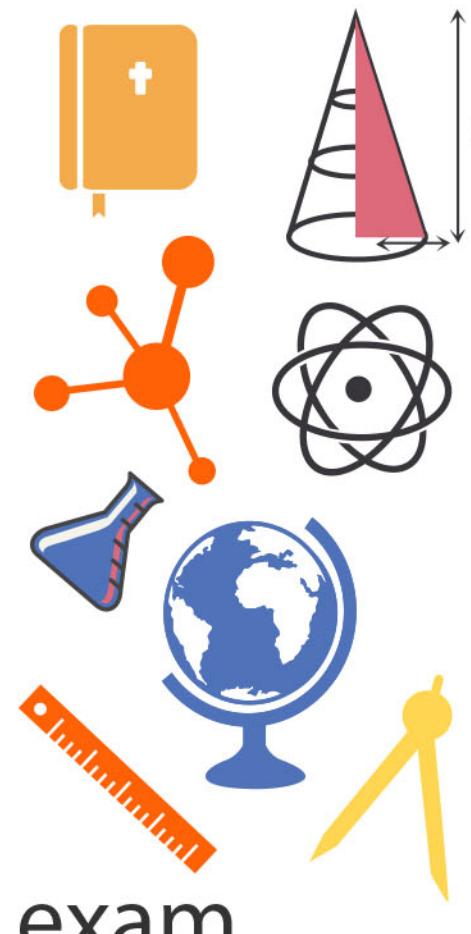
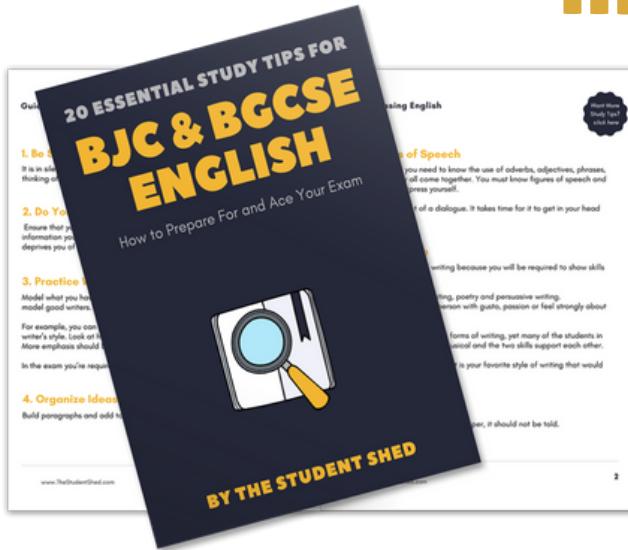


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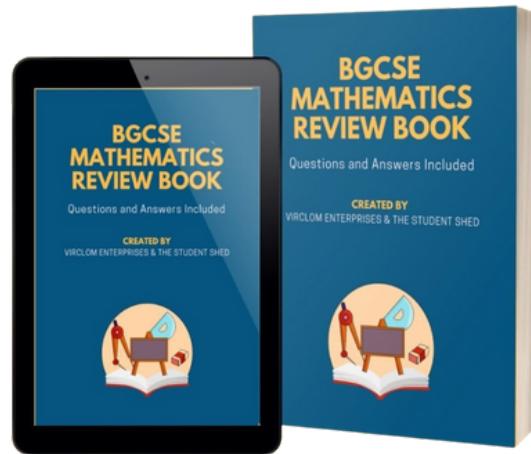


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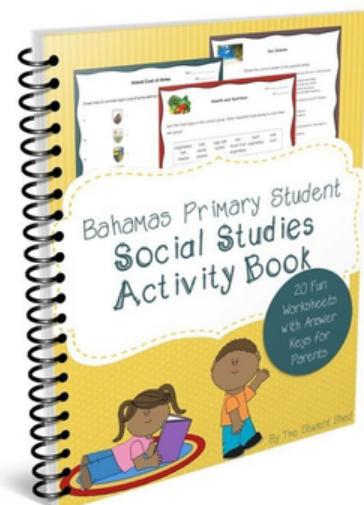
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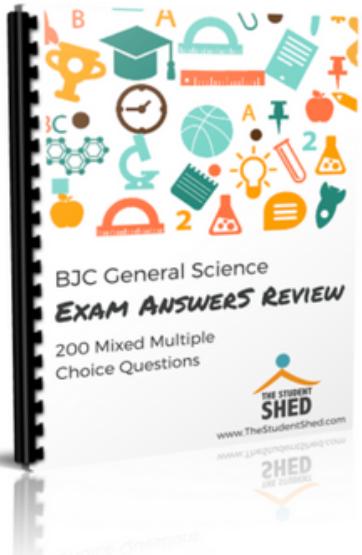
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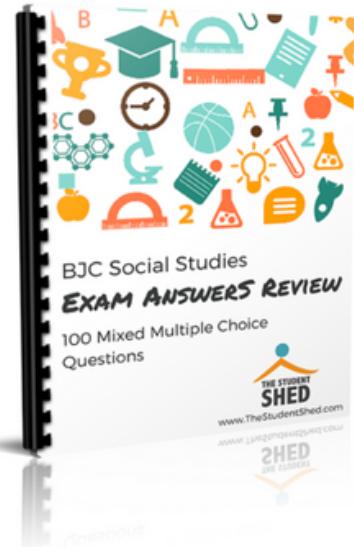
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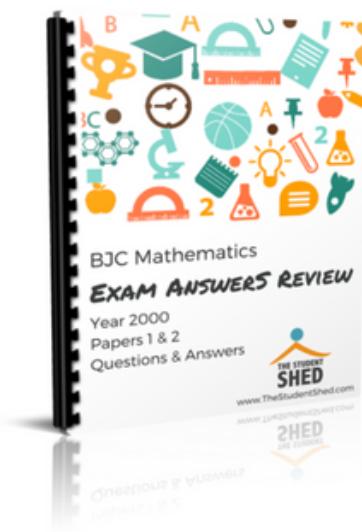
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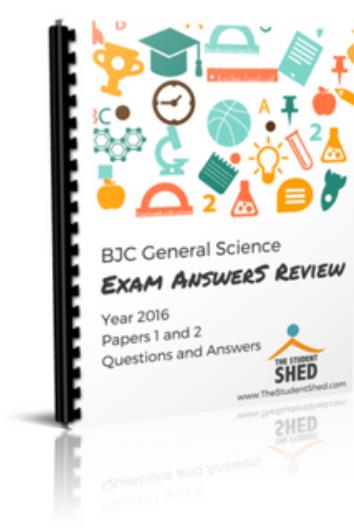
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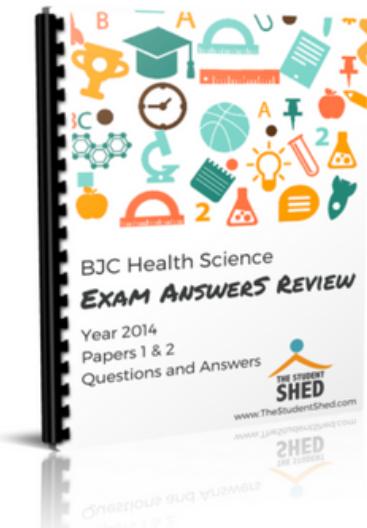
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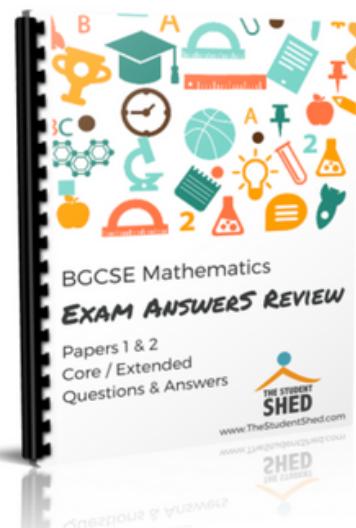
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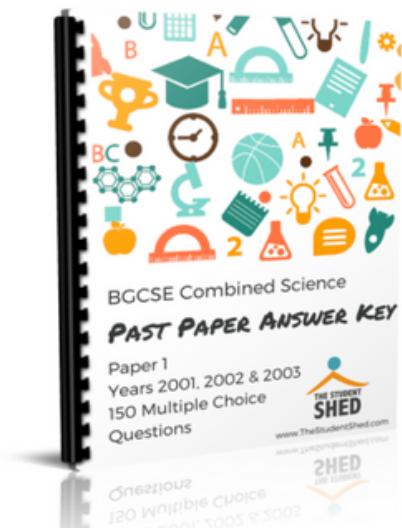
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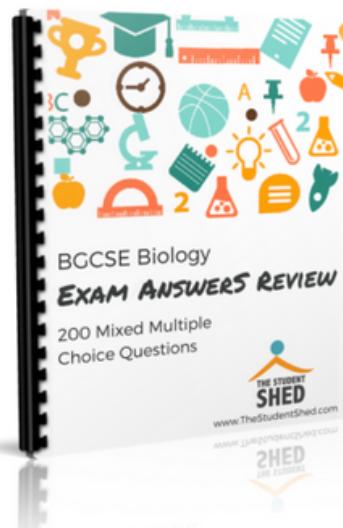
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# BIOLOGY

## PAPER 1

Tuesday **18 MAY 2010** 9.00 A.M.– 10.15 A.M.

