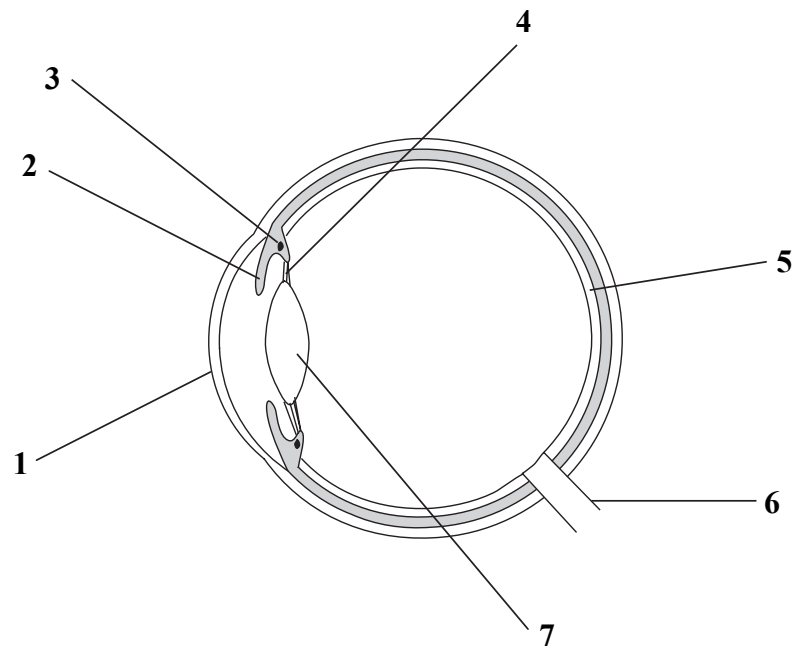


1. The diagram shows a section through a human eye.



- (a) Which part is sensitive to light? (1)
- (b) Which part contains most receptors? (1)
- (c) Which two parts **must** be transparent? and (1)
- (d) Which part alters the amount of light reaching 5? (1)

(Total 4 marks)

Q1



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2. Cigarette packets have a government health warning printed on them.



Describe how smoking cigarettes damages human health.



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(Total 7 marks)

