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BIOLOGY

PAPER 2 3009/2

Wednesday **17 MAY 2023** 10:30 A.M.–12 NOON
(1 hr 30 mins.)

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 [].

Calculators are permitted, however NO graphing calculators are allowed.

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

This question paper consists of 17 printed pages and 3 blank pages.

1. The diagrams represent two plants found in a Bahamian ecosystem.



plant A



plant B

- (a) Name the ecosystem in which these plants are found.
_____ [1]
- (b) State the name of plant A and plant B.
A _____
B _____ [2]
- (c) Zonation occurs in the mangrove ecosystem.
- (i) State what is meant by the term zonation.

_____ [1]
- (ii) Identify the zone in which plant A is found in this ecosystem.
_____ [1]
- (d) State **ONE** natural and **ONE** man-made threat to the ecosystem named in (a).
natural _____

man-made _____
_____ [2]



- (e) (i) State **TWO** reasons why this habitat should be conserved.

[2]

- (ii) Suggest **ONE** method that can be used to conserve this ecosystem.

[1]

TOTAL MARKS [10]



2. The question below is about blood.

- (a) Complete the table using a tick (✓ = **true**) or a cross (X = **false**) to show if each statement applies to red blood cells or to white blood cells. The first statement has been done for you.

statement	red blood cell	white blood cell
numbers may increase following infections	X	✓
transports oxygen		
contains a nucleus		
has a biconcave shape / disc shape		
engulfs bacteria		

[4]

- (b) People are often asked to donate blood during blood drives in the community.

- (i) Where is this donated blood stored?

_____ [1]

- (ii) Why is it important to have stored blood?

 _____ [1]

- (c) State which blood group is known as the “universal donor” and give a reason for your choice.

blood group _____

reason _____

_____ [2]



(d) Julie is in need of a blood transfusion.

She has blood group B.

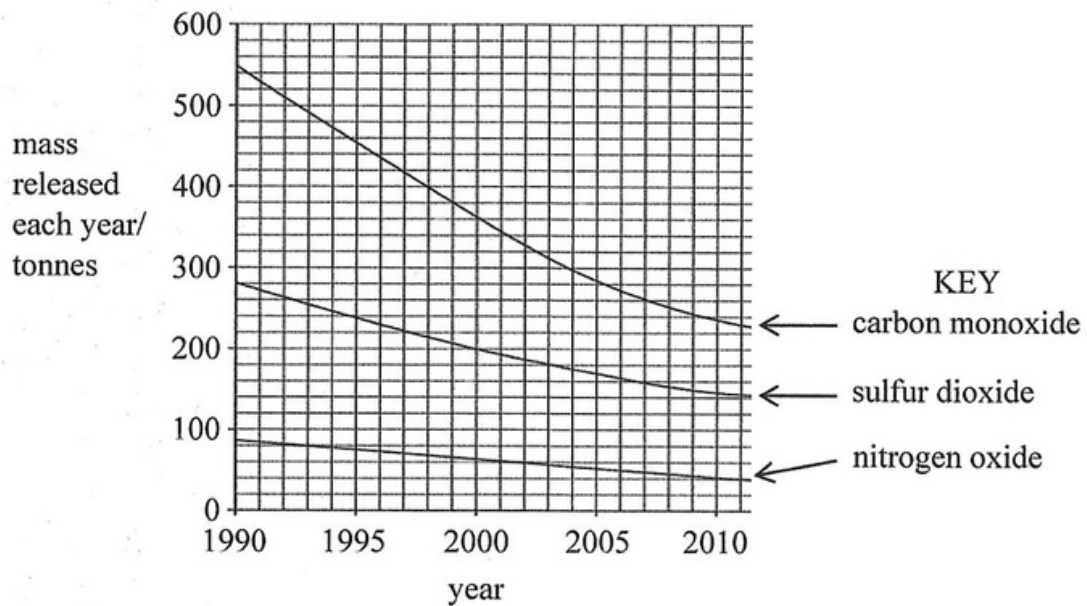
Describe the possible effects of giving Julie a transfusion with blood group A.

