FORM TP 2024085

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MAY/JUNE 2024

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE® EXAMINATION

HUMAN AND SOCIAL BIOLOGY

Paper 02 – General Proficiency

2 hours

872

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.**

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SECTION A

Answer ALL questions.

1. (a) Justin is an amateur boxer. His trainer advises him that in order to increase his energy levels, he should consume a diet that contains more complex carbohydrates such as sweet potato and cassava, which are rich in starch.

(i) Name the test that Justin could use to determine the presence of starch in his diet and state the colour of the precipitate formed if starch is present.

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(2 marks)

(ii) Identify TWO foods that are rich in starch, other than sweet potato and cassava.

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(2 marks)

(iii) State which TWO of the following foods Justin should consume for growth and repair of his muscle tissue: chicken, plantain, tomato, lentil peas.

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(2 marks)

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(b) Table 1 shows the number of children (in hundreds) who suffer from nutritional deficiency diseases in two countries, Country X and Country Y.

TABLE 1: NUMBER OF CHILDREN SUFFERING FROM NUTRITIONAL DEFICIENCY DISEASES IN TWO COUNTRIES, X AND Y

Nutritional Deficiency Disease	Number of Children (in hundreds)	
	Country X	Country Y
Marasmus	65	55
Kwashiorkor	70	45
Night blindness	35	25
Rickets	20	30

(i) On the grid provided in Figure 1 **on page 7**, draw a bar graph to represent the data shown in Table 1. **(4 marks)**

(ii) From your graph, identify the country which had the HIGHER incidence of BOTH marasmus and kwashiorkor.

.....

(1 mark)

(iii) From your graph, identify the country which had the LOWER incidence of diseases **overall**.

.....

(1 mark)

(iv) State the **major** micronutrient that is lacking in the diets of the children in Country X and the **major** micronutrient that is lacking in the diets of the children in Country Y.

Country X .....

Country Y .....

(2 marks)

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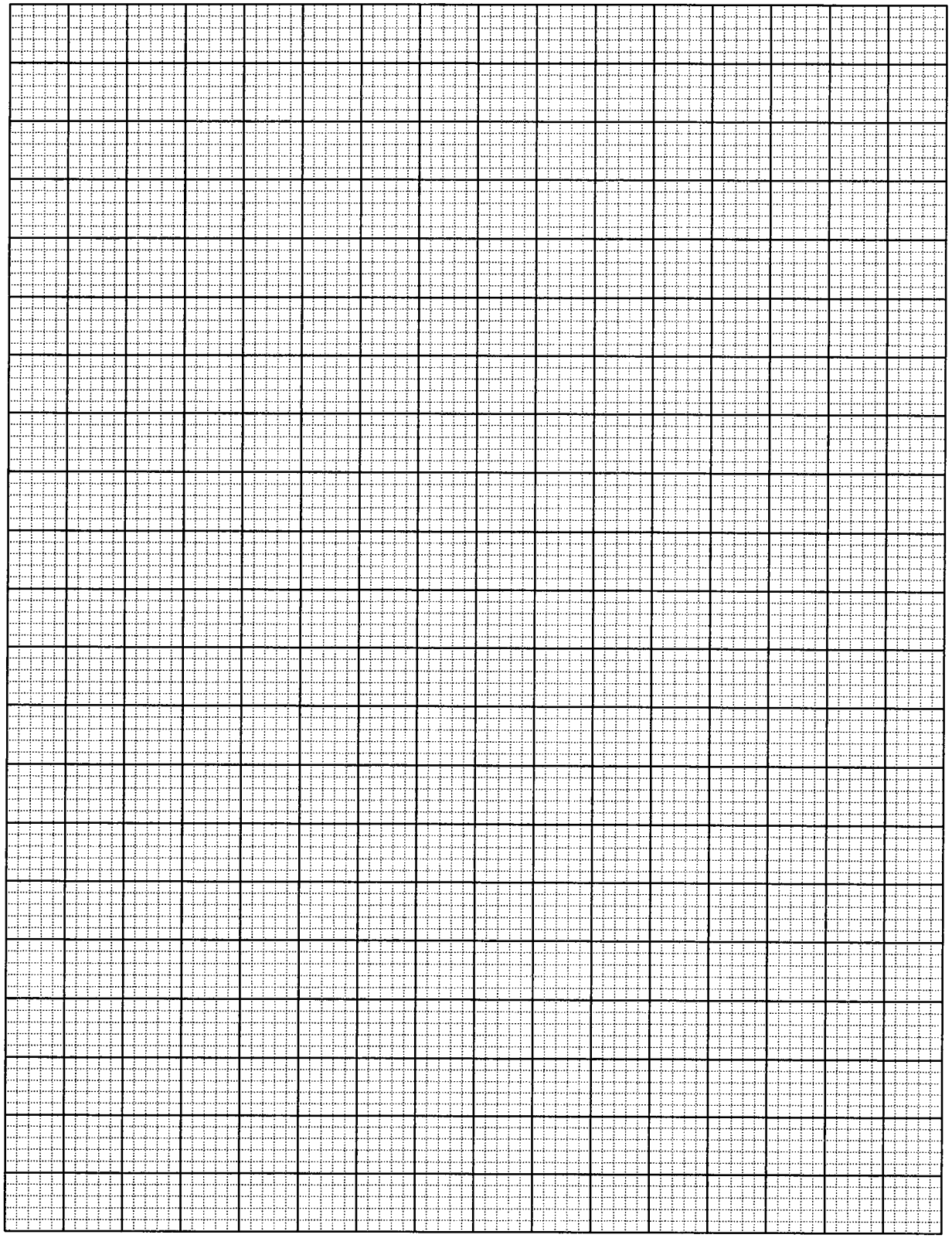


