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3009/1

BGCSE

School Number	Candidate Number
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BIOLOGY

PAPER 1 3009/1

Monday **20 MAY 2019** 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.

Answer **ALL** questions.

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

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



This question paper consists of 20 printed pages and 4 blank pages.

1. Which characteristics of living things occur when a butterfly sucks nectar from the nectary of a flower?
 - A growth and reproduction
 - B movement and nutrition
 - C nutrition and growth
 - D sensitivity and growth

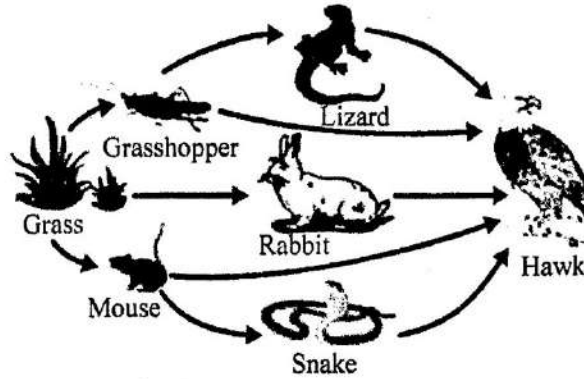
2. Which is the correct way to write the scientific name of the Yellow Elder Plant?
 - A *Tecoma Stans*
 - B *Tecoma stans*
 - C *tecoma Stans*
 - D *tecoma stans*

3. Which environmental factor is biotic?
 - A light intensity
 - B pH
 - C predation
 - D temperature

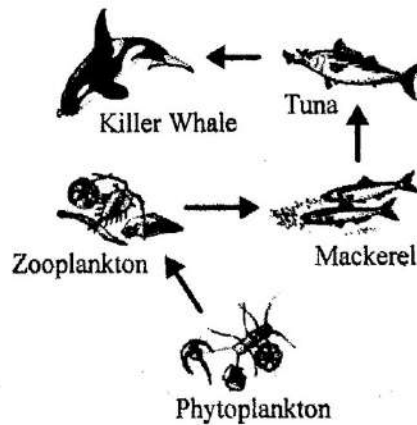


4. The diagram represents a food web.

Which organism in the food web is the tertiary consumer?



- A hawk
B lizard
C rabbit
D snake
5. The picture shows an aquatic food chain.



At which trophic level is the tuna?

- A 1
B 2
C 3
D 4



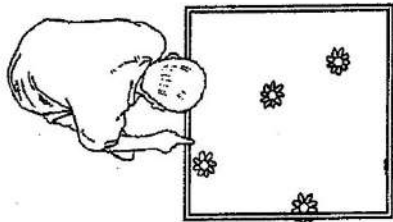
6. Which is the correct zonation of mangroves in The Bahamas?

	seaward → landward			
A	Buttonwood	White	Black	Red
B	White	Black	Red	Buttonwood
C	Black	Red	Buttonwood	White
D	Red	Black	White	Buttonwood

7. What adaptation of animals, living on a sandy beach, helps to protect them from drying out and predators?

- A** burrowing in the sand
- B** camouflage
- C** exoskeleton
- D** filter feeding

8. Which apparatus is being used in this ecological field study?



- A** measuring tape
- B** pit fall trap
- C** quadrat
- D** sweep net



9. What is a natural threat to an ecosystem?

- A deforestation
- B disease
- C genetic engineering
- D overfishing

10. Which pollutant correctly matches the effect it has on the environment?

	pollutant	effect
A	carbon dioxide	causes ozone depletion
B	chlorofluorocarbons	causes eutrophication
C	sulphur dioxide	causes acid rain
D	smoke	causes enhanced greenhouse effect

11. Which water pollutant is commonly found at Clifton Pier?

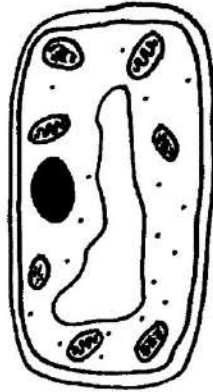
- A crude oil
- B fertiliser
- C pesticide
- D sewage

12. Which product is biodegradable?

- A glass
- B metal
- C plastic
- D wood



13. What type of cell is shown in this diagram?



- A animal
 - B bacterium
 - C fungus
 - D plant
14. Which of the following correctly matches an organelle with its function?
- A central vacuole – control cells activities
 - B chloroplast – makes glucose
 - C mitochondrion – stores water
 - D nucleus – stores glucose
15. Which **TWO** organelles are present in plant cells but **not** in animal cells?
- A cell membrane and chloroplast
 - B cell wall and chloroplast
 - C cytoplasm and cell wall
 - D nucleus and cell membrane

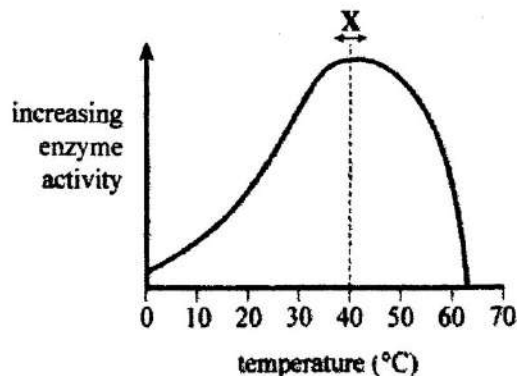


16. How do water molecules move during the process of osmosis?
- A from a concentrated solution to pure water
 - B from a concentrated solution to a more dilute solution
 - C from a dilute solution to a more concentrated solution
 - D from a dilute solution to a more dilute solution
17. What will happen to a red blood cell when placed in distilled water?
- A It doubles in size then stays that way.
 - B Its size shrinks.
 - C It stays the same size.
 - D It swells until it bursts.
18. When starch and amylase are mixed in the presence of iodine solution, the blue black colour rapidly disappears. This happens because the starch is turned into which of the following?
- A glucose
 - B glycogen
 - C maltose
 - D sucrose



19. Use the graph below to answer questions 19 and 20.

The graph shows the relative rate of an enzyme-controlled reaction at different temperatures.



Which describes the shape of the graph within the temperature range marked X?

- A The rate decreases.
 - B The rate increases then decreases.
 - C The rate is at its maximum.
 - D The rate is zero.
20. At which temperature is this enzyme totally denatured?
- A 0°C
 - B 35°C
 - C 40°C
 - D 63°C
21. Which gas is a waste product of respiration?
- A carbon dioxide
 - B hydrogen
 - C nitrogen
 - D oxygen



22. What is the product of anaerobic respiration in muscle tissue?

- A carbon dioxide
- B ethanol
- C lactic acid
- D oxygen

23. Which row in the table shows the correct percentage of oxygen in inhaled and exhaled air?

	inhaled air	exhaled air
A	4	16
B	16	4
C	20	16
D	21	78

24. The cells that line the trachea have cilia. What is the function of these cilia?

- A assist in gas exchange
- B increase the internal surface area of the trachea
- C moisten the air entering the lungs
- D sweep dust and dirt containing mucus out of the lungs

25. In systemic circulation, blood is pumped to all parts of the body except which organ?

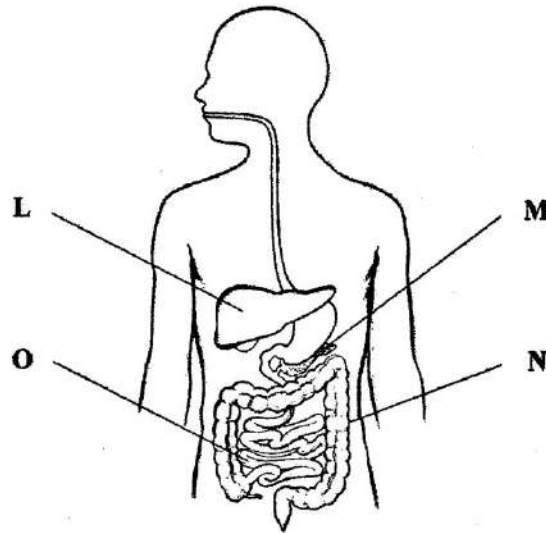
- A head
- B kidneys
- C liver
- D lungs



26. In which of the following structures is blood pressure greatest?

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

27. The diagram shows the human digestive system.



Which labelled parts correctly show where absorption of water can occur?

