

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®  
EXAMINATION

23 JANUARY 2023 (a.m.)



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SUBJECT HUMAN AND SOCIAL BIOLOGY – Paper 02

PROFICIENCY GENERAL

REGISTRATION NUMBER 

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SCHOOL/CENTRE NUMBER  

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NAME OF SCHOOL/CENTRE  

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CANDIDATE'S FULL NAME (FIRST, MIDDLE, LAST)  

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DATE OF BIRTH 

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FORM TP 2023014



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JANUARY 2023

**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.
2. Answer ALL questions.
3. Do NOT write in the margins.
4. Write your answers in the spaces provided in this booklet.
5. 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.**
6. **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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01253020/J/CSEC 2023



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**SECTION A**

**Answer ALL questions.**

1. (a) (i) Name ONE greenhouse gas.

.....  
(1 mark)

- (ii) List THREE human practices which could contribute to increased levels of greenhouse gases in the atmosphere.

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(3 marks)

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- (b) Figure 1 shows the number of weather climate disasters which occurred between 2000 and 2020.

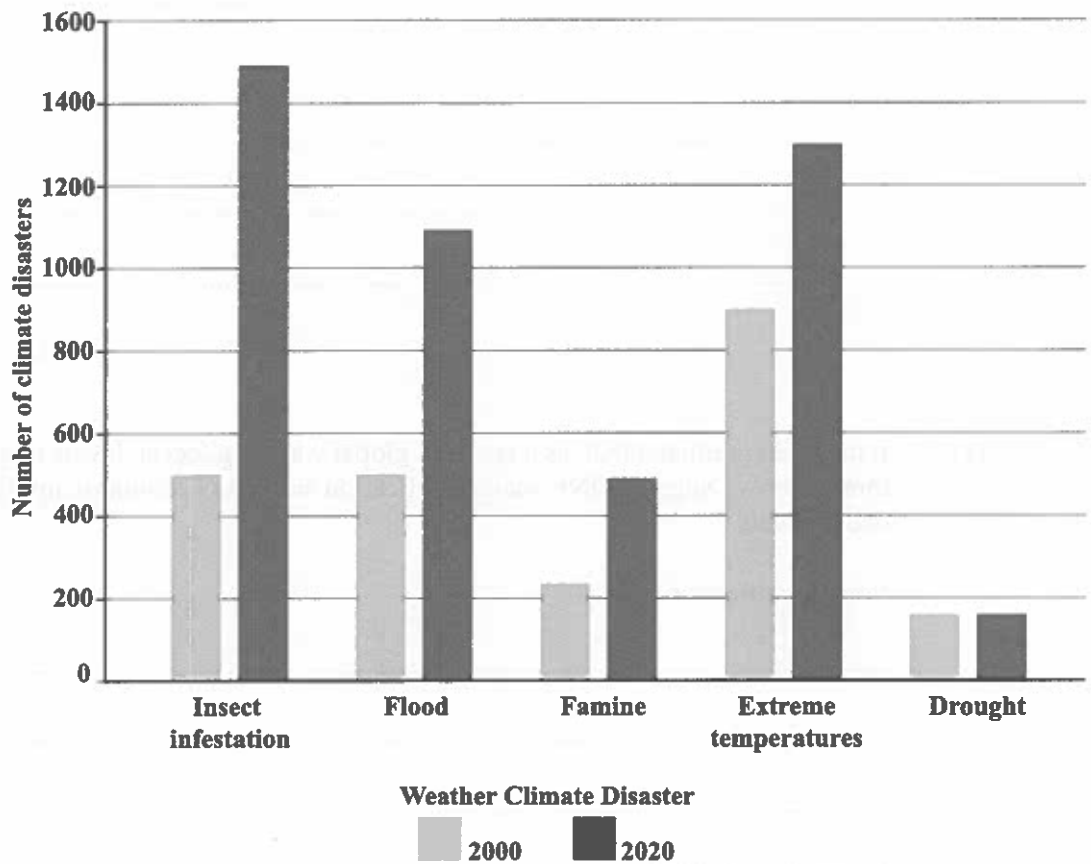


Figure 1. Weather climate disasters occurring between 2000 and 2020

- (i) Identify the weather climate disaster that had the GREATEST increase between 2000 and 2020.

.....  
(1 mark)

- (ii) Identify the weather climate disaster which occurred MOST frequently in the year 2000.

.....  
(1 mark)



(iii) Suggest TWO ways in which flooding could impact food security.

