

CARIBBEAN EXAMINATIONS COUNCIL

CARIBBEAN SECONDARY EDUCATION CERTIFICATE®  
EXAMINATION

16 JANUARY 2020 (a.m.)



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SUBJECT HUMAN AND SOCIAL BIOLOGY – Paper 02

PROFICIENCY GENERAL

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JANUARY 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.
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 2020



**SECTION A**

**Answer ALL questions in this section.**

1. (a) The table below shows the sources of energy of several organisms.

<b>Organism</b>	<b>Source of Energy</b>
Blackbird	Seeds, fruits, insects
Mango tree	Solar energy converted to simple sugars
Mouse	Seeds, grass
Hawk	Mice, birds

From the table above, identify the organism which is a

- (i) producer .....
  - (ii) herbivore .....
  - (iii) carnivore .....
  - (iv) omnivore .....
- (4 marks)**

- (b) State the process by which energy

- (i) enters the food chain  
.....
  - (ii) leaves the food chain.  
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- (2 marks)**

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- (c) Figure 1 is a biomass pyramid which shows the availability of energy and the number of organisms at EACH trophic level in a food chain.

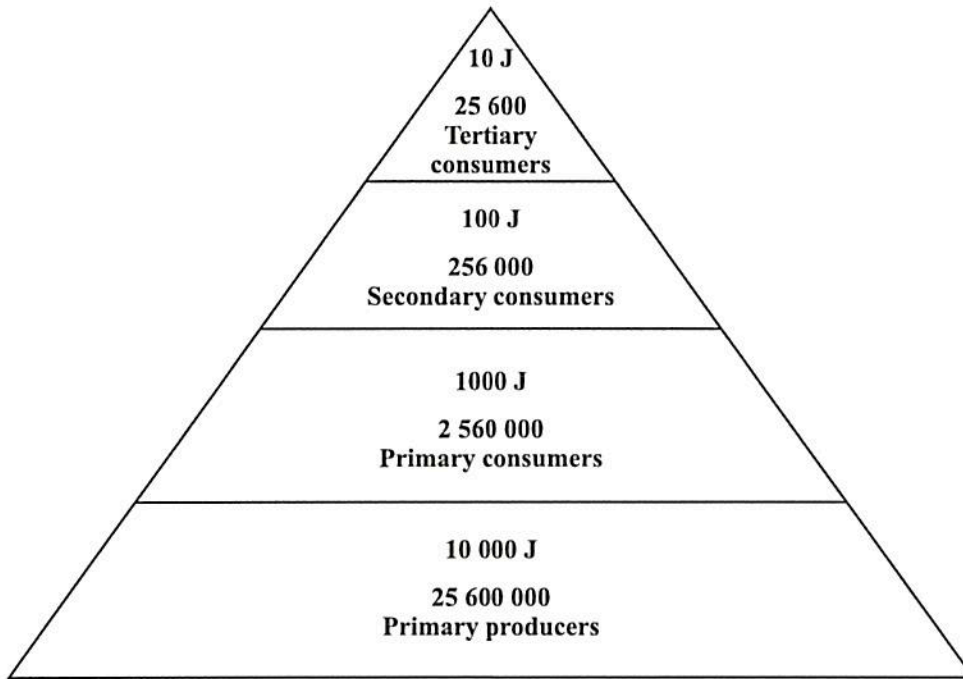


Figure 1. Biomass pyramid

- (i) State TWO trends that are observed when moving from the base of the biomass pyramid to the top.

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(2 marks)

- (ii) At which trophic level is the LEAST amount of energy available?

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(1 mark)

- (iii) Suggest ONE reason why this food chain has four trophic levels only.

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(2 marks)

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- (d) Figure 2 illustrates the percentage of nutrients in 100 grams of beef versus 100 grams of soya beans.

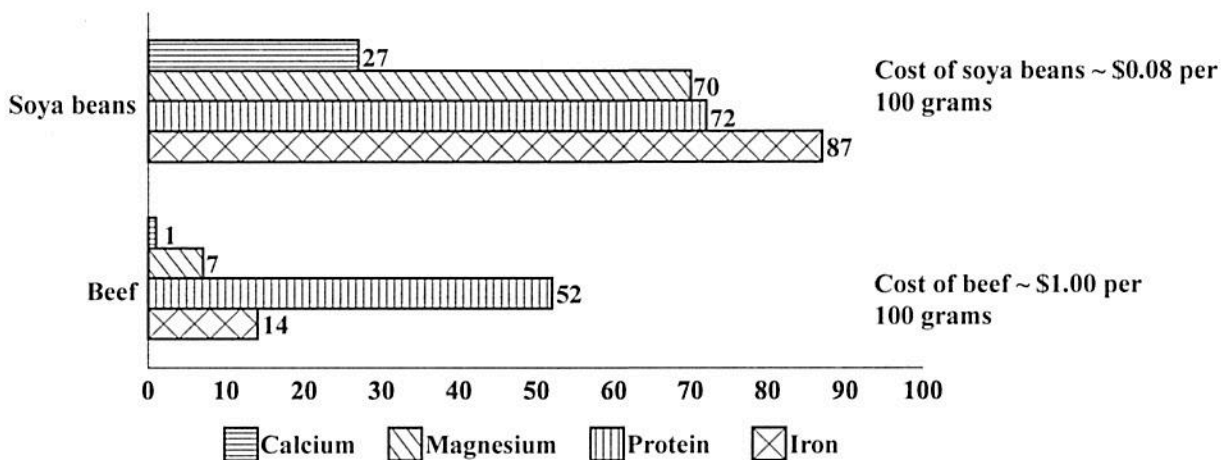


Figure 2. Percentage of nutrients in beef and soya beans per 100 grams

World hunger is on the increase with millions of people not having enough food to eat.

