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Name: ()

Class:

**ASSUMPTION ENGLISH SCHOOL
PRELIMINARY EXAMINATION 2024**

**SCIENCE (BIOLOGY)
5088 / 01**



ASSUMPTION ENGLISH SCHOOL ASSUMPTION ENGLISH SCHOOL ASSUMPTION ENGLISH SCHOOL ASSUMPTION ENGLISH SCHOOL
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LEVEL: Sec 4 Express

DATE: 28 August 2024

CLASSES: Sec 4/2 & 4/3

DURATION: 1 hour (for both
Science components)

Additional Materials provided: 1 sheet of OAS paper

INSTRUCTIONS TO CANDIDATES

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

Write your NAME, INDEX NUMBER and CLASS at the top of this page and on the OAS paper.

This paper consists of 1 section.

There are 20 questions in this section. Answer **all** questions. For each question, there are four possible answers **A, B, C** and **D**. Choose the correct answer and record your choice in soft or 2B pencil on the OAS paper provided. **DO NOT** fold or bend the OAS paper.

At the end of the examination, hand in your OAS paper and question booklet separately.

This Question Paper consists of 10 printed pages including this page.

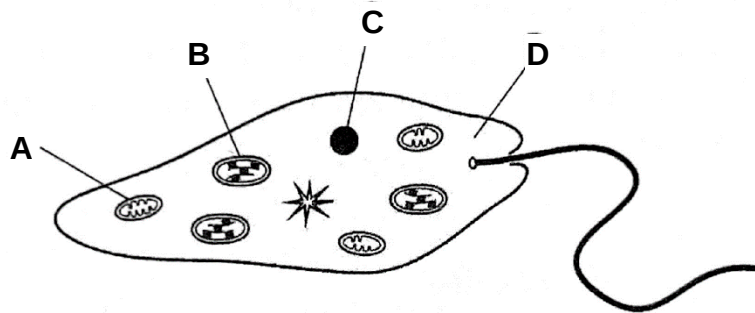
[Turn over

MULTIPLE-CHOICE QUESTIONS [20 marks]

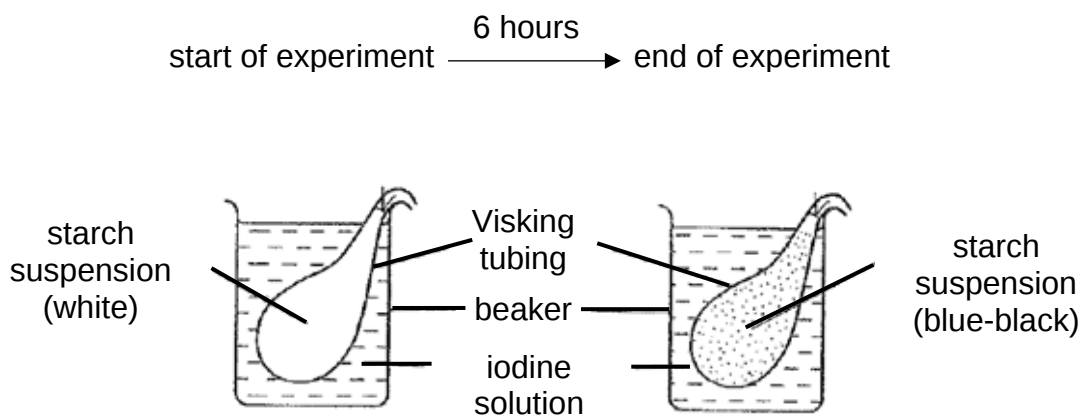
For each question, **there are four** possible answers **A, B, C** and **D**. Choose the one you consider correct and record your choice in the OAS paper provided.

- 1 The diagram shows an organism called Euglena. Euglena is a single-celled organism that can photosynthesise.

Which label points to the structure that enables it to photosynthesise?



- 2 The diagram shows an experiment.



Why has the starch suspension changed colour?

- A Iodine has diffused in through the membrane.
- B Iodine has diffused out through the membrane.
- C Starch has diffused in through the membrane.
- D Starch has diffused out through the membrane.

3 Which substance is the basic unit that forms glycogen?

- A** amino acids **B** fatty acids **C** glucose **D** glycerol

4 Which of the following is/are functions of proteins?

- 1 provide thermal insulation
- 2 repair of tissues
- 3 serve as biological catalyst to speed up reactions
- 4 transport of water

- A** 1 and 2 only **B** 2 and 3 only
C 2 and 4 only **D** All of the above

5 An unknown food sample was tested and the following results were obtained.

- A white emulsion when mixed with ethanol and water.
- A violet colour in the biuret test.
- A blue colouration was observed when heated with Benedict's solution.
- A yellowish brown colour with iodine.

What does the food sample contain?

- A** The sample contains fats and proteins.
B The sample contains fats and starch.
C The sample contains proteins only.
D The sample contains starch only.

6 Starch is digested to maltose by the enzyme amylase.

According to the 'lock-and-key' hypothesis, which option correctly identifies the 'lock' and the 'key'?

	'lock'	'key'
A	amylase	maltose
B	amylase	starch
C	starch	amylase
D	starch	maltose

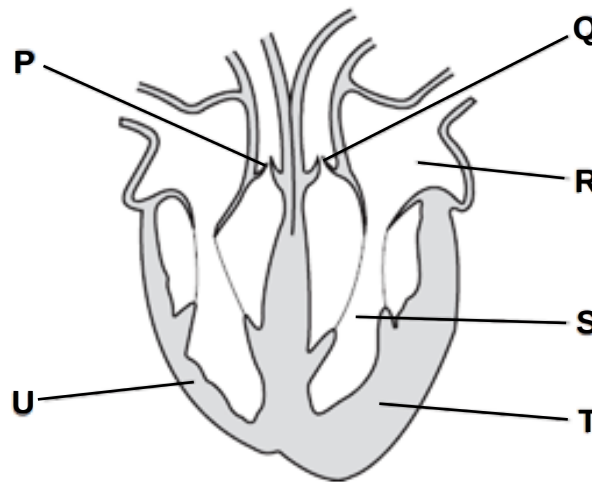
- 7 The table below shows the characteristics of the blood flowing through a blood vessel in the body.

concentration of oxygen	high
concentration of carbon dioxide	low
blood pressure	high

Which blood vessel has these characteristics?

- A** aorta
- B** pulmonary artery
- C** pulmonary vein
- D** vena cava

- 8** The diagram shows a section through the human heart.



Which feature suggests that blood leaves the heart at different pressures, when going to the lungs and to the body?