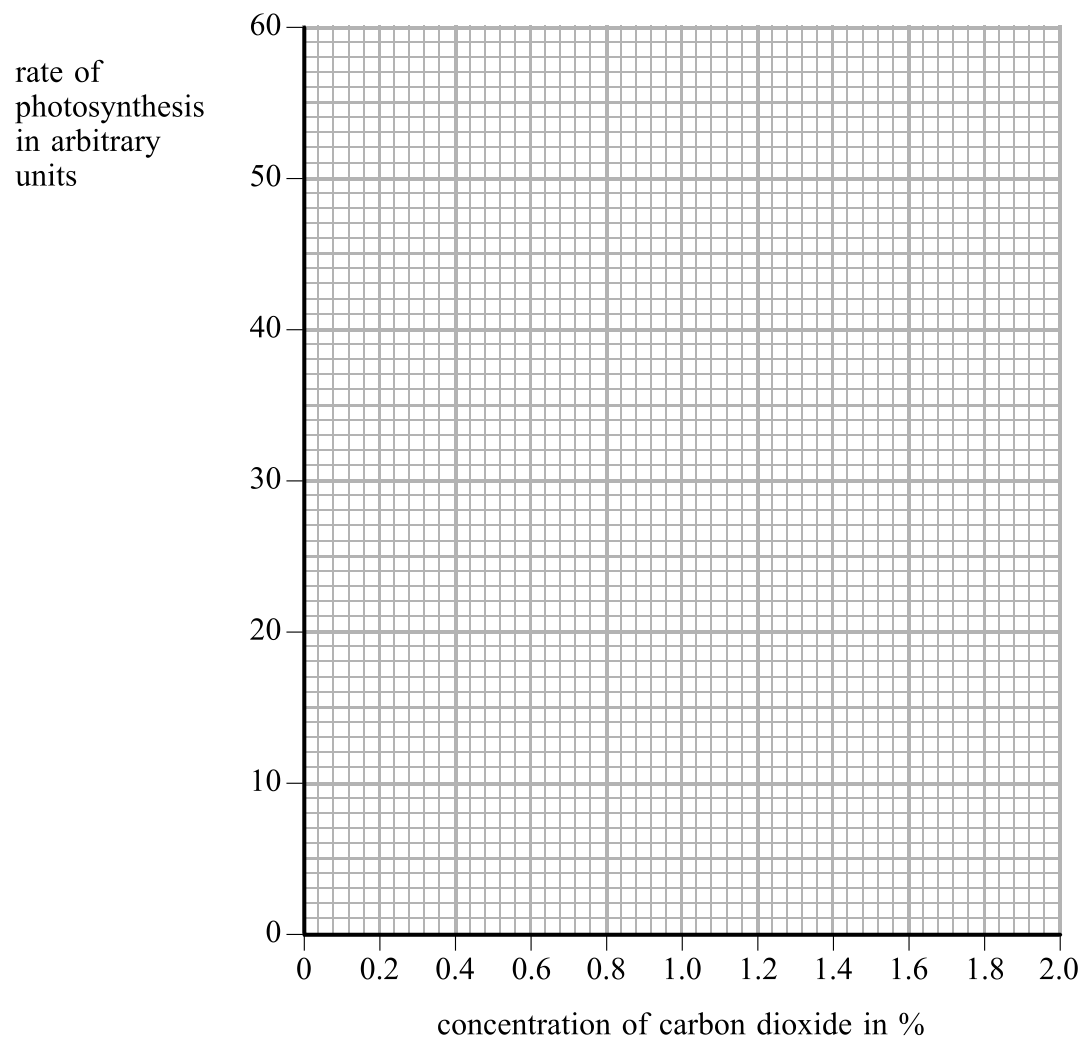
Q2



3. A student carried out an investigation to find the effect of carbon dioxide concentration on the rate of photosynthesis.
The results are shown in the table below.

concentration of carbon dioxide (%)	rate of photosynthesis (arbitrary units)
0.0	0
0.2	16
0.4	32
0.6	47
0.8	55
1.0	57
1.2	57
1.4	57
1.6	57
1.8	57

- (a) Use the grid to draw a graph of rate of photosynthesis against concentration of carbon dioxide.



(4)



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blank

(b) Use your graph to estimate the rate of photosynthesis when the concentration of carbon dioxide is 0.5%.

..... (1)

(c) Use the graph to help you explain the effects of carbon dioxide concentration on the rate of photosynthesis.



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(6)

(Total 11 marks)

Q3

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4. Some hormones control sexual maturity and reproduction.

(a) Name the hormone that stimulates the production of sperm.

..... (1)

(b) State **one** secondary sexual characteristic that is the same in both females and males.

..... (1)

(c) The female sex hormones control the menstrual cycle.

(i) Describe the function of each of the following female hormones in this cycle.

Follicle stimulating hormone (FSH)

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Luteinising hormone (LH)

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Oestrogen

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Progesterone

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..... (4)

(ii) Which **two** of these sex hormones are released by the pituitary gland?

..... (1)

Q4

(Total 7 marks)



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5. Enzymes are essential for the digestion of food.

(a) Name **one** organ that produces amylase, lipase and protease enzymes.

..... (1)

(b) (i) Name the enzyme that digests fats.

..... (1)

(ii) Name the products of digestion of fat.

..... and (1)