- A L, M
- B N, O
- C M, N
- D O, L

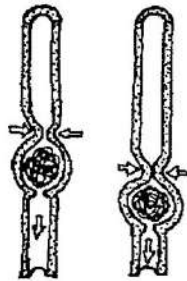


28. One gram of fat contains 37.0 KJ calories. A slice of bacon contains 3.5 g of fat.

How many calories will be in **TWO** slices of bacon?

- A 70.0 KJ
- B 74.0 KJ
- C 129.5 KJ
- D 259.0 KJ

29. The diagram shows the movement of food in the oesophagus.



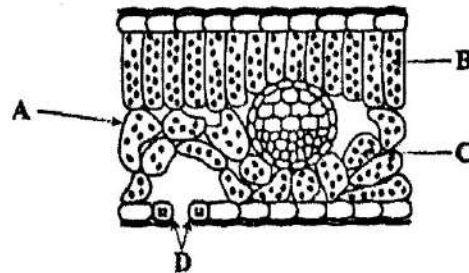
What is this process called?

- A assimilation
- B egestion
- C ingestion
- D peristalsis

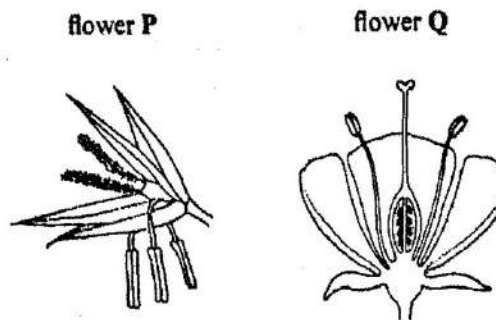


30. The diagram shows a section of a leaf.

Which structure changes shape to allow gases in and out of the leaf?



31. The diagram shows flower P and flower Q.

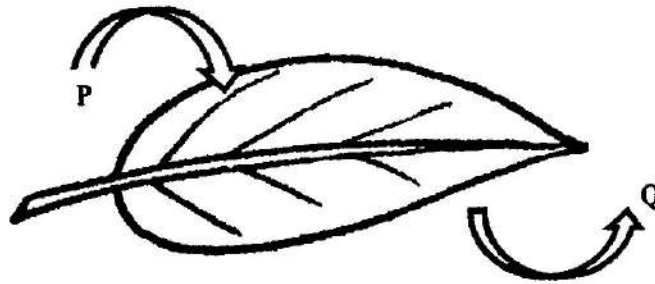


Which row correctly states features of flower P and flower Q?

	P	Q
A	bright coloured petals	light smooth pollen
B	dull coloured petals	large sticky pollen grains
C	large sticky pollen grains	bright coloured petals
D	net like stigma	dull coloured petals



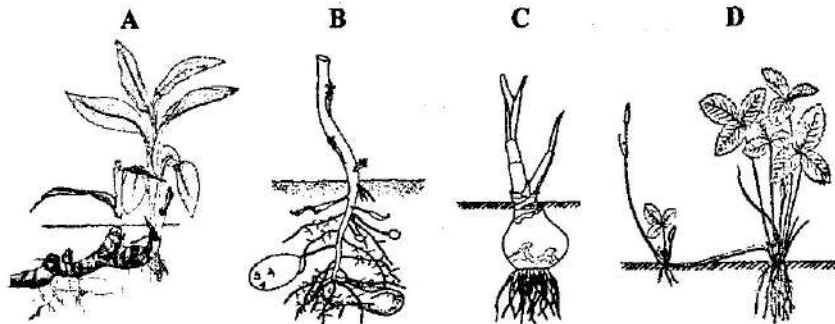
32. The diagram shows a leaf in sunlight.



Which gases are represented by arrows P and Q?

	gas P	gas Q
A	carbon dioxide	nitrogen
B	carbon dioxide	oxygen
C	oxygen	carbon dioxide
D	oxygen	nitrogen

33. Which picture shows a method of vegetative propagation that involves the use of a rhizome?

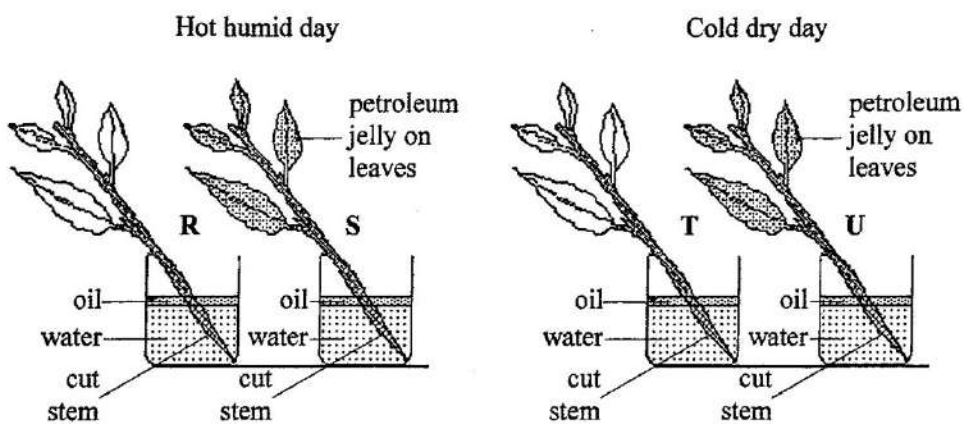


34. Plants in different habitats have become modified to reduce transpiration rate.

Which correctly matches the plant with its adaptation?

- A cactus _____ broad leaves
 - B mangrove _____ many stomata on leaf surface
 - C pine tree _____ needle-like leaves
 - D rhizome _____ rolled narrow leaves
35. The following experiment was set up to investigate the process of transpiration.

(Both sides of the leaves on the cut stem are covered in petroleum jelly.)

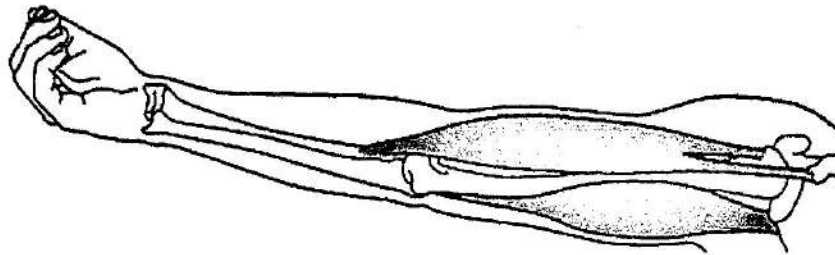


Which **TWO** beakers would show the greatest change in water levels?