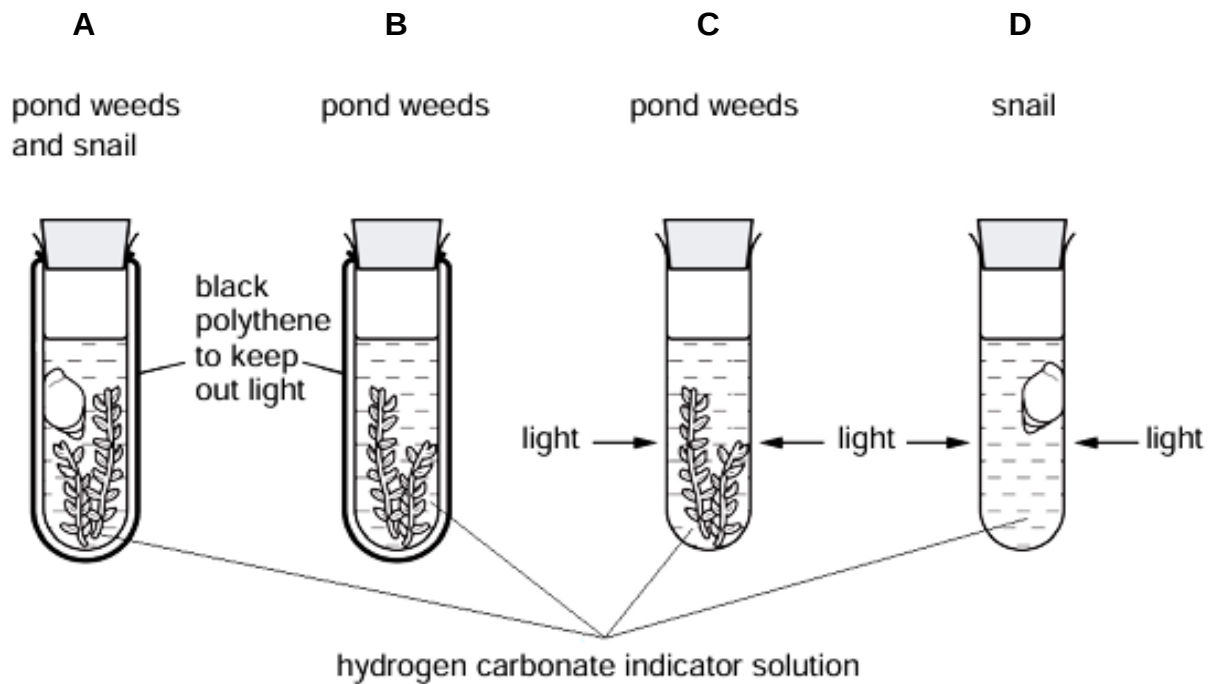
- A** Chambers **R** and **S** have different volumes.
- B** The walls of the atria are thinner than the walls of the ventricles.
- C** Valve **P** is stronger than valve **Q**.
- D** Wall **T** is more muscular than wall **U**.

- 9 Four test-tubes with hydrogen carbonate indicator solution are set up as shown below.

Hydrogen carbonate indicator solution stays red if there is no change in carbon dioxide concentration. The indicator turns yellow if the carbon dioxide concentration increases and purple if the carbon dioxide concentration decreases.

After 10 minutes, the indicator in one of the test-tubes turned purple.

Which test-tube turned purple?

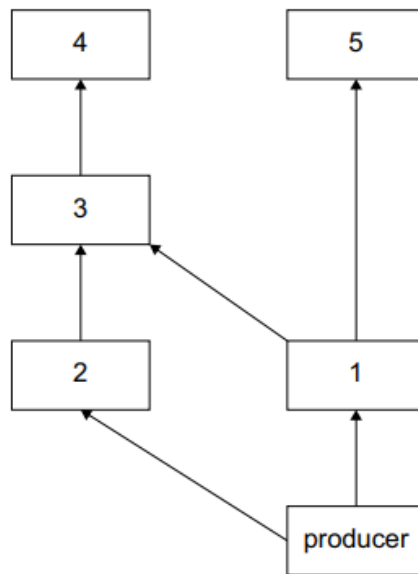


- 10 Which option indicates a common mode of transmission for the diseases?

	disease	mode of transmission
1	coronary heart disease	direct contact
2	HIV	malnutrition
3	influenza	respiratory droplets
4	pneumococcal disease	contaminated food and water

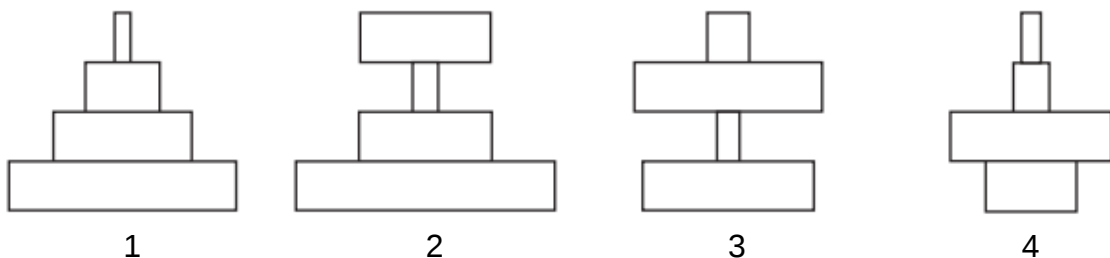
- A** 1 and 2 only **B** 2 and 3 only
C 3 and 4 only **D** All of the above

- 11 The diagram shows a food web.



Which organisms occupy the same trophic level?

- A** 1 and 4 **B** 2 and 3 **C** 2 and 5 **D** 3 and 5
- 12 The diagram shows four ecological pyramids.



In a food chain, grass is eaten by cows. The cows have insects living on their skin. The insects are eaten by birds.

Which row shows the pyramid of biomass and pyramid of numbers in this food chain?

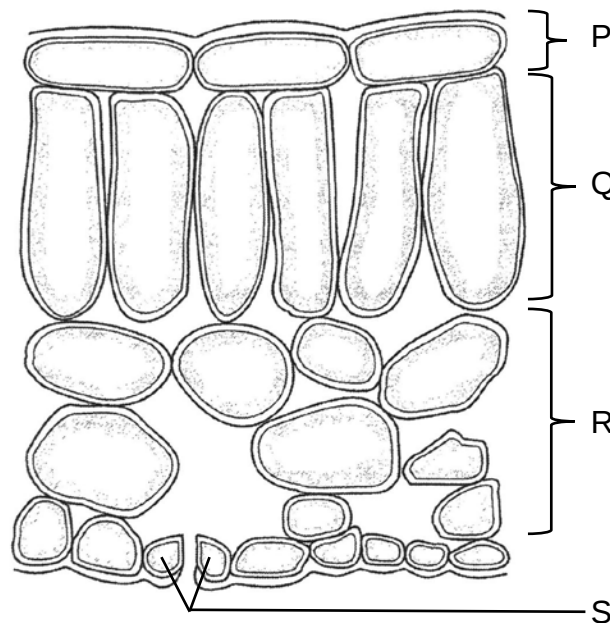
	pyramid of biomass	pyramid of numbers
A	1	3
B	1	4
C	3	1
D	3	2

13 Which statement about carbon sinks is correct?

- A** All carbon sinks are fossil fuels.
- B** Carbon sinks emit more carbon dioxide than they absorb.
- C** Carbon sinks remove carbon dioxide permanently from the atmosphere.
- D** Increasing carbon sinks could reduce global warming.

