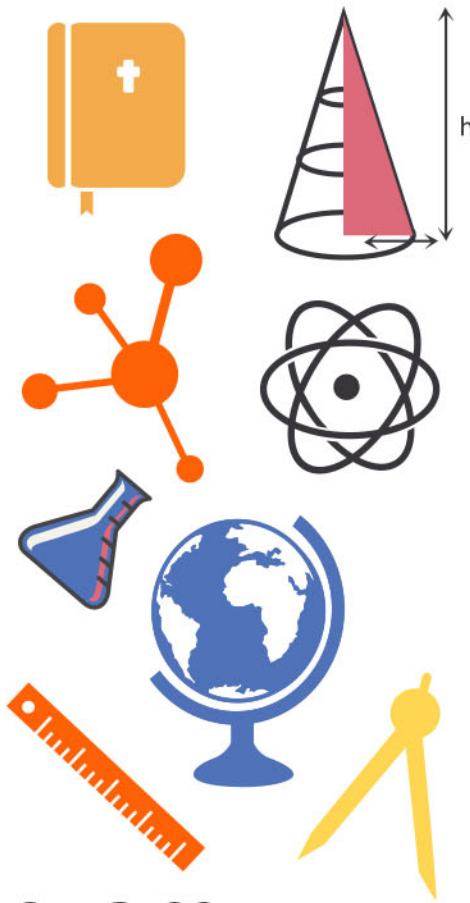
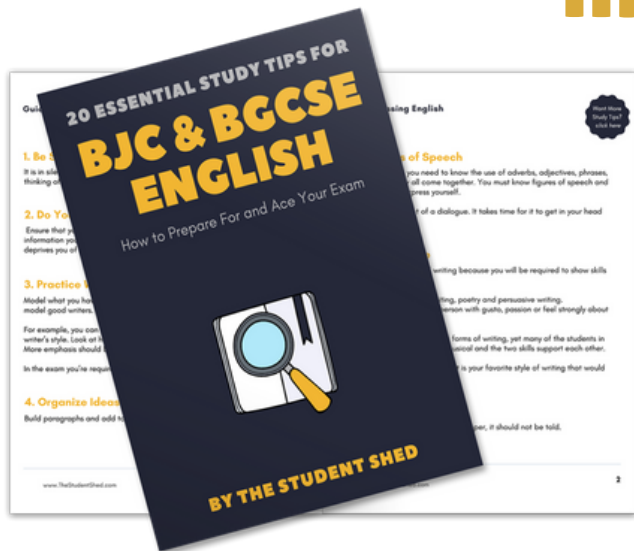


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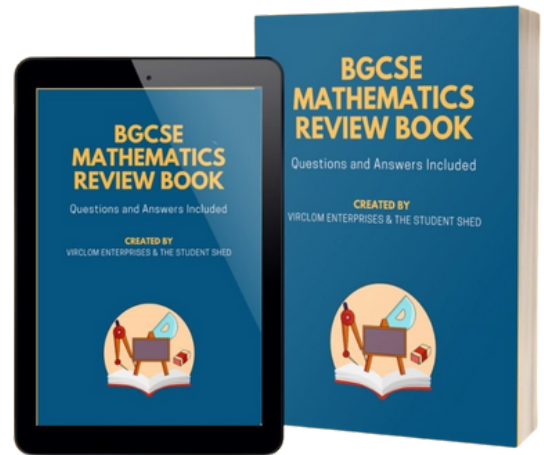


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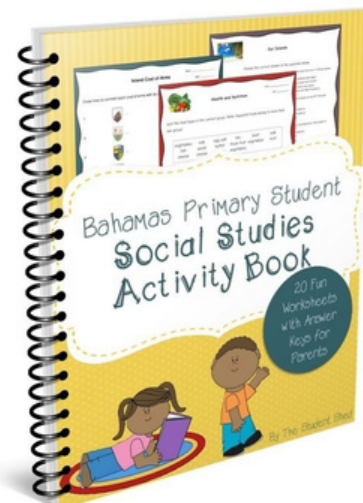
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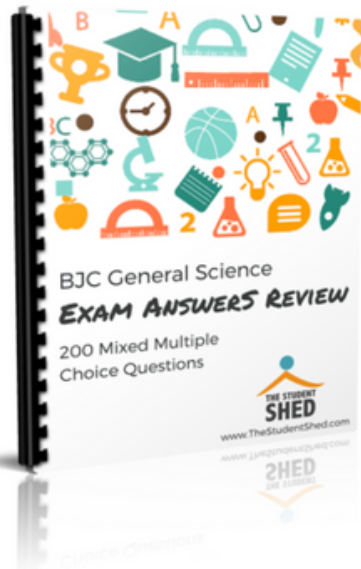
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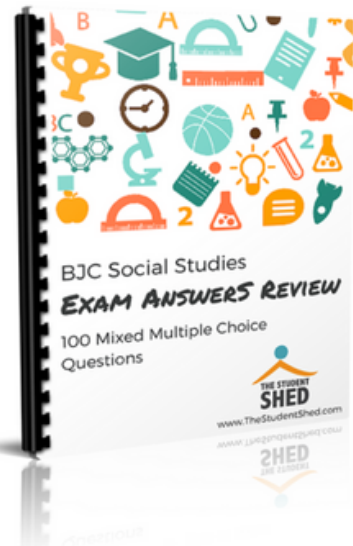
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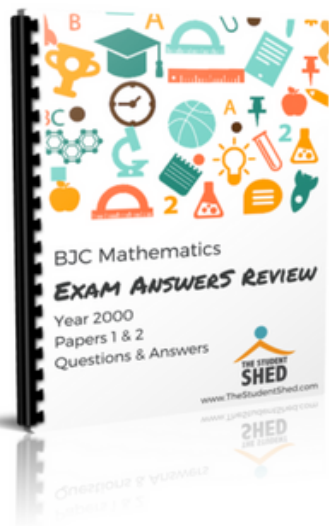
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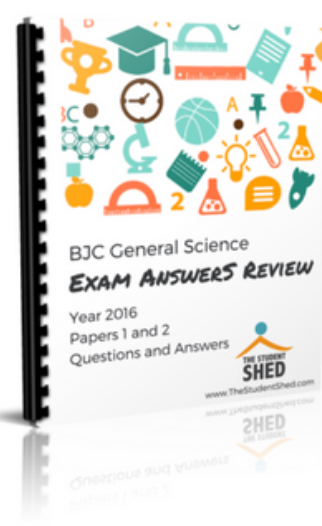
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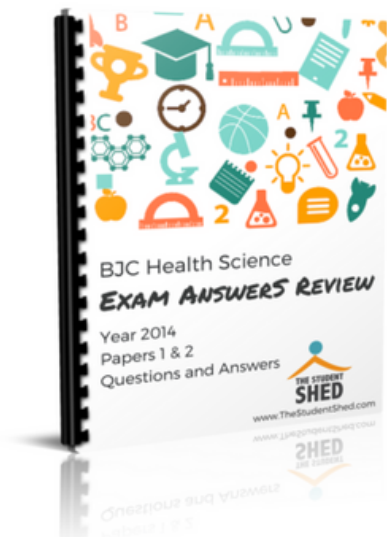
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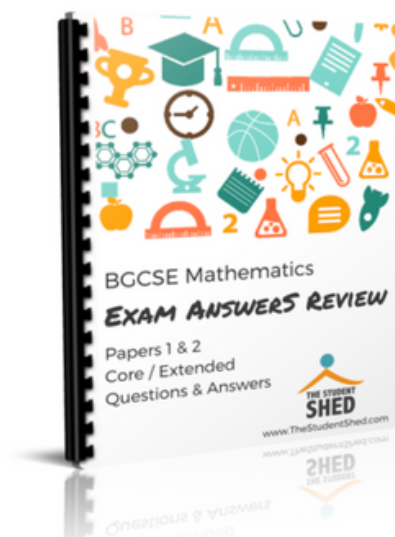
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# BIOLOGY

## PAPER 1

Tuesday **21 MAY 2002** 12.30 – 1.45 P.M.