[2]

TOTAL MARKS [10]



3. The graph shows the mass of three different air pollutants released into the atmosphere each year from 1990 to 2010.



- (a) Define the term pollutant.
- _____ [1]
- (b) (i) Identify the air pollutant that showed the smallest change in the mass released into the atmosphere from 1990 to 2010.
- _____ [1]
- (ii) Identify the air pollutant for which 360 tonnes was released into the atmosphere in 2000.
- _____ [1]
- (c) (i) Calculate the change in the mass of sulfur dioxide released into the atmosphere from 1990 to 2010.
- Show your working.



- (ii) List **TWO** reasons for the change in the mass of sulfur dioxide released into the atmosphere from 1990 to 2010.

[2]

- (d) Another common air pollutant produced from man's activities is carbon dioxide.

- (i) Name the key environmental problem caused by this pollutant.

[1]

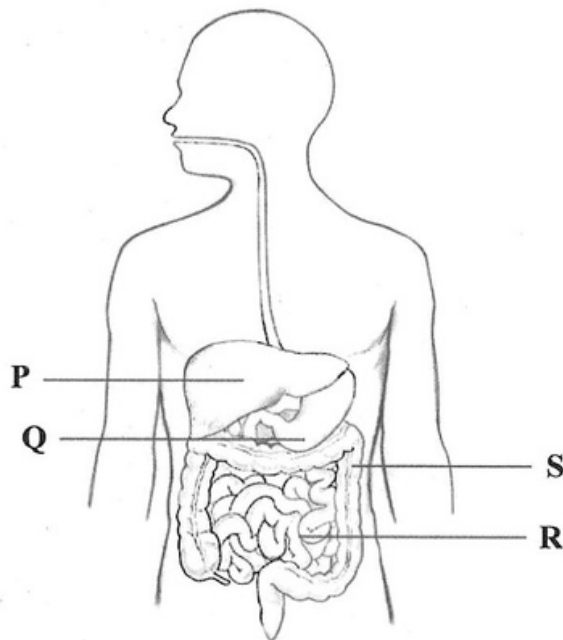
- (ii) State **TWO** adverse effects this problem has on the **ABIOTIC** environment.

[2]

TOTAL MARKS [10]



4. The diagram represents the human digestive system and associated organs.



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

P _____

Q _____

R _____ [3]

- (b) Complete the table by writing in the letter of the structure where each function occurs. Each letter may be used once, more than once or not at all.

function	letter
absorption of nutrients into the bloodstream	
production of bile	
where digestion of proteins begins	

[2]



- (c) The pancreas is a part of the digestive system.

Name an enzyme produced by the pancreas, the food nutrient it acts on and the product of this action.

name of enzyme _____

food nutrient _____

product _____ [3]

- (d) State the roles of the pancreas and liver in reducing blood sugar levels.

pancreas _____

liver _____

_____ [2]

TOTAL MARKS [10]



5. Microbes are used in the production of many different food items.

(a) The table below shows information on the production of two food items.

Complete the table by filling in the missing information.

food item	name of microbe used in production of food item	group microbe belongs to	chemical product(s) of microbe used in production of food item
bread		fungi	
	<i>Lactobacillus</i>		lactic acid

[4]

(b) During the production of both food items, the microbes carry out the process of anaerobic respiration.

(i) Define anaerobic respiration.

_____ [1]

(ii) Write the word equation for anaerobic respiration in bread making.

_____ [2]



- (c) The information below comes from the nutritional label found on one of the food items in part (a).