14 The same number of cells from regions P to S were isolated from a green leaf, placed in a solution of 1.5% sodium hydrogencarbonate and exposed to the same light intensity.

Sodium hydrogencarbonate releases carbon dioxide in solution.



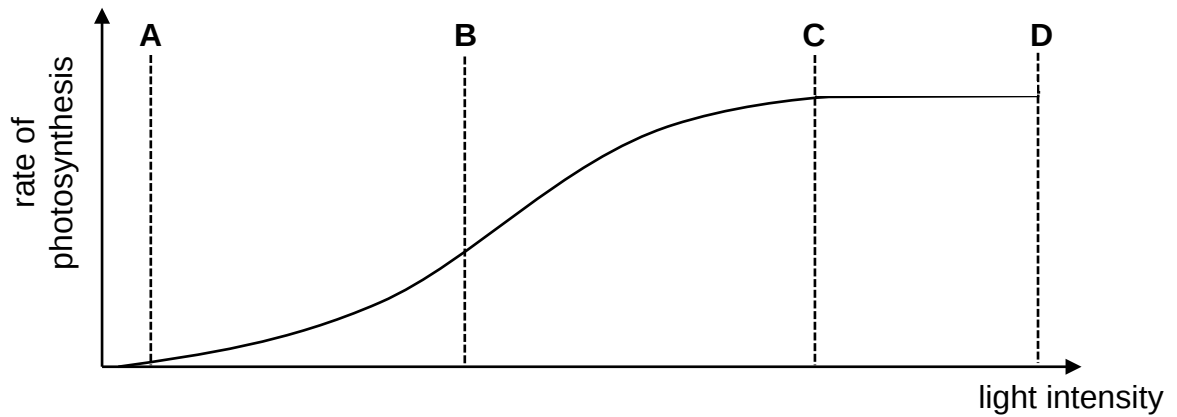
Gas released by each group of cells in 30 minutes was collected and tested.

Which group(s) of cells released oxygen gas?

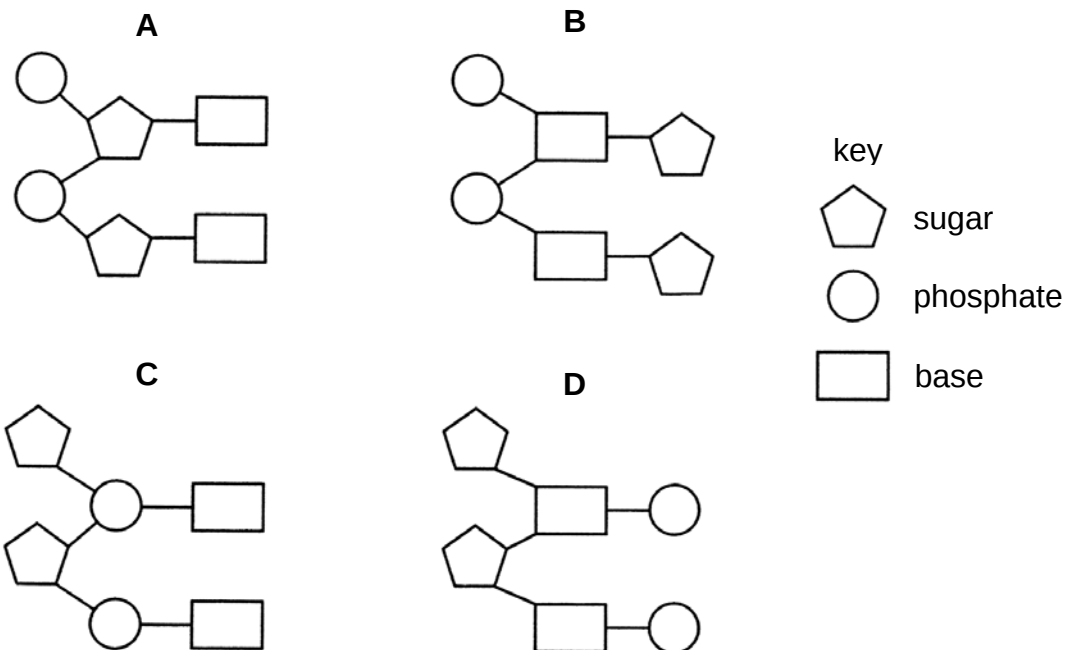
- | | |
|------------------|---------------------|
| A P and R | B P and S |
| C Q only | D Q, R and S |

- 15** The graph shows the rate of photosynthesis in a plant exposed to normal atmospheric conditions but different light intensities.

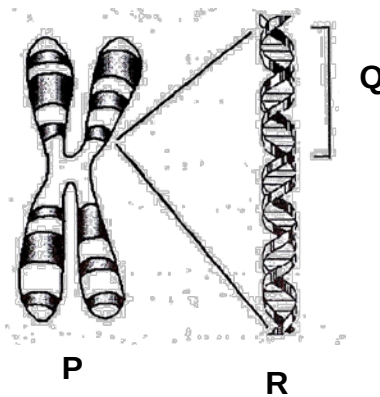
At which part of the graph did carbon dioxide concentration become a limiting factor?



- 16** Which diagram shows the structure of two nucleotides in a DNA molecule?



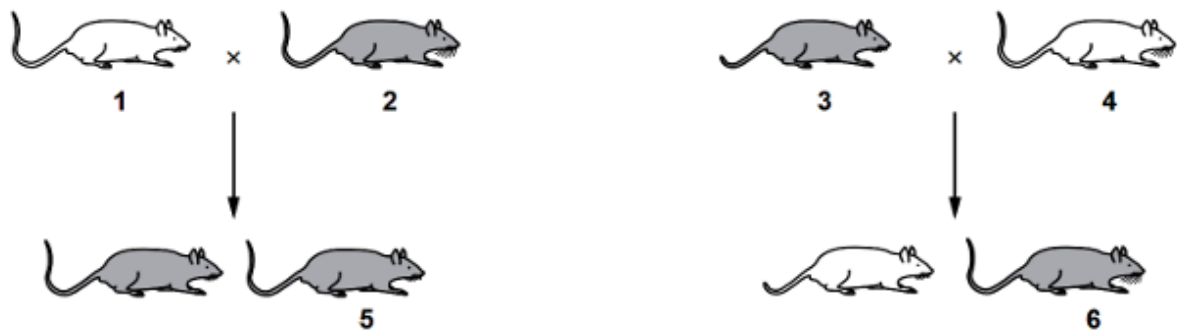
- 17 The diagram illustrates the relationship between chromosomes, genes and DNA.