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



36. The diagram shows an extended human arm.

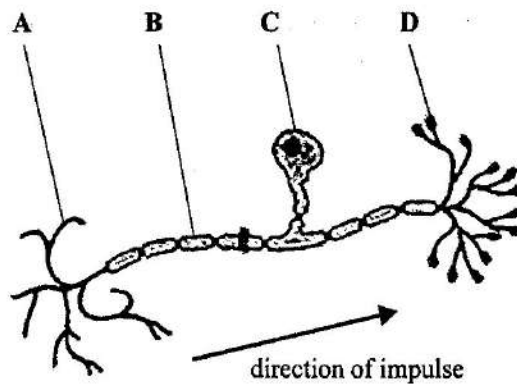


What combination will bend the arm?

- A triceps contracts, biceps relaxes
- B triceps relaxes, biceps contracts
- C triceps contracts, biceps contracts
- D triceps relaxes, biceps relaxes

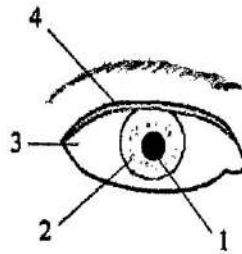
37. The diagram shows a sensory neuron.

Which structure has the function of picking up the stimulus?



38. The diagram shows a front view of the human eye.

What are the numbered structures?



	1	2	3	4
A	cornea	eyelid	iris	pupil
B	eyelid	pupil	sclera	iris
C	pupil	iris	sclera	eyelid
D	sclera	cornea	iris	eyelid

39. Which of the following groups of symptoms most clearly suggests over secretion of thyroxine in an adult?

- A high metabolic rate, tired, overweight
- B high metabolic rate, over active, thin
- C low metabolic rate, overactive, thin
- D low metabolic rate, tired, overweight



40. Which sex hormones are responsible for bringing about puberty in males and females?

	female	male
A	follicle stimulating	oestrogen
B	oestrogen	testosterone
C	oestrogen	progesterone
D	progesterone	testosterone

41. What is fertilisation and where does it take place in humans?

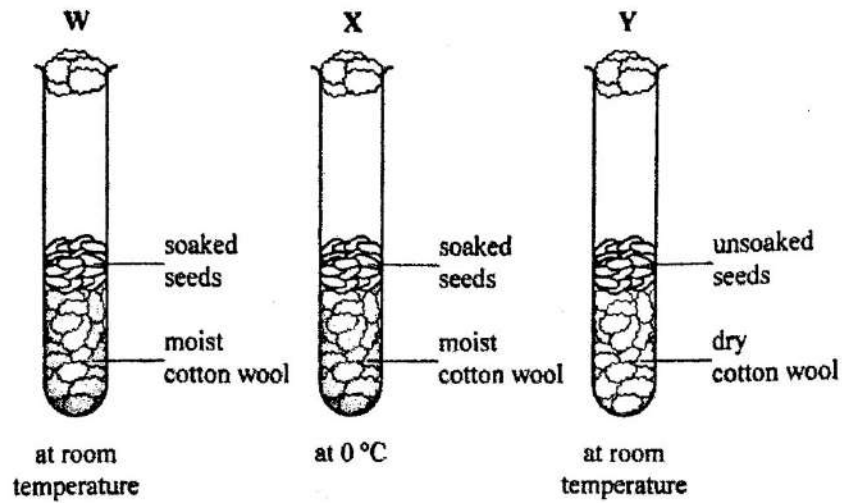
- A fusion of gametes in uterus
- B fusion of gametes in fallopian tube
- C implantation of gametes in uterus lining
- D implantation of ovum in uterus lining

42. The HIV virus attacks the cells of which body system?

- A digestive system
- B excretory system
- C immune system
- D nervous system



43. The diagram below shows how an experiment was set up to investigate the conditions needed for germination.



Which list shows the order in which seeds will germinate from least to most?

- A W, X, Y
- B W, Y, X
- C X, W, Y
- D Y, X, W



44. Which body cell is capable of differentiation into any cell type?

- A egg
- B nerve
- C sperm
- D stem

The table shows the mass of four substances in 1 dm³ of blood plasma and urine.

Use the table to answer questions 45 and 46.

substance	mass in 1 dm ³ of blood plasma	mass in 1 dm ³ of urine
urea/g	0.3	14.0
sodium/g	8.5	4.6
protein/g	80.0	0.1
glucose/g	0.8	0.0

45. Which substance shows the biggest change in mass per dm³ between blood plasma and urine?

- A glucose
- B sodium
- C protein
- D urea

46. What is the percentage decrease for sodium between blood plasma and urine?

- A 3.9
- B 45.9
- C 54.1
- D 81.3



47. In tobacco plants the diploid number is 48.
How many chromosomes will be found in the nucleus in a pollen grain from the tobacco plant?
- A 12
 - B 24
 - C 48
 - D 96
48. Which term describes the physical appearance of an organism?
- A genome
 - B genotype
 - C mutation
 - D phenotype
49. In pea plants, the allele for round seeds (**R**) is dominant to wrinkled seeds (**r**).
In a genetic cross between two heterozygous plants, what percentage of the offspring will have round seeds?
- A 25%
 - B 50%
 - C 75%
 - D 100%
50. The dog breeds that we have today were developed through which method?
- A artificial selection
 - B acquired selection
 - C natural selection
 - D sexual selection



3009/2

BGCSE

School Number	Candidate Number
Surname and Initials	

BIOLOGY

PAPER 2 3009/2

Monday **20 MAY 2019** 10:30 A.M.–12 NOON

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 on this paper. Read each question carefully and make sure you know what you have been asked to do before starting your answer.

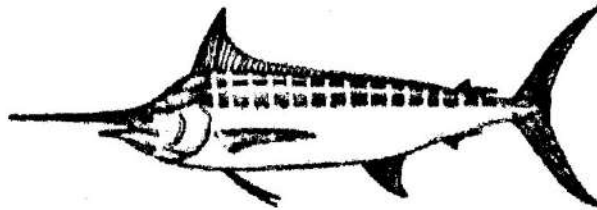
Confine your answer to the lines following each question. The mark for each part-question is given in brackets [].

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



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

1. The diagram shows the national fish of The Bahamas. The binomial name for the national fish is *Makaira nigricans* (Blue marlin).



- (a) (i) What genus does this fish belong to?
_____ [1]
- (ii) What does the term binomial mean?

_____ [1]
- (iii) State the importance of using the binomial name.

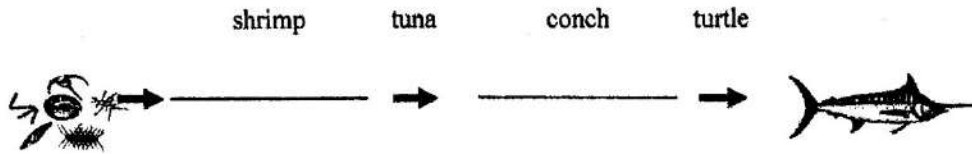
_____ [1]
- (b) Complete the classification of this organism by filling in the table below.

group	name
Kingdom	Animalia
Phylum	
Class	Fish
Order	Perciformes
Family	Istiophoridae
Genus	
Species	

[3]



- (c) (i) Select **TWO** organisms from the list given to complete the food chain below. [2]



- (ii) Identify the trophic level of the following organisms in your food chain.