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**(2 marks)**

(c) It has been predicted that, as a result of global warming, ocean levels may rise as much as three metres. Suggest ONE social implication and TWO economic implications of rising ocean levels.

**Social implication**

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.....  
.....

**Economic implications**

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**(3 marks)**



(d) (i) Identify TWO examples of renewable energy.

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(2 marks)

(ii) Explain ONE way in which the use of renewable energy can help to solve environmental issues in the Caribbean.

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(2 marks)

**Total 15 marks**



2. (a) Figure 2 shows a diagram of the male reproductive system, with four structures labelled A, B, C and D.

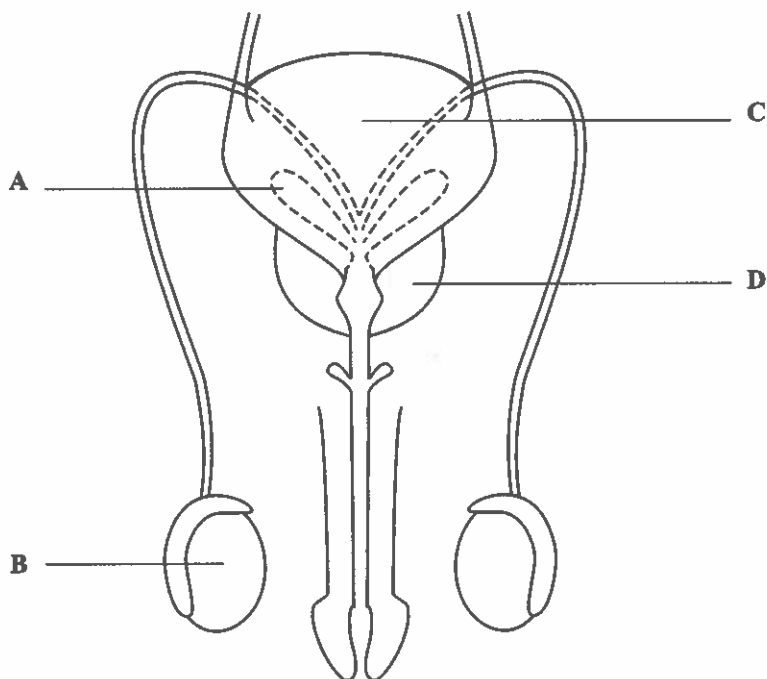


Figure 2. Male reproductive system

Using the letter labels only,

- (i) identify the labelled structure in Figure 2 which is responsible for the production of sperm

.....  
(1 mark)

- (ii) identify the labelled structure in Figure 2 which is MOST prone to developing cancer

.....  
(1 mark)

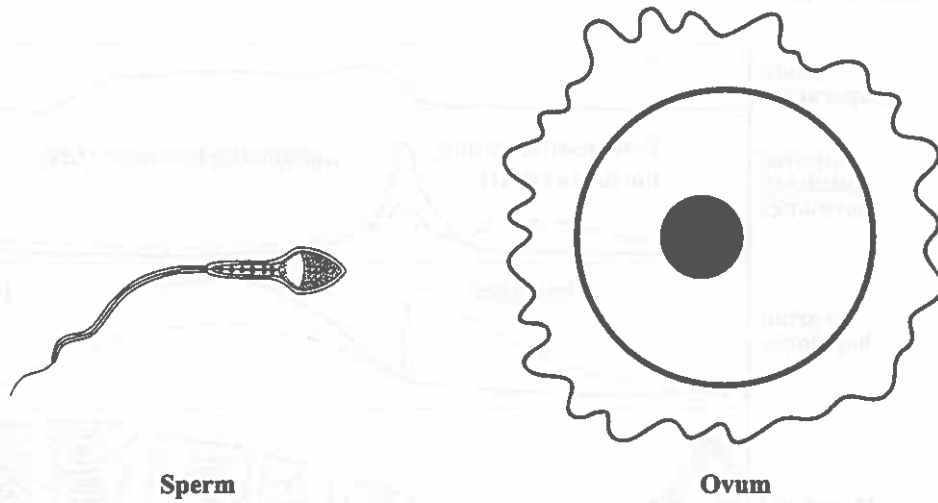
- (iii) identify the labelled structure in Figure 2 which produces a nutrient-rich fluid that is the main component of semen.

.....  
(1 mark)

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(b) Figure 3 shows diagrams of a human sperm and a human ovum.



**Figure 3. Human sperm and ovum**

Explain why the human ovum is much larger than the human sperm.