NUTRITION	<u>amount/serving</u>	<u>amount/serving</u>
FACTS	<u>Total fat 0 g</u>	<u>Potassium 8 mg</u>
Serving size	<u>Saturated fat 0 g</u>	<u>Carbohydrates 23 g</u>
1 container (150 g)	<u>Trans fat 0 g</u>	<u>Dietary fibre 0 g</u>
Kilojoules 585 kJ	<u>Cholesterol 20 mg</u>	<u>Sugars 21 g</u>
Kilojoules from fat 0	<u>Sodium 5 mg</u>	<u>Protein 12 g</u>

- (i) State the energy content, in kilojoules (kJ), of two and half containers of this food item.

_____ [1]

- (ii) Which food nutrient supplies most energy?

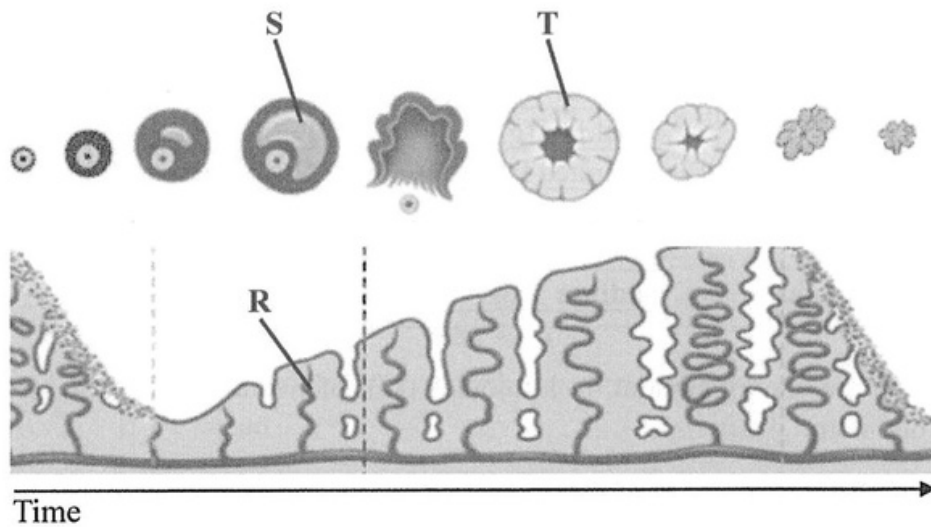
_____ [1]

- (iii) Why may this food **not** be a healthy choice for a person with heart disease?

_____ [1]

TOTAL MARKS [10]

6. The diagram represents the changes that occur during the menstrual cycle of a woman.



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

R _____

S _____

T _____ [3]

- (ii) In which labelled structure does implantation occur?

_____ [1]

Use the calendar below to answer the following questions.

NOVEMBER						
SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

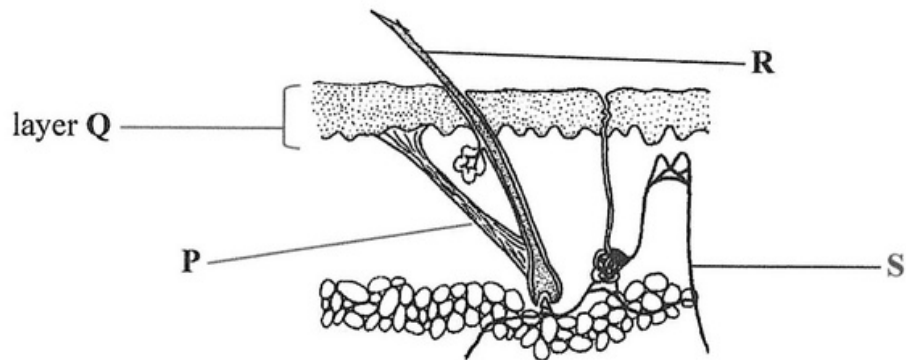


- (b) The woman's menstrual cycle begins on Tuesday 1st November.
- (i) Place the letter **X** on the calendar on each of the five days that menstruation is typically expected to occur. [1]
- (ii) Place the letter **Y** on the calendar on the day that ovulation is most likely to occur. [1]
- (c) How many days, on average, does a menstrual cycle last? [1]
- _____
- (d) A number of hormones are involved in the menstrual cycle. The concentration of one of the hormones, in the blood, drops dramatically several days after ovulation if fertilisation has not occurred.
- State the name of this hormone. [1]
- _____
- (e) Explain how knowledge of changes during the menstrual cycle can be used to prevent pregnancy. [2]
- _____
- _____
- _____

