery and a vein?

	kidney	liver	lungs
A	✓	x	✓
B	x	✓	x
C	x	✓	✓
D	✓	✓	✓

✓ = yes

x = no

- 28 Emphysema is a condition that arise because of long-term violent coughing. A person with emphysema has difficulties breathing.

Why does emphysema cause difficulty in breathing?

- A** alveoli become less elastic
 - B** over production of mucus in the bronchi
 - C** surface area becomes larger
 - D** trachea collapsed
- 29 Which row correctly shows the reactant(s) and product(s) of anaerobic respiration in muscles?

	reactant(s)	product(s)
A	glucose	lactic acid
B	glucose	lactic acid, carbon dioxide, water
C	glucose, oxygen	lactic acid
D	glucose, oxygen	lactic acid, carbon dioxide, water

- 30 Which of these diseases is caused by a pathogen?

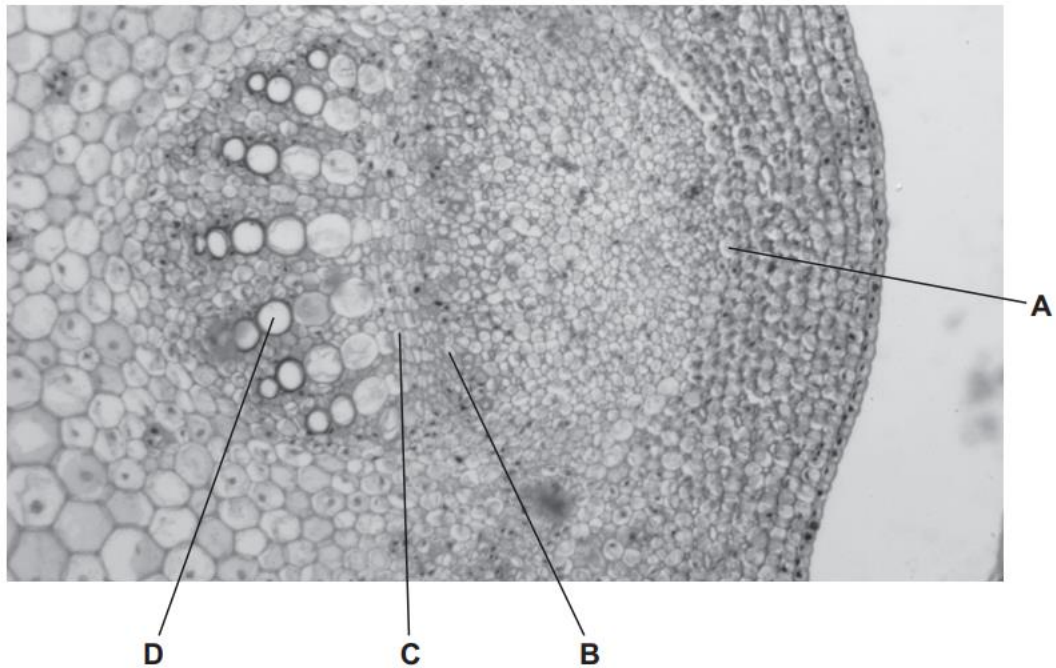
- A** liver cancer
- B** pneumococcal
- C** sickle-cell anaemia
- D** type 1 diabetes

- 31 Which of these will result in the development of antibiotic-resistant bacteria?

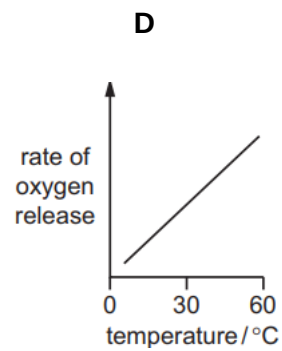
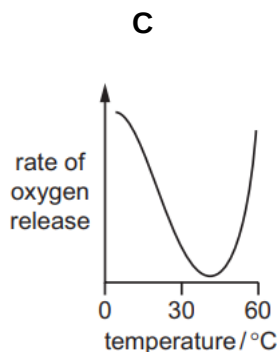
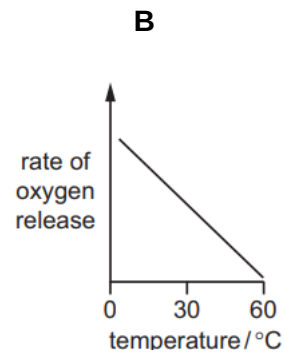
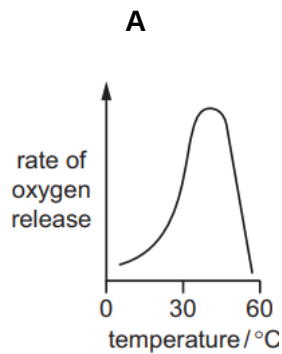
- A** not completing dose of antibiotics
- B** skipping booster vaccinations
- C** taking antibiotics before food
- D** taking antibiotics for an infection