Figure 1. Graph of nutritional diseases in children (per 100) in Countries X and Y

(c) Suggest ONE disease that could develop as a result of overeating.

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(1 mark)

Total 15 marks

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2. (a) All living organisms share common characteristics.

Complete Table 2 by inserting the characteristic of life that corresponds with EACH definition.

TABLE 2: CHARACTERISTICS OF LIVING THINGS

Characteristic of Life	Definition of Characteristic
(i)	The ability of an organism to detect and react to a stimulus
(ii)	The removal of waste products, produced by metabolism, from the body
(iii)	The release of energy from food substances to do work in the body
(iv)	The removal of undigested waste products from the body

(4 marks)

(b) Figure 2 shows the four main types of tissue found in the human body, labelled A–D.

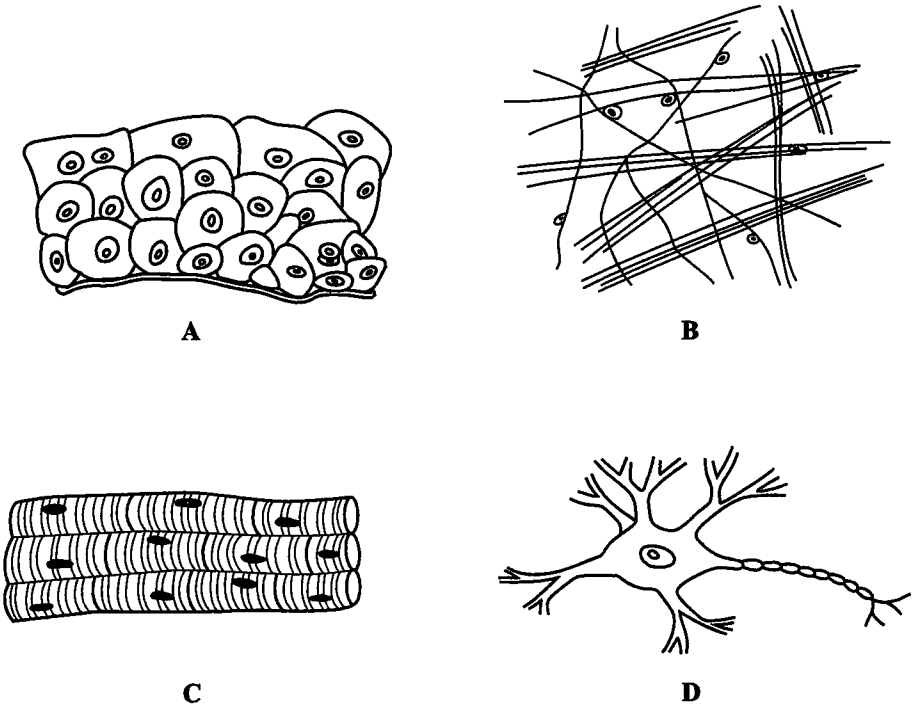


Figure 2. Types of human tissue

Using letter labels only, identify the type of tissue that is responsible for movement and the type of tissue that is responsible for the protection of body surfaces.

