FORM TP 2020081

TEST CODE **01253020**

MAY/JUNE 2020

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

1. This paper consists of SIX questions in TWO sections. Answer ALL questions.
2. Write your answers in the spaces provided in this booklet.
3. Do NOT write in the margins.
4. If you need to rewrite any answer and there is not enough space to do so on the original page, you must use the extra lined page(s) provided at the back of this booklet. **Remember to draw a line through your original answer.**
5. **If you use the extra page(s) you MUST write the question number clearly in the box provided at the top of the extra page(s) and, where relevant, include the question part beside the answer.**

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.

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SECTION A

Answer ALL questions.

1. (a) Figure 1 shows a diagram of a diseased artery.

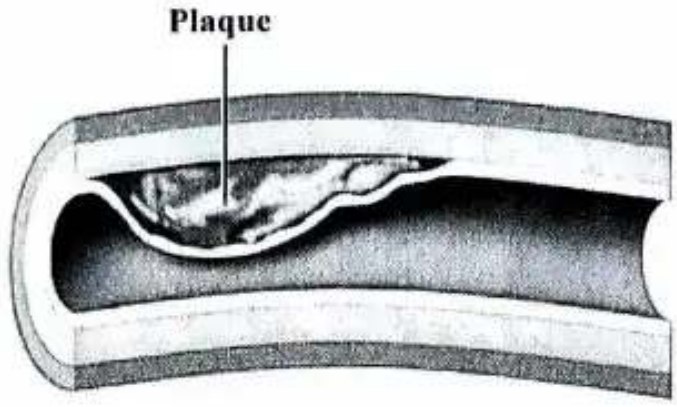


Figure 1. Diseased artery

(i) Identify the condition shown in Figure 1.

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(1 mark)

(ii) Describe how the condition in Figure 1 contributes to hypertension.

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(2 marks)

(iii) Name ONE potentially fatal cardiovascular event that the condition in Figure 1 may lead to.

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(1 mark)

(iv) State TWO risk factors, other than diet, for developing the condition in Figure 1.

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(2 marks)

(b) Individuals with heart disease are advised to follow a special diet to improve their condition and overall health.

From the menu below, circle the healthiest option for EACH mealtime which would contribute to improved cardiovascular health.

Breakfast	Lunch	Dinner	Snack
Frosted cornflakes and milk, and banana	Grilled fish, rice, fresh green salad, string beans and a glass of water	Slices of pizza	Potato chips
Oatmeal with fruit and herbal tea	Cheeseburger with lettuce and tomato, fries, soft drink	Fish soup with vegetables	Candy bar
White bread and butter, and hot cocoa	Fried chicken, coleslaw, macaroni and cheese, and lemonade	Peanut butter and jelly on white bread	Mango

(4 marks)

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(c) Figure 2 shows a graph of the leading causes of death during the years 1900 and 2000.