32 The diagram shows the transverse section of a stem.

Which part will be stained when the stem is placed in a solution of red dye after a day?

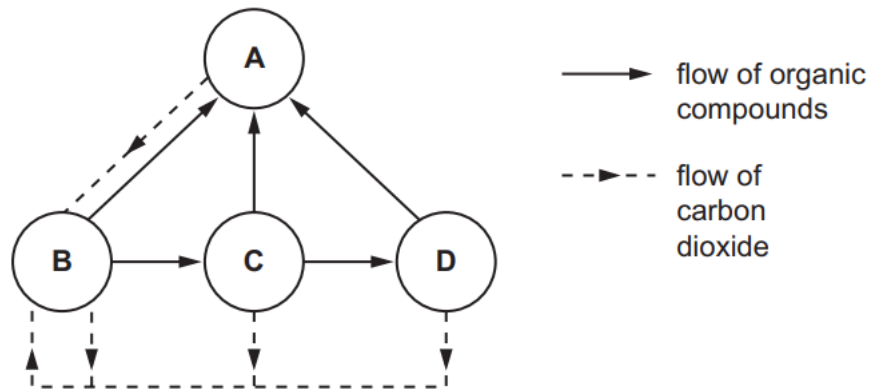


33 Which graph correctly shows the effect of temperature on the rate of oxygen released by an aquatic plant when placed under strong light?

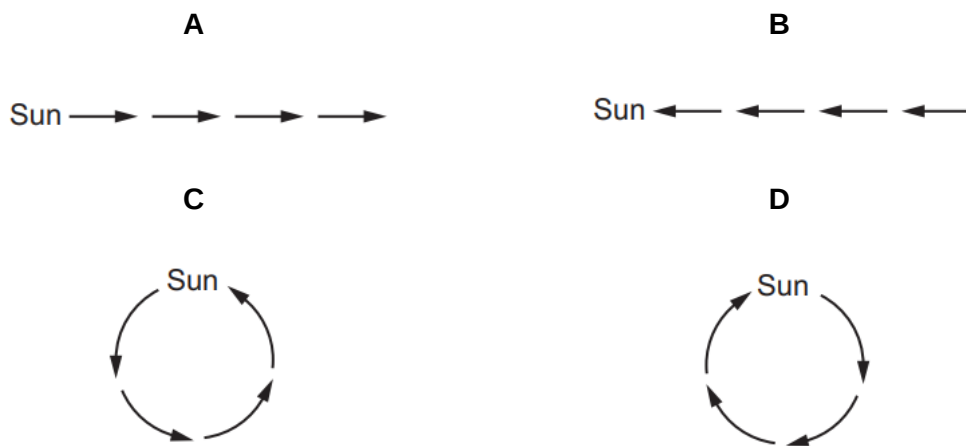


- 34** The diagram shows the flow of substances in an ecosystem. The circles represent the different trophic levels.

Which circle represents the producers?



- 35** Which diagram correctly shows the flow of energy within the ecosystem?



- 36** A polypeptide is made up of 240 amino acids.

How many bases are there in the gene that will be used to code for the polypeptide?