Movement .....

Protection .....

(2 marks)

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(c) Seema is a footballer who notices that she tires easily even after very short practice sessions. She researches possible causes of her fatigue and discovers some interesting facts about certain cell organelles.

(i) Identify the cell organelle in Seema's body which may not be working adequately and therefore causing her fatigue.

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(1 mark)

(ii) State the process which occurs in the cell organelle identified in (c) (i) which would prevent Seema's fatigue.

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(1 mark)

(iii) Write, in words, an equation that describes the process stated in (c) (ii).

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(2 marks)

(iv) Seema decides to visit the doctor to be tested to determine the cause of her fatigue. The doctor indicates that her fatigue is not caused by a malfunctioning cell organelle but is the result of a mineral deficiency in her diet.

Suggest the disease that Seema is likely suffering from and state what is occurring in her body as a result of the disease.

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(2 marks)

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(d) The human body consists of several organs and organ systems.

Identify ONE organ in the body which belongs to two different organ systems and state the names of the TWO organ systems.

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(3 marks)

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3. (a) Define the term 'health', according to the World Health Organization (WHO).

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(2 marks)

(b) Identify, by circling, the TWO diseases in the list below which are classified as non-communicable diseases.

Malaria Cervical cancer Chlamydia Influenza Hypertension

(2 marks)

(c) There are concerns about the increasing global incidence of the viral disease monkey pox. Typically, infected persons will experience the following signs and symptoms.

- Fever
- Headaches
- Muscle aches
- Chills
- Rash

From the list above, identify ONE sign and ONE symptom experienced by a person who is suffering from monkey pox.

(i) Sign .....

(ii) Symptom .....

(2 marks)

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(d) Explain TWO ways in which the COVID-19 pandemic has impacted societies and economies of the Caribbean.

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(e) Human immunodeficiency virus (HIV) is transmitted primarily through sexual contact or body fluids.

(i) Explain TWO ways in which individuals may reduce their risk of contracting HIV.

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(4 marks)

(ii) State why antibiotics cannot be used to treat HIV infections.

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(1 mark)

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4. (a) Figure 3 shows a diagram of a cross-section of the human heart.

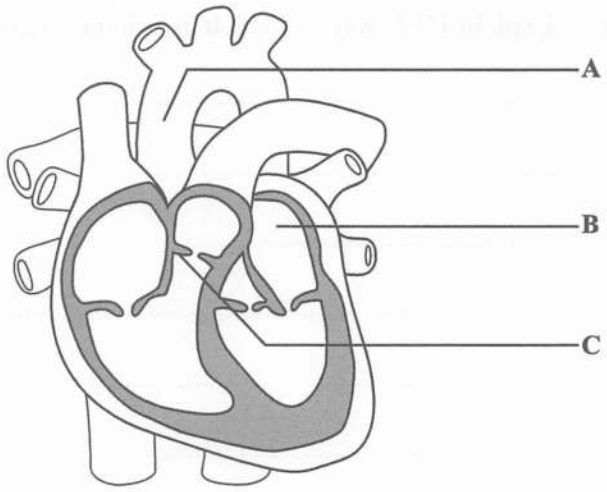


Figure 3. Cross-section of the human heart

(i) Identify the structure of the heart labelled A and the region of the heart labelled B.

Structure A .....

Region B .....

(2 marks)

(ii) Describe the function of the structure of the heart labelled C.

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(2 marks)

(iii) State the region of the heart in which the pacemaker is located.

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(1 mark)

(iv) State the function of a pacemaker.

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(1 mark)

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(b) Certain countries within the Caribbean have very high incidences of coronary heart disease (CHD).

Discuss how ONE named factor contributes to the development of coronary heart disease.

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(4 marks)

(c) Explain why the walls of the ventricles of the heart may become thicker as a result of coronary heart disease.

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(2 marks)

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(d) Suggest THREE approaches that could be used by governments to reduce the incidence of coronary heart disease.

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(3 marks)

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SECTION B

Answer ALL questions.

5. (a) State TWO sources of water pollution.

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(2 marks)

(b) Figure 4 shows a diagram of an aquatic ecosystem.

