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BIOLOGY**PAPER 1**

Monday 22 MAY 2000 12.30 – 1.45 P.M.

Additional materials:
Answer sheet

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 and candidate number in the spaces provided on the answer sheet.

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 record your choice, using a #2 pencil, on the answer sheet provided.

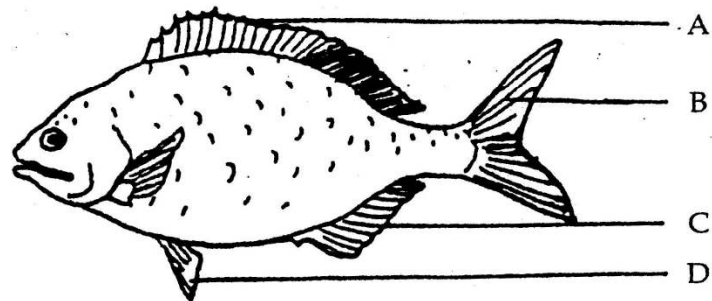
Use a pencil.

This question paper consists of 21 printed pages and 3 blank pages.

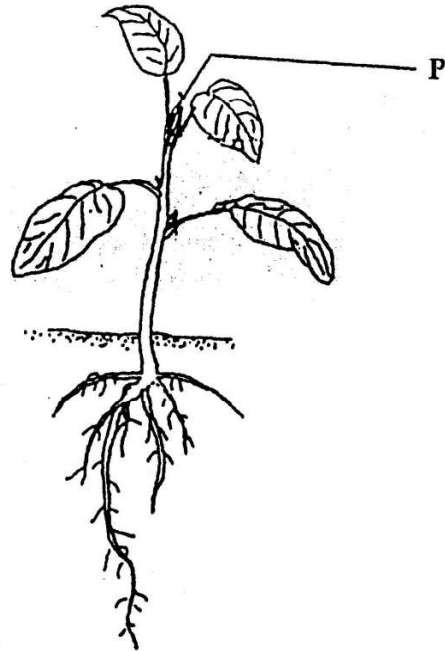
1. The scientific name for humans is Homo sapiens. What do the underlined words indicate?
 - A class and genus
 - B genus and species
 - C order and family
 - D phylum and genus

2. What is the characteristic of living things in which wastes produced as a result of chemical changes are released from the organism?
 - A excretion
 - B irritability
 - C reproduction
 - D respiration

3. The diagram shows a bony fish. Which labelled fin is paired?

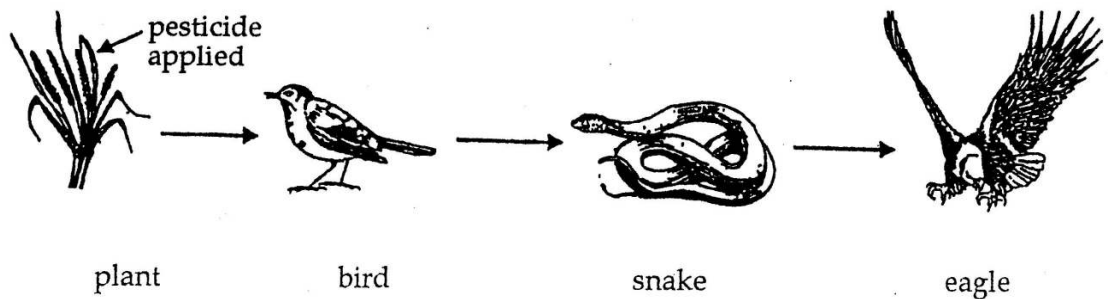


4. The diagram shows a flowering plant. What is the purpose of P?



- A absorbs water from soil
- B causes growth sideways
- C causes upwards growth
- D protects the other parts of the plant

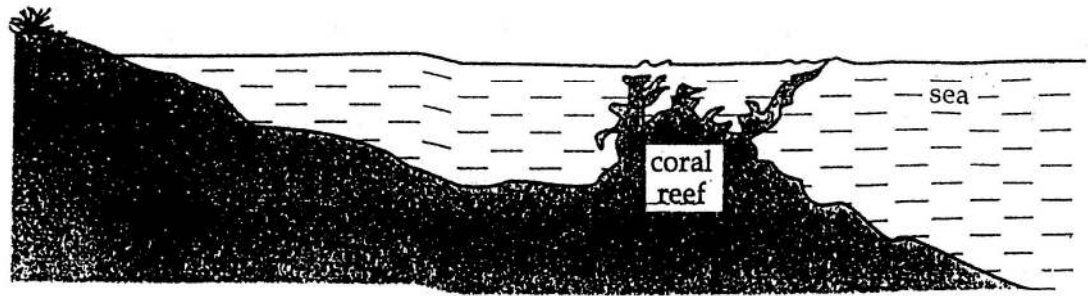
5. The diagram shows a food chain.



In which organism is there likely to be the highest build-up of pesticide?

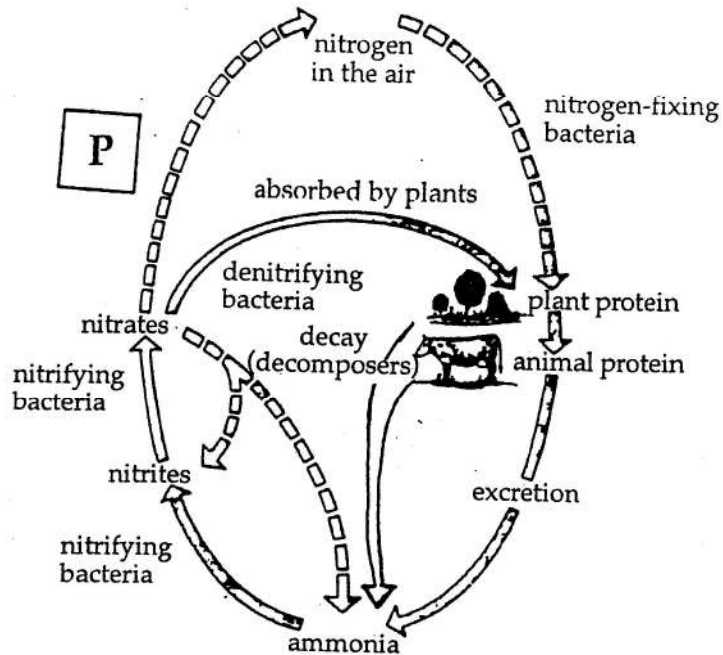
- A bird
- B eagle
- C plant
- D snake

6. The diagram shows a profile from a sandy beach to the sea.



- What would be the effect of destroying the coral reef?
- A decrease in the amount of sand on the beach
 - B decrease in the size of the waves washing the shore line
 - C increase in the amount of sand on the beach
 - D increase in the depth of the sea
7. At which trophic level would a herbivore be found in a food chain containing four organisms?
- A 1
 - B 2
 - C 3
 - D 4