<b>MINISTRY OF EDUCATION NATIONAL EXAMINATIONS</b>
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### INSTRUCTIONS AND INFORMATION FOR CANDIDATES

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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.

---

This question paper consists of 22 printed pages and 2 blank pages.

1. Bats are nocturnal mammals that locate their prey by echo-location. They give off high frequency sounds that are reflected back to the bat's ears by surrounding objects.

What life characteristic enables bats to identify the position of their prey?

- A. excretion
  - B. movement
  - C. nutrition
  - D. irritability
2. The table shows characteristics of four different vertebrates.

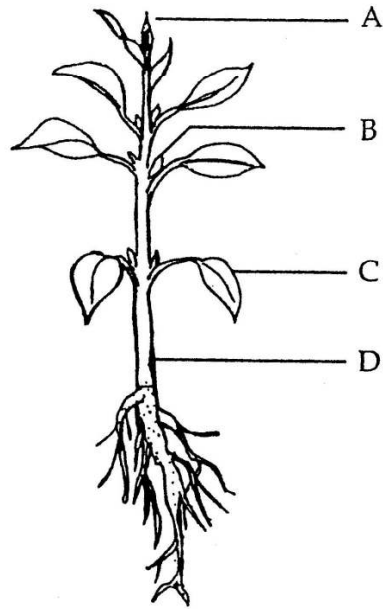
	R	S	T	U
Have scales	✓		✓	✓
Have hair		✓		
Aquatic		✓	✓	✓
Legs	✓			✓
Fins			✓	

Which **TWO** animals are most likely to be reptiles?

- A. R and T
- B. R and U
- C. S and U
- D. T and U

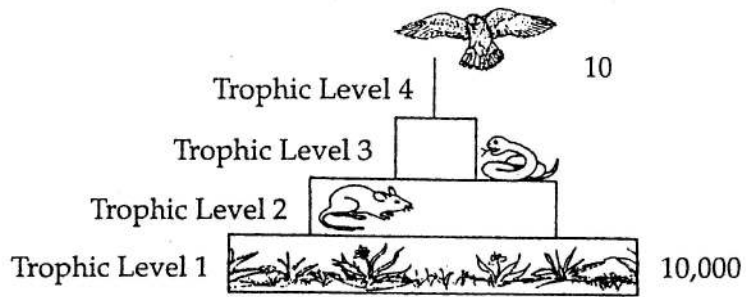


3. The diagram shows a typical flowering plant. Which structure would be responsible for its lateral growth?



4. On what do omnivores feed?
- A. consumers only
  - B. its manufactured food
  - C. other consumers and producers
  - D. producers only

5. The amount of energy at trophic levels one and four in an ecosystem is indicated by the numbers. Only 10% of the energy is passed on to the next trophic level.

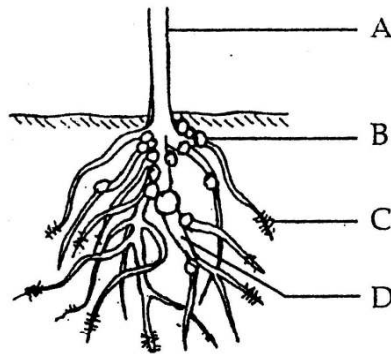


What is the total amount of energy in levels two and three?

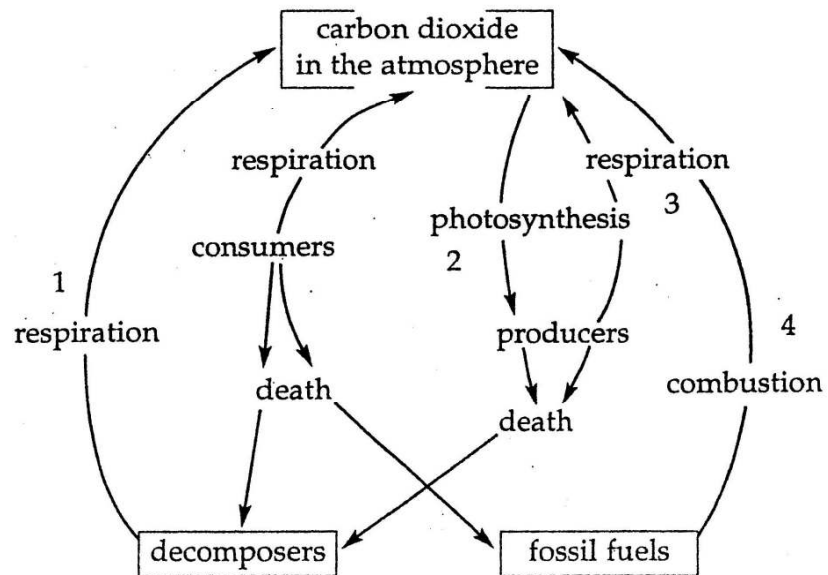
- A. 100
  - B. 110
  - C. 1,100
  - D. 10,010
6. Which process returns nitrogen gas to the atmosphere?
- A. decomposition
  - B. denitrification
  - C. nitrification
  - D. nitrogen fixation

7. The diagram shows the root system of the pigeon pea plant.

What structure contains microorganisms responsible for making nitrogen available to the plant?

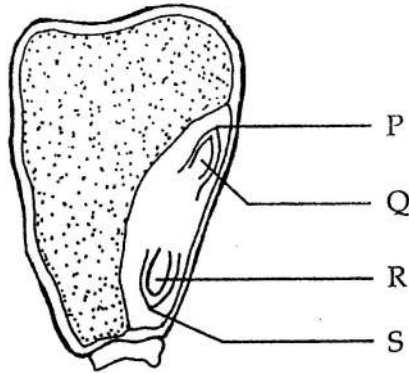


8. The diagram shows the Carbon Cycle. What three processes all release a substance used by green plants to make food?



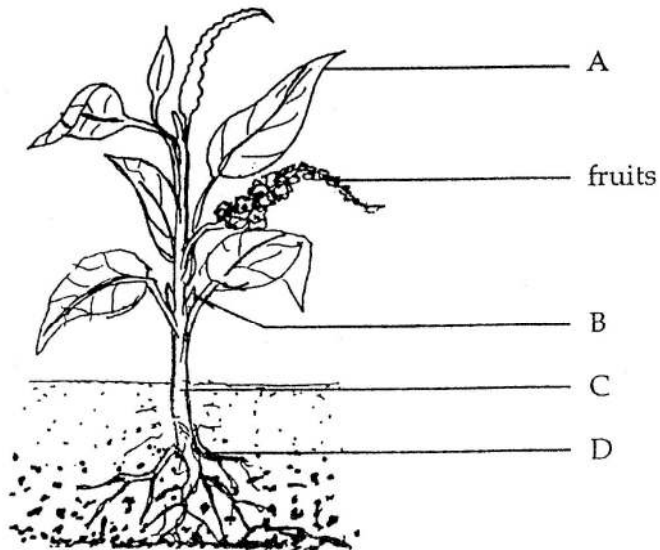
- A. 1, 2, 4  
B. 2, 3, 4  
C. 3, 4, 1  
D. 4, 3, 2

9. The diagram shows a longitudinal section through a maize grain.



In what order do the labelled structures emerge from the seed?