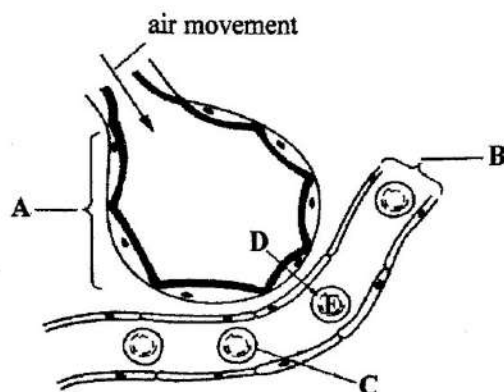
Plankton _____

Blue marlin _____ [2]

TOTAL MARKS [10]



2. The diagram shows structure **A** and an associated blood vessel, in the human respiratory system.



- (a) (i) On the diagram, draw an arrow to show the direction of the movement of carbon dioxide between the blood vessel and structure **A**. [1]
- (ii) Name gas **D** and state the name of the process by which it passes into cell **E**.
 Name of gas _____
 Name of process _____ [2]
- (b) Name the structure labelled **A**.
 _____ [1]
- (c) Identify the type of blood vessel labelled **B** and state **ONE** structural characteristic of this blood vessel.
 Type of vessel _____
 Structural characteristic _____
 _____ [2]
- (d) State the term that describes the composition of the blood entering structure **B**, AND name the part of the heart that this blood came from.
 Term _____
 Name of part of the heart _____ [2]



(e) Name **TWO** respiratory diseases caused by smoking.

1. _____

2. _____ [2]

TOTAL MARKS [10]



3. **Macronutrients** are nutrients that are required in relatively large quantities in the diet.

(a) State the element found in all macronutrients.

[1]

(b) Proteins are an example of a macronutrient.

(i) Name the **FOUR** elements found in all proteins.

_____ [1]

(ii) State the building blocks of a protein molecule.

 [1]

(c) The diagram shows two types of carbohydrates.



(i) Identify the type of carbohydrate labelled **W** and **X** and give a named example of each.

W _____

Named example _____

X _____

Named example _____ [3]

(ii) Carbohydrates are the key energy sources in the body. Name the carbohydrate stored in the liver.

[1] <http://www.fishbase.org>



- (d) Today, many processed foods undergo food preservation.

State the meaning of the term preservation.

(i) _____
_____ [1]

- (ii) Name a specific chemical used to preserve meat and fish and suggest a possible health risk of this preservative.

Chemical _____

Health risk _____

_____ [2]

TOTAL MARKS [10]

4. (a) Complete the table to show the differences between asexual and sexual reproduction.

	asexual reproduction	sexual reproduction
number of parents		
genetic make-up of the offspring in relation to parent		
example of organisms that use this type of reproduction		

[6]

- (b) State **TWO** advantages of asexual reproduction in plants.

_____ [2]

- (c) Name the type of cell of which ovum and sperm are examples **AND** state the type of cell division that they are involved in?

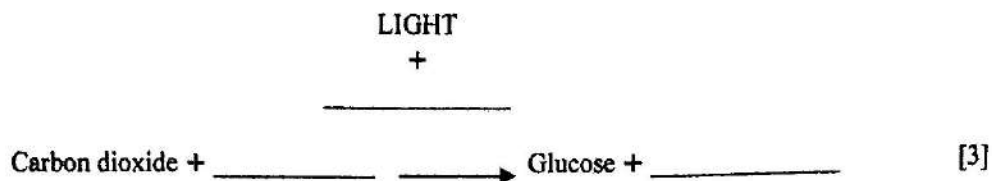
_____ [2]

TOTAL MARKS [10]

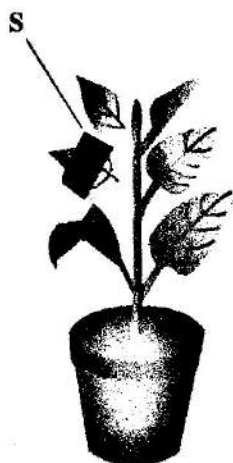


5. This question is based on the process of photosynthesis in green plants.

(a) Complete the word equation for photosynthesis.



(b) A student used a potted plant to find out if light is needed for photosynthesis. The diagram shows how she set up her experiment.



(i) State what the student should do next with the plant, before carrying out any tests on the leaf.

[2]



- (ii) Name the product of photosynthesis that could be tested in this investigation.

_____ [1]

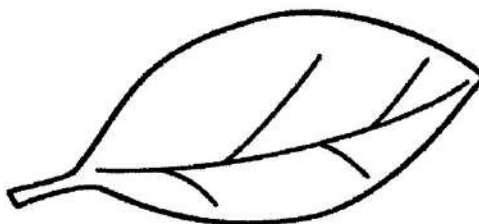
- (iii) Name the reagent used to test for this product.

_____ [1]

- (iv) The outline below represents leaf S (not drawn to scale).

Complete the diagram to show the results of the student's investigation.

Label your diagram clearly.



[3]

TOTAL MARKS [10]



6. Three students were examined by a nurse. Their heart rates were recorded three times at rest and three times after doing 20 jumping jacks. The information is recorded in the table below.

student	heart rate at rest (beats per minute)			heart rate after exercise (beats per minute)			average heart rate (beats per minute)	
	1	2	3	1	2	3	at rest	after exercise
F	55	60	65	80	90	70	60	
G	59	61	60	99	100	101	60	100
H	60	57	63	90	100	80	60	90

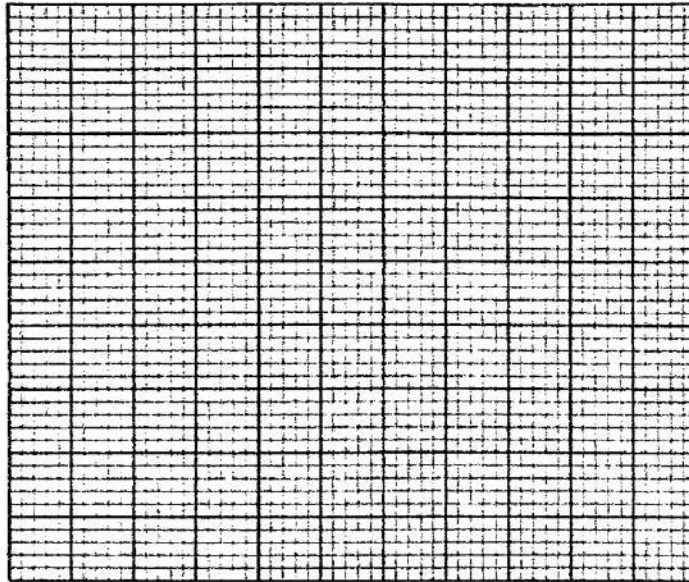
- (a) (i) Why did all students do the same number of jumping jacks?

_____ [1]

- (ii) Complete the table by calculating the average heart rate after exercise for student F. [1]



- (b) Plot a bar chart to show the average heart rate after exercise for each student.



[4]

- (c) (i) State the effect of exercise on the heart rate of the students.

_____ [1]

- (ii) Use the results to state which student is the fittest. Give a reason for your choice.

_____ [2]

- (d) Name ONE substance that would have a similar effect on the heart rate as exercise.

_____ [1]

TOTAL MARKS [10]

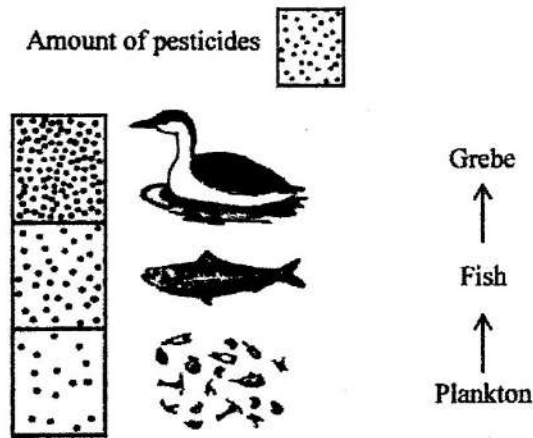


7. This question is about pollution and the problems that it can cause.

(a) Explain what is meant by the term pesticide.