- A** 80
B 240
C 720
D 1440

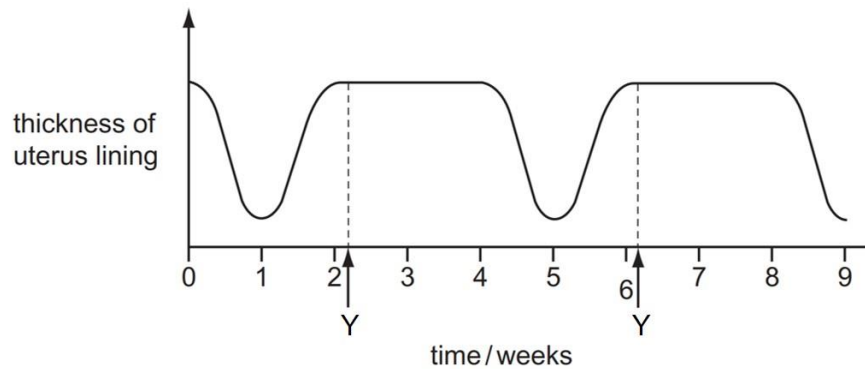
37 A student wrote several statements about DNA but made some mistakes.

- There are 23 pairs of chromosomes in a haploid cell.
- DNA is a double-stranded molecule made of nucleotides.
- A chromosome is a highly condensed DNA.
- DNA can contain many types of genes.
- In a pair of homologous chromosomes, the alleles can be identical.

How many of these statements is/are correct?

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

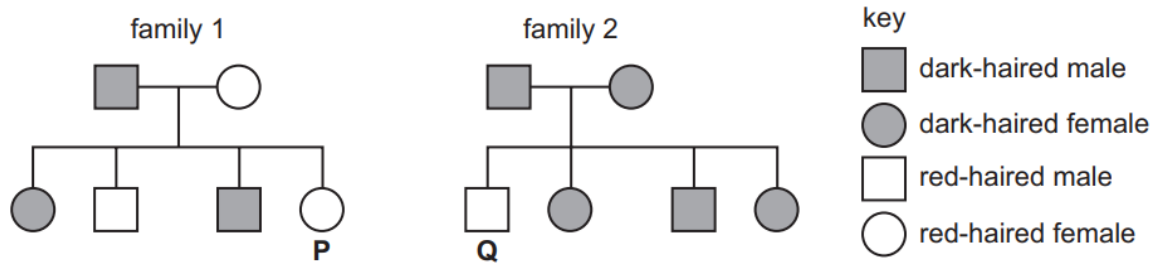
38 The graph shows changes in the thickness of the uterus lining of a woman.



Which statement best describes the event happening at Y?

- A implantation of embryo
- B growth and repair of uterine lining
- C release of mature egg from ovary
- D uterine lining breaks down

- 39 The diagram shows the pattern of inheritance of dark haired and red haired in two families.



If individuals **P** and **Q** have children together, what is the percentage of having a child with dark-hair?

- A 0%
 - B 25%
 - C 75%
 - D 100%
- 40 Which of these phenotypes will show discontinuous variation?
- A foot size
 - B presence of dimples
 - C skin colour
 - D weight



**BEATTY SECONDARY SCHOOL
PRELIMINARY EXAMINATION 2024
SECONDARY FOUR EXPRESS**

CANDIDATE
NAME

CLASS

REGISTER
NUMBER

SCIENCE (CHEMISTRY, BIOLOGY)

Paper 4
Setter:

Biology
Mdm Siti Zubaidah

5088/04

**23 August 2024
1 hour 15 minutes**

Candidates answer on the Question Paper.
No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

Write your name, class and register number on all the work you hand in.
You may use an HB pencil for any diagrams, graphs, tables or rough working.
Write in dark blue or black pen.
Do not use staples, paper clips, glue or correction fluid.

The use of an approved scientific calculator is expected, where appropriate.
You may lose marks if you do not show your working or if you do not use appropriate units.

Section A

Answer **all** questions.

Write your answers in the spaces provided on the question paper.

Section B

Answer only **one** question.

Write your answers in the spaces provided on the question paper.