- A. P, Q, R, S
  - B. P, S, Q, R
  - C. S, R, P, Q
  - D. S, R, Q, P
10. The diagram shows a growing plant.
- From which of the labelled structures do the fruits receive manufactured food for growth?



11. The table shows the relationship between number of animals and meat produced by cattle on four different farms. Which farm is the most productive?

	Animals kept on a farm	Number of acres	Meat produced in kg
A.	cows	14,960	3,864,000
B.	goats	200	72,727
C.	pigs	7,600	2,272,727
D.	sheep	2,600	682,000

12. How does the law preventing the harvesting of conchs without a well formed lip help to preserve the conch fishery?

- A. The conchs which are harvested are the juvenile conchs.
- B. Egg bearing female conchs can be identified and not captured.
- C. Harvested conchs would have had the opportunity to reproduce.
- D. This method would permit more male conchs than female conchs to be captured.

13. Which of the statements is true about solid waste in New Providence? It is mostly

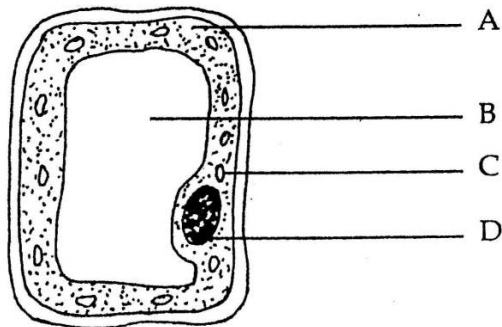
- A. collected by Government Agencies.
- B. collected by private agencies.
- C. containerized.
- D. uncontainerized.



14. Which structure identifies the black mangrove plant?
- A. breathing roots
  - B. prop roots
  - C. salt glands
  - D. shiny leaves
15. Which structure of the conch is used to identify the female?
- A. claw
  - B. groove
  - C. mantle
  - D. mouth

16. The diagram shows a typical plant cell.

Which part of the cell is the place where photosynthesis occurs?



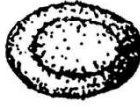
17. Which cell structure changes chemical energy to heat energy?
- A. cytoplasm
  - B. mitochondrion
  - C. nucleus
  - D. vacuole

18. The diagrams show 4 body cells.

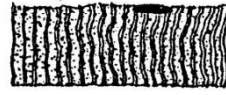
Which cell is able to shorten?



A



B



C

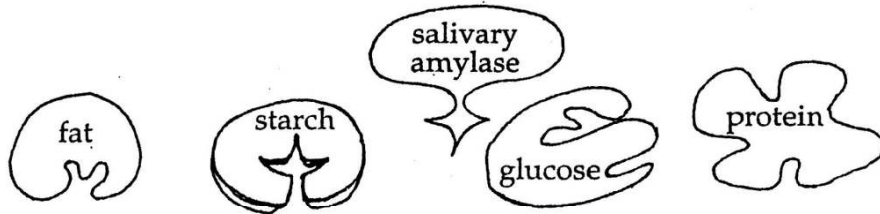


D

19. What materials are transported in xylem cells?

- A. amino acids
- B. carbon dioxide
- C. fatty acids
- D. mineral salts

20. The diagrams represent molecular structures of named substances.



Which characteristic of enzymes is shown?

- A. Enzymes are not used up in a reaction.
- B. Enzymes are pH specific.
- C. Enzymes are substrate specific.
- D. Enzymes are temperature specific.

21. What carbohydrate in the leaf cannot be broken down by human digestive enzymes?
- A. cellulose
  - B. glucose
  - C. starch
  - D. sucrose

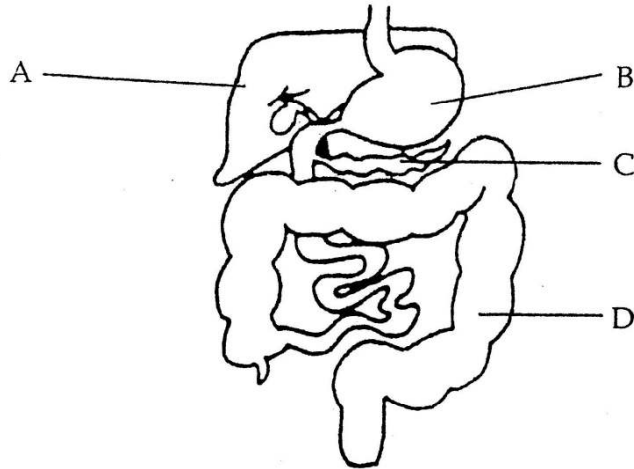
22. A nutrient analysis of a potato produced the following results:

Substance	Percentage composition by mass
starch and sugars	11.0
water	82.0
vitamins	0.3
other substances	6.7

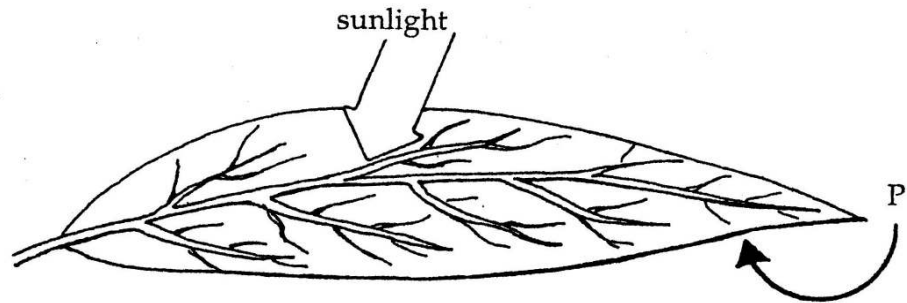
What percentage of the total is made up of carbohydrates and vitamins?

- A. 11.0%
- B. 11.3%
- C. 82.0%
- D. 82.3%

23. The diagram shows a part of the digestive system. Which structure produces a substance that lowers blood glucose after a meal?



24. The diagram shows a leaf in sunlight.



What gas is represented by arrow P?

- A. carbon dioxide
- B. nitrogen
- C. oxygen
- D. water vapour

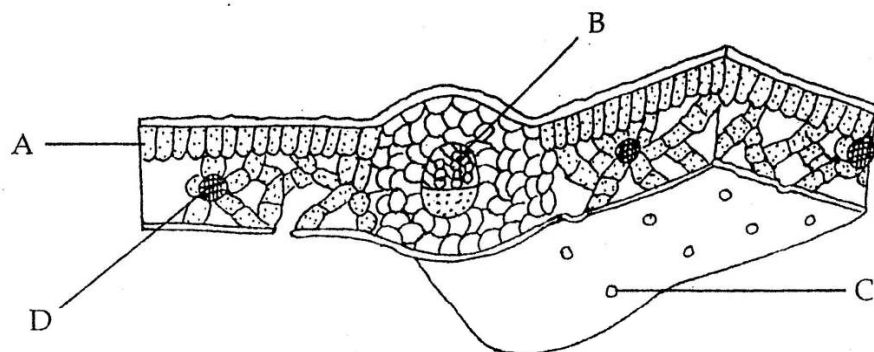
25. The main reason for chewing is to make pieces of food

- A. smaller.
- B. softer.
- C. soluble.
- D. tastier.