### MINISTRY OF EDUCATION NATIONAL EXAMINATIONS

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

#### INSTRUCTIONS AND INFORMATION FOR CANDIDATES

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

Write your school number, candidate number, surname and initials in the spaces provided above.

There are fifty questions on this paper.

Attempt **ALL** questions.

For each question there are four possible answers labelled **A, B, C, D**.

Choose the one you consider correct and circle the **LETTER** of your choice in the booklet.

1. A plant was placed in a dark cupboard for 24 hours. It was then exposed to sunlight for 6 hours. After this time, starch was found in its leaves.

Which characteristic of living things is observed?

- A excretion
- B nutrition
- C respiration
- D sensitivity

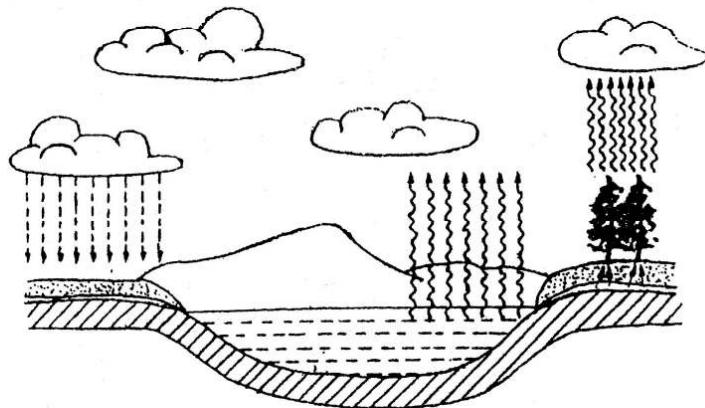
2. Which characteristic below is common to birds and mammals?

- A constant body temperature
- B feet with four digits
- C hair all over the body surface
- D teeth

3. Which is the scientific name for the Queen conch?

- A *Homo sapiens*
- B *Rhizophora mangle*
- C *Strombus gigas*
- D *Zea mays*

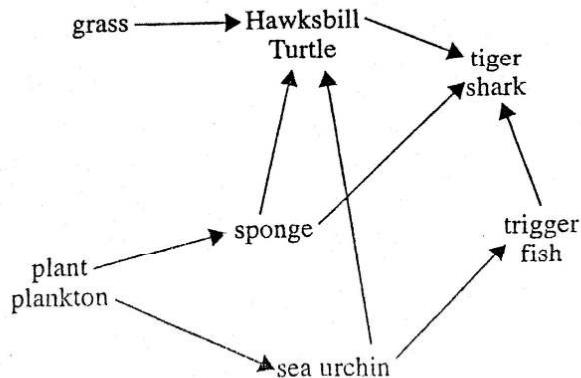
4. The diagram shows the water cycle.



What will happen if all the plants are removed?

- A Evaporation will increase.
- B Precipitation will increase.
- C Transpiration will decrease.
- D Transpiration will increase.

5. The diagram shows part of a marine food web.



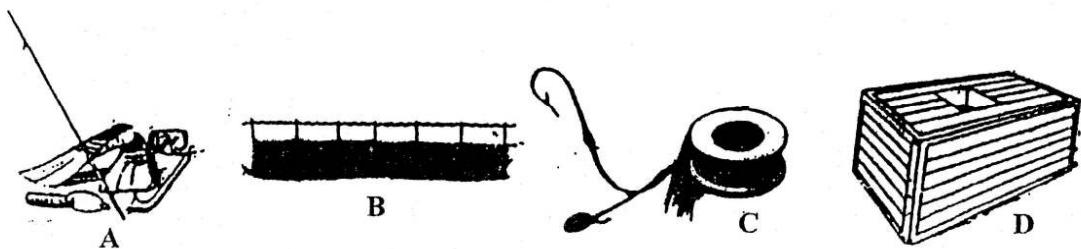
Which statement best describes the Hawksbill Turtle?

- A a primary consumer only
- B a primary and a secondary consumer
- C a primary and a tertiary consumer
- D a secondary and a tertiary consumer

6. Which two gases contribute greatly to the greenhouse effect?

- A carbon dioxide, oxygen
- B methane, carbon dioxide
- C sulphur dioxide, carbon dioxide
- D sulphur dioxide, methane

7. The diagram shows four types of fishing gears.

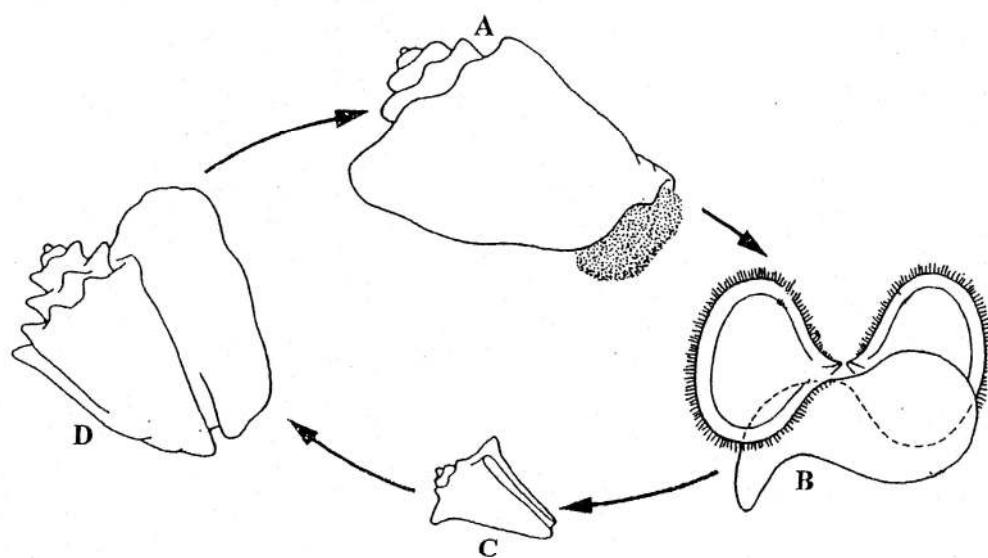


Which is a correct statement about the gear shown?

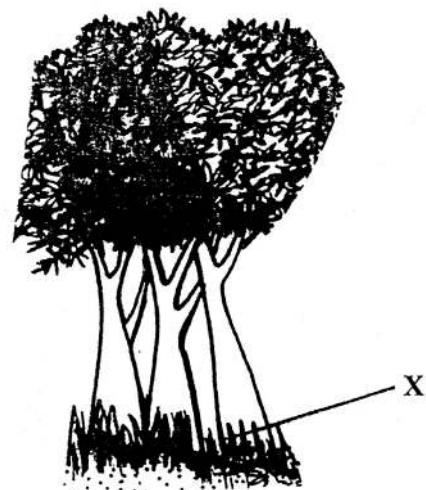
Gear	Statement
A	Should only be used to capture conchs
B	Used to capture shallow water fish
C	Legal only for sports fishing
D	Used to capture large quantity of scale fish

8. The diagram shows the life cycle of the Queen conch.

Which letter identifies the veliger?