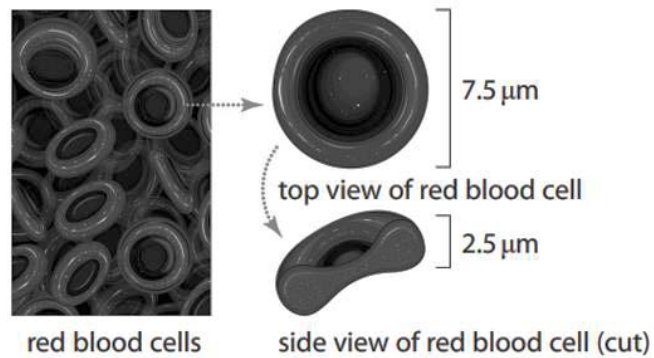
The number of marks is given in brackets [] at the end of each question or part question.

For Examiner's Use	
A	55
B.....	10
Total	65

Section A

Answer **all** the questions in the spaces provided.

- 1 Figure 1.1 below shows the structure and actual size of a red blood cell (not drawn to scale).



(Source: © N.Vinoth Narasingam/Shutterstock)

Fig. 1.1

- (a) Given that the top view of red blood cell is viewed at a magnification of 400x, calculate its image size.

Give your answer in mm. (1 mm = 1000 μm)

image size = mm [1]

- (b) Describe the structural adaptation of red blood cell, as seen in Fig. 1.1, allowing it to carry out its function effectively.

..... [2]

- (c) Red blood cells are usually stored in 5.0% glucose and 0.9% salt solution, in blood transfusion cases.

Explain why red blood cells **cannot** be stored in pure water.

..... [2]

2 Pineapple juice contains a protease known as bromelain.

A student investigates the effect of pH on the action of bromelain by carrying out the following method:

- place solid gelatine protein into five different test tubes up to a height of 5 cm;
- mix 5 cm³ of pineapple juice and 1 cm³ buffer solution of different pH (pH 3, 5, 7, 9 and 11) respectively;
- leave tubes for one hour in a water bath set to 37 °C;
- measure height of the solid gelatine and use it to calculate the volume of gelatine that has been digested.

Fig. 2.1 shows part of the student's method.

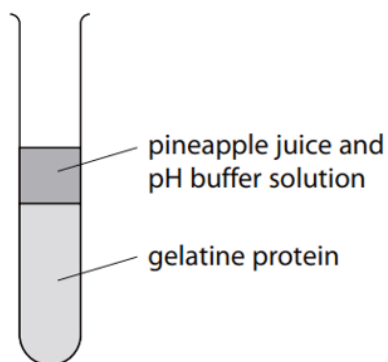


Fig. 2.1

- (a) Suggest one way the student can obtain a more reliable result.

..... [1]

- (b) Table 2.1 shows the results of the investigation.

Table 2.1

pH	volume of gelatine digested/ cm ³
3	0.32
5	0.98
7	0.51
9	0.33
11	0.01

- (i) From the results, state a possible optimum pH for the bromelain.

..... [1]

(ii) Explain your answer.

.....
 [2]

(c) Pineapple juice is often used to tenderise meat.

Suggest why it is advisable to use fresh pineapple juice instead of canned pineapple juice which has been treated to high temperatures to kill

.....
 [1]

3 (a) Stomata play an important role in photosynthesis.

Describe how stomata are involved in this process.

.....
 [2]

(b) Fig. 3.1 shows the number of stomata per mm^2 present on the lower surfaces of leaves of plants grown in soil of different water content.