TOTAL MARKS [10]



7. The diagram shows a section of human skin.



- (a) (i) Name the structures labelled **P** and **R**.
- P** _____
- R** _____ [2]
- (ii) State the effect of cold temperatures on structures **P** and **R**.
- structure **P** _____
- structure **R** _____ [2]
- (iii) Which term is used to describe what happens to structure **S** at cold temperatures?
- _____ [1]
- (b) Give the name of layer **Q** and state **TWO** functions of this layer.
- name _____
- function 1 _____
- _____
- function 2 _____
- _____ [3]



- (c) Mammals are described as endotherms and reptiles are described as ectotherms.

Distinguish between the terms ectotherm and endotherm.

[2]

TOTAL MARKS [10]

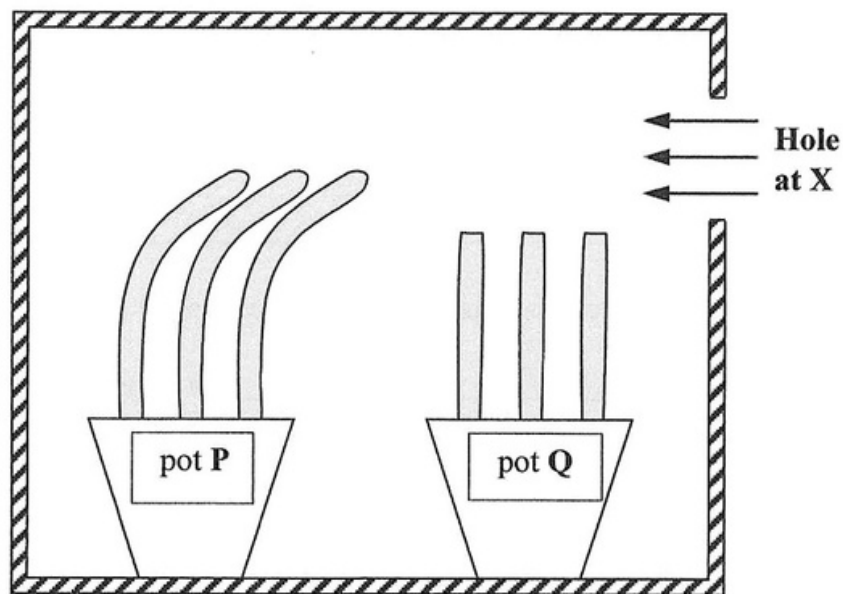


8. An investigation was set up to observe growth patterns in plants.

Two pots, **P** and **Q**, each containing three young plants of the same age and height, were placed inside a large cardboard box. A circular hole was cut in one side of the cardboard box and a directional stimulus was placed outside the hole at **X**.

The young plants had all been grown under the same conditions but the young plants in pot **Q** received an additional treatment as the investigation was set up.

The diagram shows the appearance of the seedlings after they had been in the box for four days.



- (a) (i) Identify the directional stimulus placed at **X**.
_____ [1]
- (ii) State the term used to give the growth response in the plants in pot **Q**.
_____ [2]
- (iii) Name the plant hormone responsible for this growth response.
_____ [1]



- (iv) Explain how this hormone named in (a) (iii) causes this growth response.

[2]

- (b) From your observations of the diagram, suggest and explain why the plants in pot **Q** do not show the same response as the plants in pot **P**.

[2]

- (c) In modern agriculture, farmers tend to use synthetic plant hormones for herbicides.

What are herbicides and what are they used for?

[2]

TOTAL MARKS [10]



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