9. The diagram shows a black mangrove plant.



Which statement describes the purpose of the structures labelled X?

- A They allow oxygen to diffuse into the roots.
- B They form new plants.
- C They help to anchor the plant in the mud.
- D They help to remove excess salt from the water.

10. The table shows some of the results of a transect down a rocky seashore.

Animal species	Quadrat number										
	Splash zone			Tidal pool zone		Intermittently wet zone			Permanent wet zone		
	1	2	3	4	5	6	7	8	9	10	11
Number of Nerite	7	2	6	12	4	6	7	5	26	40	65

What is the average number per quadrat of *Nerite* found in the area of the shore that is covered and uncovered by the ebb and flow of the tides?

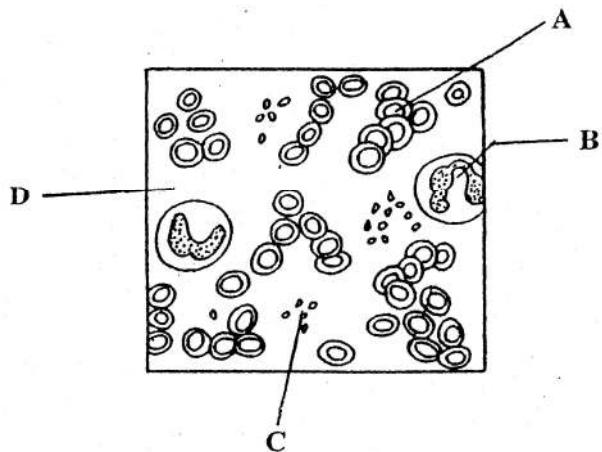
- A 5  
B 6  
C 8  
D 18
11. Which structure in a plant cell gives it the green colour?  
A cell wall  
B chloroplast  
C cytoplasm  
D vacuole

12. Which part of a plant cell enables it to maintain its shape?

- A cell membrane
- B cell wall
- C nucleus
- D vacuole

The diagram represents blood components as seen under a microscope.

Use the diagram to answer questions 13 and 14.



13. Which component represents structures needed for blood to clot?

- A
- B
- C
- D

14. Which component is responsible for the transportation of oxygen?

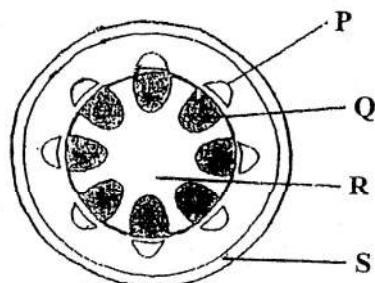
A

B

C

D

15. The diagram shows a transverse section through a stem.



Which labelled structures contain transporting tissues?

A P and Q

B Q and S

C R and S

D S and P

16. What is the function of fats in the body?

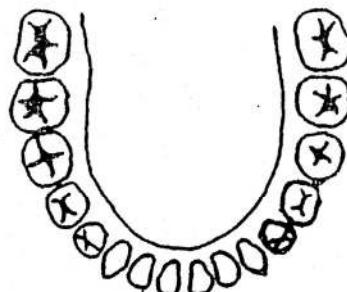
A production of energy

B production of proteins

C production of red blood cells

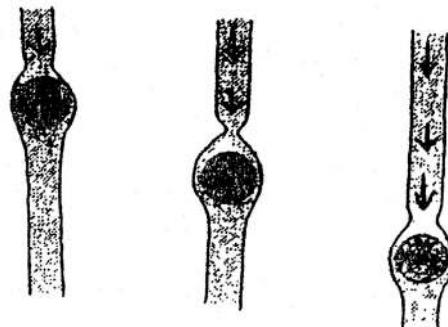
D production of white blood cells

17. The diagram shows the arrangement of teeth in the lower jaw of an adult male.



What is the total number of teeth in the mouth of this adult male?

- A 16
  - B 26
  - C 32
  - D 38
18. The diagrams show a food bolus at various points in the oesophagus.

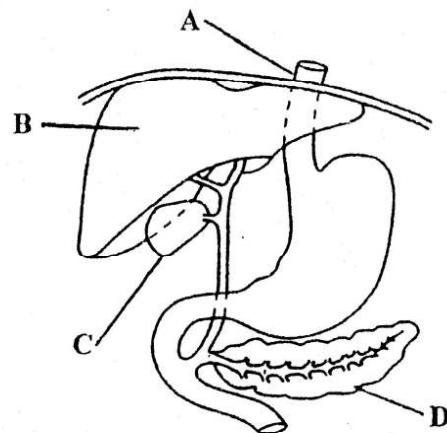


What process do the arrows illustrate?

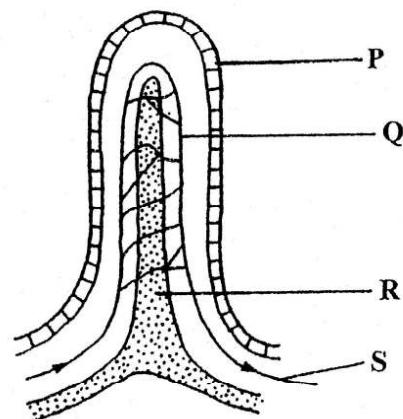
- A absorption
- B assimilation
- C chemical digestion
- D peristalsis

19. The diagram shows some organs of the digestive system.

Which structure produces enzymes that act upon carbohydrates, fats and proteins?



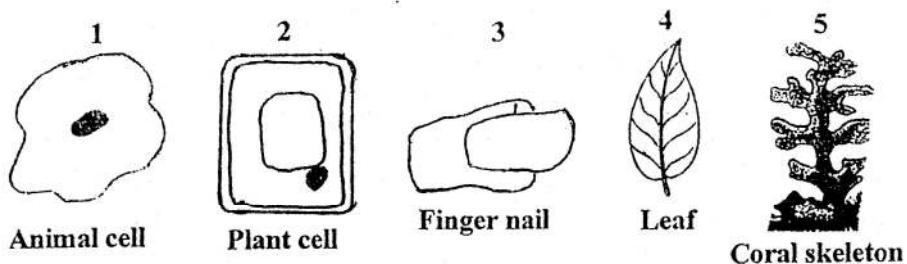
20. The diagram shows the structure of a villus.



Which of the products of digestion are absorbed into the part labelled Q?

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

21. The following diagrams represent living and non-living substances.



In which of these structures does respiration occur?

- A 1, 2, 4  
B 1, 3, 5  
C 1, 2, 3, 4  
D 1, 2, 3, 5
22. Which of the following is true of the composition of expired air compared with inspired air?

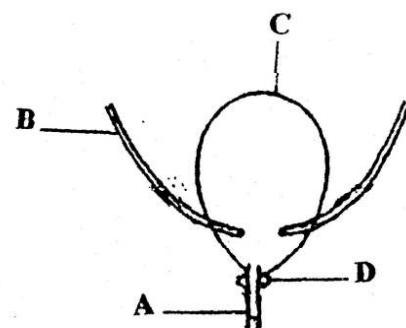
	% nitrogen	% carbon dioxide	% oxygen	% water vapour
A	less	less	less	more
B	more	less	more	less
C	same	more	less	more
D	same	more	less	less

23. Why is haemoglobin useful to the human respiratory system?
- A Haemoglobin binds tightly to both oxygen and carbon dioxide.  
B Haemoglobin decreases the ability of the blood to transport carbon dioxide.  
C Haemoglobin increases the ability of the blood to transport oxygen.  
D Most of the haemoglobin is dissolved in the plasma.

24. Which of the following is true of gas exchange surfaces?
- A The surface is always at a constant temperature.
  - B The surface is moist.
  - C The surface is thick.
  - D The surface must be exposed to air.
25. What is the effect of cigarette smoke on the functioning of the respiratory tract?
- A It causes the epiglottis to malfunction.
  - B It damages the rings of cartilage around the bronchi.
  - C It slows down the beating of the cilia lining the respiratory system.
  - D It speeds up the beating of the cilia in the respiratory system.
26. Which of the following are the products of anaerobic respiration in humans?
- A carbonic acid + energy
  - B carbon dioxide + energy
  - C ethanol + carbon dioxide + energy
  - D lactic acid + energy.