Identify structures **P**, **Q** and **R**.

	P	Q	R
A	chromosome	DNA	gene
B	chromosome	gene	DNA
C	DNA	chromosome	gene
D	gene	chromosome	DNA

- 18 The diagram shows breeding rats where the allele for grey fur is dominant to white fur.



Which two individuals are definitely heterozygous for fur colour?

- A** 1 and 4 **B** 2 and 3
C 2 and 5 **D** 3 and 6

19 Which two characteristics show continuous and discontinuous variation?

	continuous	discontinuous
A	eye colour	height
B	weight	eye colour
C	height	weight
D	gender	eye colour

20 The chromosomes in four human cell samples are examined. What row shows an example of a chromosome mutation?

human cell samples	total number of chromosomes per cell	number of X chromosomes per cell	number of Y chromosomes per cell
A	23	0	1
B	23	1	0
C	46	1	2
D	46	2	0

- End of Paper -

Name: ()

Class:

**ASSUMPTION ENGLISH SCHOOL
PRELIMINARY EXAMINATION 2024**

**SCIENCE (BIOLOGY)
5088 / 04**



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LEVEL: Sec 4 Express

DATE: 27 August 2024

CLASSES: Sec 4/2 & 4/3

DURATION: 1 hour 15 minutes

Additional Materials provided: NIL

INSTRUCTIONS TO CANDIDATES

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

Write your NAME, INDEX NUMBER and CLASS at the top of this page. This paper consists of 2 sections.

SECTION A (55 marks)

STRUCTURED QUESTIONS

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

SECTION B (10 marks)

FREE RESPONSE QUESTIONS

Answer **one** question. Write your answers in the spaces provided on the question paper.

For Examiner's Use	
Paper 1	/20
Paper 4 Section A	/55
Paper 4 Section B	/10
Paper 5	/15
Total Marks	/100

SECTION A – STRUCTURED QUESTIONS (55 marks)

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

- 1** A student peeled a layer of cells from the inside of an onion bulb. He placed them in a drop of water on a microscope slide and covered them with a cover slip.

Fig 1.1 shows what he saw when viewing the cells through a microscope.

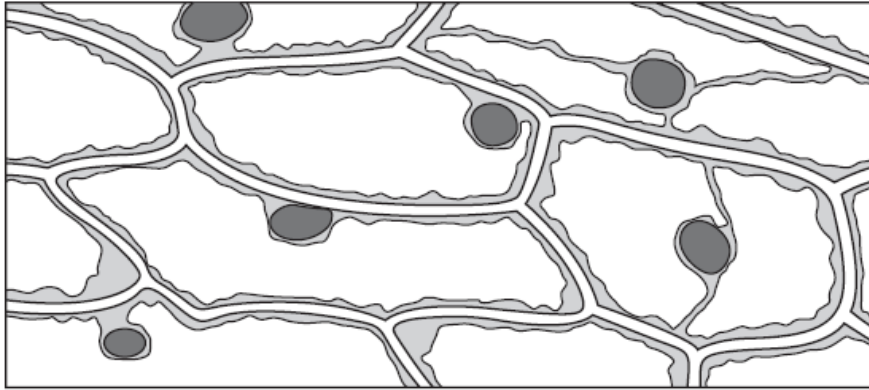


Fig. 1.1

- (a)** State two ways in which the cells in Fig. 1.1 differ from animal cells.

.....

 [2]

The student replaced the water on the slide with a drop of concentrated sugar solution. He waited for five minutes and then looked at the cells through the microscope again.

Fig. 1.2 shows what he saw.

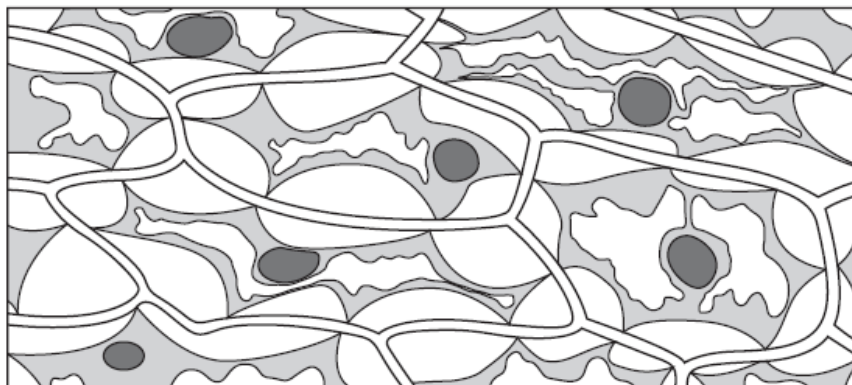


Fig. 1.2

- (b) (i) Label the partially permeable membrane on one of the cells in Fig. 1.2. [1]

- (ii) Describe and explain the appearance of the cells in Fig. 1.2.

.....

.....

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..... [3]

- 2 Fig. 2.1 shows the level of blood sugar and hormones **J** and **K** in a healthy person.