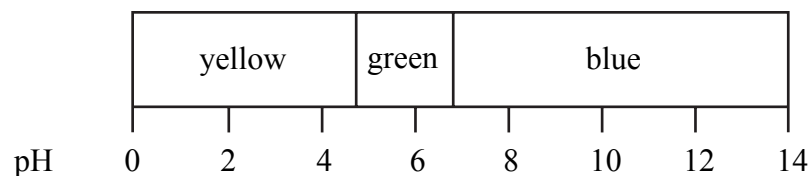
QUESTION 5 CONTINUES OVERLEAF



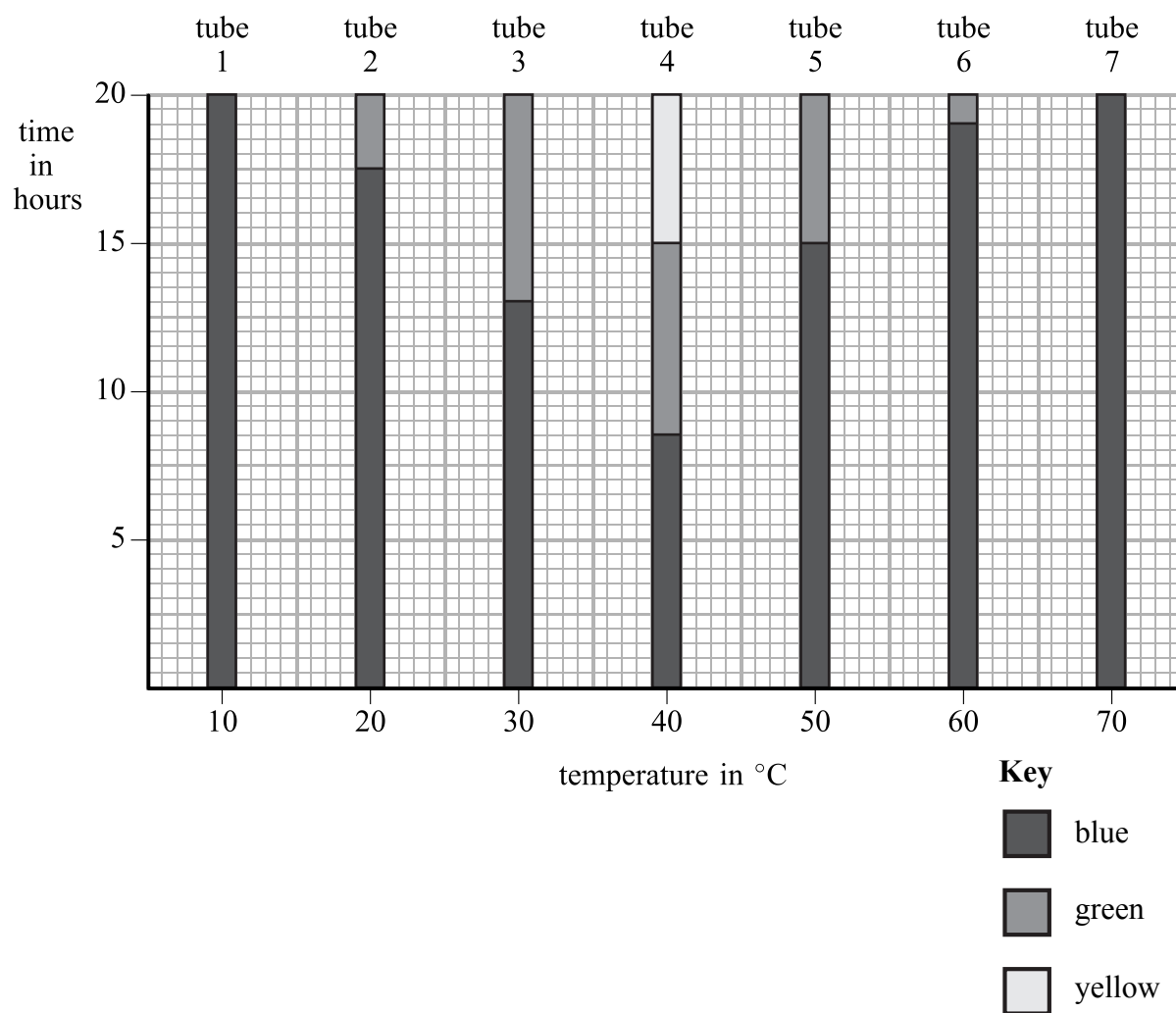
(c) Seven test tubes were set up, each containing the same quantities of olive oil, a digestive enzyme, bile salts and a pH indicator.

The seven tubes were kept at different temperatures.

The indicator changes colour as the pH changes. This is shown in the diagram below.



The colour of the indicator in each tube was recorded every hour and the results are shown in the bar chart.



(i) State the temperature at which the reaction happened most quickly.

..... (1)



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(ii) Explain why the indicator changes from blue to yellow in one of the tubes.

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(2)

(iii) Tubes 1 and 7 were then kept at 40 °C for an extra 20 hours.
Suggest, with reasons, the colour or colours you would expect to observe in each tube after the extra 20 hours.