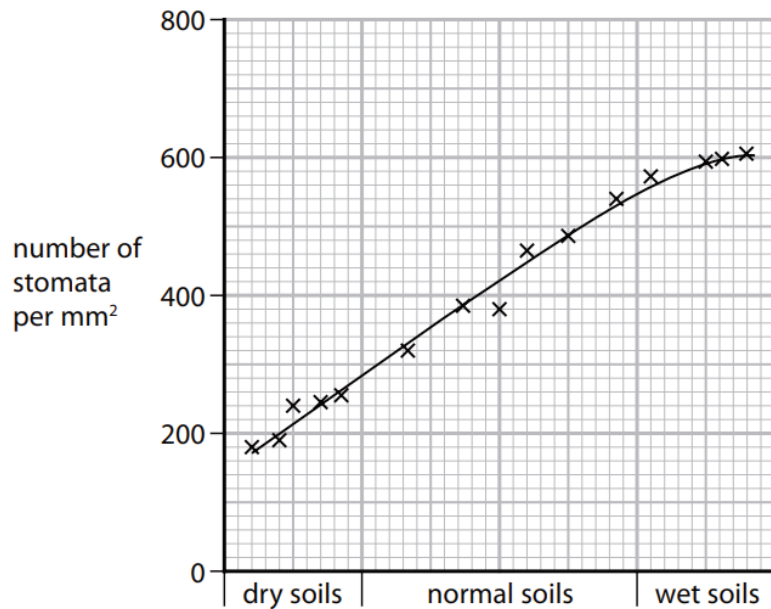


Fig. 3.1

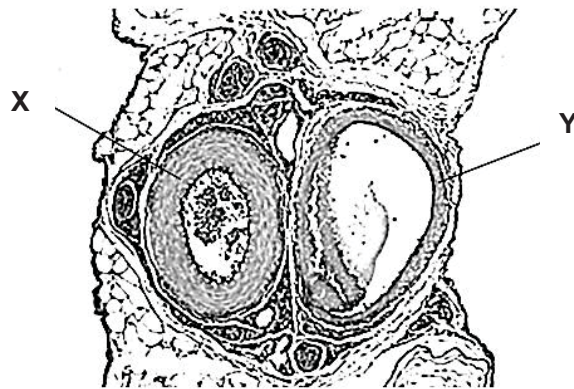
Describe the relationship between the number of stomata per mm² and the soil of

..... [1]

- (c) Explain the difference in the number of stomata per mm² between plants grown in dry soils and plants grown in wet soils

..... [3]

- 4 Fig. 4.1 shows a cross-section of two different blood vessels, **X** and **Y**, in the pancreas.



(Source: © The University of Kansas Medical Center)

Fig. 4.1

- (a) Determine, with a reason, the blood vessel that transports blood at high pressure.

..... [1]

- (b) State a structural difference between **X** and **Y** that is **not** seen in Fig. 4.1.

..... [1]

- (c) It was found that there is a higher level of a chemical substance in **Y** an hour after a meal rich in carbohydrates.

Identify **Y** and explain the increase in the level of **Y**.

.....
 [3]

- (d) Coronary arteries supply blood to the heart muscles.

Table 4.1 shows the blood flow in the coronary arteries in two different persons.

Table 4.1

person	blood flow through the coronary arteries in cm ³ per minute
A	250
B	155

.....

 [3]

- 5 Fig. 5.1 shows a strand of a DNA molecule showing part of a gene that is responsible in the production of haemoglobin.

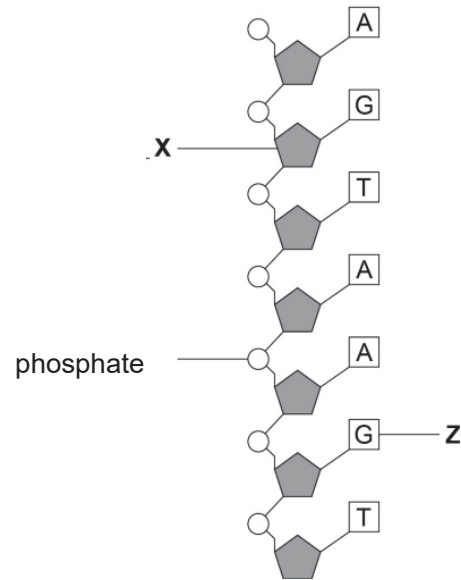


Fig. 5.1

- (a) Identify **X** and **Z**.

X:...

Z:...

[2]

- (b) Haemoglobin protein is made up of four different polypeptides. There are two processes involved in its production.

Complete Table 5.1 to identify the processes and product obtained at end of each process.

Table 5.1

process 1	
product	
process 2	
product	

[2]

(c) A mutation in **Z** (refer to Fig. 5.1) resulted in the production of a dysfunctional haemoglobin.

(i) State the type of mutation that took place.

..... [1]

(ii) Explain how the mutation resulted in the production of a dysfunctional haemoglobin.

..... [2]

(iii) Suggest how this mutation can affect the person.