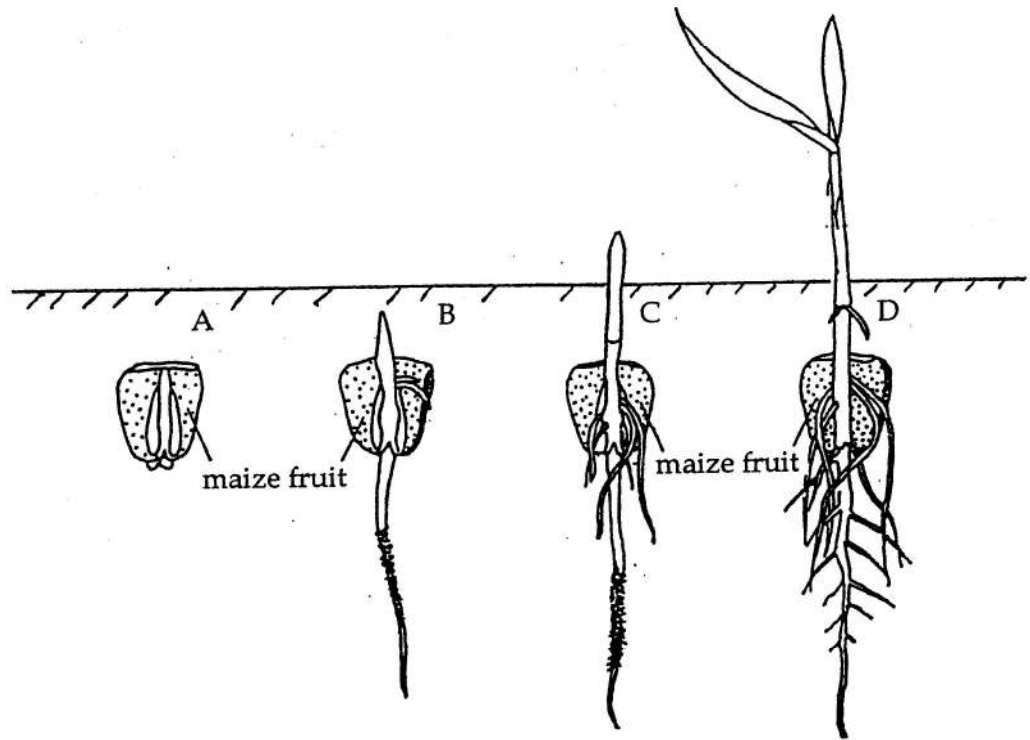
8. The diagram shows the nitrogen cycle.



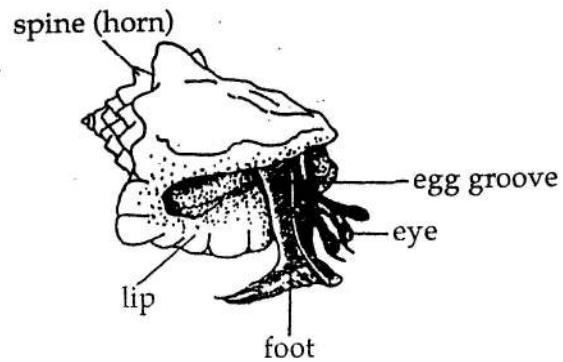
Which process is shown occurring at P on the diagram?

- A ammonification
 - B assimilation
 - C denitrification
 - D nitrogen-fixation
9. What is a good reason for conserving mangrove swamps?
- A They allow the sea easy access to the land.
 - B They form habitats for Bahamian boa.
 - C They form habitats for yellow tail fish.
 - D They grow at a very slow rate.

10. The diagram shows some of the stages of the maize life-cycle. At which stage is least food found in the maize fruit?



11. The diagram shows a queen conch.

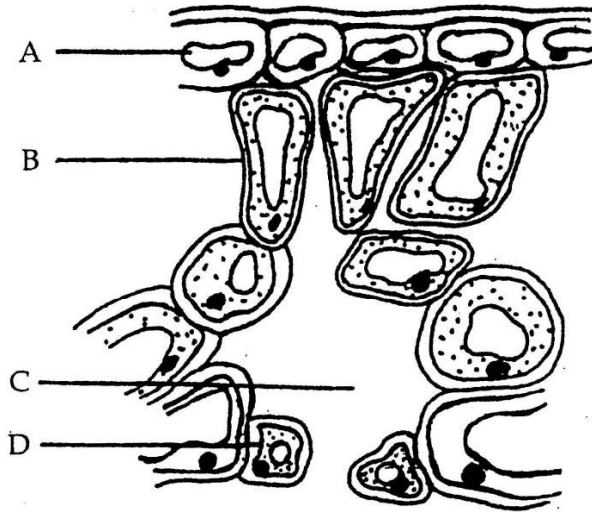


Which **TWO** parts are used to determine the age of the conch?

- A egg groove and foot
- B foot and lip
- C lip and spine
- D spine and egg groove

12. The diagram shows a section through part of a leaf.

Which part controls the exchange of gases between the leaf and the atmosphere?



13. By what process does water move from one cell to another in a plant's tissue?

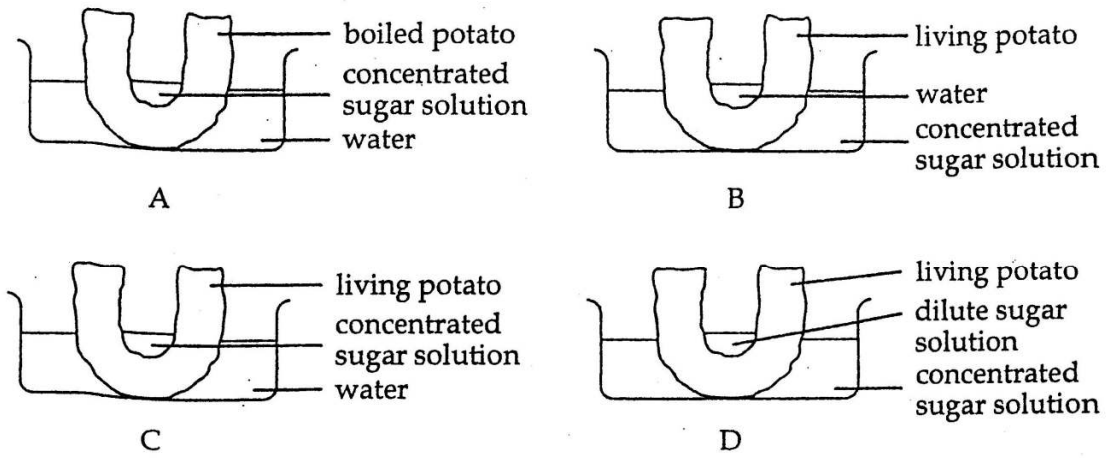
A fermentation
B fertilization
C osmosis
D transpiration

14. In which part of a cell does aerobic respiration occur?

A cytoplasm
B mitochondria
C nucleus
D vacuole

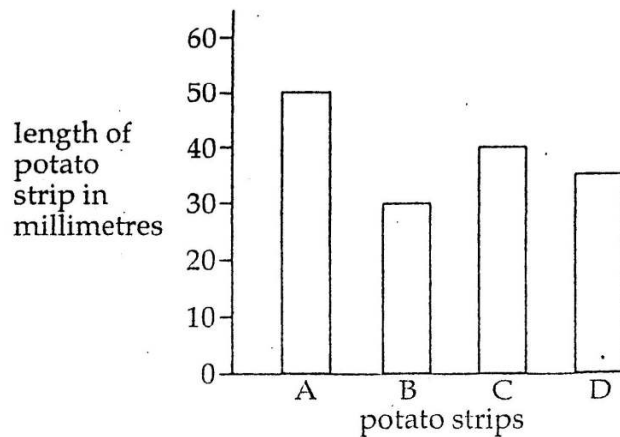
15. An experiment was set up as shown.

Each cup-shaped hole in a potato was half filled with liquid. In which potato cup would the liquid level rise after 40 minutes?