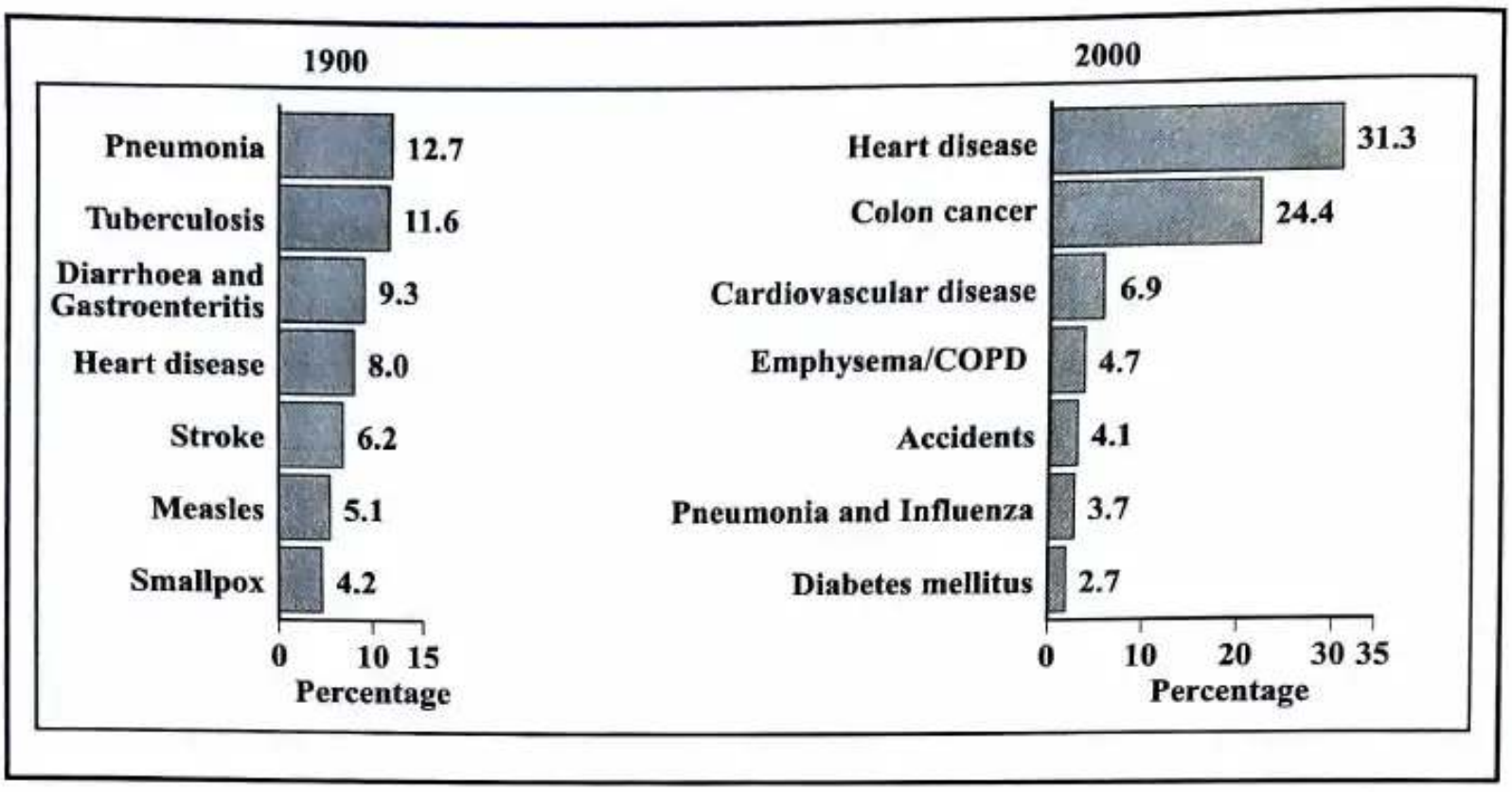


Figure 2. Graph showing the leading causes of death during 1900 and 2000, by percentage

(i) What percentage of the deaths in the year 2000 were likely caused by non-communicable diseases?

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(1 mark)

(ii) Outline the MOST significant difference in the types of diseases that resulted in death in the year 1900 as compared to 2000.

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(2 marks)

GO ON TO THE NEXT PAGE

(iii) Suggest TWO reasons for the difference in the types of diseases outlined in (c) (ii).

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(2 marks)

Total 15 marks

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2. (a) List FOUR characteristics of living organisms.

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(4 marks)

(b) State TWO organelles found in plant cells which are NOT found in animal cells.

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(2 marks)

(c) Sanjeev carried out an investigation to confirm that oxygen is generated from photosynthesis. Figure 3 shows his experimental set up.