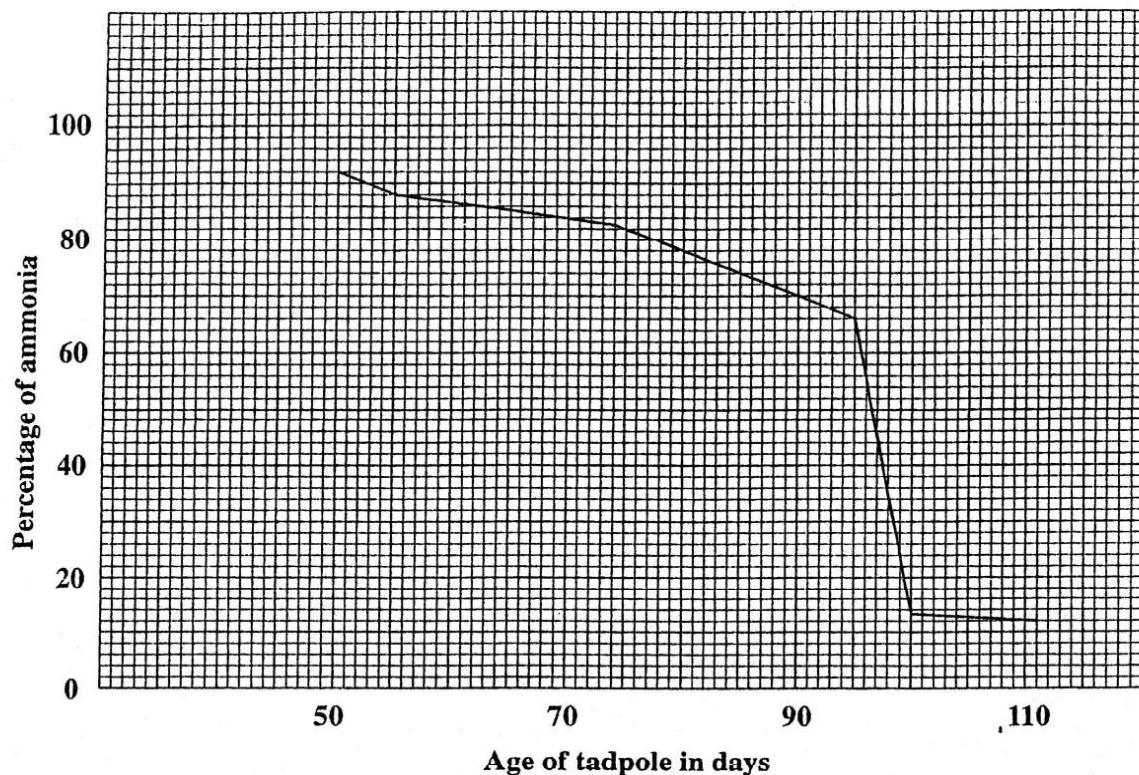
27. The diagram shows the bladder and accessory structures.

Which part represents the urethra?



28. The graph shows the percentage excretion of ammonia by a tadpole with age.

When tadpoles become frogs, they stop secreting a great deal of ammonia and start secreting mainly urea as they move from water to land.



During which days do tadpoles come out of the water in which they live?

- A 50 – 60
- B 70 – 80
- C 90 – 100
- D 100 – 110

29. Which term describes the maintenance of a fairly constant blood sugar level?

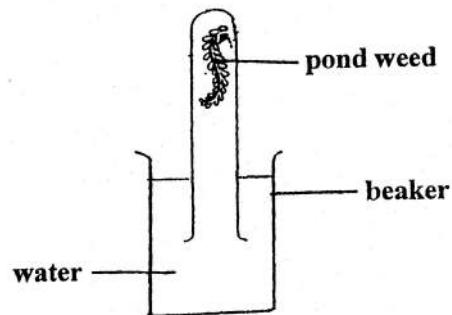
- A epistasis
- B homeostasis
- C osmosis
- D osmoregulation

30. Sunlight and chlorophyll are needed for photosynthesis.

What compounds are needed for this reaction to occur?

- A carbon dioxide and water
- B glucose and water
- C oxygen and water
- D oxygen and carbon dioxide

31. The diagram shows a water plant in a solution in a well lit area.



Which gas is produced by the plant?

- A carbon dioxide
- B glucose
- C nitrogen
- D oxygen

32. The table shows the number of stomata in the leaves of three plants.

Plant	Number of stomata per leaf
Bean	38
Pumpkin	30
Tomato	16

What is the average number of stomata per leaf?

- A 20
- B 25
- C 28
- D 30

33. Which of these describes the process of osmosis?

- A The movement of solutes along a diffusion gradient.
- B The movement of particles from a place of low to a place of high concentration.
- C The movement of a solvent from a dilute to a concentrated solution through a selectively permeable membrane.
- D The movement of solutes through a selectively permeable membrane.

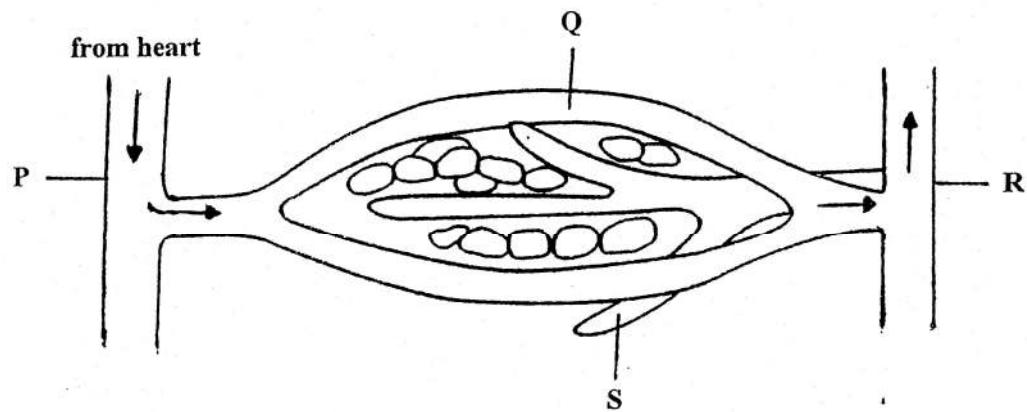
34. For which condition could the risk be reduced by taking regular exercise and eating a balanced, low-fat diet?

- A asthma
- B heart attack
- C iron deficiency anaemia
- D weight loss

35. Why is blood clotting important?

- A controls blood pressure
- B increases haemoglobin content
- C prevents loss of red blood cells
- D provides entry of micro-organisms

36. The diagram shows an arteriole, a venule, a blood capillary and a lymph capillary.

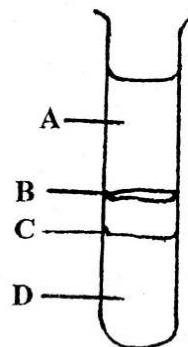


Which blood vessel has a high concentration of oxygen?

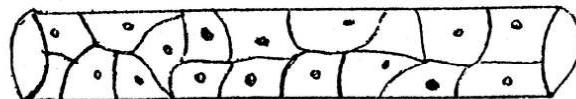
- A P
- B Q
- C R
- D S

37. The diagram shows a blood sample that has been allowed to separate into its various components.

Which label identifies the location of platelets?



38. The diagram shows the structure of a capillary.



Which cell can pass through the capillary wall?