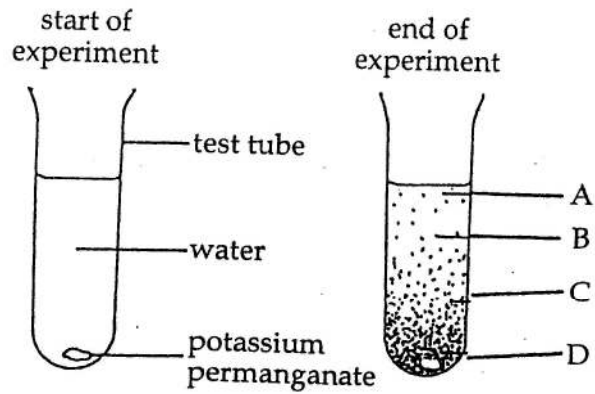


16. Four strips of potato were each cut 40 millimetres long. One strip was then placed in a concentrated salt solution, one in a concentrated sugar solution, one in distilled water and one was left in a dish without any liquid.

The bar graph shows the strips after 75 minutes. Which potato strip was placed in distilled water?



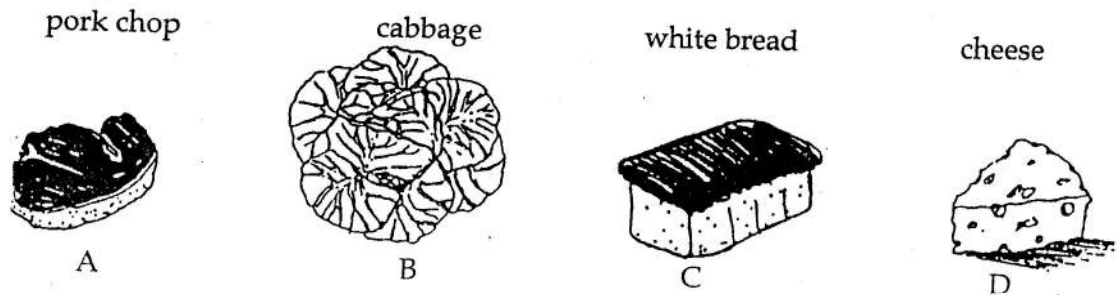
17. A potassium permanganate crystal was gently placed in a test tube of water. Where is the lowest concentration of the solution at the end of the experiment?



18. Which substances are essential for the production of sugars in the leaves of green plants?
- A carbon dioxide and oxygen
 - B carbon dioxide and water
 - C chlorophyll and glucose
 - D chlorophyll and oxygen

19. The diagrams show **FOUR** foods.

Which food, when increased in the diet, helps to prevent constipation?



20. Which type of tooth is used for tearing tough food?



A



B

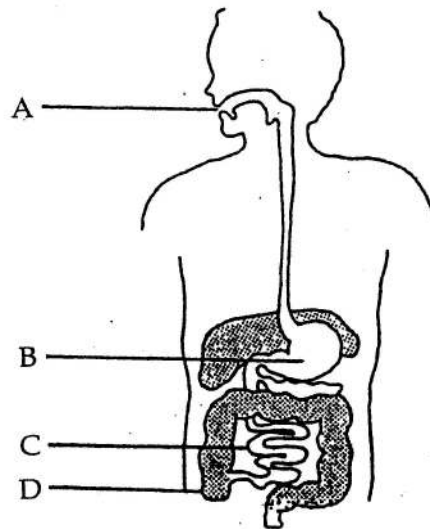


C



D

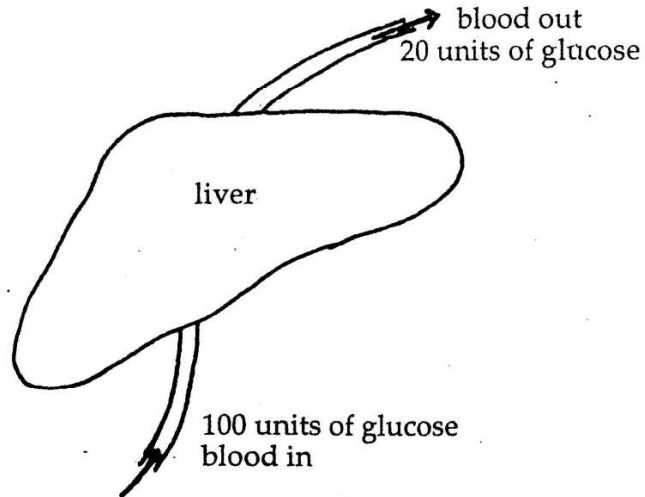
21. The diagram shows the human digestive system. In which organ does most absorption of food take place?



22. The enzyme lipase aids in the digestion of which food?

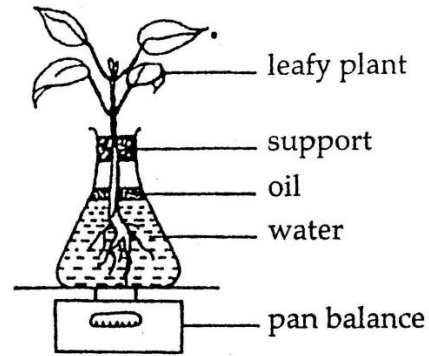
- A bacon
- B cabbage
- C cassava
- D orange

23. The diagram represents the liver and shows the relative amounts of glucose entering and leaving it.



- Which function of the liver is shown in the diagram?
- A deamination
 - B detoxification
 - C glycogen formation
 - D production of glucose
24. What name is given to the process by which food materials are converted to new living protoplasm?
- A absorption
 - B assimilation
 - C digestion
 - D nutrition
25. Which colour change occurs when iodine solution is dropped on a piece of bread?
- A yellow to black
 - B yellow to brown
 - C yellow to orange
 - D yellow to red

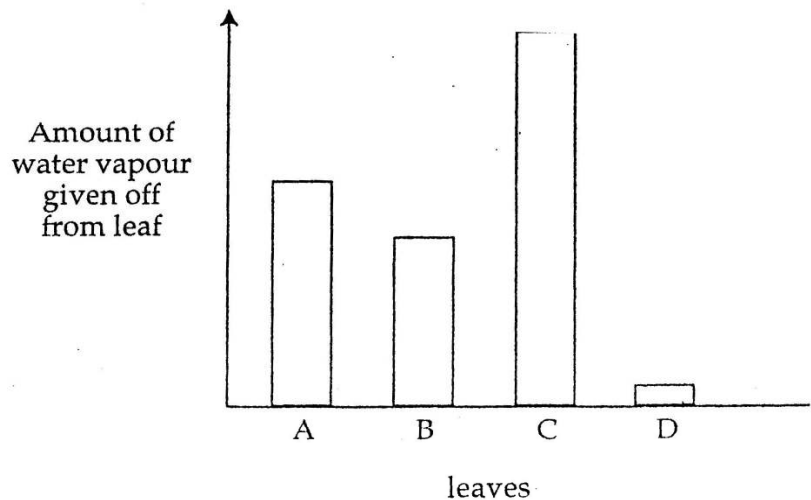
26. The diagram shows a plant on a weight potometer



Under which conditions would weight loss be greatest?

- A cool, moving air, at night
 - B cool, still air, in daylight
 - C warm, moving air, in daylight
 - D warm, still air, at night
27. Four leaves of equal size from the same plant were used in a transpiration experiment. One leaf was greased on both surfaces, one on the upper surface, another on the lower surface and the fourth was not greased at all.