26. Which row correctly shows the events occurring in roots, stems and leaves as water moves through a plant?

	Roots	Stems	Leaves
A	absorb water and minerals	transport of water and minerals	loss of water vapour
B	diffusion of minerals	absorption of water	loss of water vapour
C	transport of water and minerals	absorption of water and minerals	loss of water vapour
D	transport of water and minerals	loss of water	diffusion of minerals

27. The diagram shows the internal structure of a leaf. Which structure allows transpiration to occur?

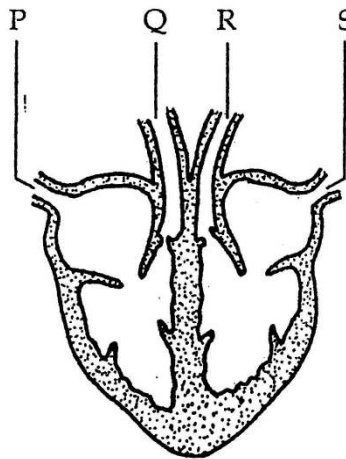




28. In which structure is sucrose transported in plants?

- A. petioles
- B. phloem
- C. veins
- D. xylem

29. The diagram shows the structure of the heart. Which structures transport deoxygenated blood?



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

30. Which component of blood helps begin the formation of clots?

- A. plasma
- B. platelets
- C. red blood cells
- D. white blood cells

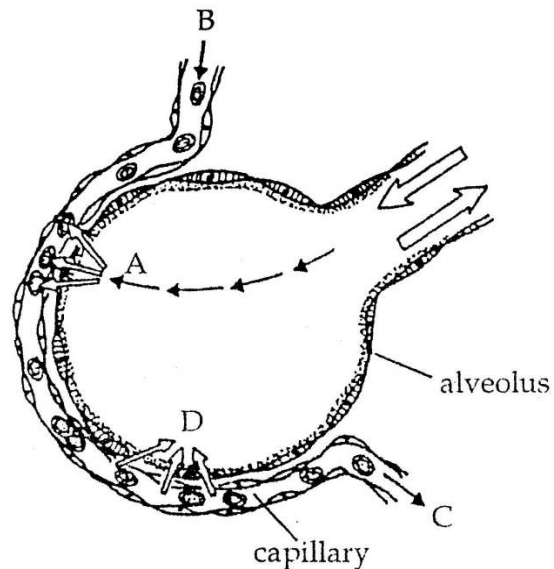
31. Which cells destroy invading bacteria in the body?

- A. platelets
- B. red blood cells
- C. skin cells
- D. white blood cells

32. Which row shows the composition of expired air?

	Oxygen %	Nitrogen %	Carbon Dioxide %	Water Vapour
A	10	79	4	saturated
B	16	79	4	saturated
C	20	79	1	none
D	21	79	0.04	varies

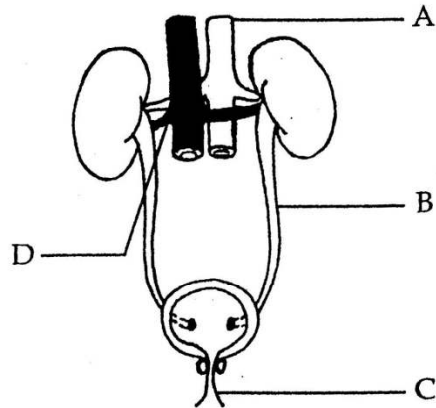
33. The diagram shows gaseous exchange in an alveolus. At which point is diffusion of most carbon dioxide likely to occur?



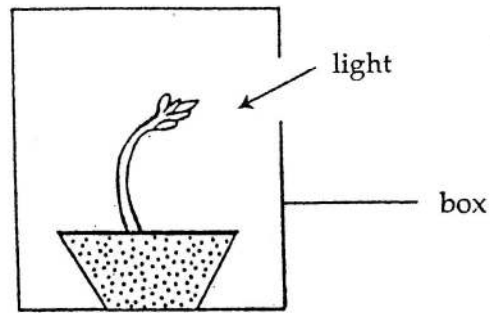
34. Which waste product is carried in the blood?

- A. fibrin
- B. sweat
- C. urea
- D. urine

35. The diagram shows the urinary system. Which structure is responsible for the removal of deoxygenated blood from a kidney?



36. The diagram shows a seedling shoot growing towards the stimulus of light.

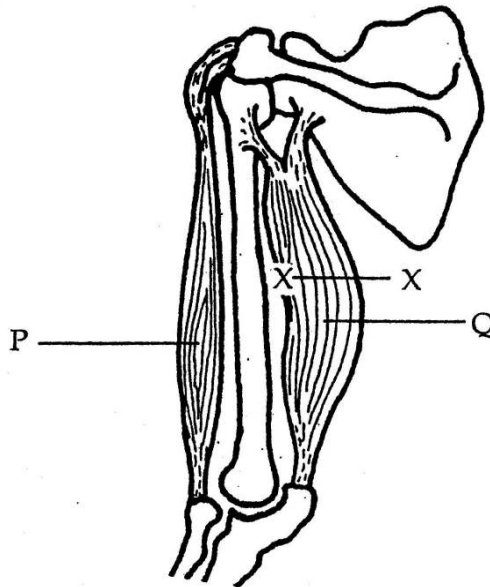


Why does the shoot grow towards the light?

- A. Auxins decrease the growth of the cells in the darkness.
  - B. Auxins decrease the growth of the cells in the light.
  - C. Auxins increase the growth of the cells in the darkness.
  - D. Auxins increase the growth of the cells in the light.
37. Which is a characteristic of hormones?
- A. They are biological catalysts.
  - B. They are chemical in nature.
  - C. They are electrical in nature.
  - D. They have a direct effect on organs.
38. Which part of the brain functions in maintaining balance and coordination of movement?
- A. cerebellum
  - B. cerebrum
  - C. hypothalamus
  - D. medulla oblongata

39. Which sequence represents the pathway sound travels during hearing?
- A. sound waves → outer ear → tympanic membrane → middle ear → round window → inner ear → brain
  - B. sound waves → oval window → inner ear → tympanic membrane → middle ear → brain
  - C. sound waves → oval window → inner ear → tympanic membrane → outer ear → brain
  - D. sound waves → tympanic membrane → middle ear → oval window → inner ear → brain

40. The diagram shows the joints in a human arm with two muscles P and Q.



What would be the effect of severing the muscle at X?

- A. The elbow cannot be flexed.
- B. The elbow cannot be extended.
- C. The muscle P cannot contract.
- D. The muscle P cannot relax.



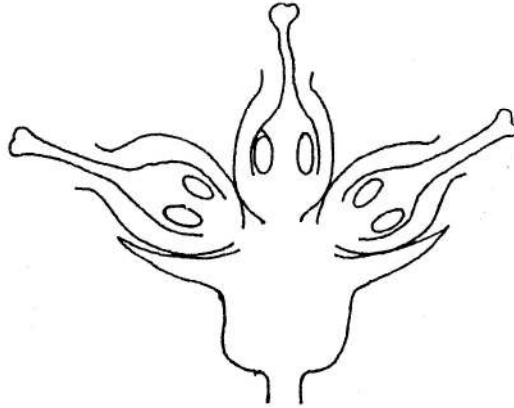
41. Which natural method of asexual reproduction occurs in the Irish potato?
- A. budding
  - B. marcotting
  - C. formation of spores
  - D. formation of tubers
42. Which agent is responsible for pollinating maize flowers?
- A. birds
  - B. honey bees
  - C. water
  - D. wind
43. The diagram shows a flowering plant. The arrow represents the movement of pollen during pollination.



Which type of pollination is shown?