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(6)

(Total 12 marks)

Q5

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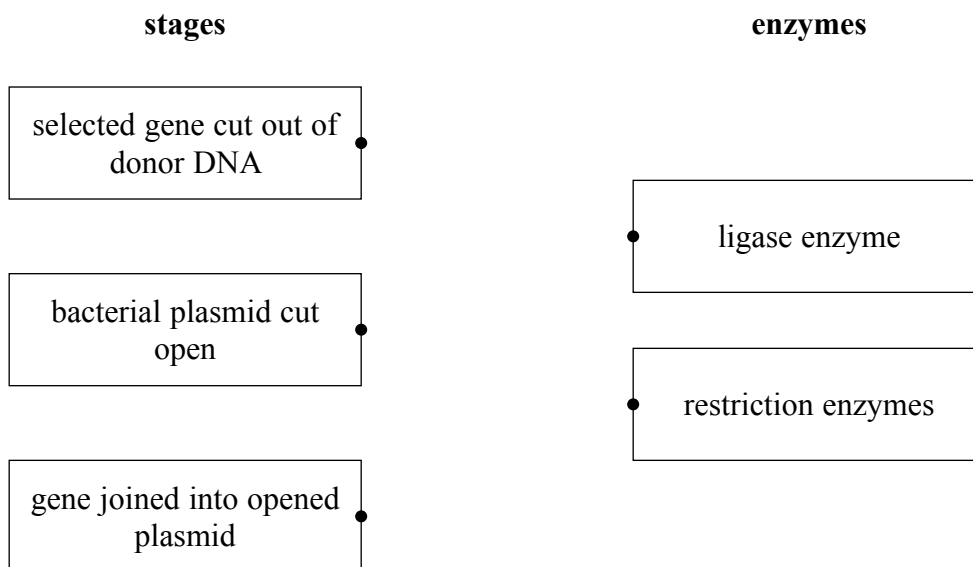
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6. It is possible to transfer genes from one species to another species. This is called genetic modification (GM).

(a) Some of the stages in transferring the human insulin gene into a bacterium and the enzymes involved in those stages are shown.

Draw **one** line from each stage to the enzymes involved.



(3)

(b) It is possible to genetically modify crop plants so that they are resistant to herbicides or can produce their own insecticides. This has caused concern about the use of GM crop plants.

Suggest some of the concerns that people may have.

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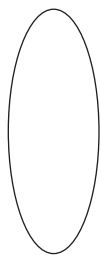
(3)

(Total 6 marks)

Q6



7. (a) The lens in the human eye alters the direction of light rays by changing shape.



lens most convex

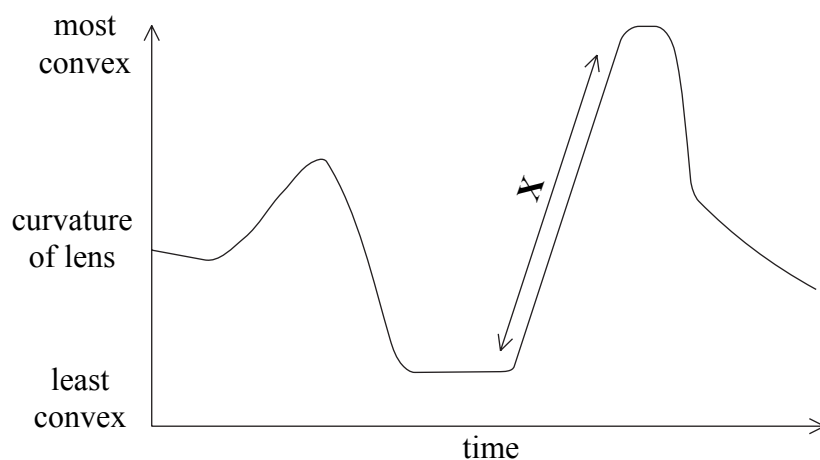


lens least convex

Name another part of the eye which also alters the direction of light rays.

..... (1)

(b) The graph shows changes in the shape of the lens as Bryan watches a bird swooping down and climbing overhead.



(i) Mark with **N** a point on the graph when the bird is nearest to Bryan. (1)

(ii) Mark with **H** a period of time when the bird is hovering (at a constant height) above Bryan. (1)



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(iii) Explain how the ciliary body and the suspensory ligaments change the shape of the lens to produce a constantly focused image during period X.

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(4)

Q7

(Total 7 marks)



8. A skier is suddenly aware of the risk of an avalanche. He is very frightened and tries to ski away from the danger as fast as possible.