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**(2 marks)**



- (c) Figure 4 is a graph showing the menstrual cycle and the hormones that influence its functioning.

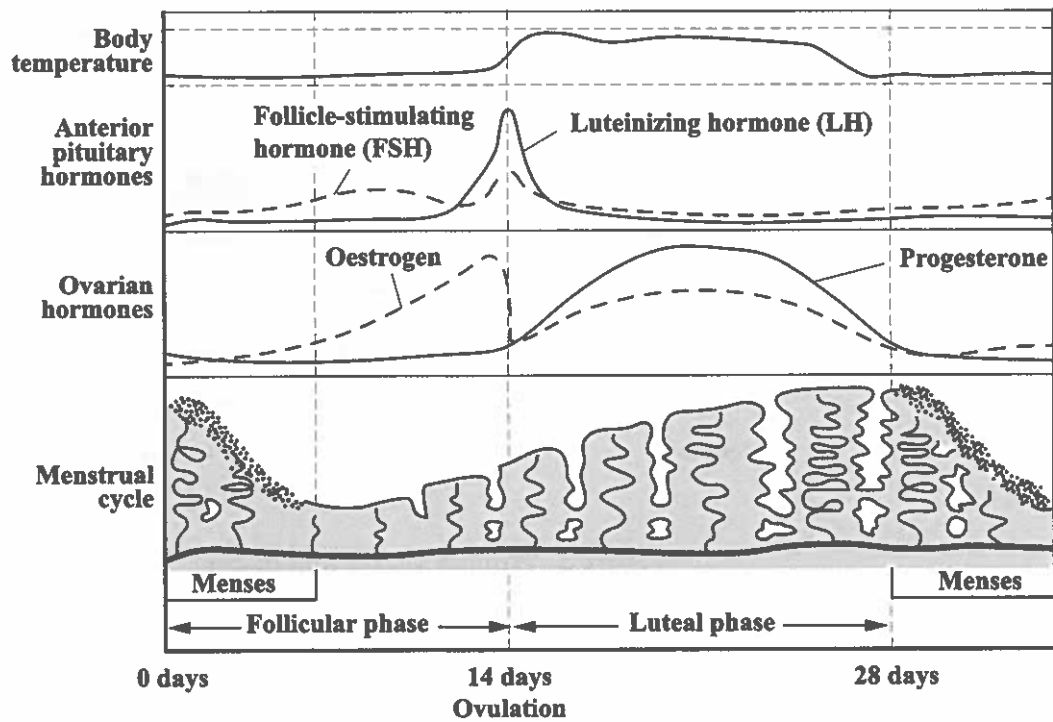


Figure 4. The menstrual cycle and its associated hormones

- (i) From Figure 4, identify the TWO hormones that are necessary for ovulation to occur.

.....  
.....  
(2 marks)

- (ii) From Figure 4, identify the hormone that is MOST important for the thickening of the endometrial lining during the luteal phase.

.....  
(1 mark)

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3. (a) Define the term 'pollutant'.

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(2 marks)

(b) (i) Identify TWO sources of air pollution, other than factory exhaust.

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.....

(2 marks)

(ii) State TWO effects of air pollution, other than acid rain.

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.....  
.....

(2 marks)

(c) Human products found in the Caribbean and activities that occur in the Caribbean are shown below. Each of these products and activities has its own impact on the water cycle.

- A. Dams    B. Urbanization    C. Deforestation    D. Factory exhaust

Match EACH human product and activity above with the impact it could have on the water cycle below.

<p><b>Decreases the amount of water stored in ground water and increases runoff</b></p>	<p><b>Decreases transpiration and increases soil runoff and results in soil erosion</b></p>	<p><b>Increases cloud cover, leads to increased precipitation and decreased evaporation</b></p>	<p><b>Increases water surface area resulting in greater evaporation</b></p>
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(i) ..... (ii) ..... (iii) ..... (iv) .....

(4 marks)

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(d) Figure 5 is a diagram which shows sources of water pollution.