_____ [2]

(b) The diagram shows how pesticides in runoff water build up along a food chain in a freshwater ecosystem.



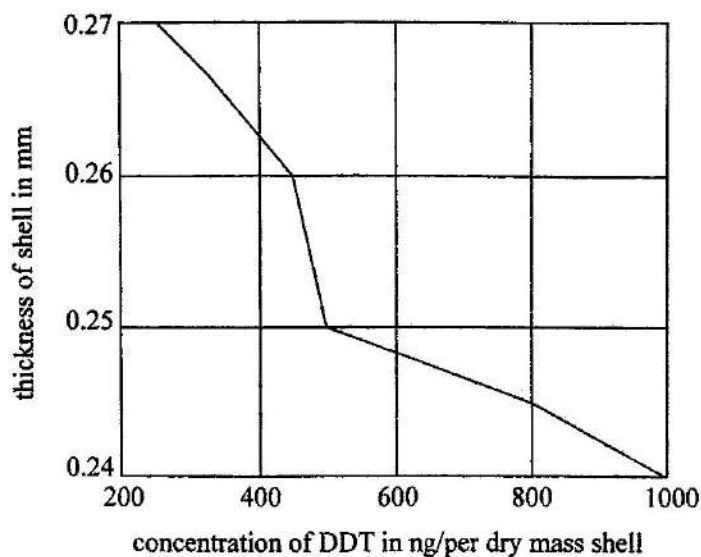
(i) State the term used to describe the build up of chemicals along a food chain, as shown in the diagram.

_____ [1]

(ii) Referring to the named organisms in the food chain, explain how this process occurs.

_____ [2]

- (c) The graph shows the results of a study carried out on the thickness of bird eggshells in areas where pesticides containing DDT were used.



- (i) Use the graph to describe the relationship between the concentration of DDT in the egg shells, and the thickness of the shells.

[1]

- (ii) Use the graph to suggest what effect high levels of DDT might have on the bird population. Explain your answer.

[2]

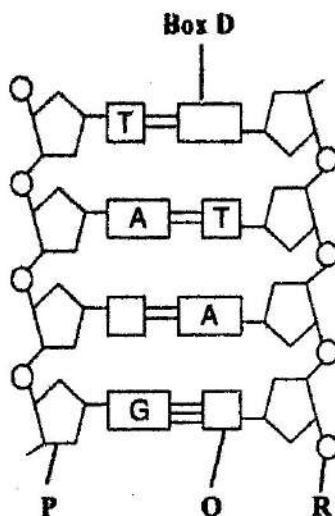
- (iii) The birds are predators of snakes. Explain how the effect described in (c) (ii) would impact the snake population.

[2]

TOTAL MARKS [10]



8. The diagram shows the simplified chemical structure of a portion of a chromosome found in a cell nucleus.



- (a) State the name of the molecule, shown in the diagram, which chromosomes are made of.

_____ [1]

- (b) Identify the parts labelled P, Q and R on the diagram.

P _____

Q _____

R _____ [3]

- (c) Place the correct missing letter in box D on the diagram.

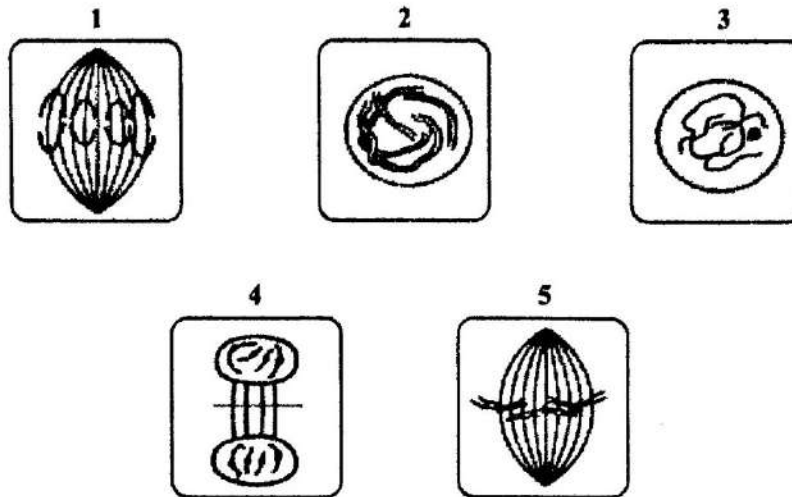
[1]

- (d) Before a cell divides by mitosis the molecule shown in the diagram must be carefully replicated. Explain why.

_____ [2]



- (e) The diagrams show five different stages of mitosis in a cell.



- (i) List the diagrams (1–5), in the correct order to show the stages in which mitosis occurs.

_____ [1]

- (ii) State which diagram represents anaphase. Give a reason for your choice.

_____ [2]

TOTAL MARKS [10]



3009/3

BGCSE

School Number	Candidate Number
Surname and Initials	

BIOLOGY

PAPER 3 3009/3

Thursday **23 MAY 2019** 12:30 P.M.–2:00 P.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.

Answer **ALL** questions in Section A in the space provided.

Answer **TWO** out of **THREE** questions in Section B in the spaces in the question booklet.
Candidates are advised to spend no more than 35 minutes on **Section A**.

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

Calculators are permitted however **NO** graphing calculators are allowed.

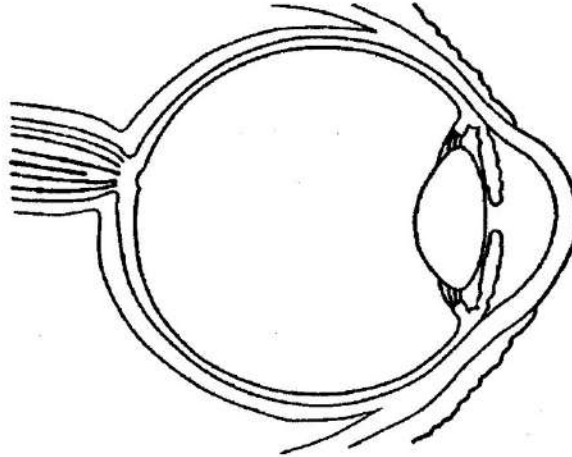
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This question paper consists of 11 printed pages, 10 lined pages and 3 blank pages.

SECTION A

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



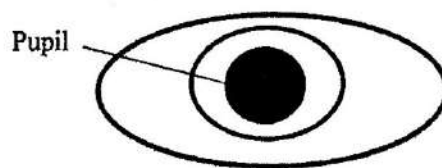
- (a) Draw lines on the diagram to label the following structures:
lens
cornea
choroid.

[3]

- (b) State the function of the cornea.

[1]

- (c) The diagram shows how the pupil appears when you are standing in a dimly lit room.