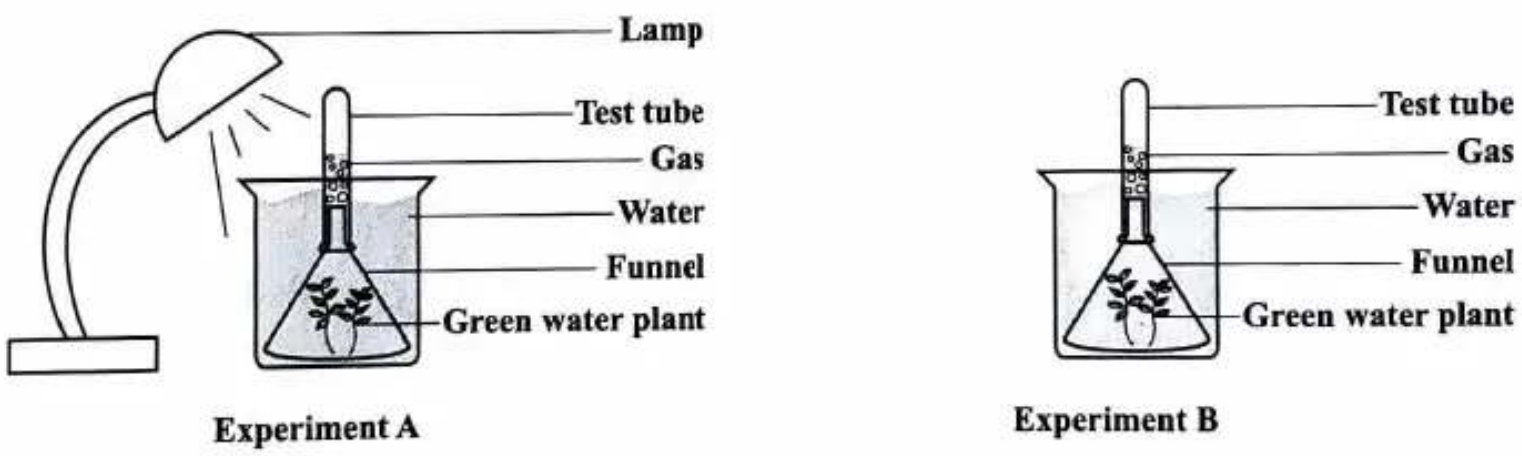


Figure 3. Photosynthesis investigation

He followed the procedure below.

1. Count the number of bubbles generated in Experiment A and count the number of bubbles generated in Experiment B.

2. Remove the test tube in Experiment A by placing your finger over its mouth, taking it out of the water and turning it over.

3. Move your finger and place a glowing splint into the tube and observe what occurs.

4. Repeat Steps 2 and 3 for Experiment B.

GO ON TO THE NEXT PAGE

(i) State which experiment, A or B, would have generated MORE bubbles.

.....

(1 mark)

(ii) State what Sanjeev would have observed happening to the glowing splints in Experiment A and Experiment B.

A .....

.....

B .....

.....

(2 marks)

(iii) Identify the gas that would have produced the bubbles in Experiment B and state the process which would have produced this gas.

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(2 marks)

(iv) Explain why Sanjeev can conclude that oxygen is a by-product of photosynthesis.

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(2 marks)

(v) State which experiment served as the control and give ONE reason for your response.

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(2 marks)

Total 15 marks

3. Figure 4 illustrates the position of endocrine glands throughout the body.

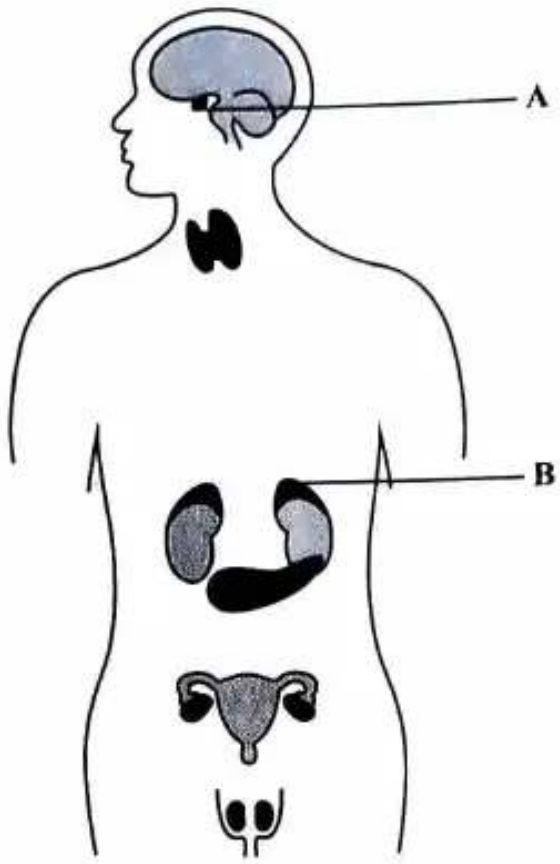


Figure 4. Endocrine glands

(a) (i) Identify the glands labelled A and B.

A .....

B .....

(2 marks)

(ii) Complete the following table by inserting the missing hormone or hormone function.

Hormone	**Function**
Luteinizing hormone (LH)	Stimulates the corpus luteum to produce progesterone
	Promotes growth of follicles and production of estrogen in the ovaries
Adrenalin	

(2 marks)

DO NOT WRITE IN THIS AREA

(iii) Outline ONE difference between the endocrine system and the nervous system.