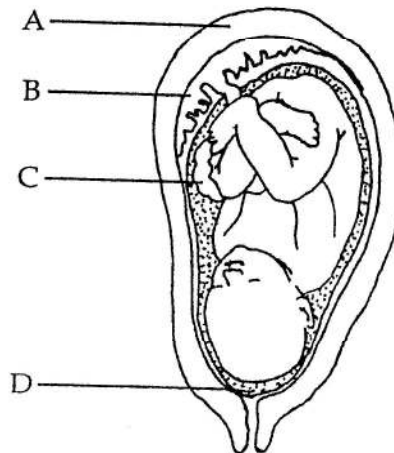
- A. cross
- B. individual
- C. self
- D. wind

44. The diagram shows an inflorescence.

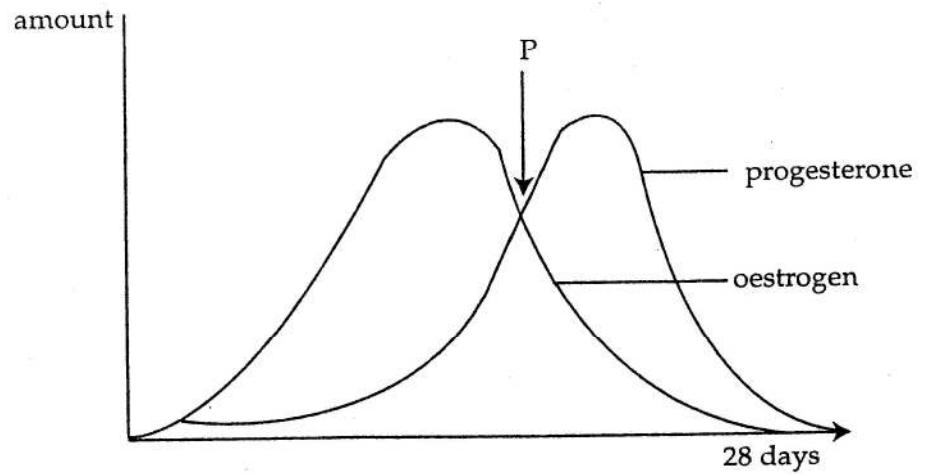


What would be produced as a result of all the flowers being pollinated and fertilized?

- A. one fruit with six seeds
  - B. three fruits each with one seed
  - C. three fruits each with two seeds
  - D. three seeds and six fruits
45. The diagram shows a foetus in the uterus. Which structure is responsible for implantation?



46. The diagram shows the relative amount of oestrogen and progesterone present during the menstrual cycle.



Which statement is true when the hormone levels are as shown at P?

- A. Ovulation has occurred.
- B. The corpus luteum has disappeared.
- C. The graafian follicle is forming.
- D. The ovum is maturing.

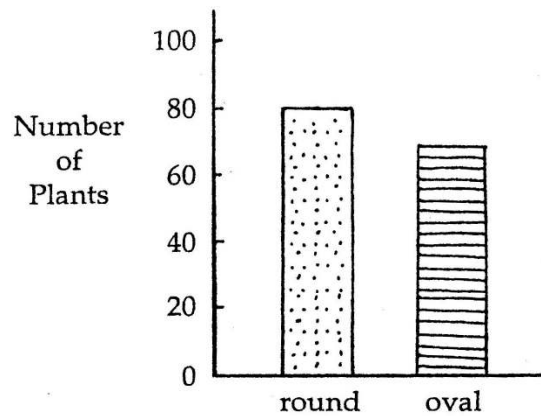
47. The table shows the number of persons, on an island, who used each method of contraception over five years.

	1984	1985	1986	1987	1988
diaphragm	10	8	8	10	9
condom	10	80	130	140	150
spermicide	6	2	0	4	4
birth control pills	60	70	75	80	90

Which factor explains the figures for condoms?

- A. decrease in availability of the pill
  - B. decrease in sexual activity
  - C. increase in cost of contraceptive devices
  - D. increase in AIDS awareness
48. Which sexually transmitted disease is treated with the use of penicillin?
- A. AIDS
  - B. gonorrhea
  - C. herpes
  - D. syphilis
49. Which term describes two forms of a gene that codes for a particular trait?
- A. alleles
  - B. heterozygous
  - C. homozygous dominant
  - D. homozygous recessive

50. In key limes, the gene for round shape is completely dominant to the gene for oval shape. The seeds produced from cross pollination and fertilization of two plants, were planted. The number of plants in the second generation which produced each type of fruit is shown on the graph.



What were the genotypes of the parental plants?

- A. both homozygous dominant
- B. both homozygous recessive
- C. heterozygous and homozygous dominant
- D. heterozygous and homozygous recessive

School Number	Candidate Number
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**BIOLOGY****PAPER 2**

Tuesday **21 MAY 2002** 1.50 – 3.20 P.M.

<b>MINISTRY OF EDUCATION</b> <b>NATIONAL EXAMINATIONS</b>
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Write your school number, candidate number, surname and initials in the spaces provided above.

Answer **ALL** questions on this paper.

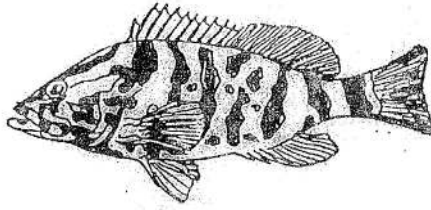
Read each question carefully and make sure you know what you have been asked to do before starting your answer. Confine your answer to the lines following each question.

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

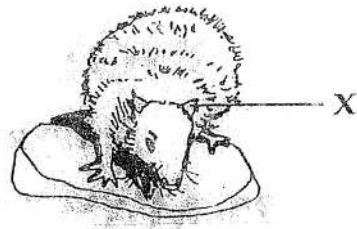
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1	
2	
3	
4	
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7	
8	
TOTAL	

This question paper consists of 15 printed pages and 1 blank page.

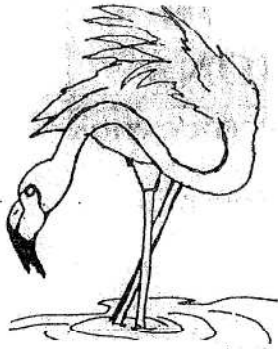
1. The diagrams show four vertebrate animals.



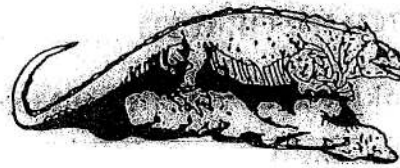
P. Grouper



Q. Hutia



R. Flamingo



S. Iguana

- (a) Name the class of vertebrates to which **P** and **S** belong.

P. \_\_\_\_\_

S. \_\_\_\_\_ [2]

- (b) Give **TWO** external characteristics which distinguish animals that belong to the same class as **Q** from those that belong to the same class as **R**.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

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

- (c) Identify **TWO** sense organs on P and give the stimulus which they detect.

1. Organ: \_\_\_\_\_

Stimulus: \_\_\_\_\_

2. Organ: \_\_\_\_\_

Stimulus: \_\_\_\_\_ [4]

- (d) What is the function of the part labelled X?

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

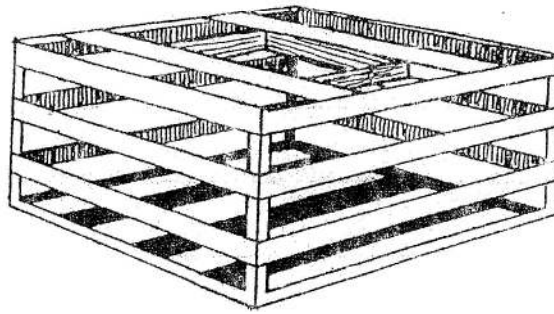
- (e) State which of the organisms shown is **NOT** protected by law in The Bahamas.