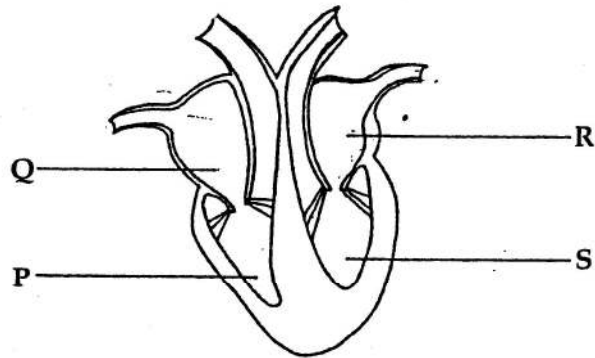
Which leaf was greased on both surfaces?



28. Which correctly describe the structure of an artery?

	Wall	Valves
A	thick	present
B	thick	not present
C	thin	present
D	thin	not present

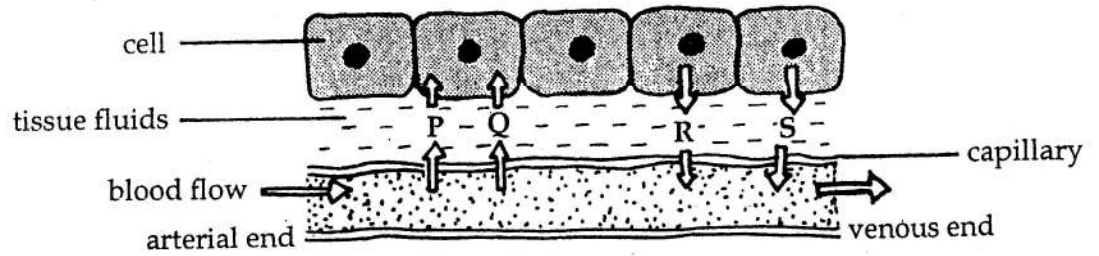
29. The diagram shows a longitudinal section of the heart.



In which of the labelled chambers is the blood deoxygenated?

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

30. The drawing shows a capillary, cells and tissue fluids in the arm of a human.



Which of the following is correct?

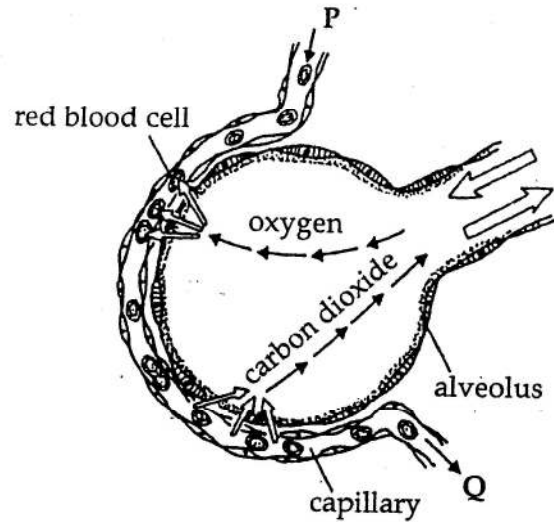
- A P shows the flow of carbon dioxide.
 - B Q shows the flow of glucose.
 - C R shows the flow of oxygen.
 - D S shows the flow of amino acids.
31. The word equation represents a vital chemical activity carried out in living cells.



What is represented by X in the equation?

- A chlorophyll
 - B energy
 - C glucose
 - D yeast
32. Which is **ONE** difference between aerobic respiration and anaerobic respiration?
- A Lactic acid is produced only during aerobic respiration.
 - B Carbon dioxide is produced only during aerobic respiration.
 - C Alcohol is produced only during anaerobic respiration.
 - D Water is produced only during anaerobic respiration.

33. The diagram shows an alveolus and its blood supply.



Which chamber of the heart does the blood enter when it leaves at Q?

- A left atrium
 - B left ventricle
 - C right atrium
 - D right ventricle
34. Which organ is responsible for the removal of nitrogenous waste from the body?
- A kidney
 - B liver
 - C lungs
 - D small intestine

35. The table shows the relative proportion of substances in the blood entering and leaving an organ.

substances	blood entering organ	blood leaving organ
carbon dioxide	less	more
glucose	more	less
oxygen	more	less
urea	less	more

What is the name of the organ?

- A kidney
 - B liver
 - C lung
 - D skin
36. Which process increases the amount of water in the blood?
- A digestion
 - B respiration
 - C sweating
 - D urination
37. Which row in the table gives the correct information about the named hormones?

	hormone	parts of body affected	result
A	oestrogen	breast	decrease in size
B	oestrogen	hip girdle	decrease in size
C	testosterone	face	increase in hair growth
D	testosterone	penis	increase in sperm production

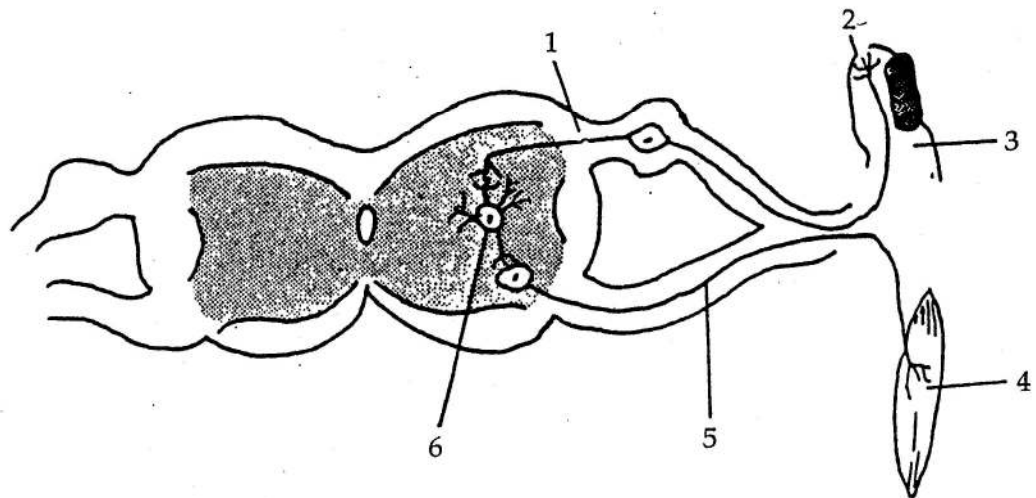
38. Which feature of the skin makes it well suited for temperature control?

- A large surface area
- B Malpighian layer
- C sebaceous glands
- D three layers

39. What is the name of the tiny gaps between the ends of two neurones?

- A axons
- B dendrites
- C ganglia
- D synapses

40. The diagram shows part of the spinal cord, a fingertip and a muscle of the arm.

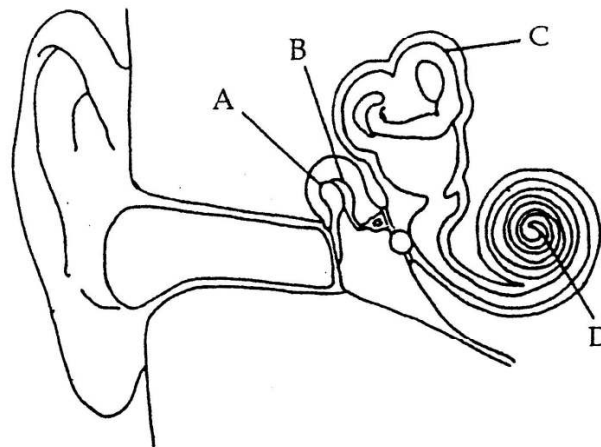


What is the route of a reflex arc impulse from the finger to the muscles of the arm?