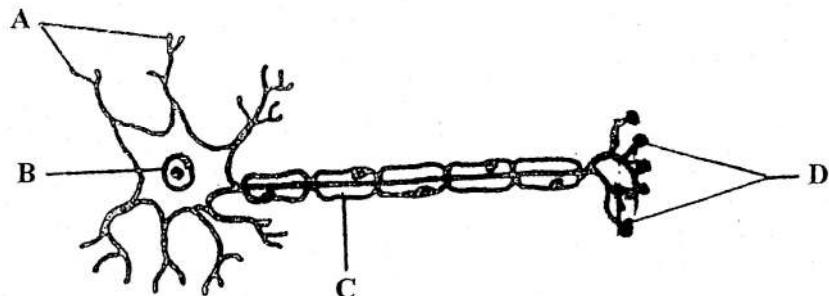
- A lymphocyte
- B phagocyte
- C platelet
- D red blood cell

39. What name is given to the plasma protein needed for blood clotting?

- A fibrinogen
- B glycogen
- C haemoglobin
- D insulin

40. The diagram shows a motor neurone.

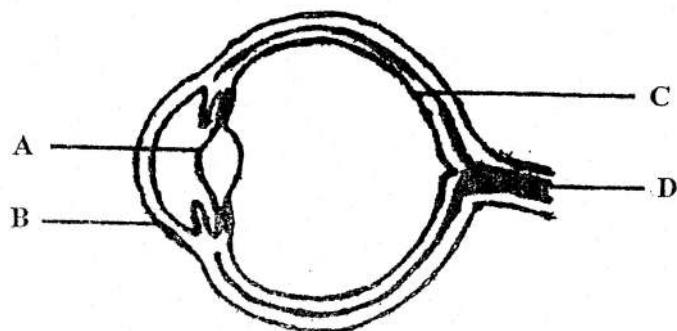
Identify the structure whose thickness influences the speed at which an impulse travels.



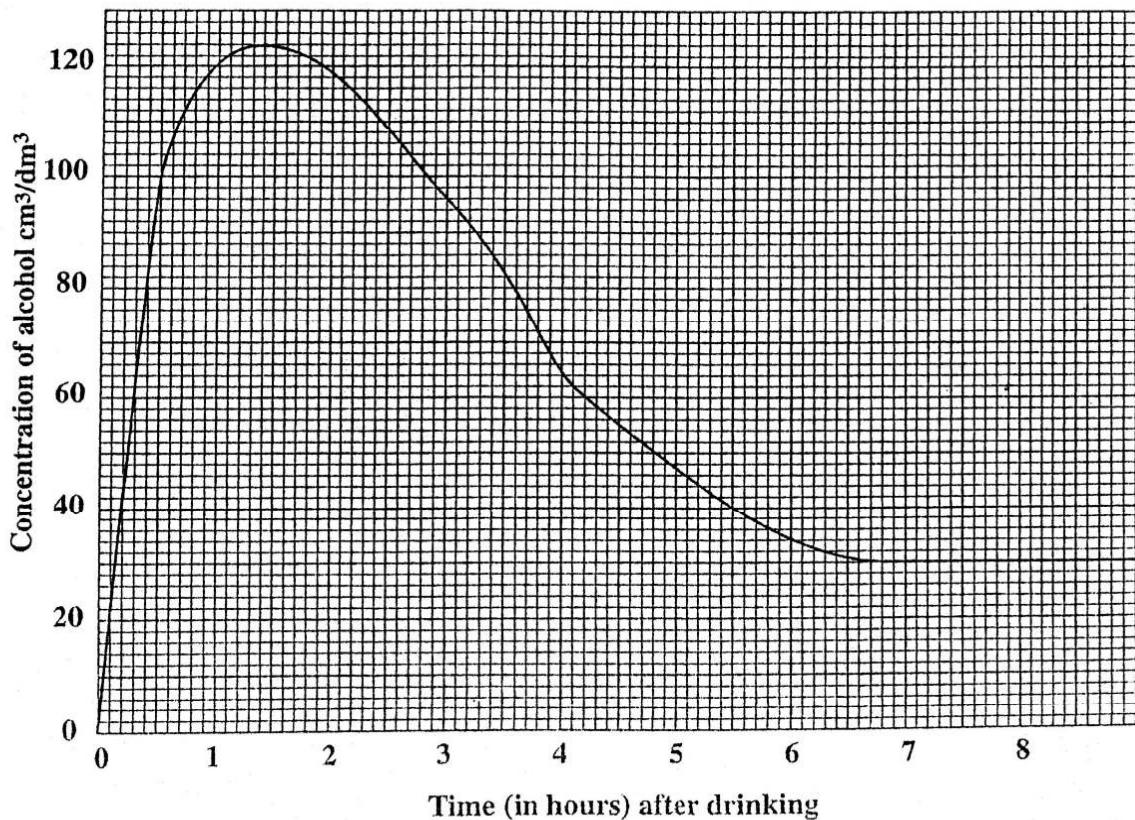
41. Which is a characteristic of a person with a severely damaged cerebellum?

- A an inability to learn
- B a low heart rate
- C high blood pressure
- D a lack of coordination

42. Which structure has photo receptors that convert light rays to electrical impulses?



43. Which structure in the ear does NOT vibrate during the process of hearing?
- A anvil  
B cochlea fluid  
C eardrum  
D eustachian tube
44. The graph shows the concentration of alcohol in  $\text{cm}^3/\text{dm}^3$  blood over an 8-hour period.



If the legal limit to drive is  $80 \text{ cm}^3/\text{dm}^3$ , how long will it take after drinking alcohol for it to be legal to drive again?

- A 1 hr  
B 2.5 hrs  
C 3 hrs  
D 3.5 hrs

45. What is the difference between sexual and asexual reproduction?
- A Asexual reproduction cannot occur in diploid species.
  - B Asexual reproduction cannot occur in multicellular organisms.
  - C Asexual reproduction produces offspring that are clones of the parent.
  - D Sexual reproduction does not require cell division.

46. The photograph shows a baby holding an apple.



Which part of the fertilized flower develops into the fruit?

- A anther
- B ovary
- C stigma
- D style

Surname and Initials

**BIOLOGY****PAPER 2 3009/2****Tuesday 18 MAY 2010 10.20 A.M. – 11.50 A.M.**

**MINISTRY OF EDUCATION  
NATIONAL EXAMINATIONS**

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Write your school number, candidate number, surname and initials in the spaces provided above.

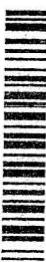
Answer **ALL** questions on this paper.

Read each question carefully and make sure you know what you have been asked to do before starting your answer. Confine your answer to the lines following each question.

The mark for each part-question is given in brackets [ ].

For Examiner's Use	
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

This question paper consists of 16 printed pages and 4 blank pages.



—5—

(b) (i) On diagram A, draw a line to identify the structures which produce pollen grains and label it X. [1]

(ii) Name the agent involved in the transfer of the pollen grains in plant A.

\_\_\_\_\_ [1]

(c) Explain how the roots of both plants are similar in function.

\_\_\_\_\_

\_\_\_\_\_ [2]

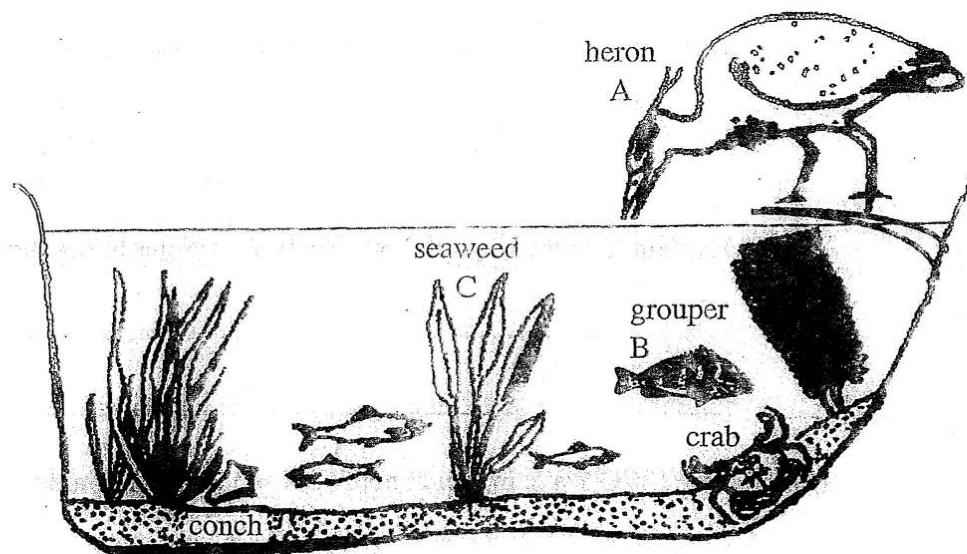
(d) List **TWO** ways in which maize is used in The Bahamas.