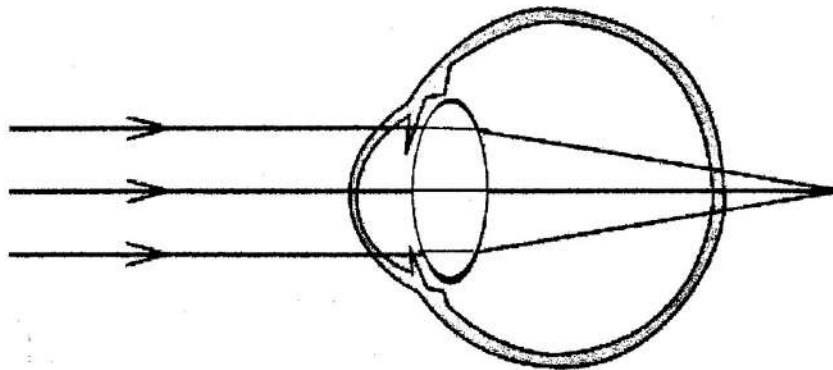
- (i) When you walk from a dimly lit room into bright sunlight, explain how the changes in the pupil are brought about.

[2]

- (ii) State why the change to the pupil, described in (c) (i), is necessary.

[1]

- (d) The diagram shows light rays passing into the eye of a person with an eye defect.



- (i) Identify the eye defect shown in the diagram.

[1]

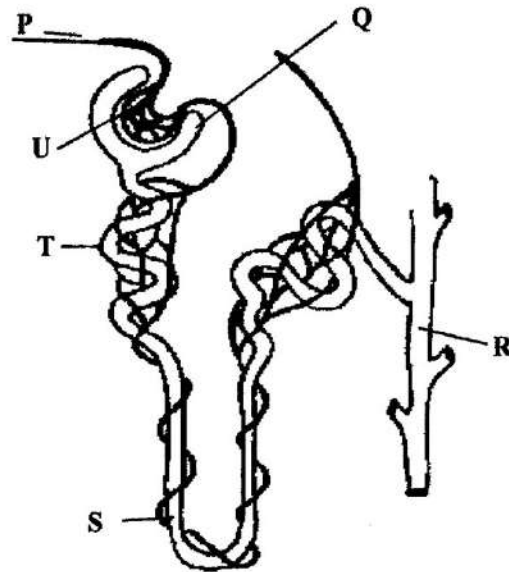
- (ii) Complete the diagram by drawing the following:
the lens used to correct the defect
dotted lines to show the path of the corrected light rays.

[2]

TOTAL MARKS [10]



2. The diagram shows a nephron (kidney tubule).



- (a) State the names of the parts labelled Q and U.

Q _____

U _____

[2]

- (b) Glucose is normally reabsorbed from the filtrate in the nephron.

- (i) State the meaning of the term "reabsorbed" in this context.

_____ [1]

- (ii) Where in the diagram does this process occur?

_____ [1]

- (iii) State **ONE** possible cause of glucose remaining in the urine.

_____ [1]

- (iv) State **ONE** substance, other than glucose, that can be found in part P but would not normally be found in part R.

_____ [1]

- (c) (i) Name the hormone that regulates the water content of urine and state where it is produced.

[2]

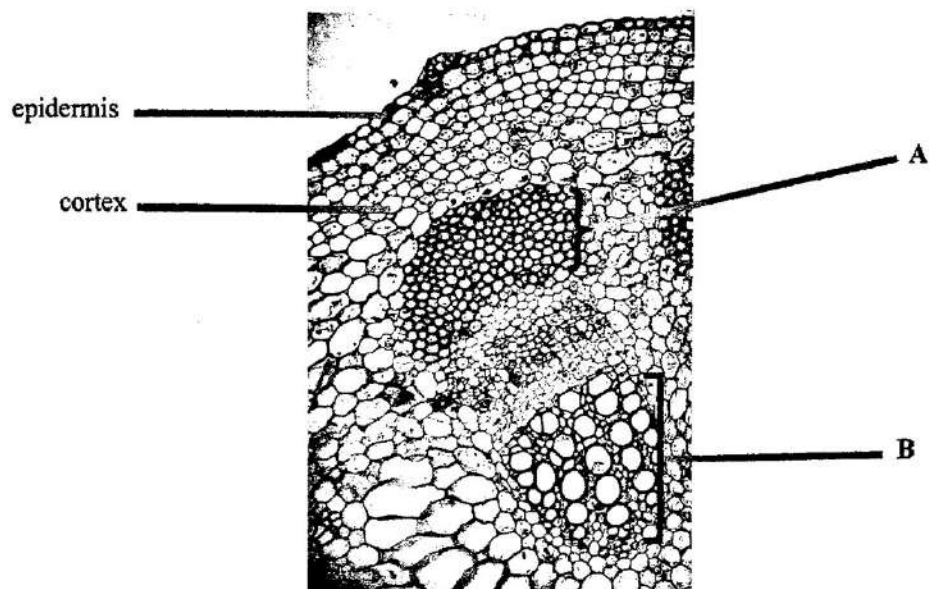
- (ii) Explain why urine is darker yellow on a hot day than on a cool day.

[2]

TOTAL MARKS [10]



3. The photograph shows a magnified image of a cross section of part of a dicotyledonous stem, including a vascular bundle.



- (a) (i) Name the tissues labelled A and B.

A _____

B _____

[2]

- (ii) On the diagram draw a line to the cambium tissue and label it with the letter C.

[1]

- (iii) Name the two types of cells found in tissue A.

1. _____

2. _____

[2]



- (b) (i) State **ONE** function that tissue **A** and tissue **B** have in common.

_____ [1]

- (ii) State **TWO** ways in which the functions of tissue **A** differ from those of tissue **B**.

1. _____
2. _____ [2]

- (iii) State **TWO** ways in which tissue **B** is adapted for its function.

_____ [2]

TOTAL MARKS [10]



4. Some farmers grow GM crops, such as Bt corn, which have been produced using the bacterium *Bacillus thuringiensis*. Growing Bt corn allows the farmer to reduce the use of pesticides.

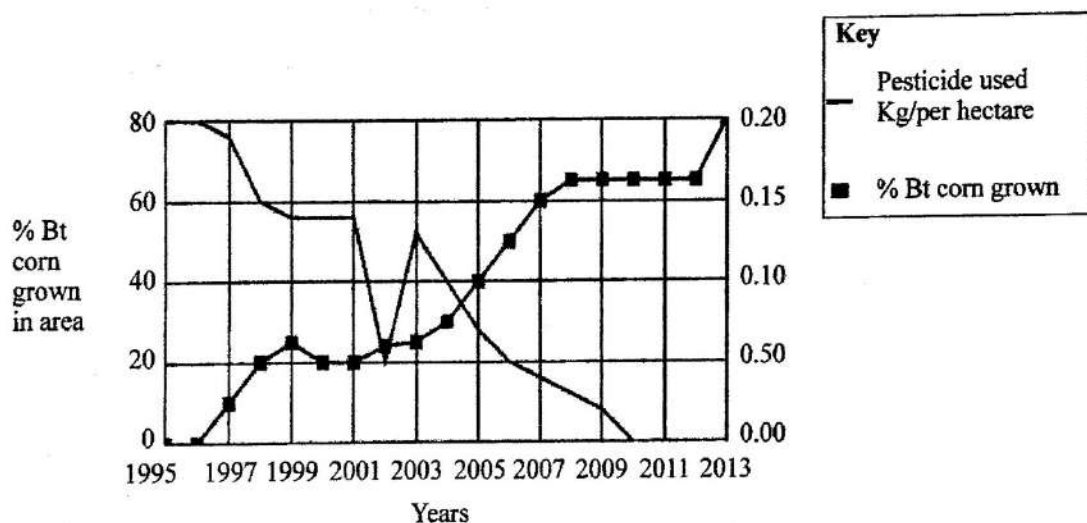
(a) (i) What do the letters GM stand for?