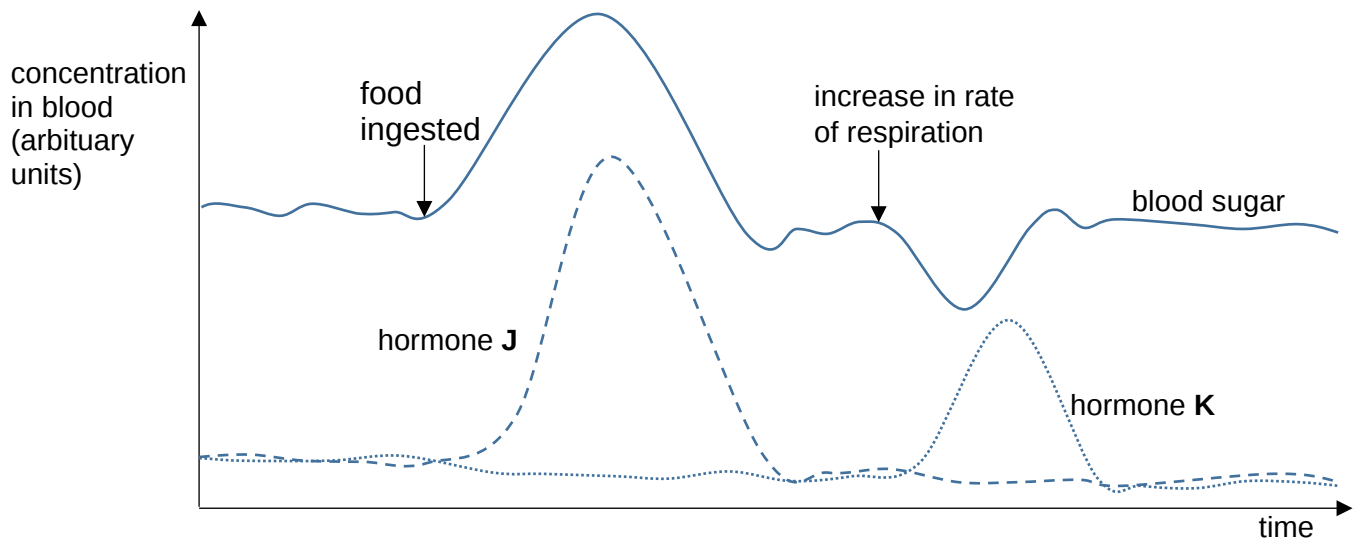


Fig. 2.1

- (a) Identify this 'blood sugar'.

..... [1]

- (b) Define what is meant by a *hormone*.

.....

 [2]

- (c) (i) Suggest the identities of hormone **J** and **K**.

hormone **J** hormone **K** [1]

- (ii) Explain your answer to (c)(i).

hormone **J**

 hormone **K**
 [2]

- (d) State two effects of hormone **J** in the control of blood glucose concentration in the human body.

.....

.....

.....

..... [2]

- 3 Varicose veins are veins that have become enlarged and swollen. Varicose veins are often found on the leg such as shown in Fig. 3.1.



Fig. 3.1

Fig. 3.2 compares between a normal vein and a varicose vein.

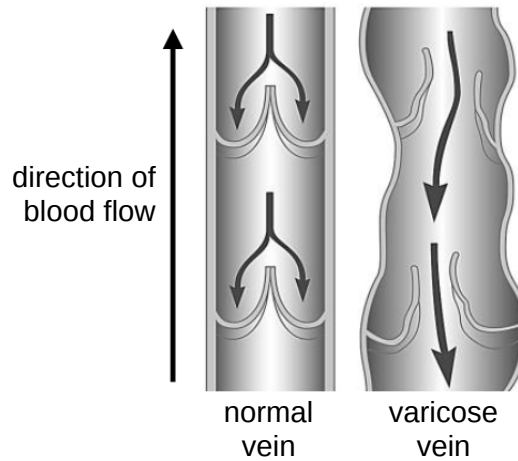


Fig. 3.2

- (a) By comparing both veins in Fig. 3.2, suggest why varicose veins can become enlarged as seen in Fig. 3.1.

.....

.....

.....

..... [2]

- (b)** Suggest why this condition does not often occur in arteries.

.....
.....
.....
..... [2]

- (c)** The blood flow in varicose veins may slow down, causing blood clots to form. Outline the process of blood clotting.

.....
.....
.....
.....
.....
..... [3]

4 Fig. 4.1 shows the carbon cycle.

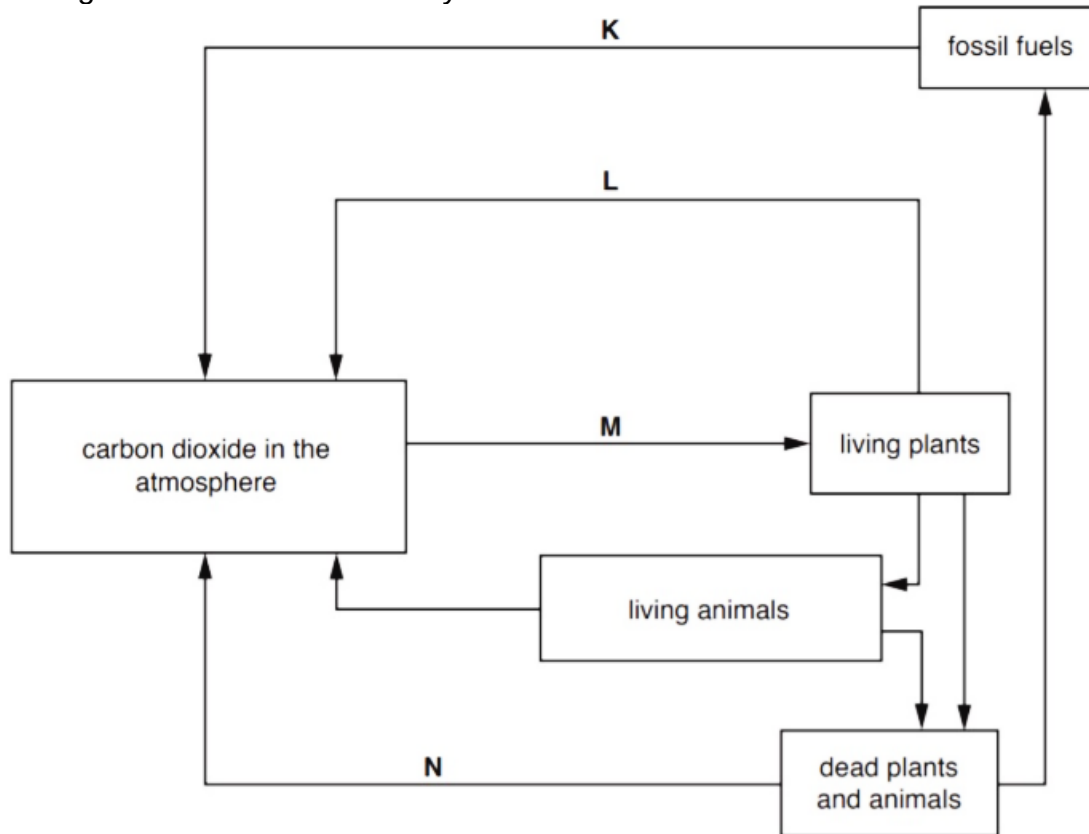


Fig 4.1

(a) Name the processes K, L, M & N.

K:

L:

M:

N:

[4]

(b) Explain the importance of decomposition in the carbon cycle.

.....

.....

.....

.....

.....

..... [3]

- 5 Fig. 5.1 shows an experiment set up to compare the loss in mass of two identical plants potted in damp soil over a period of time. The plants were placed in a dark room and were not watered throughout the experiment.