\_\_\_\_\_

\_\_\_\_\_ [2]

**Total marks [10]**

2. The diagram shows a seashore ecosystem in The Bahamas.



- (a) (i) Write a food chain using the organisms labelled A, B and C.

\_\_\_\_\_ [2]

- (ii) Name the primary consumer in your food chain.

\_\_\_\_\_ [1]

- (b) (i) During which months is it illegal to harvest the Nassau grouper?

\_\_\_\_\_ [1]

- (ii) Why was this time period selected?

\_\_\_\_\_ [1]

- (c) The sand dollar is an organism that lives on the sandy beach.

- (i) State **TWO** problems it encounters in its habitat during low tide.

\_\_\_\_\_

\_\_\_\_\_ [2]

- (ii) The sand dollar burrows into the sand.

Describe **ONE** structural feature which allows it to do this easily.

\_\_\_\_\_ [1]

(d) The last zone of the seashore is the scrub woodland zone.

(i) Name **ONE** type of plant that is typically found here.

---

[1]

(ii) Describe **ONE** advantage that these plants have over the plants that live in the pioneer zone.

---

---

[1]

**Total marks [10]**

3. The table shows the bubbles produced by a water plant in a bright light.

Distance from light (cm)	Number of bubbles produced per minute
15	38
25	21
35	10
45	7

- (a) (i) State **TWO** factors, other than moving the light closer to the plant, that could increase the rate of photosynthesis of the water plant.

---

---

[2]

- (ii) How does the distance from the light affect the production of bubbles?

---

---

[1]

- (iii) Name the gas inside the bubbles.

---

[1]

- (b) (i) Name the part of the cell in which photosynthesis takes place.

---

[1]

- (ii) State **TWO** differences between photosynthesis and respiration.

---

---

[2]

- (c) Predict how the rate of photosynthesis of the water plant would be affected if the only light shining on it was green light. Explain your answer.

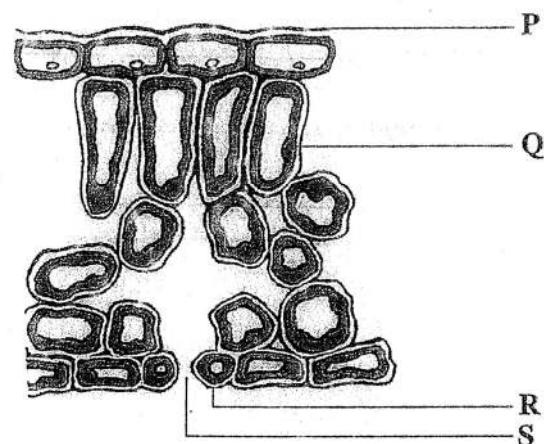
predicition \_\_\_\_\_

explanation \_\_\_\_\_

[2]

**Total marks [9]**

4. The diagram shows the internal structure of a leaf.



- (a) Name the structures labelled **P**, **R** and **S**.

**P** \_\_\_\_\_ **R** \_\_\_\_\_

**S** \_\_\_\_\_ [3]

- (b) Give the function of the structures labelled **P** and **R**.

**P** \_\_\_\_\_

**R** \_\_\_\_\_ [2]

- (c) Explain the importance of intercellular air spaces in the leaf.

---

---

---

[3]

- (d) State what will happen to the part labelled **S** if the air around the leaf is very hot and dry. Explain why this would happen.

---

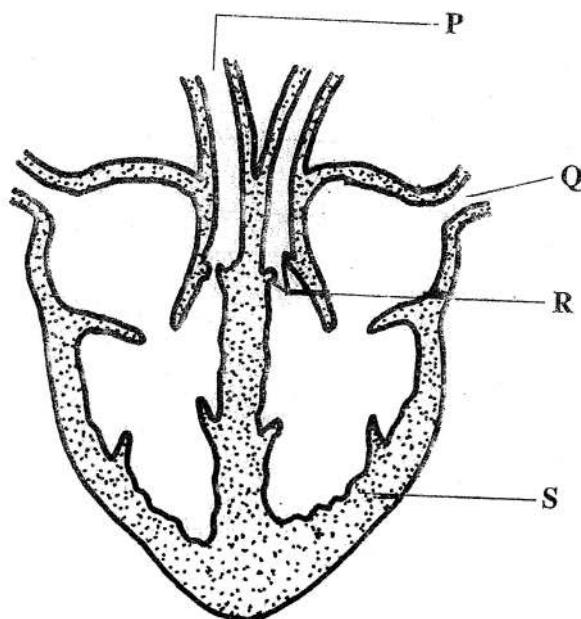
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[3]

**Total marks [11]**

5. The diagram shows a cross-section of the human heart seen from the front.



- (a) (i) Name the structures labelled **P**, **Q** and **R**.

**P** \_\_\_\_\_ **Q** \_\_\_\_\_

**R** \_\_\_\_\_

[3]

- (ii) What term describes blood in **P**?

\_\_\_\_\_ [1]

- (b) (i) The heart is said to be a double pump. Explain what this means.

\_\_\_\_\_

\_\_\_\_\_ [2]

- (ii) Explain how the wall of **S** is specially suited for its function.

\_\_\_\_\_

\_\_\_\_\_ [2]

- (c) Name **TWO** common disorders of the circulatory system that are related to a diet high in animal fats.

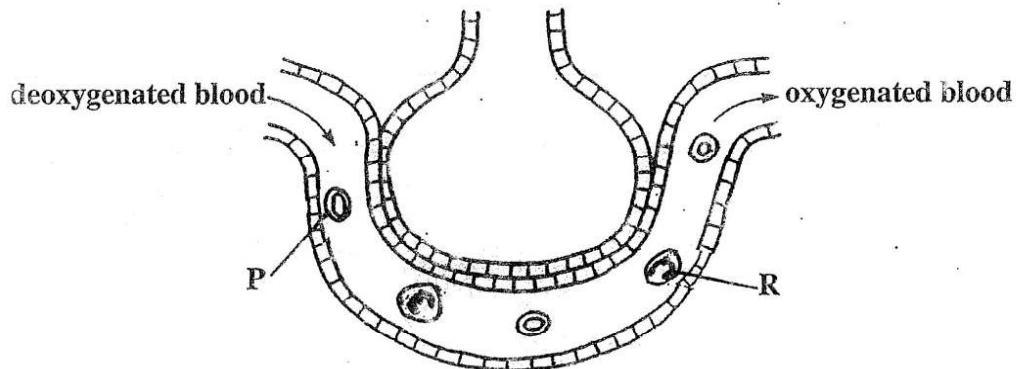
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[2]

**Total marks [10]**

6. The diagram shows a cross section of an alveolus with its blood supply:



- (a) Name the structures labelled **P** and **R**.

**P** \_\_\_\_\_ **R** \_\_\_\_\_ [2]

- (b) In which labelled structure would you find haemoglobin?

\_\_\_\_\_ [1]

- (c) Give **THREE** features of the alveoli, in the lungs, which enable them to function efficiently.

\_\_\_\_\_

\_\_\_\_\_ [3]

- (d) Explain what must happen, during breathing, to expel air from the alveoli.

\_\_\_\_\_

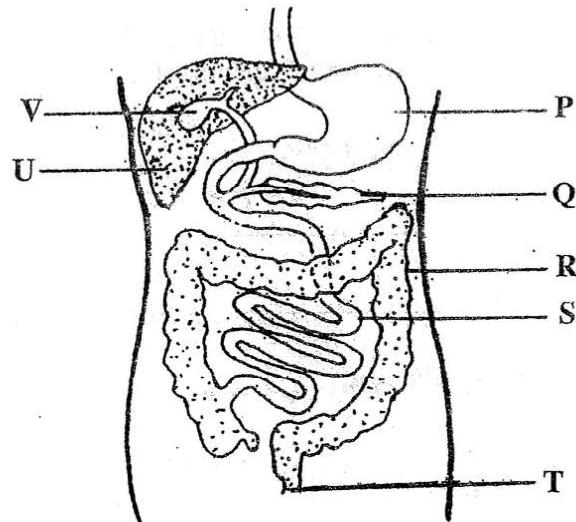
\_\_\_\_\_ [3]

- (e) Suggest **ONE** way in which a person's life style could adversely affect the functioning of their alveoli.