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

Total Marks [10]



2. The drawing shows a trap used in the capture of an economically important fishery resource in The Bahamas.



- (a) (i) Name the material from which this trap is most probably made.
- \_\_\_\_\_
- (ii) Identify the fishery resource that this trap is designed to capture.
- \_\_\_\_\_ [2]
- (b) (i) Name another type of fishing gear commonly used to capture the organism identified in question (a) (ii).
- \_\_\_\_\_
- (ii) How might the use of the gear named in (b) (i) negatively impact a coral reef ecosystem?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_ [2]
- (c) State **ONE** illegal method used to capture this resource and describe **ONE** adverse effect it has on the environment.
- illegal method \_\_\_\_\_
- adverse effect \_\_\_\_\_ [2]

- (d) What would be the economic impact if this fishery resource was depleted?

---

---

[2]

- (e) In 1997, it was estimated that 9,300 people were employed in the commercial fishing industry. 95% of these persons were fishermen.

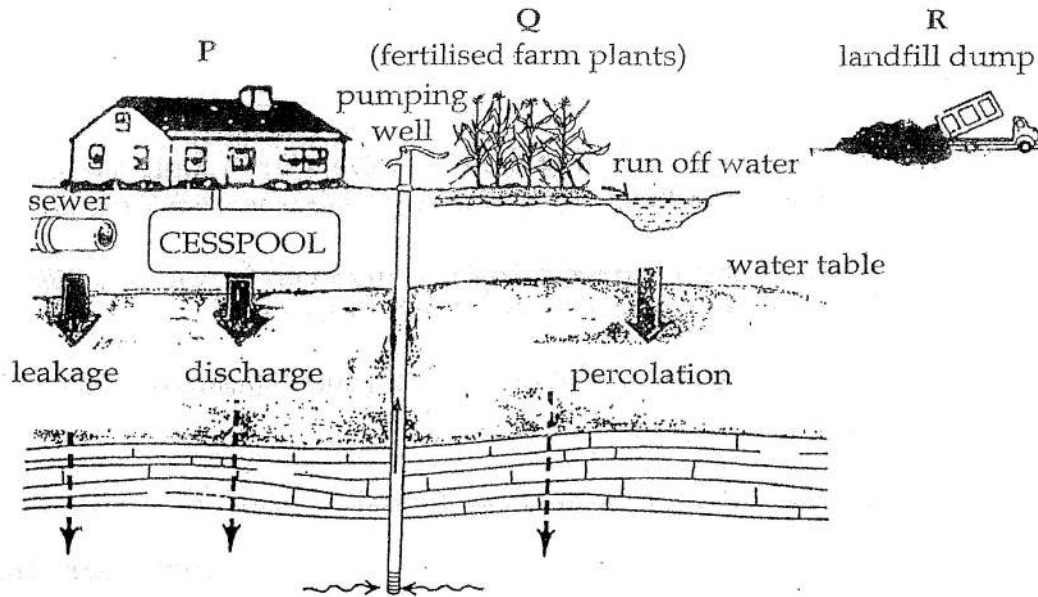
- (i) What was the number of people involved in the commercial fishing industry that were **NOT** fishermen?
- (ii) Identify **ONE** job in the commercial fishing industry other than fishing.

---

[2]

Total Marks [10]

3. The diagram shows the pollution of water both by a cesspool and by run-off water from a farm. It also shows pollution by solid waste.



- (a) Distinguish between 'pollutant' and 'pollution'.

---

---

---

---

[2]

- (b) Name the type of pollutant occurring at:

P. \_\_\_\_\_

Q. \_\_\_\_\_

[2]

- (c) State what can be done to prevent pollution of the water at:

P. \_\_\_\_\_

Q. \_\_\_\_\_

[2]

- (d) Give **TWO** easily available methods which might make the water from the pumping well safe for household consumption.

---

---

[2]

- (e) Describe **TWO** negative effects of the practice occurring at R.

---

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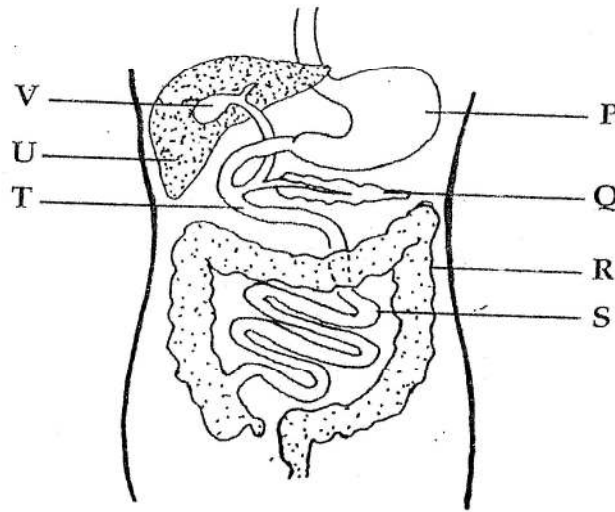
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[2]

Total Marks [10]

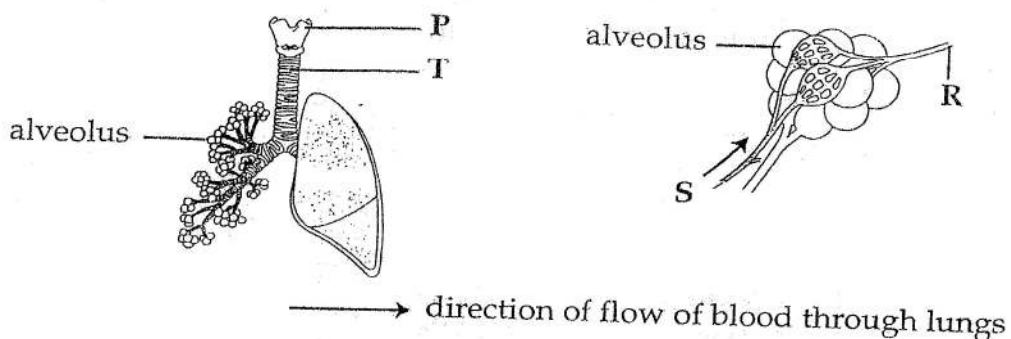
- 4 The diagram represents the human digestive system.



- (a) Name parts labelled R – U.
- R \_\_\_\_\_ T \_\_\_\_\_
- S \_\_\_\_\_ U \_\_\_\_\_ [4]
- (b) Name the substance stored in V.
- \_\_\_\_\_ [1]
- (c) State where acid is produced in the diagram.
- \_\_\_\_\_ [1]
- (d) State where most of the digested food is absorbed.
- \_\_\_\_\_ [1]
- (e) What **TWO** structures add digestive juices for the breakdown of fat?
- \_\_\_\_\_ [2]
- (f) Give **ONE** difference in structure between the small intestine and the large intestine.
- \_\_\_\_\_ [1]

Total Marks [10]

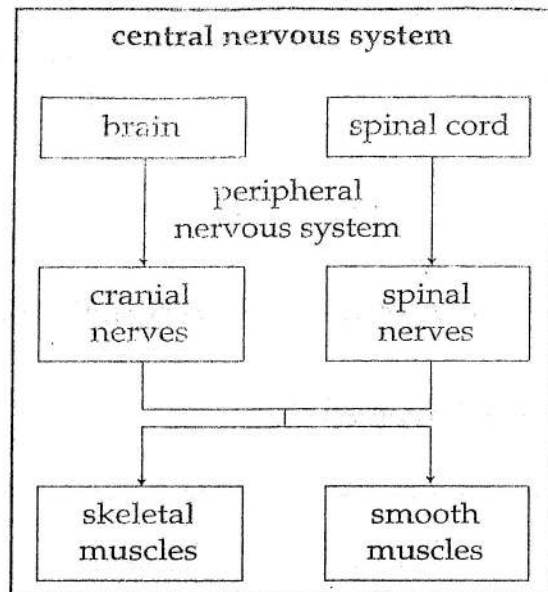
5. The diagrams show the structure of the respiratory system.