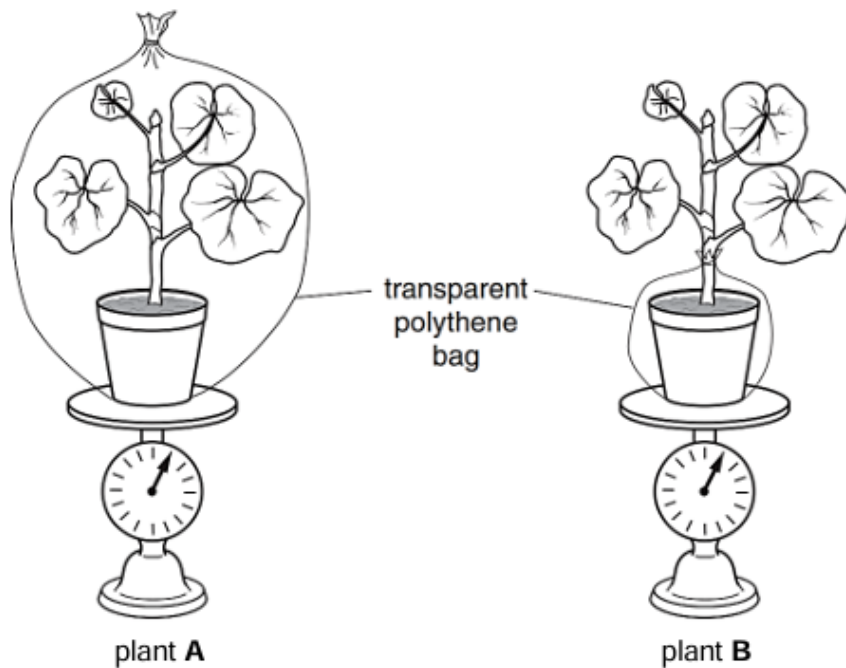


Fig. 5.1

Fig. 5.2 is a graph showing the loss in mass of the plants over the next five days.

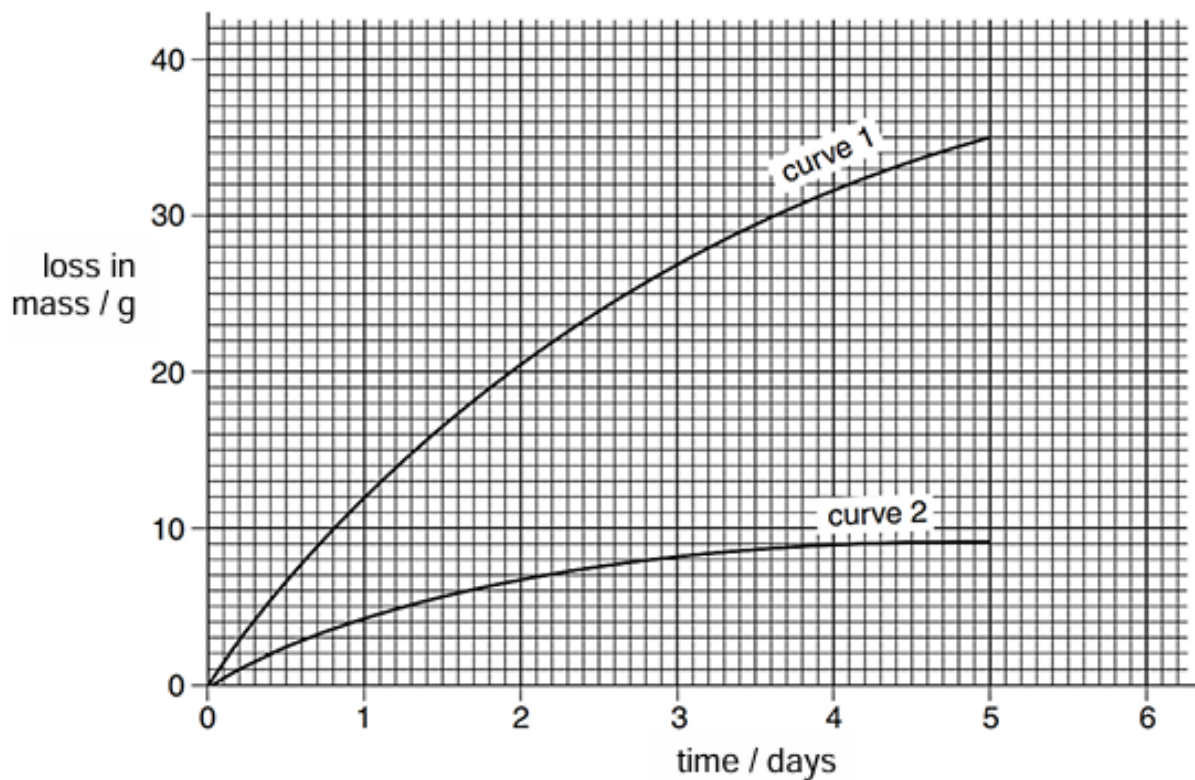


Fig. 5.2

- (a) (i) Which plant gives the result shown by curve 1?

plant [1]

- (ii) On Fig. 5.2, continue curve 1 to day 6 and calculate the mass that would be lost by this plant between day 5 and day 6. Show your working.

loss in mass = g [2]

- (b) (i) Name the process responsible for this loss in mass.

..... [1]

- (ii) Explain how this process is affected by the polythene bag around plant **A**.

.....

.....

.....

..... [2]

- (c) Explain the effect on the loss of mass in plant **B** if there is a thin layer of petroleum jelly on the lower surfaces of all the leaves.

.....

.....

.....

..... [2]

- (d) Name the chemical process which produces water inside a mesophyll cell in a leaf.

..... [1]

- 6 In humans, a person will have attached earlobes only if he/she is homozygous for this trait.

The pedigree chart in Fig. 6.1 shows the inheritance of this trait in a particular family.