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(2 marks)

(b) Rhonda is a 53-year-old housewife who is experiencing challenges with her weight and is feeling unwell. The doctor suspects she may have a thyroid problem. The table below shows the results of Rhonda's blood tests.

Test	Normal Hormone Levels	Rhonda's Hormone Levels	Hyperthyroidism	Hypothyroidism
Thyroxine (μg/dl)	4.6–12	1.8	>12	<4.6
Thyroid Stimulating Hormone (TSH)	0.5–0.6	0.55	<0.5	>0.6

(i) Using the lab data in the table above, suggest the endocrine condition that Rhonda may have.

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(1 mark)

(ii) Identify the lab data from the table that supports the diagnosis of the endocrine condition in (b) (i).

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(1 mark)

(iii) Suggest THREE symptoms that Rhonda would experience as a result of the condition in (b) (i).

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(3 marks)

(iv) State whether Rhonda's condition is caused by a malfunctioning pituitary gland. Give ONE reason for your response.

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(2 marks)

(v) The doctor has prescribed a hormonal replacement drug and as a result Rhonda has lost five pounds. However, she is unable to lose any more weight. Suggest whether the doctor should increase her dosage and state ONE reason for your response.

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(2 marks)

Total 15 marks

4. Cell division promotes growth and reproduction in organisms. These processes occur by mitosis.

(a) Identify ONE cell in the body in which mitosis takes place and ONE cell in which mitosis does NOT take place.

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(2 marks)

(b) Figure 5 shows the process of meiosis.

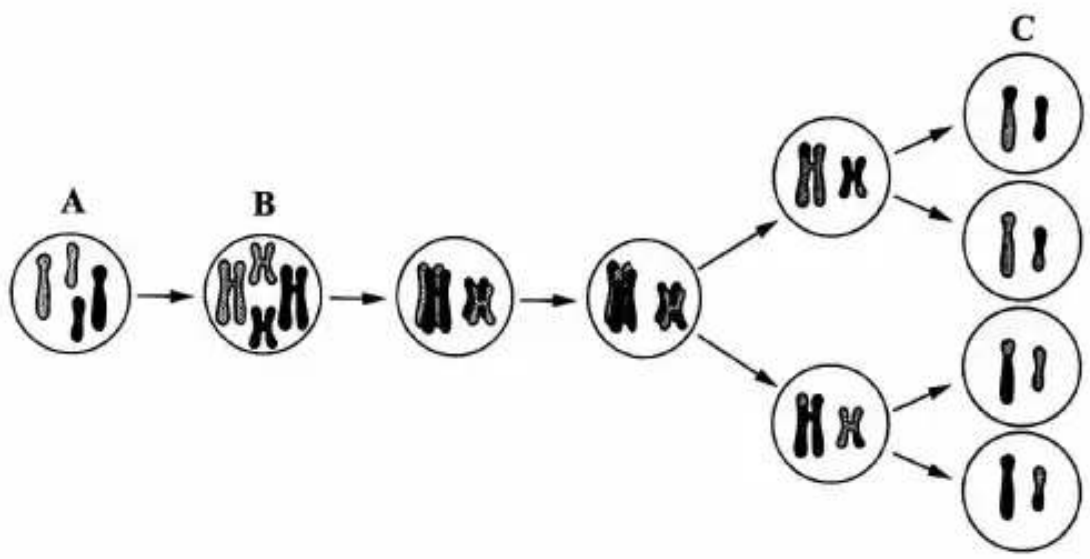


Figure 5. Process of meiosis

Match EACH labelled state of the cells above with the descriptions below by placing the correct letter, A, B or C, on the line next to the description.

(i) Haploid condition .....

(ii) Diploid condition .....

(iii) DNA duplication .....

(3 marks)

(c) State ONE factor that would account for the variation in daughter cells at the end of meiosis.

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(1 mark)

(d) Figure 6 and Figure 7 illustrate a straight thumb and a hitchhiker's thumb.