- (a) What do labels **P** and **S** represent?
- P** \_\_\_\_\_
- S** \_\_\_\_\_ [2]
- (b) What is the function of **R**?
- \_\_\_\_\_
- \_\_\_\_\_ [1]
- (c) Explain why structure **T** has a C shape rather than a ring shape.
- \_\_\_\_\_
- \_\_\_\_\_ [1]
- (d) Define the term respiration.
- \_\_\_\_\_
- \_\_\_\_\_ [2]
- (e) (i) Name the main forms of respiration.
- \_\_\_\_\_ [2]
- (ii) Explain how these forms are different.
- \_\_\_\_\_
- \_\_\_\_\_ [2]

Total Marks [10]

6. The diagram shows the Central Nervous System and the Peripheral Nervous System.



- (a) State **TWO** differences between the brain and spinal cord.

difference: \_\_\_\_\_

\_\_\_\_\_

difference: \_\_\_\_\_

\_\_\_\_\_

[2]

- (b) State the **TWO** main functions of the Central Nervous System.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[2]

- (c) State **ONE** similarity and **ONE** difference between the cranial nerves and spinal nerves.

similarity: \_\_\_\_\_

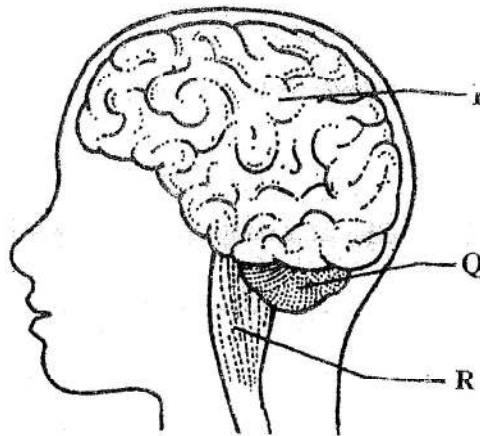
\_\_\_\_\_

difference: \_\_\_\_\_

\_\_\_\_\_

[2]

7. The diagram shows the main parts of the human brain.



- (a) Write the names for the parts labelled **P**, **Q** and **R**.

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

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

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

[3]

- (b) State the function of structure **Q**.

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

- (c) (i) Identify the labelled part which would receive impulses from the eye.

\_\_\_\_\_

- (ii) Name the nerve that would transmit the impulse.

\_\_\_\_\_

- (iii) If you are observing a red flower in daylight, from which photo receptor would the impulse be generated?

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



- (d) (i) State the effect alcohol has on the rate at which the nervous system functions.

---

- (ii) Name this type of drug.

---

- (iii) Give an example of a drug that has an opposite effect.

---

[3]

**Total marks [10]**

8. The diagrams represent reproductive structures of a plant and a human.

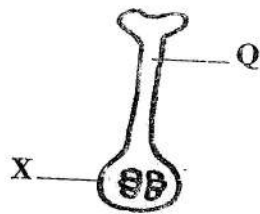


Diagram A

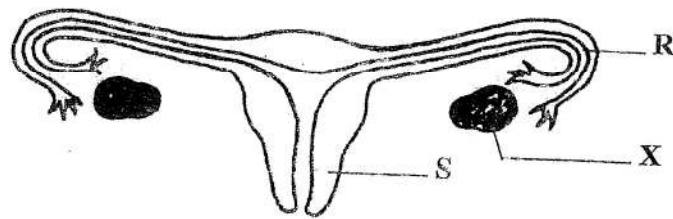


Diagram B

- (a) State the gender (sex) of the diagrams shown.
- \_\_\_\_\_ [1]
- (b) Identify in which diagram(s) the following processes occur (Diagram A, Diagram B or both)?
- (i) fertilization \_\_\_\_\_
- (ii) implantation \_\_\_\_\_
- (iii) ovulation \_\_\_\_\_
- (iv) pollination \_\_\_\_\_ [4]
- (c) State **ONE** similarity in function of structures:
- (i) **X** in diagram A and **S** in diagram B
- \_\_\_\_\_
- (ii) **Q** and **R**
- \_\_\_\_\_ [2]
- (d) Give **ONE** advantage and **TWO** disadvantages of asexual reproduction.
- Advantage: \_\_\_\_\_
- Disadvantages: \_\_\_\_\_
- \_\_\_\_\_ [3]

Total marks [10]

School Number	Candidate Number
Surname and Initials	

# BIOLOGY

## PAPER 3

Friday **24 MAY 2002** 12.30 – 2.00 P.M.

Additional materials:

Answer paper for Section B

### 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 spaces 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.

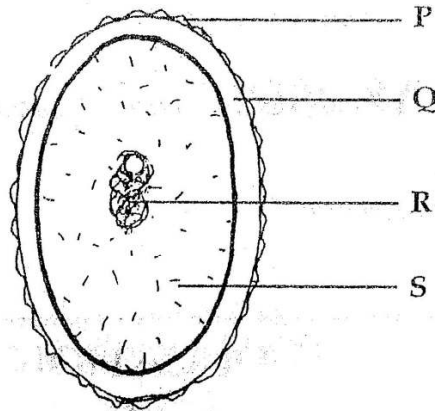
The mark for each part-question is given in brackets [   ].

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

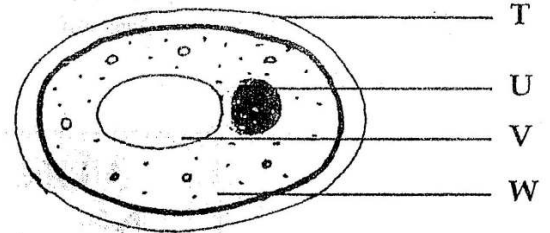
This question paper consists of 10 printed pages and 2 blank pages.

# SECTION A

1. The diagrams show a typical bacterium and yeast cell.



I BACTERIUM



II YEAST CELL

- (a) On diagram I draw and name a structure some bacteria use for movement. [2]

- (b) (i) Give **ONE** similarity between R and U.

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- (ii) Give **ONE** difference between R and U.

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[2]

- (c) Using the letters on the diagram identify bacterium and yeast cell structures which are similar to the plant cell structures named in the table.

Plant Cell	Bacterium	Yeast Cell
cell wall		
vacuole		

[2]

- (c) Name the blood vessel that carries food materials from the intestines to the liver.

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

- (d) Give the name of the carbohydrate that is stored in the liver.

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

- (e) Explain **TWO** other functions of the liver in maintaining the internal conditions of the body.

1. \_\_\_\_\_

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

- (f) State how the liver helps to recycle iron.

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

- (g) Explain why amino acids are necessary in the body.