\_\_\_\_\_ [1]

Total marks [10]

7. The diagram represents the human digestive system.



(a) Complete the following statements by selecting the appropriate letter from the diagram.

(i) Egestion happens at \_\_\_\_\_

(ii) Reabsorption of most water occurs at \_\_\_\_\_

(iii) Deamination takes place at \_\_\_\_\_ [3]

(b) (i) Name the substance stored in structure V.

\_\_\_\_\_

(ii) State **ONE** function of the substance named in (b) (i).

\_\_\_\_\_ [2]

(c) Give **ONE** way in which the structure of the large intestine differs from the small intestine.

\_\_\_\_\_

[1]

- (d) Amino acids and glucose are carried in the blood from the small intestine to the liver.

Describe the processes that occur in the liver when there is an excess of these materials arriving in the blood.

- (i) Amino acids

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[2]

- (ii) Glucose

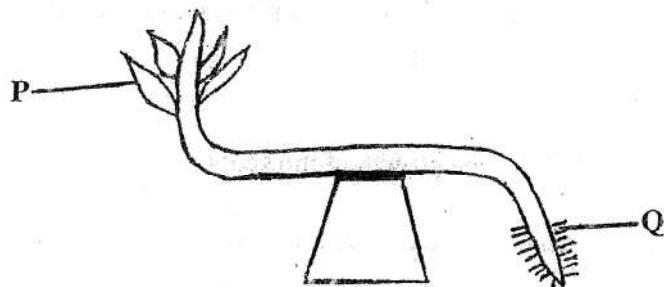
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[2]

**Total marks [10]**

8. The diagram shows the effect of tropism on a seedling.



- (a) Explain what is meant by the term tropism.

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[2]

- (b) Name the part of the seedling which has undergone each of these types of tropism.

(i) Positive geotropism \_\_\_\_\_

(ii) Positive phototropism \_\_\_\_\_ [2]

- (c) Suggest what could be done with the seedling to prevent it from showing a tropic response.

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[1]

- (d) (i) What are auxins?

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[1]

- (ii) State where auxins are produced.

---

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[1]

(e) A light source is placed at **P**. Predict the effect this would have on

(i) the distribution of the auxin in the shoot

---

(ii) the growth of the shoot

---

(iii) the growth of the root.

---

[3]

**Total marks [10]**

School Number	Candidate Number
Surname and Initials	

# BIOLOGY

PAPER 3 3009/3

Friday 21 MAY 2010 12.30 – 2.00 p.m.

**Additional materials:**  
Answer Booklet

**MINISTRY OF EDUCATION  
NATIONAL EXAMINATIONS**

BAHAMAS GENERAL CERTIFICATE OF SECONDARY EDUCATION

**INSTRUCTIONS AND INFORMATION FOR CANDIDATES**

Write your school number, candidate number, surname and initials in the spaces provided above and on the answer booklet.

Answer **ALL** questions in Section A(1–4) in the space provided.

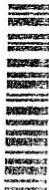
Answer two (2) out of three (3) questions in Section B on the sheets provided, which must be attached to the back of the question paper.

Candidates are advised to spend no more than 35 minutes on Section A.

The mark for each part-question is given in brackets [ ].

For Examiner's Use	
1	
2	
3	
4	
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7	
TOTAL	

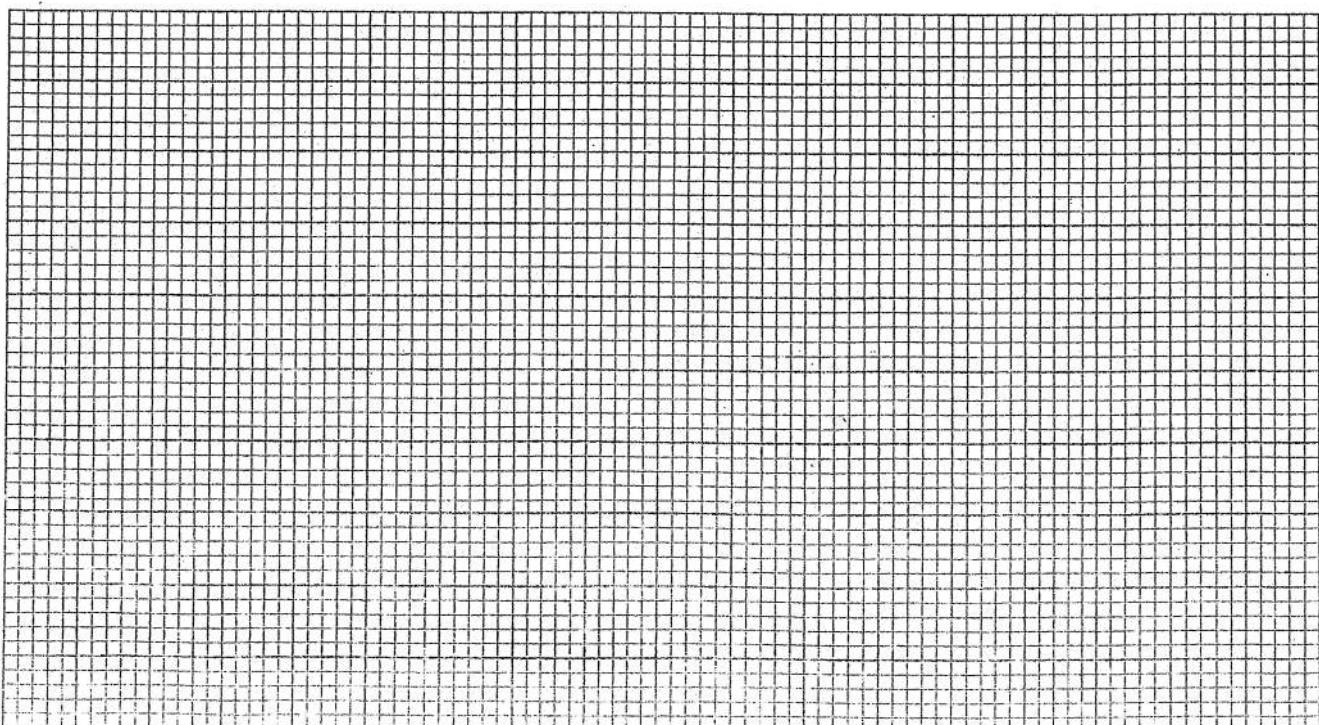
This question paper consists of 10 printed pages and 2 blank pages.



1. The table below contains information about agricultural imports of local production in The Bahamas between 1986 and 1995. The figures are in thousands of dollars.

Years	Value of imports/thousand dollars	Value of local production/thousand dollars
1986	159	26
1987	179	30
1988	178	28
1989	193	36
1990	186	50
1991	195	54
1992	181	40
1993	186	37
1994	194	42
1995	204	44

- (a) Use the information in the table to draw a line graph showing value of local production. [4]



1. The diagrams show the external features of two plants.

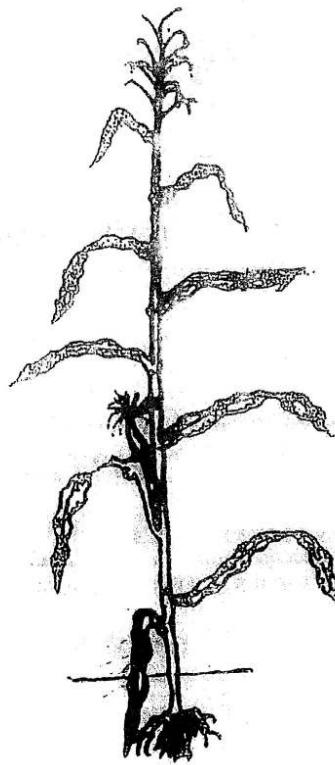


Diagram A

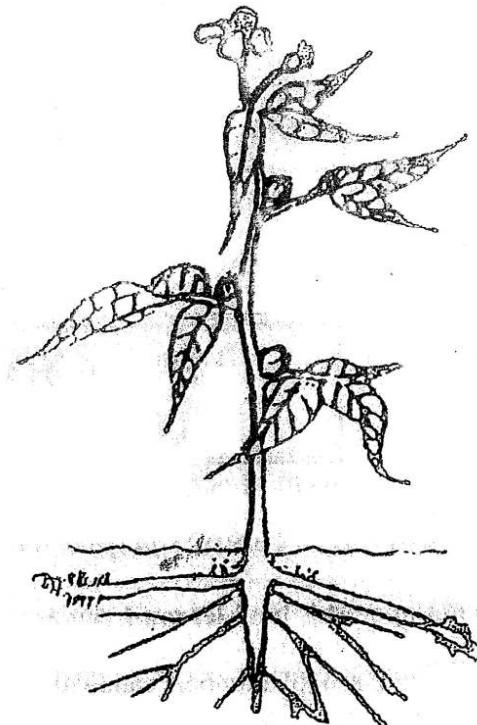


Diagram B

- (a) (i) Which plant is a dicotyledon?