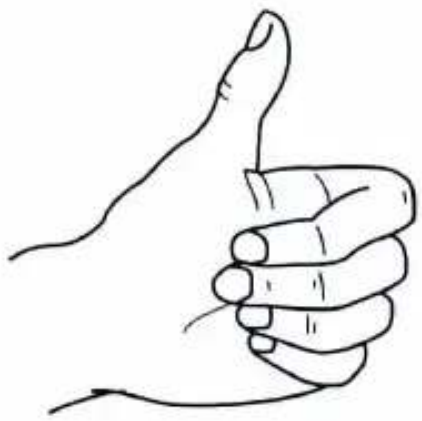


Figure 6. Straight thumb

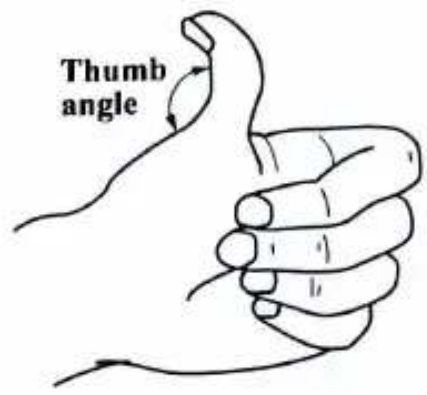


Figure 7. Hitchhiker's thumb

(i) The allele for hitchhiker's thumb is recessive (*h*) and the allele for a straight thumb is dominant (*H*). Barry and his father both have hitchhiker's thumb.

Identify the genotypes of Barry and his parents.

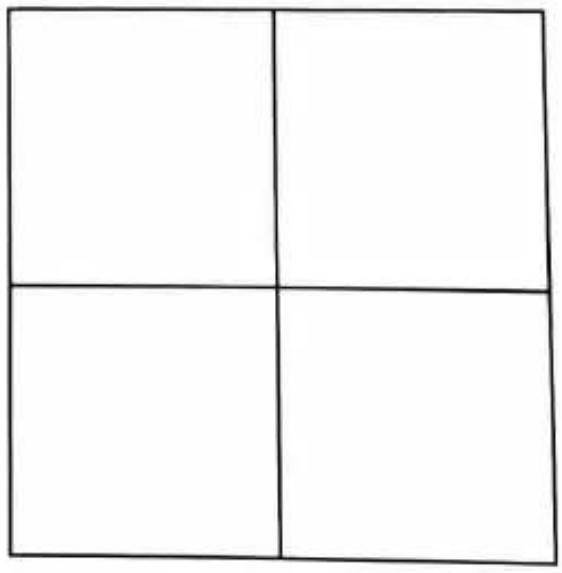
Barry .....

Mother .....

Father .....

(3 marks)

(ii) Barry's mother is now pregnant. Complete the Punnett square below and determine the likelihood that her unborn child will have hitchhiker's thumb.



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(3 marks)

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(iii) Figure 8 illustrates data obtained on the angle at which persons with hitchhiker's thumb can bend their thumb.