 _____ [1]

(ii) Explain how *Bacillus thuringiensis* is of importance in Bt corn production.

 _____ [2]

(b) The graph below shows the relationship between Bt corn and pesticide use in the United States.



(i) State the general trend shown in pesticide use and percentage of Bt corn grown.

 _____ [1]

(ii) During which years does the graph not show this trend?

_____ [1]

- (iii) Give ONE reason, shown on the graph, why there was no change in pesticide use between the years of 1999 and 2001.

_____ [1]

- (c) Suggest TWO environmental problems which could result from the growth of Bt corn.

1. _____

2. _____

_____ [2]

- (d) State TWO ethical issues associated with using GM crops such as Bt corn as a food source.

1. _____

2. _____

_____ [2]

TOTAL MARKS [10]



SECTION B

Answer **TWO** of three questions

5. This question is based on a coral reef ecosystem.

- (a) (i) Draw a simple labelled diagram of the coral polyp. [4]
- (ii) The coral polyp and brown-green algae (zooxanthellae) share a special relationship.

State the name and describe the significance of this special relationship. [5]
- (b) State **TWO** ways in which the reef is important to the Nassau Grouper and describe **TWO** adaptations for its survival on the coral reef. [4]
- (c) (i) State **TWO** natural threats and describe **THREE** man made threats that affect the coral reef. [5]
- (ii) State **TWO** ways the Bahamian Government tries to conserve the coral reef ecosystem. [2]

TOTAL MARKS [20]

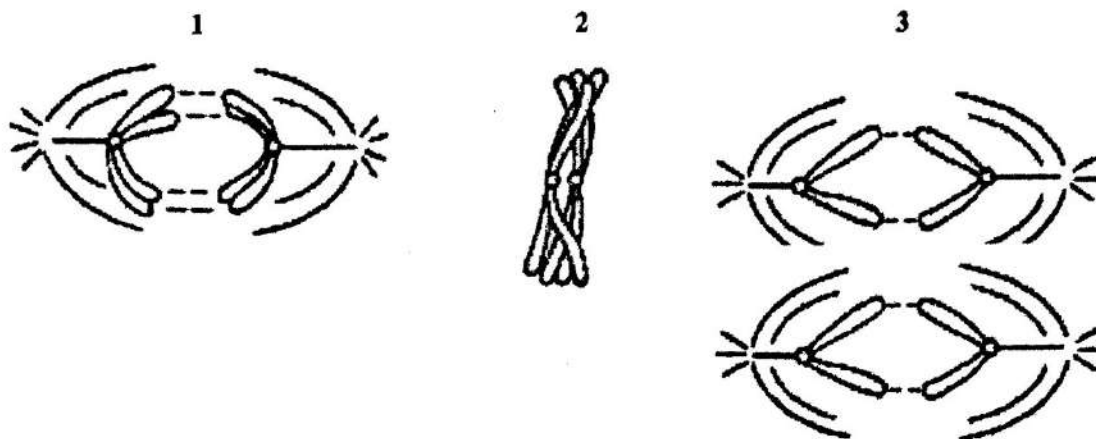
6. Blood is essential to the human body for many vital reasons, not only for transport of materials.

- (a) State **TWO** changes in the composition of blood as it travels from the pulmonary artery to the pulmonary vein and describe how these changes are brought about. [4]
- (b) Identify the two types of white blood cell. For each cell, explain how it performs its role in the protection of the body from infectious diseases. [6]
- (c) Describe the process of blood clotting. [5]
- (d) Before a person is given a blood transfusion, doctors must cross match the donor's blood to ensure that it is compatible with the recipient's blood.
 - (i) State which group is known as the universal recipient and explain why. [2]
 - (ii) State the blood group which is most highly sought after by hospital blood banks. Give an explanation for your choice. [3]

TOTAL MARKS [20]



7. The diagrams show some of the stages of meiosis.



- (a) (i) What is meiosis? [2]
- (ii) Explain fully what is occurring in diagrams 1, 2 and 3. [6]
- (iii) Draw a labelled diagram to show the cells resulting from the processes shown in the diagrams above. [3]
- (b) State **THREE** differences between the processes of mitosis and meiosis. [3]
- (c) Sex-linked traits are caused by genes carried on the **X** and **Y** chromosomes. Red-green colour blindness is an example of a sex-linked trait caused by a recessive allele of a gene on the **X** chromosome, **X^r**.
- (i) Use a Punnett square to show the possible genotypes of the offspring of a red-green colour-blind male and a carrier female. [3]
- (ii) Explain why it is **NOT** possible for a red-green colour-blind female to have a son with normal colour vision. [3]

TOTAL MARKS [20]



Question
Write on both sides of the paper

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Question
Write on both sides of the paper

This image shows a full page of white paper with horizontal black ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings on the page.

Question
Write on both sides of the paper

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

Question
Write on both sides of the paper

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook paper. There is no handwriting or other markings on the page.

Question
Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question
Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question
Write on both sides of the paper

This image shows a single page of white paper with horizontal black ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

Question
Write on both sides of the paper

This image shows a single page of white paper with horizontal black lines, resembling notebook paper. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

Question
Write on both sides of the paper

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Question Write on both sides of the paper

Blank lined paper.



3009/5

BGCSE

School Number	Candidate Number

BIOLOGY

ALTERNATIVE TO PRACTICAL

PAPER 5 3009/5

Thursday **23 MAY 2019** 2:15 P.M.–3:15 P.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.

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 [].

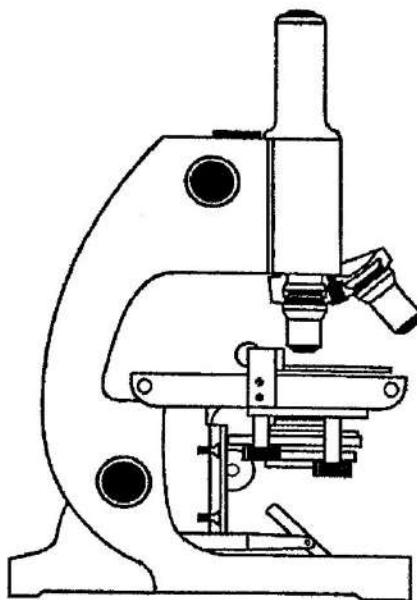
No additional sheets of paper should be placed in this book.

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This question paper consists of 9 printed pages and 3 blank pages.

1. The diagram shows a light microscope.



- (a) Use label lines to label the following parts on the diagram.

eye piece lens
stage
mirror.

[3]

- (b) State the function of the mirror.

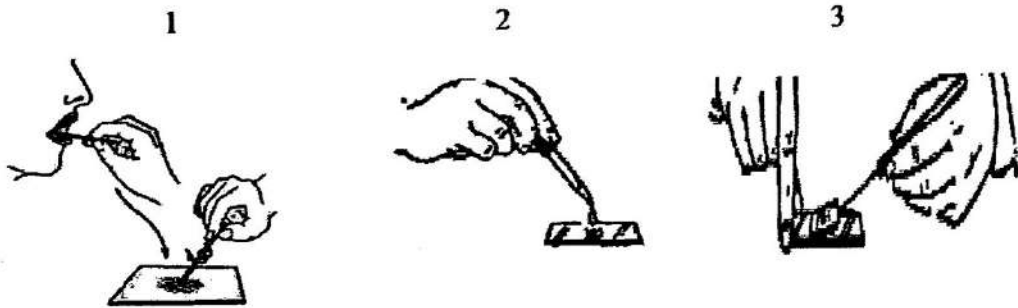
[1]

- (c) If a specimen is viewed down the microscope using an eye piece lens which magnifies X4 and an objective lens which magnifies X10, what is the overall magnification for the specimen?