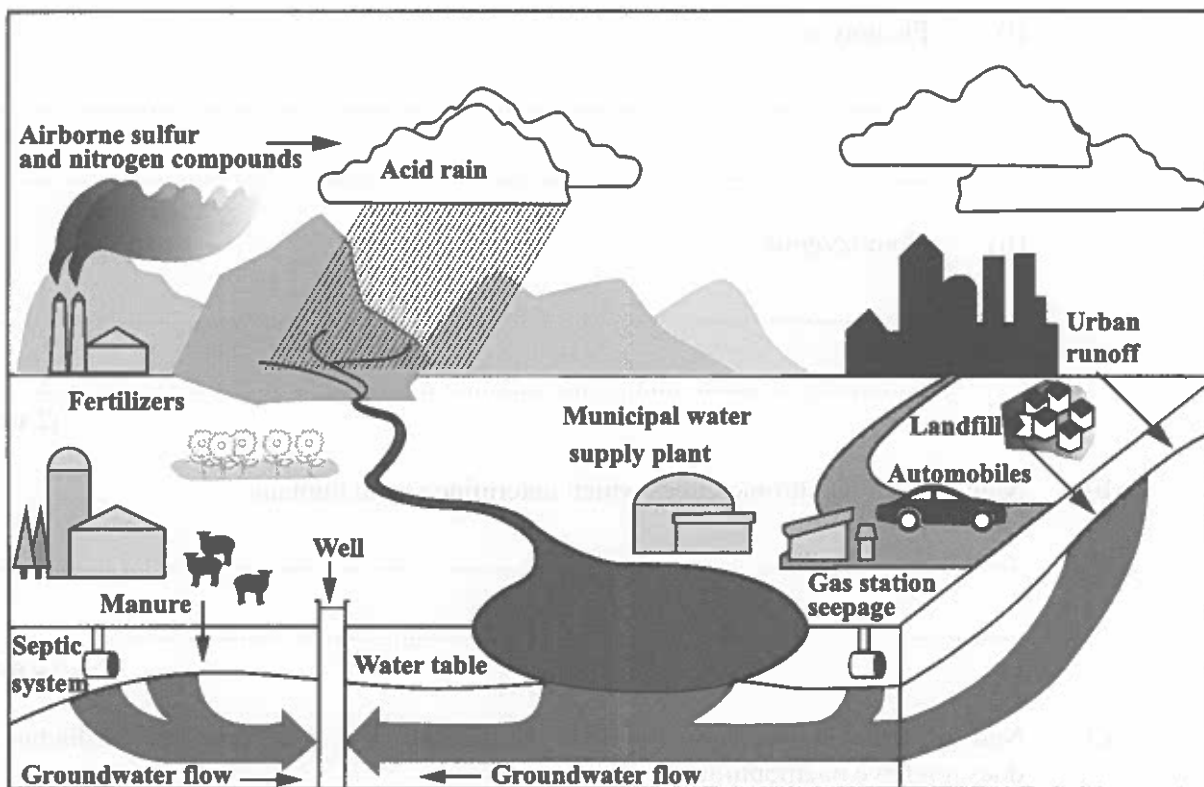


Figure 5. Sources of water pollution

(i) List THREE sources of water pollution, illustrated in Figure 5, that result in eutrophication.

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(3 marks)

(ii) Suggest TWO ways in which eutrophication can be prevented.

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(2 marks)

Total 15 marks

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4. (a) Define EACH of the following genetic terms.

(i) Phenotype

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.....

(ii) Homozygous

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.....

(2 marks)

(b) Name the TWO chromosomes which determine sex in humans.

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.....

(2 marks)

(c) Ned and Brian are brothers who share the same parents. Ned has haemophilia but Brian does not have haemophilia.

(i) Using the symbols  $X^H$  to denote normal blood and  $X^h$  to denote haemophilia, state the genotypes of Ned and Brian.

Ned .....

Brian .....

(2 marks)

GO ON TO THE NEXT PAGE



- (ii) Using the Punnett square in Figure 6, determine the phenotypes and genotypes of Ned and Brian's mother and father.

		Genotype of Mother	
Genotype of Father			

Figure 6. Punnett square

Phenotype of mother .....

Phenotype of father .....

(6 marks)

- (d) Explain why the incidence of haemophilia is higher in men than in women.

.....

.....

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.....

.....

.....

(3 marks)

**Total 15 marks**

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**SECTION B**

**Answer ALL questions.**

5. Ethan is a frontline worker at the hospital. He was not immunized against the Covid-19 virus and has contracted it. He recovers two weeks later. Several months later, a variant of the Covid-19 virus arises and Ethan is unsure whether his previous exposure will protect him from contracting the variant.

(a) In the scenario given above, identify the antigen and state why antibiotics cannot be used to eliminate it.

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**(2 marks)**

(b) Define the term 'immunity'.

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**(1 mark)**

(c) Describe the process of immunization.

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**(3 marks)**

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- (d) Explain to Ethan how his body was able to overcome the invasion of the Covid-19 virus, although he was not immunized.