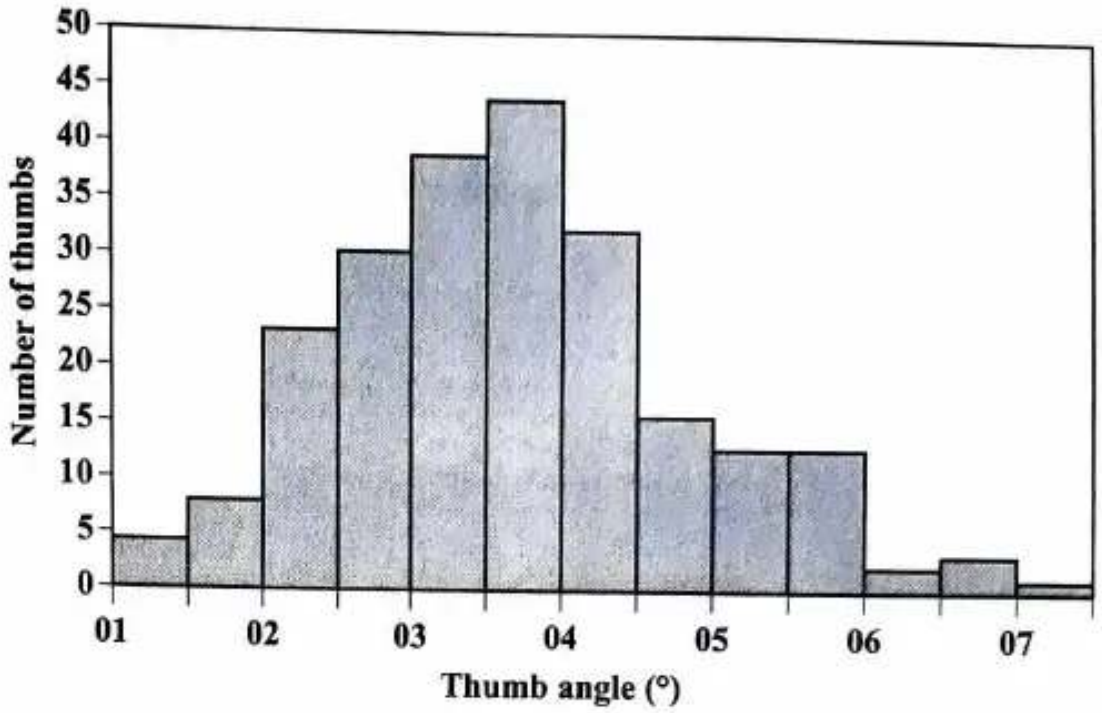


Figure 8. Data for hitchhiker's thumb

Identify the type of variation that characterizes the data. Give ONE reason for your answer.

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(2 marks)

(iv) Based on the type of variation identified in (c) (iii), state whether genetics, or the environment or both determine(s) the phenotype of hitchhiker's thumb.

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(1 mark)

Total 15 marks

SECTION B

Answer ALL questions.

5. (a) Excretion allows for the removal of unwanted metabolic waste from the body.

(i) Define the term 'homeostasis'.

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(2 marks)

(ii) Name TWO **major** excretory organs in the body.

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(2 marks)

(iii) Identify TWO excretory products produced by the body.

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(2 marks)

(b) Reggie is always thirsty. During a visit to the doctor, he learns that he has high levels of sugar in his urine.

(i) Identify the disease Reggie is likely suffering from and explain how the disease contributes to his excessive thirst.

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(5 marks)

(ii) Explain how Reggie's body detects and responds to his need for water.

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(4 marks)

Total 15 marks

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6. (a) (i) Define the term 'pollutant'.

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(2 marks)

(ii) State TWO examples of air pollutants, other than carbon dioxide.

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(2 marks)

(iii) Identify TWO sources of air pollutants.

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(2 marks)

(b) Figure 9 depicts the percentage of carbon dioxide produced by yearly transportation activities of residents in a town.

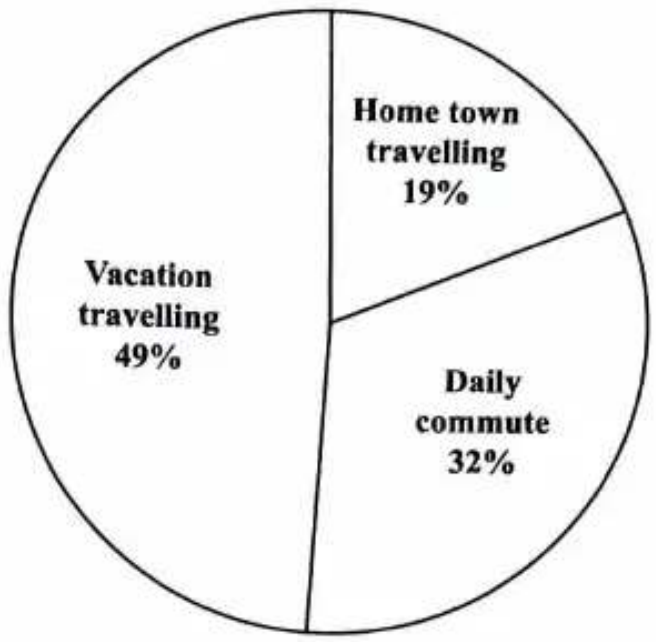


Figure 9. Percentage of carbon dioxide produced

Most residents go on vacation once a year but commute to work or school approximately five days a week. Explain why vacation travelling produces significantly more carbon dioxide than the daily commute and suggest TWO ways in which the amount of carbon dioxide produced from the daily commute may be reduced.

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(5 marks)

(c) Many Caribbean countries have banned 'single use' plastic items such as straws and plastic bags. Outline TWO reasons why this is a good decision for marine ecosystems and the wider community.

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(4 marks)

Total 15 marks

END OF TEST

IF YOU FINISH BEFORE TIME IS CALLED, CHECK YOUR WORK ON THIS TEST.

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