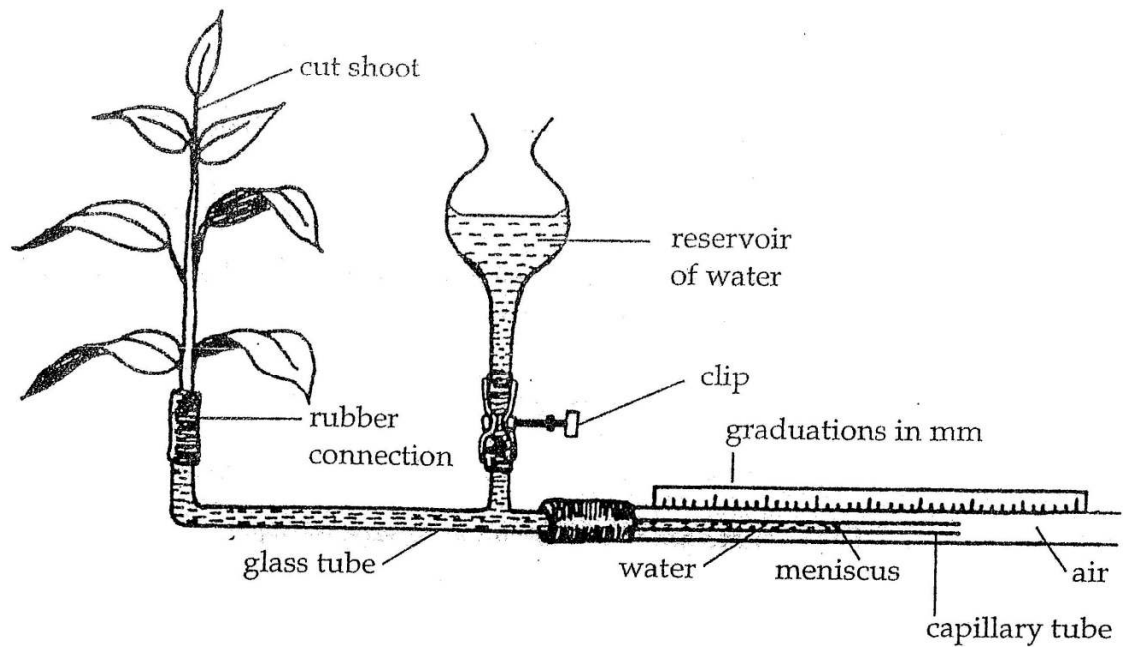
\_\_\_\_\_ [1]

- (h) A medicine needs to be taken every 4 – 6 hours. What function of the liver does this explain?

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

Total Marks [10]

3. The diagram shows a potometer with a cut shoot inserted into it.



- (a) (i) What does the potometer measure?

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

- (ii) Explain how the meniscus is repositioned after each set of readings.

\_\_\_\_\_

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

- (b) The shoot in the potometer was exposed to different conditions. The movement of the meniscus in the capillary tube was timed. Three (3) readings were taken under different combinations of conditions. Some of the results are shown in the table.

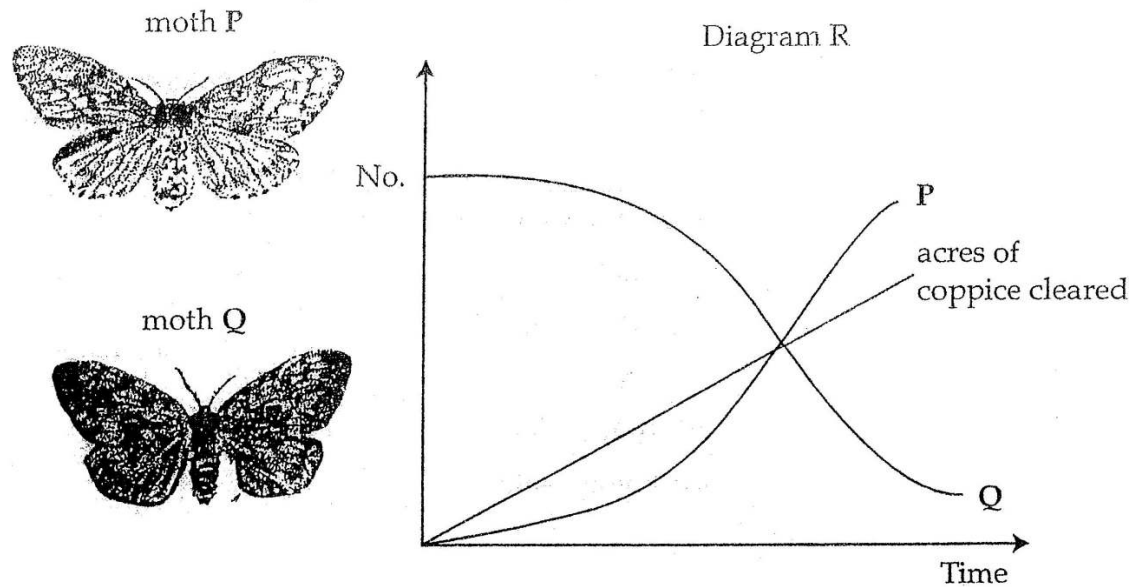
combination of conditions	time taken in seconds for meniscus to move 100 mm.		
	reading 1	reading 2	reading 3
A. cool, humid, windy	32	29	31
B. cool, humid, calm	38	38	41
C. cool, dry, windy	24	37	22
D. cool, dry, calm	27	27	30
E. hot, humid, windy	19	22	18
F. hot, humid, calm	24	25	24
G.			
H.			

- (i) Using the results in the table, give the letter of the combination of conditions that caused the highest transpiration rate.  
 \_\_\_\_\_ [1]
- (ii) Complete the "combination of conditions" column of the table by writing in the last two possible combinations in spaces G and H on the table.  
 \_\_\_\_\_ [2]
- (iii) Which of the possible combinations of conditions, A – H, would be expected to cause the slowest rate of transpiration?  
 \_\_\_\_\_ [1]
- (iv) Find the average time difference between combination of conditions A and B.  
 \_\_\_\_\_ [1]
- (c) Explain how a rise in temperature causes a change in the transpiration rate.  
 \_\_\_\_\_  
 \_\_\_\_\_ [2]

Total Marks [10]

[Turn over

4. The diagrams show the environmental effects on one type of moth over a long period of time, in a broad leaf coppice stand.



- (a) (i) What is the biological term for the existence of different types of moths in a population, as shown by P and Q?

\_\_\_\_\_

- (ii) Suggest how type P may have arisen from a population of moths containing only type Q.

\_\_\_\_\_

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

- (b) Diagram R shows the increase in the area of the coppice stand that has been cleared. Using the information in diagram R, state the effect of this land clearing on each type of moth, and explain these effects.

effect on type P \_\_\_\_\_

explanation \_\_\_\_\_

effect on type Q \_\_\_\_\_

explanation \_\_\_\_\_

[4]



- (c) To what extent does diagram R relate to evolution?

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[2]

- (d) Antibiotics are used to kill bacteria. What is the danger of excessive use of antibiotics over a long time?

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[2]

Total Marks [10]

## SECTION B

Answer any **TWO** questions

5. Write concisely on the ecological effects of the following:
- (a) removal of mangrove swamps from coastal areas; [5]
  - (b) the filling in of wetlands; [5]
  - (c) the clearing of trees from hillsides; [5]
  - (d) illegal fishing methods. [5]
- 6.
- (a) State **FOUR** characteristics of enzymes. [4]
  - (b)
    - (i) Explain the role of rennin and pepsin as a child develops from a newborn to 1 year of age. [4]
    - (ii) How do enzymes function in germination? [4]
  - (c) Discuss the importance of supplying high quality protein, easily digestible foods to children who might be suffering the effects of malnutrition and famine. [8]
- 7.
- (a) What would be the social advantages and disadvantages of the common use of birth control methods in a community? [10]
  - (b) In The Bahamas, the increase in cocaine abuse was paralleled by an increase in sexually transmitted diseases during the period 1987 – 1994. What factors may have caused this parallel? [3]
  - (c)
    - (i) What strategies may be used by governments to decrease population growth?
    - (ii) Why is there a need to control a population's growth? [7]

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