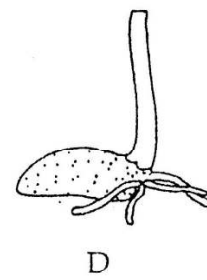
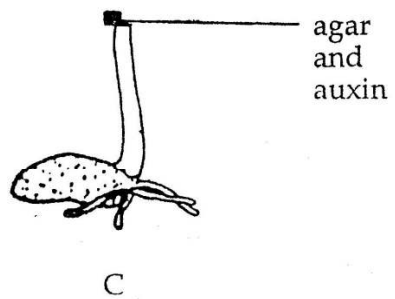
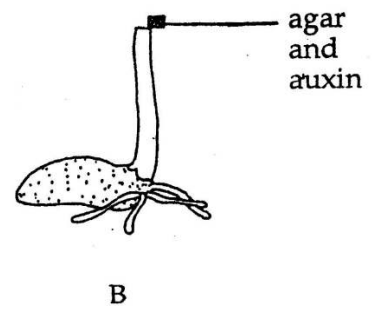
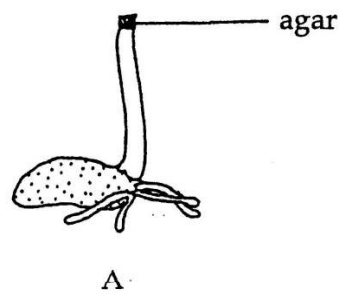
- A 1 → 6 → 5 → 4 → 3
- B 2 → 1 → 6 → 5 → 4
- C 3 → 4 → 6 → 2 → 5
- D 4 → 5 → 6 → 1 → 2

41. A diagram of the ear in section is shown.

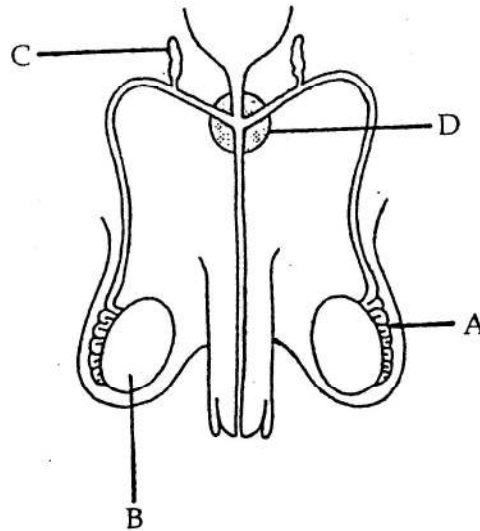
Which structure controls balance?



42. The diagrams show four seedlings with the apex removed. Which seedling will grow toward the left after three days?



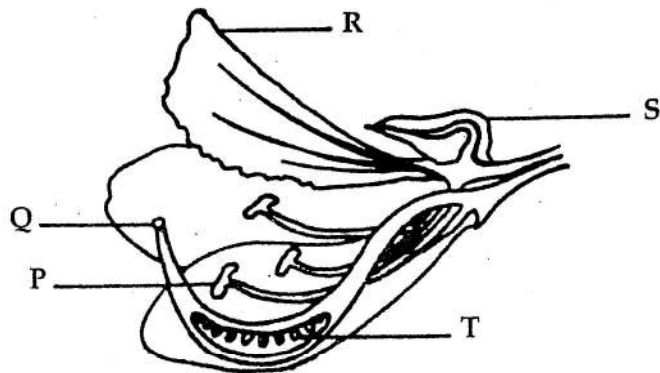
43. The diagram represents the human male reproductive system. Which part stores gametes?



44. Which structure serves as the excretory organ for the human foetus?

- A kidney
- B large intestine
- C lung
- D placenta

45. The diagram represents a *Bauhinia* flower.



In which TWO structures does meiosis occur?

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

46. What is the order of events during sexual reproduction in a flowering plant?
- A fertilization → pollen tube growth → pollination → fruit formation
 - B pollen tube growth → pollination → fruit formation → fertilization
 - C pollination → fruit formation → fertilization → pollen tube growth
 - D pollination → pollen tube growth → fertilization → fruit formation
47. Pollination involves the transfer of pollen from the anther to the
- A petal.
 - B sepal.
 - C stigma.
 - D style.

48. The diagram represents a stage of pregnancy in humans.



- Which stage of pregnancy is shown?
- A 5 weeks
 - B 2 months
 - C 4 months
 - D 9 months
49. Which disease is caused by a bacterium?
- A acquired immune deficiency syndrome (AIDS)
 - B genital herpes
 - C syphilis
 - D thrush (monilia)

50. In a cross between a tall pea plant and a short plant, 60 plants were produced, 28 of which were tall and 32 were short. What are the genotypes of the parent plants? T represents the allele for tallness and t the allele for shortness.

- A TT, TT
- B TT, Tt
- C Tt, Tt
- D Tt, tt

School Number

Candidate Number

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BIOLOGY

PAPER 2

Monday **22 MAY 2000** 1.50 – 3.20 P.M.**MINISTRY OF EDUCATION
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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.

Answer **ALL** questions on this paper.

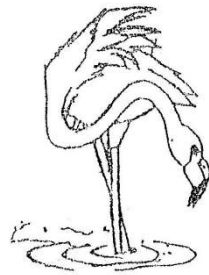
Read each question carefully and make sure you know what you have been asked to do before starting your answer. Confine your answer to the lines following each question.

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

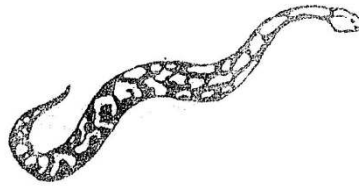
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1	
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TOTAL	

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

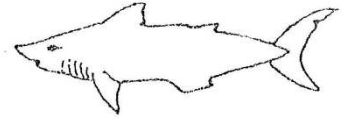
1. The diagrams show six animals.



bird



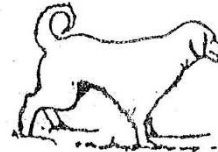
snake



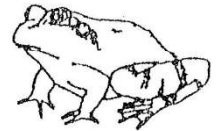
shark



whale



dog



frog

- (a) (i) Which animals shown above are in the same class?

- (ii) Complete the following table.

external feature of animal	class of animal
mammary gland	
dry waterproof skin with scales covering the body	
	fish (pisces)

- (iii) What is the function of the moist skin of the frog?

- (iv) What function do feathers and hair have?

(b) The name Carcharhinus obscurus is written using the binomial system.

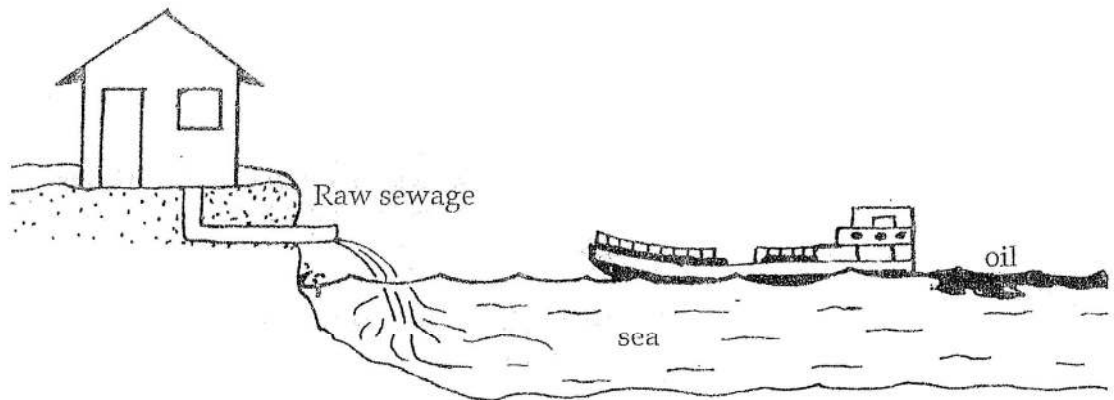
(i) What is the "binomial system"?