[1]



The diagrams show the steps involved in making a wet mount slide for viewing down the microscope.



- (d) Which type of cell is most likely being placed on the slide in step 1?
_____ [1]
- (e) Stain is being added to the slide in step 2.
- (i) Name the apparatus being used to add the stain in step 2.
_____ [1]
- (ii) Why must stain be added?

_____ [1]
- (f) Step 3 shows how a student slowly lowers the cover-slip on to the specimen.
- (i) Why must the cover-slip be lowered slowly?

_____ [1]
- (ii) State the function of the cover-slip.

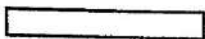
_____ [1]

TOTAL MARKS [10]



2. A student carried out an investigation on osmosis by submerging potato strips in three different solutions.

- (a) All strips were cut to the same length as shown.
Measure the length of the potato strip, in suitable units, and record.



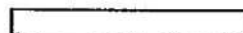
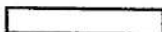
[1]

- (b) After 24 hours the strips were removed from the solution, blotted dry and their new lengths measured.

strip A

strip B

strip C



Measure and record the length of the three strips and record your results in a suitable format in the space below.

[4]

- (c) Complete the table below to describe the expected texture of potato strips A and C after being removed from the solutions.

	texture of potato strips after experiment
strip A	
strip C	

[2]



- (d) Identify which strip was placed in distilled water and explain your choice.

[2]

- (e) Compare the concentration of the solution that potato strip B was placed in with the concentration inside the potato strip.

[1]

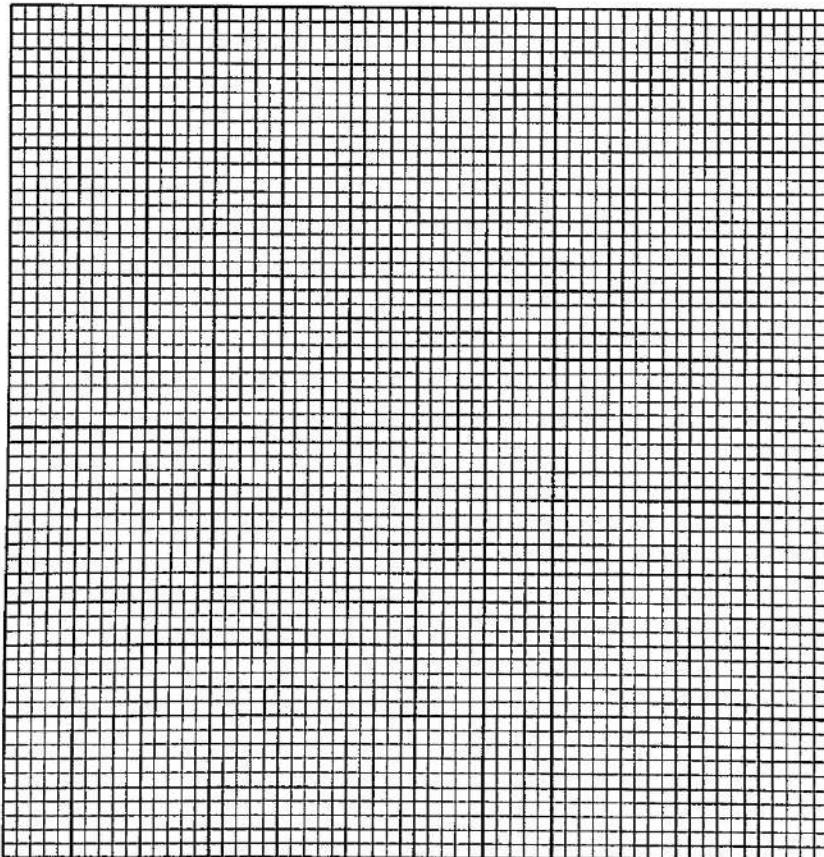
TOTAL MARKS [10]



3. A mother kept a record of her daughter's height from the time she was born until she was eight years old. The data is shown in the table below.

age in years	height in cm
0	42
1	50
2	86
3	92
4	104
5	112
6	118
7	124
8	128

- (a) Draw a line graph of the data shown in the table. Use a ruler to join each point to the next.



(b) State between which two years the child's height increases the most and increases the least.

(i) increases the most

_____ [1]

(ii) increases the least.

_____ [1]

(c) Describe the growth pattern shown by the trend of the graph.

_____ [2]

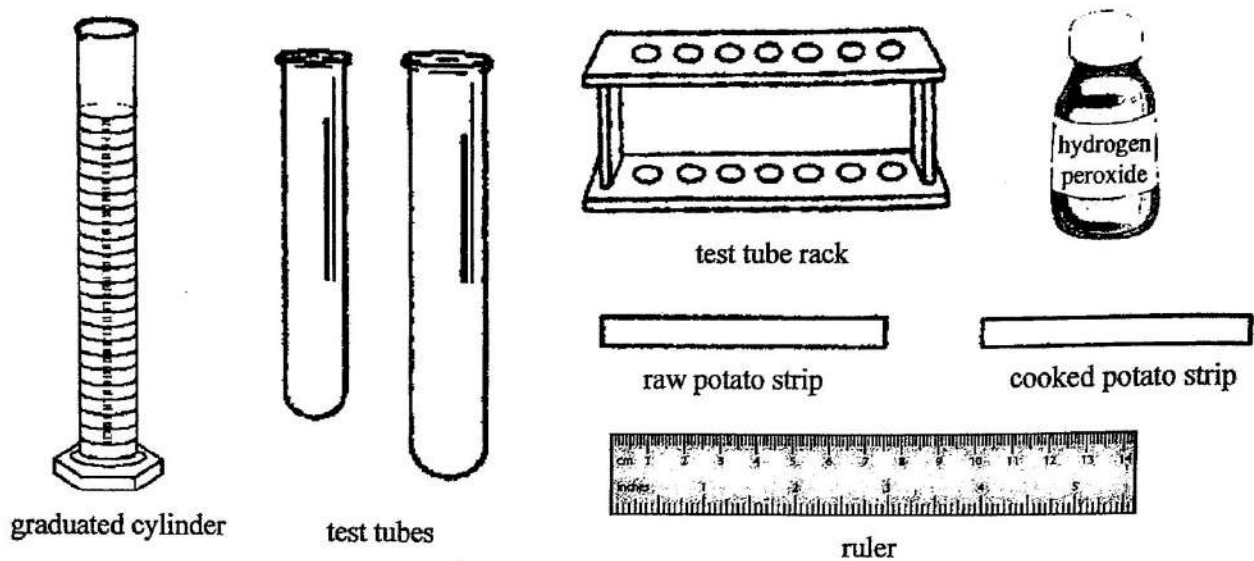
(d) State **TWO** factors that can affect the growth rate in a child, other than age.

_____ [2]

TOTAL MARKS [10]



4. The diagrams show materials used to investigate the action of a catalase on a strip of raw and cooked potato.



- (a) Use the apparatus shown to write a step by step method to investigate which potato strip has more catalase.

[6]

- (b) (i) Describe the expected results of this investigation.

_____ [2]

- (ii) Explain the expected results described in (b)(i).

_____ [2]

TOTAL MARKS [10]