.....

..... [1]

- 6 (a) Oestrogen and progesterone are hormones involved in the menstrual cycle in females.

Using oestrogen as an example, define *hormone*.

.....
 [3]

- (b) Fig. 6.1 shows the concentration of the hormones oestrogen and progesterone in the blood of women of different ages.

Table 6.1 shows the likelihood of getting pregnant across the different age groups.

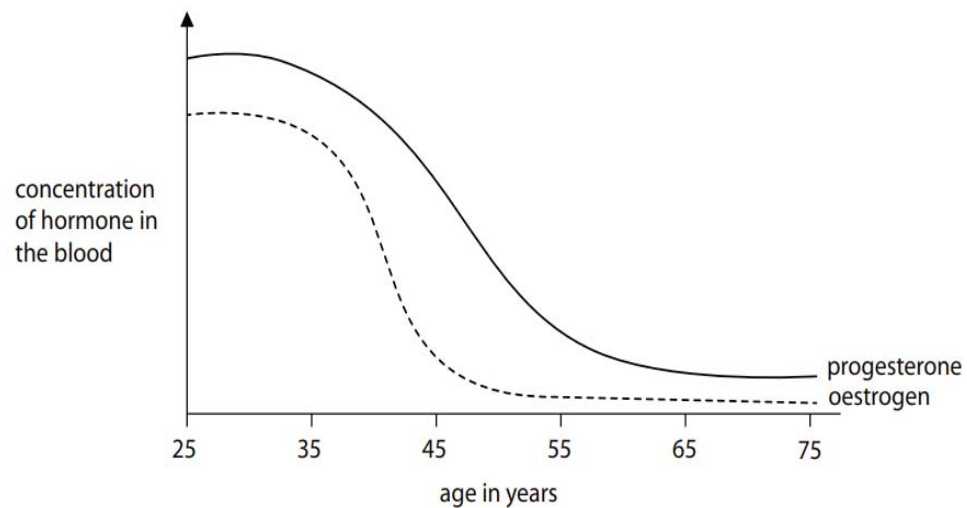


Fig. 6.1

Table 6.1

age groups	likelihood of getting pregnant / %
25-28	78
30-34	63
35-39	52
40-44	36
45-49	5
above 50	0

- (i) Describe the relationship between the concentration of hormones and the likelihood of getting pregnant.

.....
 [1]

- (ii) Using your knowledge of the functions of both hormones, explain why women, above 50 years old, have zero chance of getting pregnant.

..... [3]

- 7 Measles is a disease caused by a virus. Fig. 7.1 shows the number of cases of measles each year and the percentage of five year-olds vaccinated between 1950 and 2016 in the United Kingdom.