(ii) The same organisms may have different common names in various countries, which may result in confusion when identifying them.

How does the use of the binomial system prevent this confusion?

[4]

2. The diagram shows sewage being placed into the sea and a tanker washing oil into the sea.



- (a) What is pollution?

_____ [1]

- (b) (i) State **TWO** effects of the sewage on the organisms in the sea.

1. _____
2. _____ [2]

- (ii) State **TWO** effects of the oil on the animals in the water.

1. _____
2. _____ [2]

- (c) Explain how humans may be disadvantaged (i) directly and (ii) indirectly by the sewage in the water.

(i) directly _____

(ii) indirectly _____

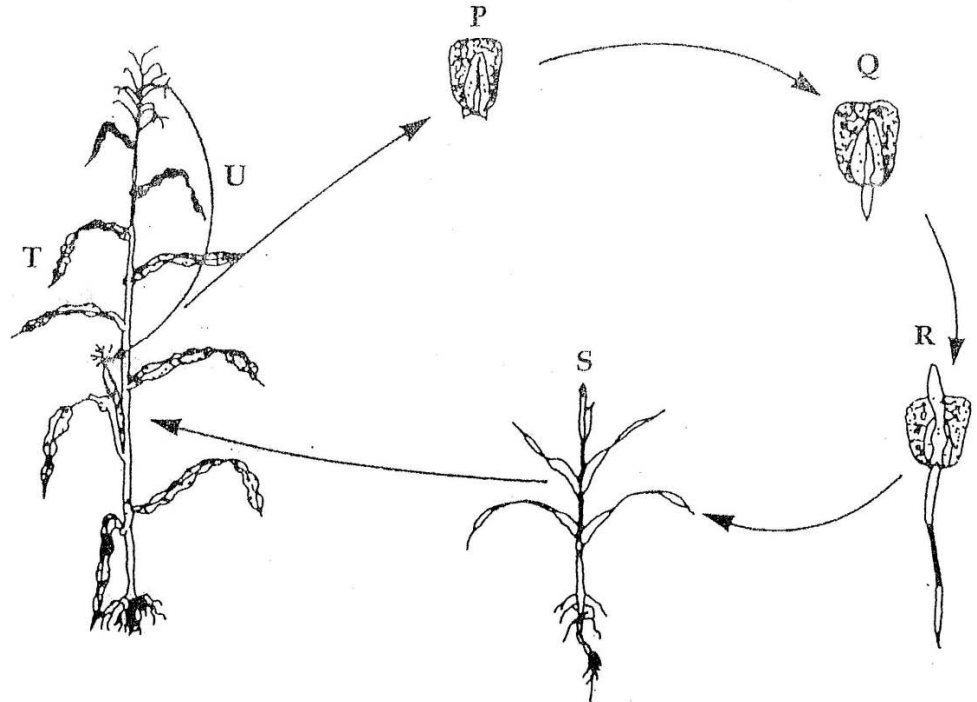
_____ [2]

- (d) The oil may affect the beaches in The Bahamas.

How could this have an adverse effect on the sea bathers?

_____ [2]

3. The diagram represents stages in the life cycle of a maize plant. The letters, P, Q, R, S and T represent each stage.



- (a) Name the agent that is responsible for the pollination that takes place at U on the diagram.

_____ [1]

- (b) (i) What letter on the diagram represents the first stage of germination?

_____ [1]

Name the part of P which

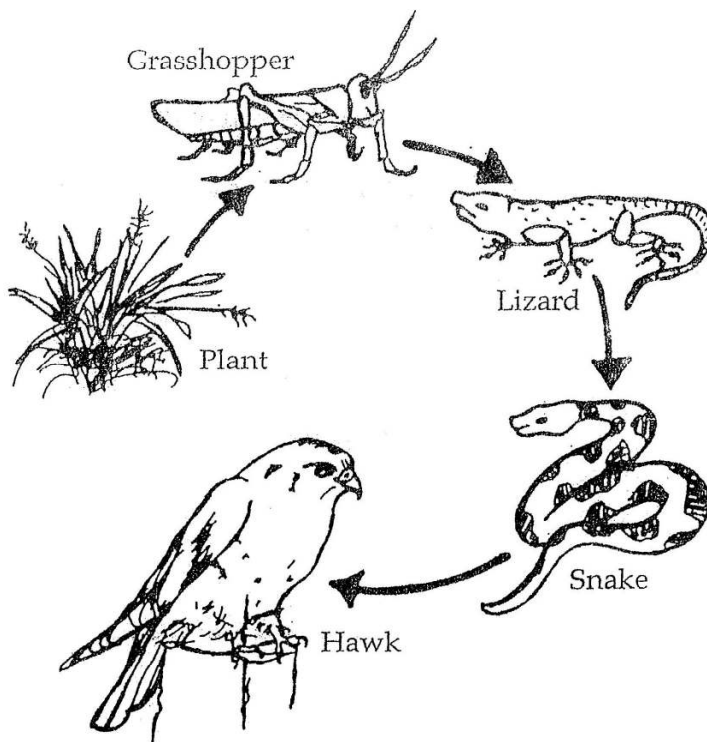
(ii) stores food, _____

(iii) passes food to the growing regions.

_____ [2]

- (c) What is the approximate number of days, after planting, that it takes to change from:
- (i) stage **P** to stage **Q**? _____
 - (ii) stage **P** to stage **T**? _____ [2]
- (d) State **TWO** external conditions which are necessary for germination of a maize grain.
- 1. _____ [1]
 - 2. _____ [1]
- (e) Name **TWO** staple foods in The Bahamas which are derived from maize.
- 1. _____
 - 2. _____ [2]

4. The diagram shows a food chain.



- (a) (i) From the food chain write down the names of the following:
producer, _____
primary consumer, _____ [2]
- (ii) What level consumers are the:
snake? _____
hawk? _____ [2]
- (b) Explain why, in a food chain, there is a very large number of plants.

 [2]

- (c) Why is it not accurate to assume that the snake would die of starvation if the lizards were destroyed?

[2]

- (d) Plants and animals are found in "populations" and "communities".

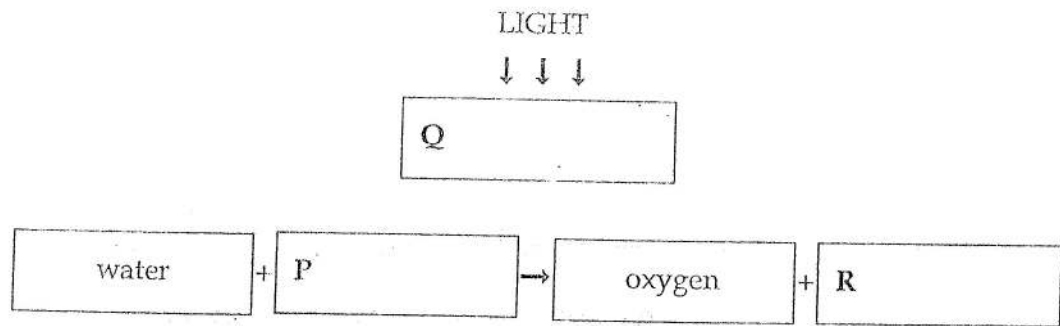
What is (i) a population and (ii) a community?