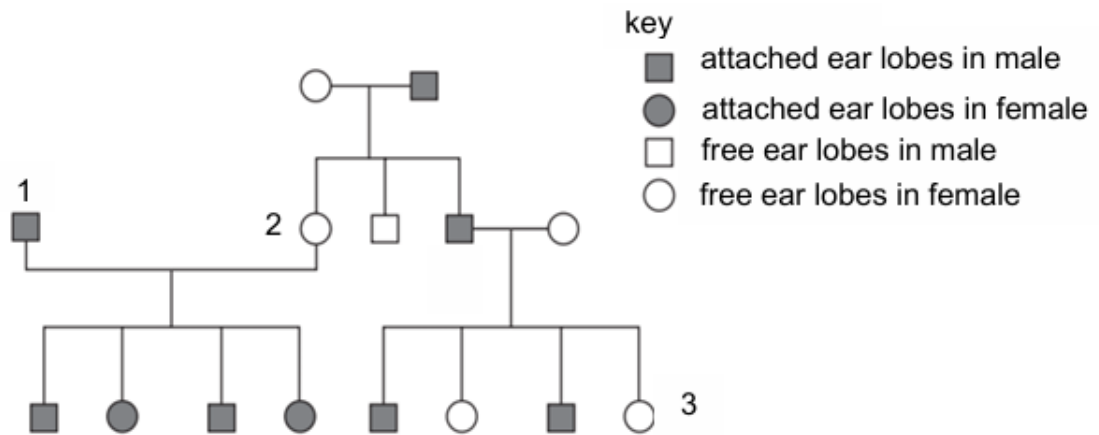


Fig. 6.1

- (a) Let T and t represents alleles for free and attached ear lobes respectively. State and explain the genotype of individual 3.

.....

.....

.....

..... [3]

- (b) Using a Punnett square, show the probability of individual 1 and 2 having a child with attached ear lobes.

		individual 2	
individual 1			

Probability: [3]

- (c) Compare your answer in (b) to the four children of individual 1 and 2 in Fig. 6.1. Suggest a reason for the difference.

.....

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..... [2]

- 7 An investigation was carried out to determine the effect of temperature on an enzyme-controlled reaction.

Fig. 7.1 shows how the equipment was set up for investigation. The first temperature tested was 20°C.

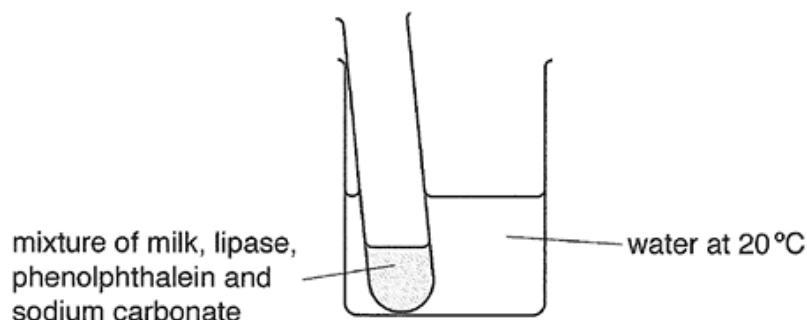


Fig. 7.1

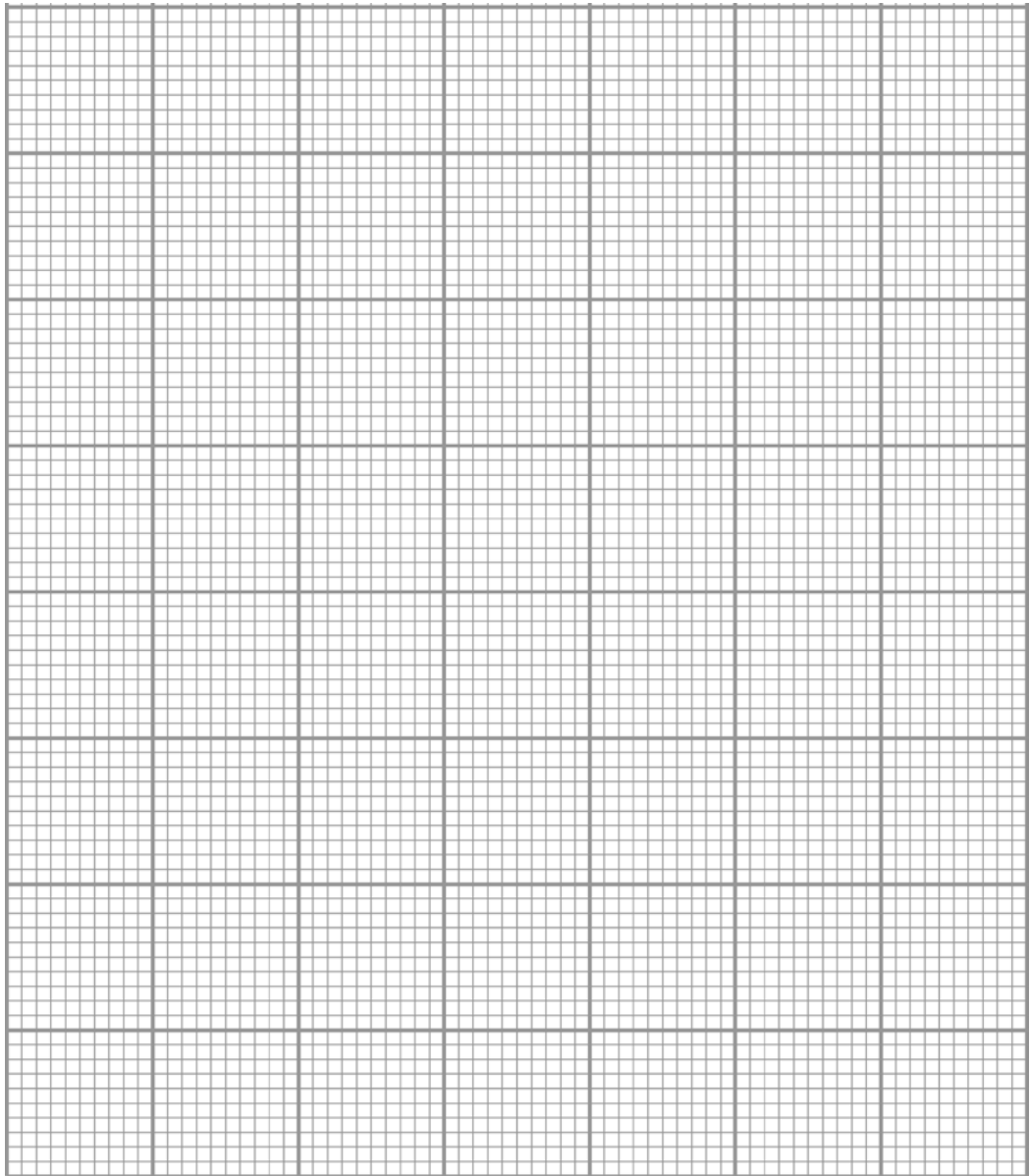
Milk contains milk fat. Phenolphthalein is an indicator that is pink in alkaline conditions above pH 8 and becomes colourless when the pH drops below pH 8. Sodium carbonate is used to make the solution alkaline.

In total, eight different temperatures were tested and the mixtures in all eight test tubes were pink at the start of the investigation. Table 7.1 shows the results of the investigation.