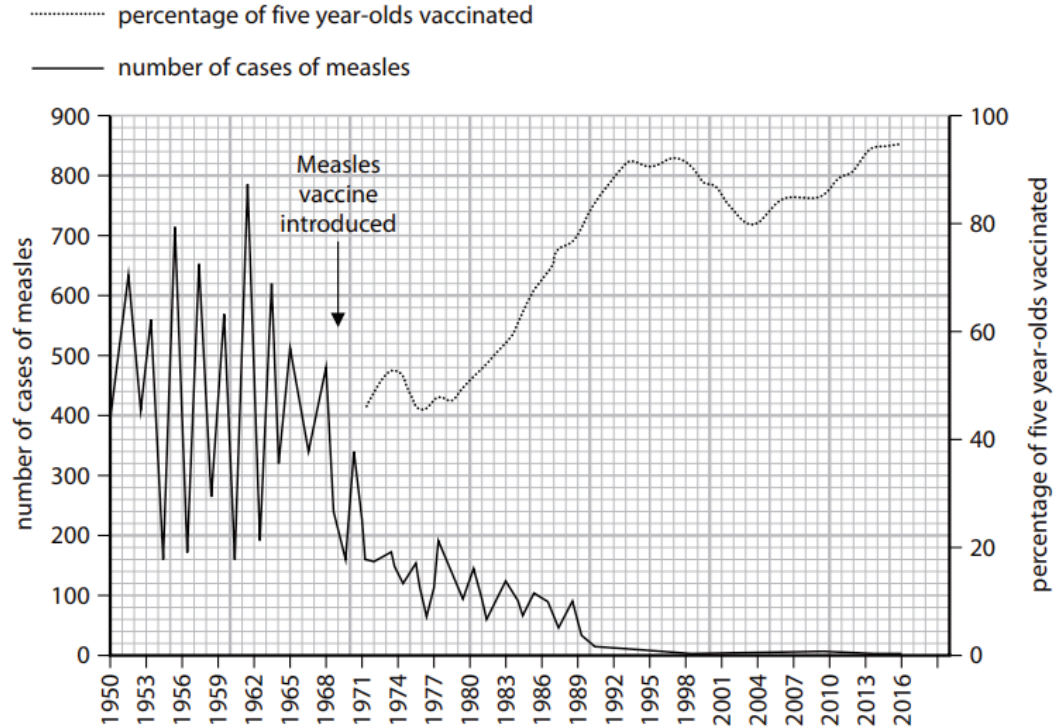


Fig. 7.1

- (a) Explain why measles is an infectious disease.

..... [1]

- (b) With reference to Fig. 7.1, describe the relationship between the number of cases of measles and percentage of five year-olds vaccinated.

.....

.....

..... [2]

- (c) Using your knowledge on how vaccines work, explain the relationship described in (b).

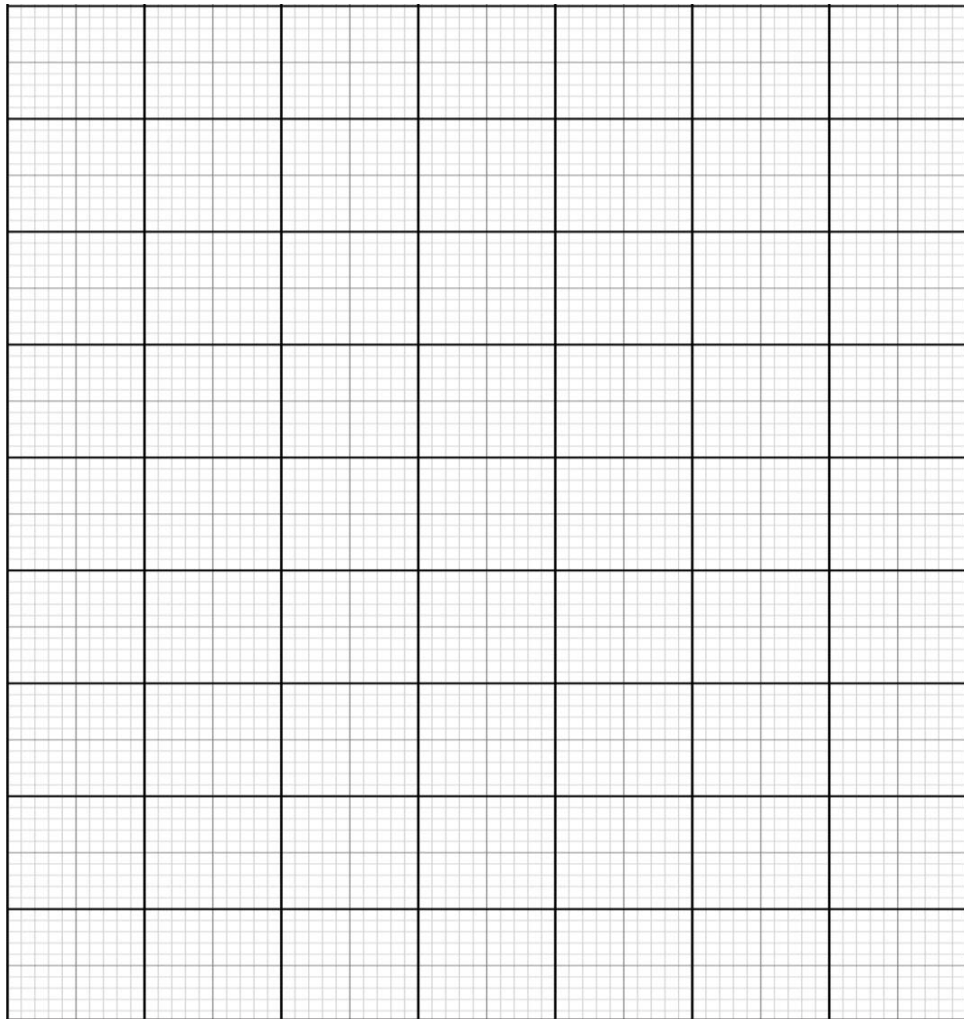
..... [3]

- 8 Table 8.1 shows the area of rainforest on the Earth from 1990 to 2015.