(i) population

(ii) community

[2]

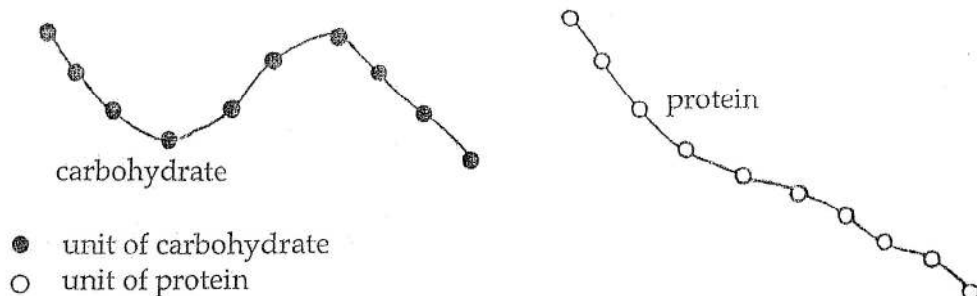
5. The diagram shows the food-making process carried out by green plants.



- (a) Fill in the boxes by completing the labelling for P, Q and R. [3]
- (b) What is the name of the food-making process?
_____ [1]
- (c) (i) Through which structure does water enter the leaf?
_____ [1]
- (ii) Through which structure does oxygen leave the leaf?
_____ [1]
- (d) Name the structures through which water passes from the roots to the leaf.
_____ [1]
- (e) Explain why light is needed for the food-making process.

_____ [2]

6. The diagrams represent molecules of nutrients.



- (a) What chemical elements do carbohydrates, proteins and fats have in common?

_____ [3]

- (b) Make a diagram of a simple disaccharide (two unit) sugar using the same code (shape) as in the diagram.

[1]

- (c) Which groups of enzymes assist in the digestion of (i) carbohydrates and (ii) proteins?

(i) carbohydrates _____

(ii) proteins _____ [2]

(d) What are the end products of digestion of (i) fats and (ii) proteins?

(i) fats _____

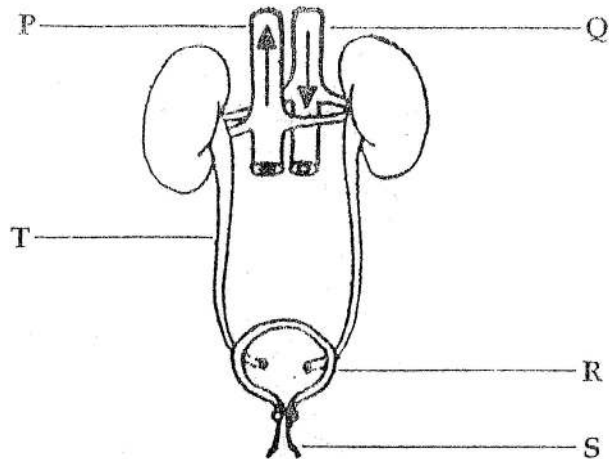
(ii) proteins _____ [2]

(e) Complete the table showing positive results of food tests.

nutrient	reagent	colour of reagent	colour showing positive result
glucose		blue	
protein		blue	

[4]

7. The diagram represents the urinary system with the arrows illustrating the flow of blood.



- (a) State **TWO** differences between the contents of the blood found in P and in Q.

_____ [2]

- (b) Name the parts of the diagram that are labelled:

R _____

S _____

T _____ [3]

- (c) Which organ, other than the kidneys, is involved in excretion and what is the waste product excreted by it?

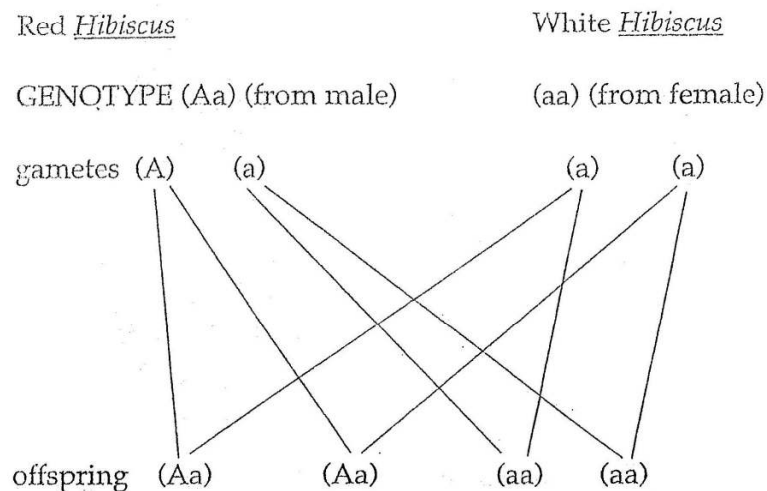
organ _____

waste _____ [2]

- (d) Why does urine have a dark yellow appearance on a hot day?

_____ [2]

8. The diagram shows a cross between a red Hibiscus flower and a white Hibiscus flower on two different plants.



- (a) (i) Name the part of the red flower that produces the gametes.

- (ii) What type of division produces the gametes?
_____ [2]
- (b) (i) Write down the ratio of red to white flowers in the offspring.

- (ii) What percentage of the offspring shown has the dominant gene?
_____ [2]
- (c) What ratio of flower colour would result from a cross between two heterozygous Hibiscus flowers? (no working needs to be shown).
_____ [2]

- (d) Place a tick in the correct box to indicate whether cells present have the haploid and/or the diploid number of chromosomes.

	haploid number of chromosomes	diploid number of chromosomes
leaf		
female gamete of flower		
stigma of flower		
fruit		

[4]

School Number	Candidate Number
Surname and Initials	

BIOLOGY

PAPER 3

Thursday, **25 MAY 2000** 12.30 – 2.00 P.M.

Additional material:
Answer paper for Section B

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.

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.

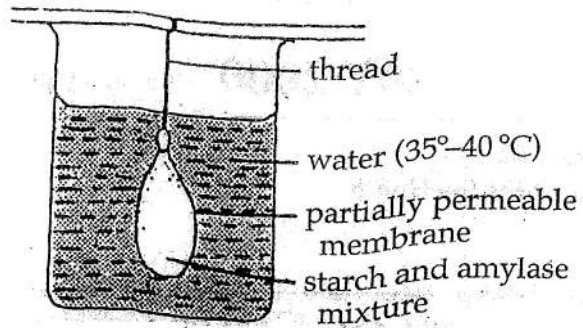
The mark for each part-question is given in brackets [].

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

This question paper consists of 11 printed pages and 1 blank page.

SECTION A

1. The diagram shows part of an experiment to investigate the effect of amylase on the digestion of starch in the small intestine.



P

Q

- (a) In the space Q draw and label a control for this experiment. [2]
- (b) State ONE way in which the apparatus in P is
- (i) similar to the small intestine.
- _____
- _____ [1]
- (ii) different from the small intestine.
- _____
- _____ [1]
- (c) Describe what takes place inside the partially permeable membrane in apparatus P.
- _____
- _____ [1]
- (d) What is the chemical reaction which occurs inside the partially permeable membrane?
- _____ [1]

- (e) What is the significance of maintaining the temperature of the water between 35 °C and 40 °C?