Table 7.1

temperature / °C	time taken to become colourless / minutes
20	18.0
25	10.5
30	4.0
35	2.5
40	5.5
45	12.0
50	20.5
55	> 60

- (a)** Plot the data for all the temperatures in the range 20°C to 50°C, on the grid. Do not include the results for 55°C.



[4]

- (b)** Using the graph, state the optimum temperature for enzyme lipase in this reaction.

..... [1]

(c) Explain why the phenolphthalein becomes colourless.

.....

.....

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.....

..... [3]

(d) Explain why the phenolphthalein did not change colour at 55°C.

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.....

.....

..... [2]

SECTION B – FREE-RESPONSE QUESTIONS (10 marks)

Answer **one** question from this section.

- 8 Fig. 8.1 shows the changes in the concentrations of two hormones during one menstruation cycle.

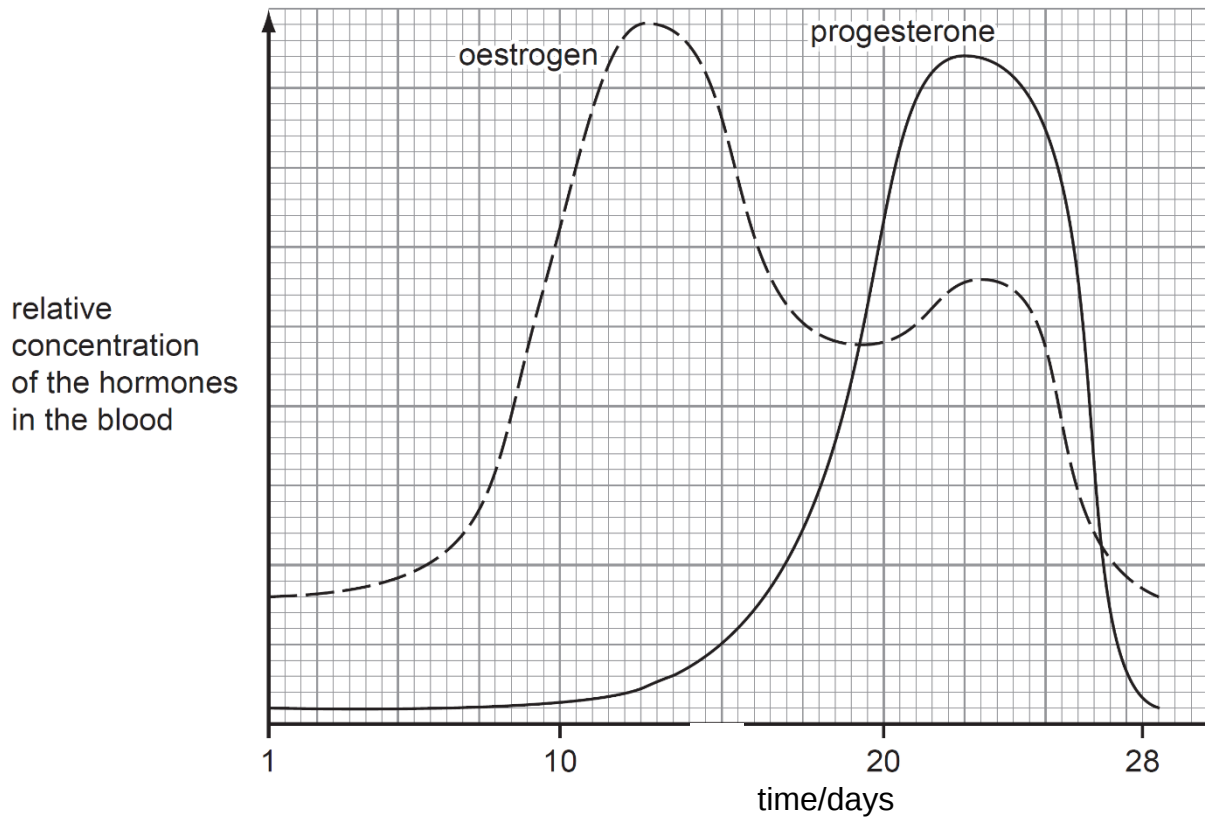


Fig. 8.1

- (a) With reference to Fig. 8.1 and your knowledge of the menstrual cycle, describe the levels of the two hormones in relation to the thickness of the uterine lining from day 10 to day 28.

.....

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..... [4]

- (b) Describe and explain what differences you would expect in the thickness of the uterus lining and concentration of hormones if an egg is fertilised during this cycle.

.....

.....

.....

.....

.....

..... [3]

- (c) A woman suspects that her partner might have Acquired Immune Deficiency Syndrome (AIDS), caused by the Human Immunodeficiency Virus (HIV). She is worried that it might spread to her through her partner's cough. The doctor advised that this is not true.

State **two** ways in which HIV is transmitted and suggest **one** way in which she can reduce the risk of getting infected.

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..... [3]

- 9 (a) Explain how the alveoli are adapted for gaseous exchange.

.....

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..... [6]

- (b) Fig. 9.1 shows a microscopic view of the alveoli of a healthy person and the alveoli of a person affected by emphysema.

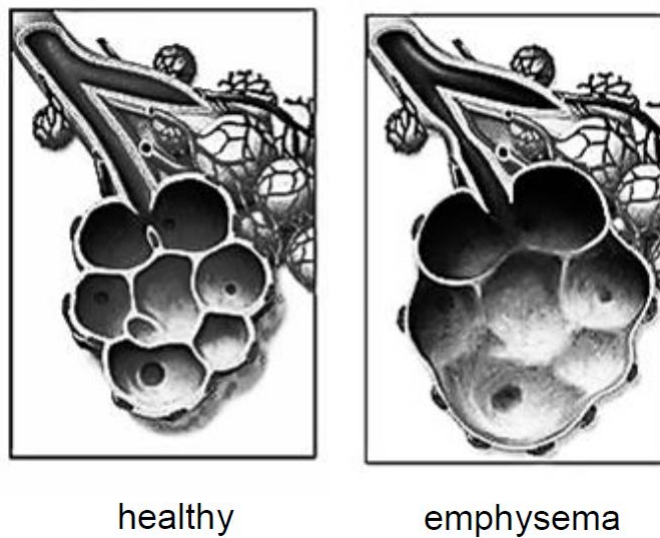


Fig. 9.1

With reference to Fig. 9.1, state and explain the differences between the healthy alveoli and the alveoli affected by emphysema.

.....

.....

.....

..... [2]

- (c) Patients with emphysema experience sore throats and coughs like patients infected with the influenza virus.

State two reasons why emphysema is not an infectious disease.

.....

.....

.....

..... [2]

- End of Paper-

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