Table 8.1

year	area of rainforest/ km ²
1990	40850
1995	40500
2000	40120
2005	40020
2010	40008
2015	40000

- (a) Plot the data in the grid provided below.



- (b) Calculate the greatest percentage change in the area of rainforest per km² over a five year period.

[1]

- (c) Suggest a reason for the decrease in the area of rainforest on Earth over the years.

.....
 [1]

- (d) Rainforests are important carbon sinks.

Explain how the decrease in area of rainforest will lead to global warming.
 In your answer, include the definition of carbon sinks.

.....

 [3]

- (e) Rainforests are also habitats to many species of plants and animals.
 Fig. 8.1 shows some of the species living in the rainforest connected in a food web.

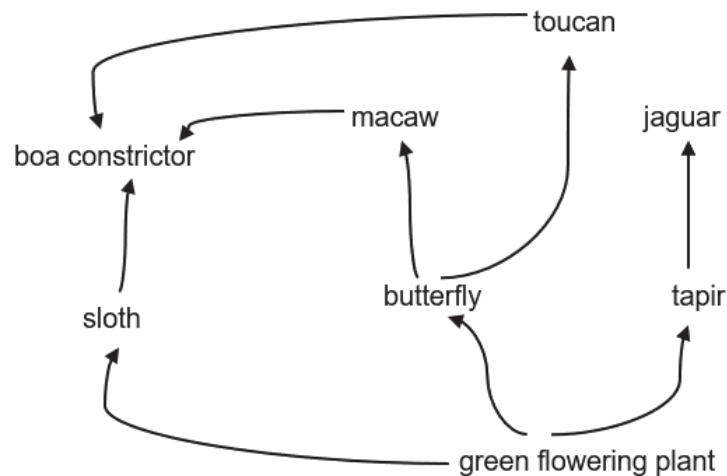


Fig. 8.1

- (i) State the number of secondary consumers present in the food web.

4

..... [1]

- (ii) The longest food chain in the Fig. 8.1 shows four trophic levels.

Explain why a fifth trophic level does **not** usually exist.

.....
..... [1]

Section B

Answer only **one** question in this section.

Write your answers in the spaces provided.

- 9** Muscular dystrophy (MD) is a type of genetic disease that results in progressive weakness of the muscles over time. Over time, a person with MD may lose ability to carry out movement. The disease will affect the quality and lifespan of the affected individual.

The disease is inherited by a recessive allele.

- (a)** A man and his pregnant wife, both carriers, are advised to do a genetic screening for MD on their fetus.

Explain, with a genetic diagram, to show why this screening may be useful. You may use 'D' or 'd' to represent the alleles.

..... [5]

- (b)** It is found that in some patients with MD, the number of a functional organelle in muscle cells is lower than normal.

Identify the organelle and explain how a lack of this organelle may result in MD.

..... [5]

- 10 (a)** Cancer of the small intestine is when the cells of the intestinal lining grow uncontrollably. One of the common signs of this disease is unexplained weight loss.

Describe the functions of the small intestine and explain how cancer of the small intestine can result in weight loss.

..... [4]

- (b) (i)** To support the nutritional requirements in patients with cancer of the small intestine, doctors will begin a procedure where a specially formulated mixture is supplied directly to the bloodstream of these patients.

Suggest, with reasons, the components that make up the mixture.

..... [4]

- (ii)** Such procedure, when carried over long-term, can result in liver disease.

Describe two functions of the liver.

.....

 [2]

For Answer please email :
LAPOOPOO555@GMAIL.COM
to share with you.