[1]

- (ii) List **THREE** observable features shown in the diagram to justify your answer.

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[3]

(b) Which year showed the greatest amounts of

(i) imports?

---

(ii) local production?

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[2]

(c) Write a concluding statement about the value of imports versus the value of local production.

---

[1]

(d) One reason given by local Bahamian farmers for their limited production is the high cost of input supplies (items needed to produce a crop).

(i) List **TWO** types of chemical input supplies.

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[2]

(ii) Explain the importance of each to the growing crops.

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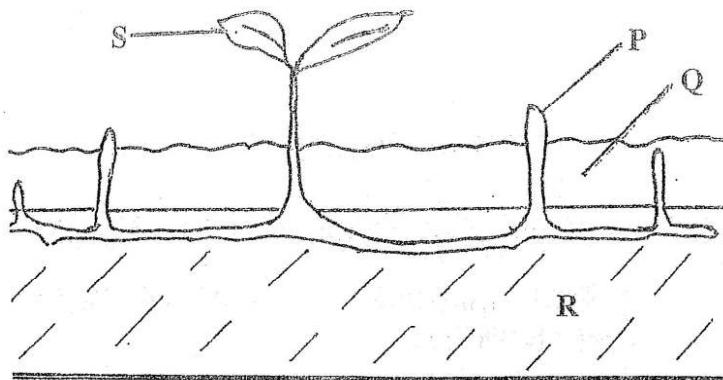
[2]

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[2]

**Total marks [11]**

2. The diagram shows a black mangrove plant.



- (a) (i) Which of the structures labelled are involved in photosynthesis?

[2]

- (ii) Write a balanced chemical equation to represent this process.

[3]

- (b) Describe how the rate of photosynthesis of the plant is affected by:

- (i) Light \_\_\_\_\_

[1]

- (ii) Carbon dioxide \_\_\_\_\_

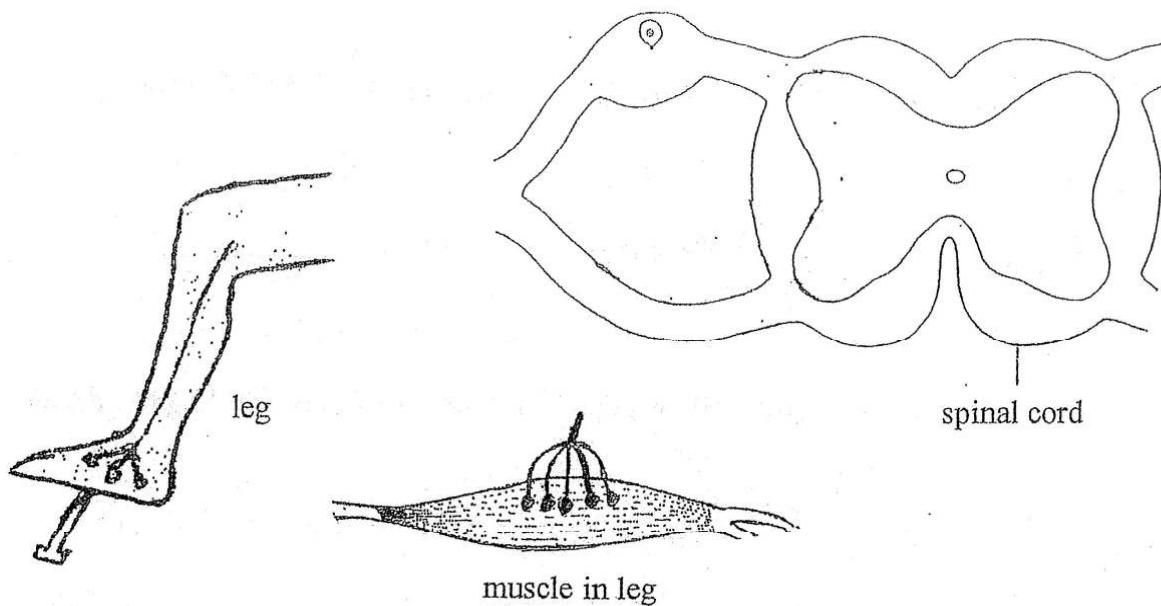
[1]

- (c) Name the structure labelled P and state how its function is related to the growth of the plant.

[3]

Total marks [10]

3. The diagram shows a leg, muscle in leg and a cross-section of the spinal cord (not to scale).



A construction worker accidentally steps on a nail. He immediately jumps.

- (a) State the term used to describe this reaction.

[1]

- (b) During this reaction, nerve impulses pass along neurones in the man's body.

Complete the diagram above by drawing and labelling the three neurones involved in this pathway. (Parts of two of the neurones are shown on the diagram.)

[3]

- (c) The construction worker also feels pain as a result of stepping on the nail. Explain how he becomes aware of the pain.

[1]

(d) In the disease multiple sclerosis (MS), a person gradually loses the use of their muscles because of the breakdown of the fatty covering around certain neurones.

- (i) Name the fatty covering and state its function.

Name \_\_\_\_\_

Function \_\_\_\_\_

[2]

- (ii) Explain how the loss of this fatty covering results in the loss of muscle use.

\_\_\_\_\_

[2]

**Total marks [9]**

- (ii) Explain ONE advantage of using a condom other than as a contraceptive device.

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[1]

- (e) Certain kinds of social behaviour by women affect their pregnancy. State TWO possible physical effects on babies born to mothers who abuse alcohol.

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[2]

**Total marks [10]**

## SECTION B

Answer any TWO questions

5. (a) There are SEVEN life processes common to all living things. Name and describe how any THREE of these processes are different in plants and animals. [6]
- (b) Describe TWO structural differences between bacteria and fungi. [4]
- (c) (i) Name the fungus used in the processes of bread making and alcohol production. Explain TWO differences between these two processes. [5]
- (ii) How is natural selection shown in the development of antibiotic-resistant strains of bacteria? [5]

Total marks [20]

6. (a) Explain how the structure of a nephron enables the following processes to occur:
- (i) ultra-filtration of the blood [4]
- (ii) re-absorption of solutes [6]
- (b) (i) What is dialysis? [2]
- (ii) Describe the advantages and disadvantages of dialysis as opposed to a kidney transplant. [4]
- (c) In the kidney, the many small tubules provide a large surface area for ultrafiltration and reabsorption. Identify TWO other parts of the body where a large surface area is provided and, for each part, explain the function of this large surface area. [4]

Total marks [20]

7. (a) Define variation. [2]
- (b) Give TWO examples of continuous variation and explain how this form of variation differs from discontinuous variation. [6]
- (c) (i) Predict the genotype and phenotype of the first generation of children of a mother with sickle cell trait and a father who has normal haemoglobin. [2]
- (ii) State which members of the first generation would be resistant to malaria and explain why this is an advantage. [5]
- (d) What is natural selection? [2]
- (e) Explain how natural selection could result in a change in the characteristics of a species over time. [3]

**Total marks [20]**

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