(a) (i) A hormone is released in increased quantities in order to prepare his body for this extra activity.

Name this hormone.

..... (1)

(ii) Describe **four** effects that this hormone has on his body to assist the extra activity.

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..... (4)

(b) This extra activity caused a rise in his body temperature.

(i) Explain how sweating can help to restore the body temperature to normal.

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..... (3)



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(ii) The skier was trapped in heavy snow and became very cold. A friend dug him out and suggested he have an alcoholic drink to warm him up. As alcohol causes vasodilation, explain why this suggestion was dangerous.

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(3)

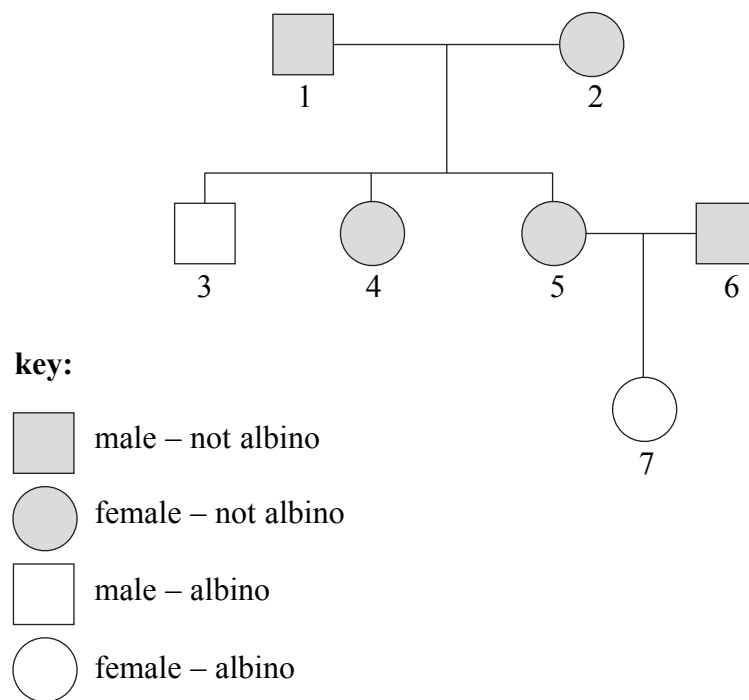
Q8

(Total 11 marks)

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9. The diagram shows a family tree in which some members are albinos.



(a) Is the allele for the albino condition dominant or recessive?

..... (1)

(b) (i) Using the symbols **A** (dominant allele) and **a** (recessive allele), state the genotype of individual **1** and of individual **3**.

1 and **3** (1)

(ii) State which **one** person could be homozygous dominant.

..... (1)



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blank

(c) Individuals **5** and **6** are expecting another child.

What is the chance of that child being a female albino?

Show your working.

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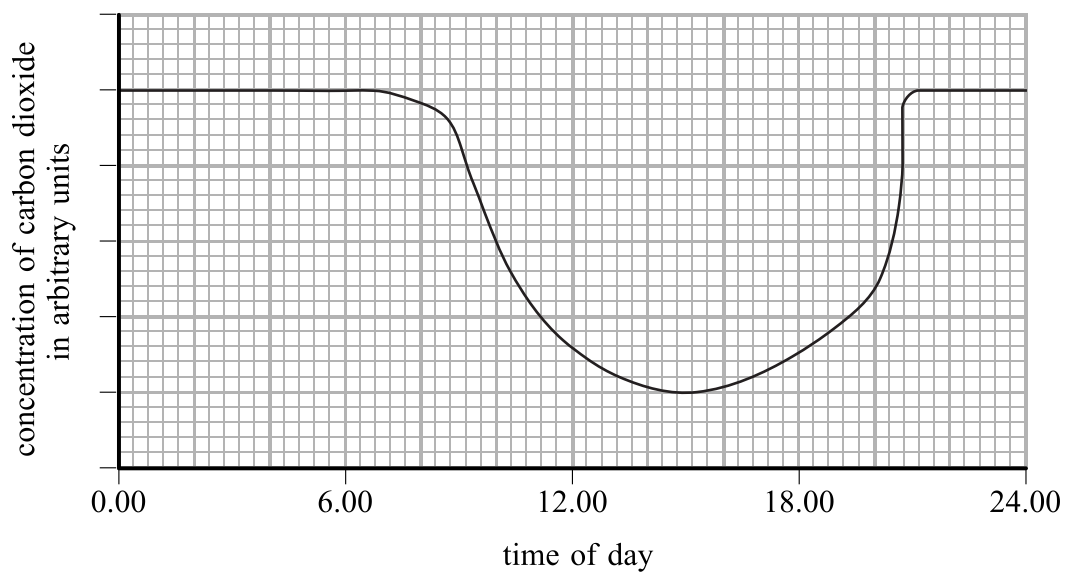
(3)