[1]

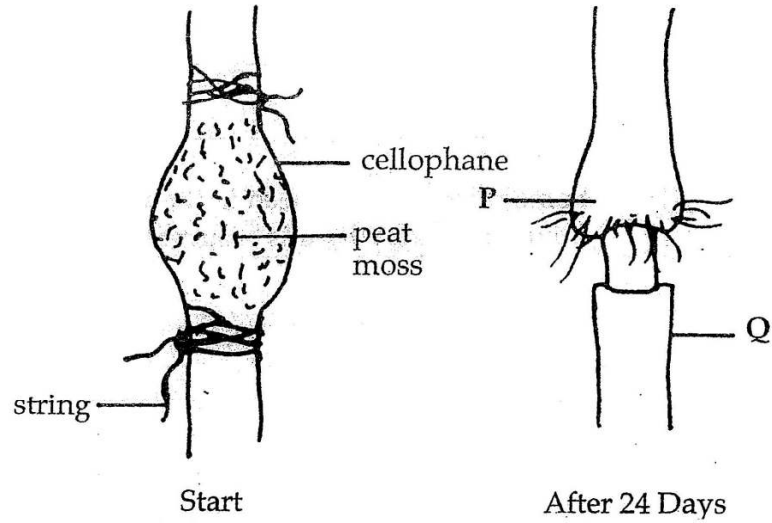
- (f) Some raisins were placed in the water and became swollen after a few hours. Explain why this occurred.

[2]

- (g) What treatment (other than drying them) would cause the raisins to shrink?

[2]

2. The diagram shows a stem that was marcotted.



- (a) (i) Why does **P** become swollen?

_____ [1]

- (ii) Why does **Q** *not* become swollen?

_____ [1]

- (b) The part of the plant that is marcotted continues to receive water from the roots.

Explain why it continues to receive water.

_____ [1]

- (c) What is the purpose of the

peat moss? _____

* cellophane? _____ [2]

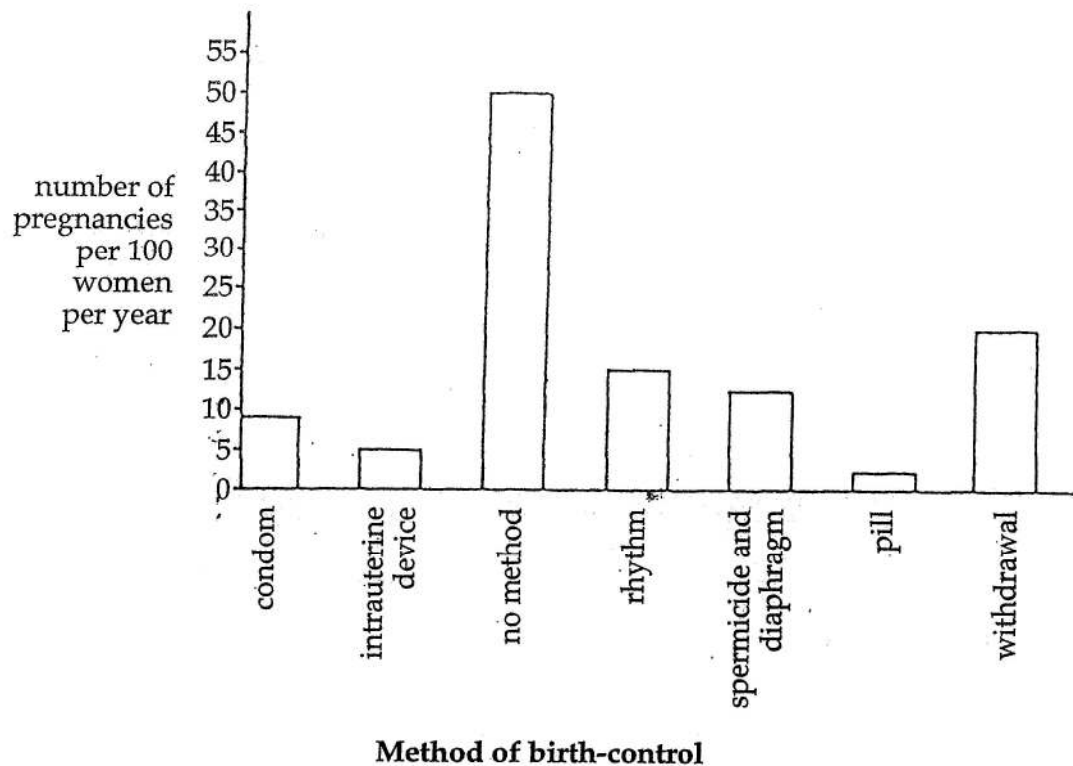
- (d) What are **TWO** advantages of marcotting compared to growing a plant from a seed?

1.

2.

[2]

3. A large group of intelligent and sexually active women agreed to help in a study of birth control. For each method of birth control, 100 women were identified and there was one group of 100 women who used no birth control. During a period of one year, the number of women becoming pregnant were noted and the results used to make the chart which follows.



- (a) Using the results above, state which method of birth control is the most effective.

_____ [1]

- (b) What is the total number of women used in the experiment?

_____ [1]

- (c) In addition to being a birth control device, state another important function that a condom serves during sexual intercourse.

_____ [1]

- (d) (i) How does the pill help to prevent pregnancy?

_____ [1]

- (ii) What is ONE adverse effect of the pill?

_____ [1]

- (e) State ONE advantage of the intrauterine device compared to the pill.

_____ [1]

- (f) Why are the rhythm and withdrawal methods of birth control unreliable?

rhythm _____
_____ [1]

withdrawal _____
_____ [1]

- (g) Is it possible to use the graph to compare the effectiveness of spermicide used on its own? Explain your answer.

_____ [1]

- (h) Assuming that all women were fertile, what are **TWO** possible explanations for the "no method" results?

explanation _____
_____ [1]

explanation _____
_____ [1]

4. (a) The inheritance of the ABO blood group in humans is an example of incomplete dominance.

Show the possible blood groups of the offspring of heterozygous parents. The man is group B and the woman is group A.

[5]

- (b) The diagram represents generations of worms living on a white sandy beach. The allele for black which is dominant is A. The allele for white which is recessive is a.

Generation 1	aa	aa	aa	aa	aa	aa
Generation 2	aa	aa	aa	aa	aa	aa
Generation 3	aa	aa	Aa	aa	aa	aa

- (i) What process may have accounted for the worm with the genotype Aa?

- (ii) Name **TWO** artificial factors that may have also been responsible for the process.

1. _____

2. _____

[Turn over

(iii) State **TWO** reasons why the number of Aa worms would be kept very low.

1. _____

2. _____

(iv) How would the number of Aa worms be affected if the white sand is replaced by black sand?

_____ [6]

SECTION B

Answer any **TWO** questions.

5. (a) Define the term "ecosystem" and explain how the three categories of organisms found in it obtain their nutrients. [8]
- (b) (i) State **TWO** *adverse* environmental conditions (not including those caused by man) that affect animals living in a named marine ecosystem.
- (ii) Explain ways in which animals overcome each of these adverse conditions. [8]
- (c) Explain how this named ecosystem is important for The Bahamas. [4]
6. (a) State and explain the properties of enzymes. [8]
- (b) Explain fully what enzymes do during the germination of seeds. [6]
- (c) Explain the functions of micro-organisms in the production of
- (i) bread and
- (ii) yoghurt. [6]
7. (a) Define the term homeostasis. [2]
- (b) Describe the role of vaso-constriction and vaso-dilation in the regulation of the body temperature of a mammal. [8]
- (c) Explain the roles played by the liver and the pancreas in controlling the sugar content of the blood. [10]