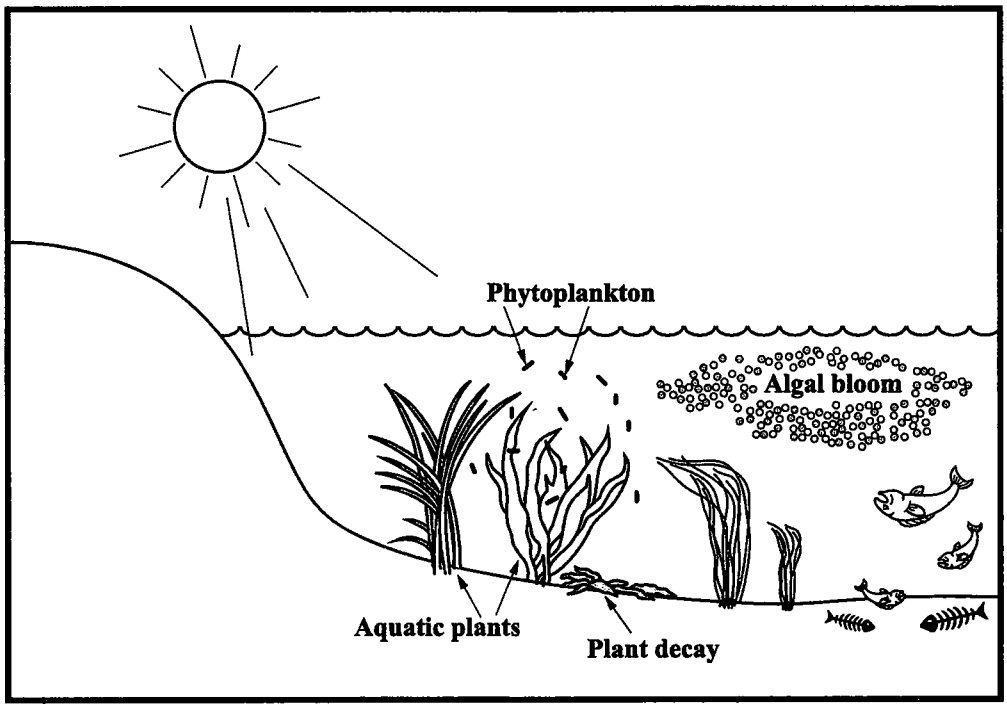


Figure 4. An aquatic ecosystem

(i) Identify the process that results in the algal bloom in Figure 4.

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(1 mark)

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(ii) Explain how the process identified in (b) (i) results in the death of the fish in Figure 4.

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(3 marks)

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(c) Table 3 shows the percentage of pollutants in the air for a city and a rural region.

TABLE 3: AIR POLLUTANTS FOR A CITY AND A RURAL REGION

Pollutant	Percentage	
	City	Rural Region
Carbon monoxide	60	25
Sulphur dioxide	15	4
Solid particles (dust, etc.)	8	1

(i) Outline TWO reasons why the percentage of carbon monoxide is so much higher in the city than in the rural region.

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(4 marks)

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(ii) Explain why the percentage of carbon monoxide is so much higher than the percentage of the other pollutants in the rural region.

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(2 marks)

(d) Recommend THREE ways in which the high levels of pollution in the city can be reduced.

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(3 marks)

Total 15 marks

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6. (a) Name ONE excretory product of EACH of the following organs.

(i) Lung

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(1 mark)

(ii) Skin

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(1 mark)

(iii) Kidney

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(1 mark)

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(b) (i) State which blood vessel carries blood to the kidney.

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(1 mark)

(ii) Identify the structures in the kidney in which ultrafiltration and reabsorption take place.

Ultrafiltration .....

Reabsorption .....

(2 marks)

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(c) Manuel and Sonya want to investigate the components of their urine. Each of them collects a urine sample and performs a Biuret's test and Benedict's test on the individual samples. Table 4 shows Manuel's and Sonya's observations.

TABLE 4: RESULTS OF BIURET'S AND BENEDICT'S TESTS

	Biuret's Test	**Benedict's Test**
Manuel	No colour change	Red
Sonya	Pinkish colour	Blue

Using the data from Table 4, state the conclusions that can be drawn about Manuel's and Sonya's urine, and suggest the diseases for which Manuel and Sonya are at risk.

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(6 marks)

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(d) Santo is badly injured at work and quickly experiences severe blood loss. He arrives at the emergency room with low blood pressure.

Explain how Santo's body will respond in order to increase his blood pressure.

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(3 marks)

Total 15 marks

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END OF TEST

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

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