Q9

(Total 6 marks)



10. An investigation measured the concentration of carbon dioxide in the air above a field of barley. Measurements were taken over a 24 hour period. The results are plotted in the graph.



(a) (i) At what time was the concentration of carbon dioxide at its lowest?

..... (1)

(ii) At what time would the concentration of oxygen be at its highest?

..... (1)



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(b) Describe and explain the pattern of gas exchange between the plants and the atmosphere over the 24 hour period.

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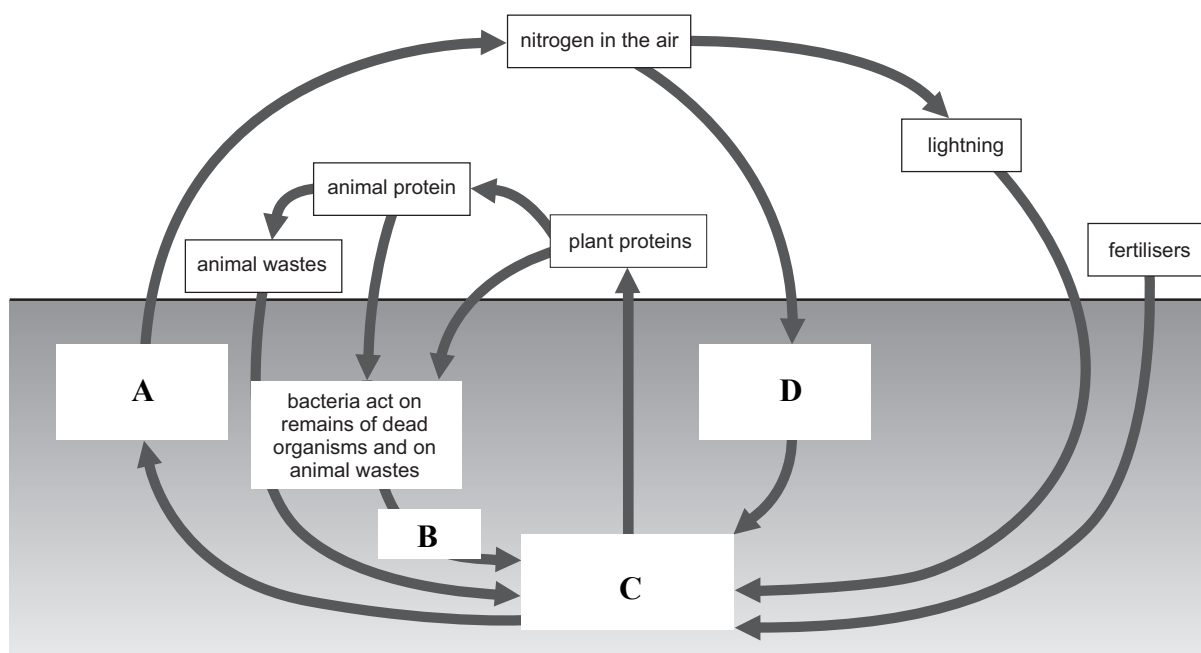
(6)

Q10

(Total 8 marks)



11. The diagram shows the nitrogen cycle.



(a) Name the type of bacteria in each of the following stages and describe their effect on the nitrogen cycle.

(i) Stage A

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(2)

(ii) Stage B

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(2)



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(iii) Stage D

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(2)

(b) Describe what is happening in stage C of this cycle.

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(2)

(c) Explain how nitrates are formed in some types of plant.

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(3)

(Total 11 marks)

Q11

TOTAL FOR PAPER: 90 MARKS

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N 2 5 7 9 0 A 0 2 3 2 4

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