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(3 marks)

- (e) Discuss the type of immunity that Ethan developed as a result of contracting the Covid-19 virus.

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(3 marks)

- (f) Discuss whether Ethan's exposure to the Covid-19 virus would provide him protection against the variant.

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(3 marks)

**Total 15 marks**

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6. Figure 7 shows two human hearts, A and B. One heart is in the state of systole and one heart is in the state of diastole. The arrows shown indicate the flow of blood.

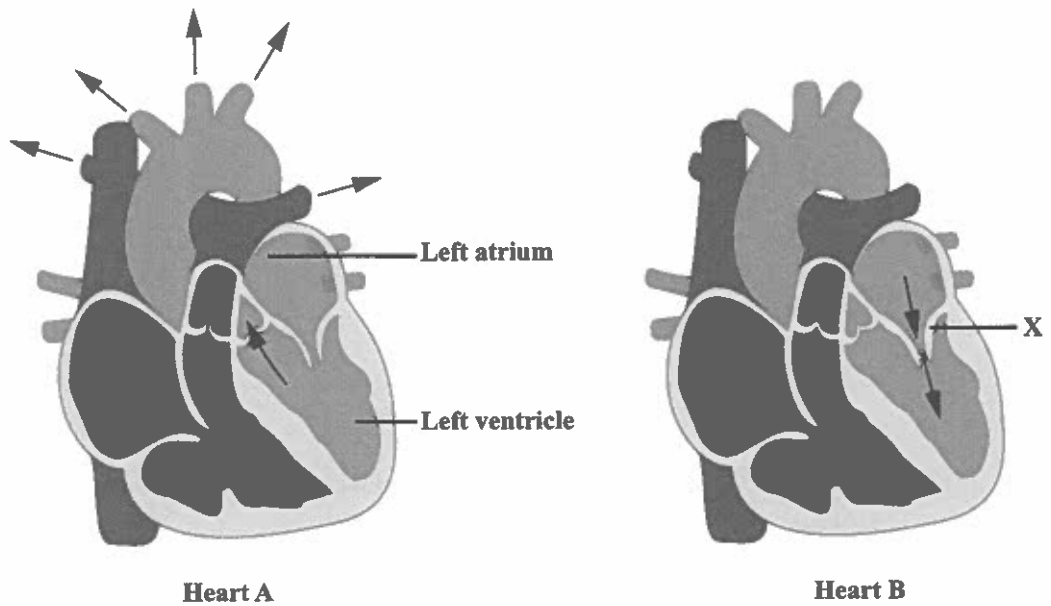


Figure 7. Hearts in systole and diastole

- (a) (i) Identify the structure labelled X in Heart B and state its function.
- .....
- .....
- .....
- (2 marks)
- (ii) Identify the heart in Figure 7 that is in systole and state whether the ventricle is being emptied or filled.
- .....
- .....
- .....
- (2 marks)
- (iii) State whether the blood flowing in the left ventricle is oxygenated or deoxygenated. Justify your response.
- .....
- .....
- .....
- (2 marks)

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(b) Figure 8 shows a man sitting at a dinner table.



**Figure 8. A man sitting at a dinner table**

(i) Examine Figure 8 and list THREE risk factors, other than obesity, that could contribute to the man developing hypertension.

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**(3 marks)**

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- (ii) Suggest TWO other non-communicable diseases (NCDs) that the man could develop as a result of the risk factors identified in (b) (i).

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.....  
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(2 marks)

- (c) With each subsequent decade in the Caribbean, the incidence of obesity has been increasing in children. Explain TWO strategies that Caribbean governments could utilize to address this trend.

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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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### INSTRUCTIONS TO CANDIDATE

1. Fill in all the information requested clearly in capital letters.

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SUBJECT HUMAN AND SOCIAL BIOLOGY – Paper 02

PROFICIENCY GENERAL

REGISTRATION NUMBER 

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FULL NAME \_\_\_\_\_  
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DATE \_\_\_\_\_

2. Ensure that this slip is detached by the Supervisor or Invigilator and given to you when you hand in this booklet.
3. Keep it in a safe place until you have received your results.

### INSTRUCTION TO SUPERVISOR/INVIGILATOR

Sign the declaration below, detach this slip and hand it to the candidate as his/her receipt for this booklet collected by you.

I hereby acknowledge receipt of the candidate's booklet for the examination stated above.

Signature \_\_\_\_\_  
Supervisor/Invigilator

Date \_\_\_\_\_