- (i) Identify which food, soya beans or beef, would be MORE suitable to meet the needs of millions of hungry people. State TWO reasons for your answer.

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(3 marks)

- (ii) Suggest ONE reason why beef has significantly lower levels of calcium and protein as compared to soya beans.

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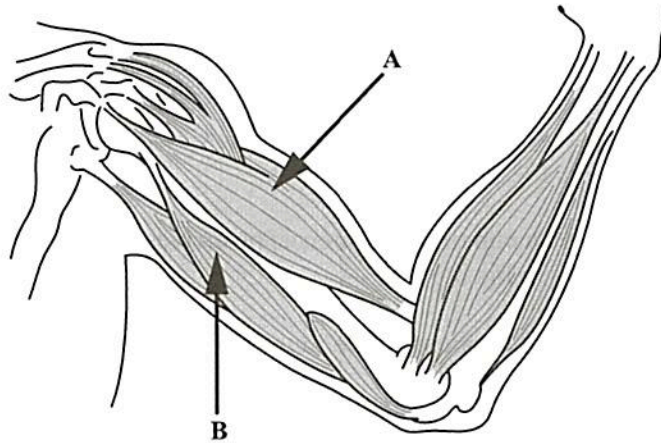
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Total 15 marks

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2. Figure 3 shows the muscles in the arm.



**Figure 3. Muscles in the arm**

(a) Muscles A and B are referred to as antagonistic muscles. Define the term ‘antagonistic muscles’.

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**(2 marks)**

(b) Suzie hates to exercise because she does not like to feel sweaty. As a result, Suzie’s muscles have now become very soft and are lacking in tone.

(i) Define the term ‘muscle tone’.

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**(1 mark)**

(ii) State TWO benefits of having well-toned muscles.

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**(2 marks)**

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- (iii) State ONE reason, other than improved muscle tone, why exercise is necessary for good health.

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**(1 mark)**

- (c) Roger likes to have a cup of tea as soon as he arrives at the office. After preparing the tea, Roger lifts the cup to his mouth.

- (i) Explain what happens to the muscles in Roger's upper arm as he lifts the cup of tea to his mouth.

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**(2 marks)**

- (ii) Roger's tea is too hot and he quickly releases his hold on the cup. Identify the type of action that takes place and state which part of the central nervous system processes the action.

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**(2 marks)**





- (d) Figure 4 and Figure 5 show X-ray images of the bones in a normal foot and a damaged foot with a bunion (a painful swelling on the joint of the first toe).



Figure 4. Normal foot



Figure 5. Damaged foot

Suggest TWO likely causes for the misalignment of the bones in the foot in Figure 5.

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(2 marks)

- (e) Poor posture could cause compression of the organs in the thorax and abdomen. Suggest THREE **other** effects that poor posture could have on the body.

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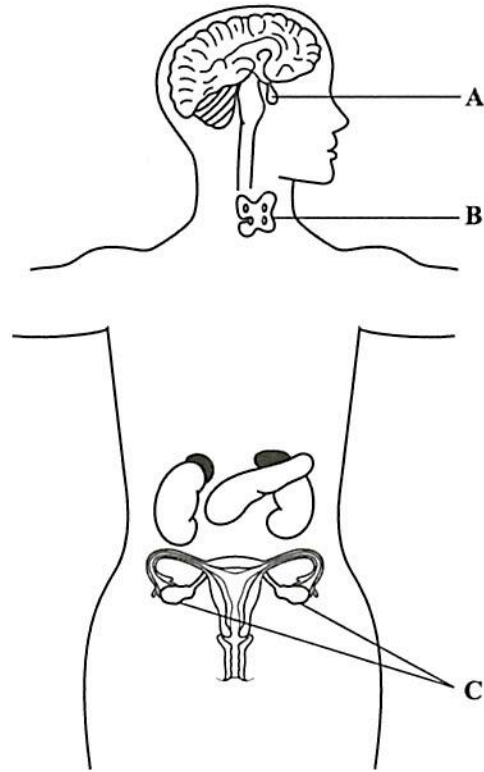
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Total 15 marks

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3. (a) Figure 6 shows some organs of the endocrine system.



**Figure 6. Organs of the endocrine system**

(i) Identify Organ A and Organ C.

Organ A .....

Organ C .....

**(2 marks)**

(ii) State the effect on the body, if there is an excessive amount of the hormone produced by Organ B.

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**(1 mark)**



(b) The pancreas produces two hormones whose actions on the body oppose each other.

(i) Name the TWO hormones whose actions oppose each other.

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(2 marks)

(ii) Both of these hormones, produced by the pancreas, target the liver cells. Describe the action of ONE **named** hormone on the liver cells and its effects on blood glucose levels.

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(2 marks)



- (c) The table below shows the diets and levels of activity of two groups of individuals, Group A and Group B.

	Content of Meal	Level of Activity
Group A	Carbonated drink Pasta with cheese French fries Fried chicken	Sedentary lifestyle  No form of exercise
Group B	Steamed vegetables Baked chicken Pigeon peas and rice	Jogs 4 times a week  Swims twice a week

- (i) Identify which of the two groups, A or B, is MORE likely to develop diabetes mellitus. State TWO reasons for your answer.

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(3 marks)

- (ii) State ONE sign or symptom of diabetes mellitus.

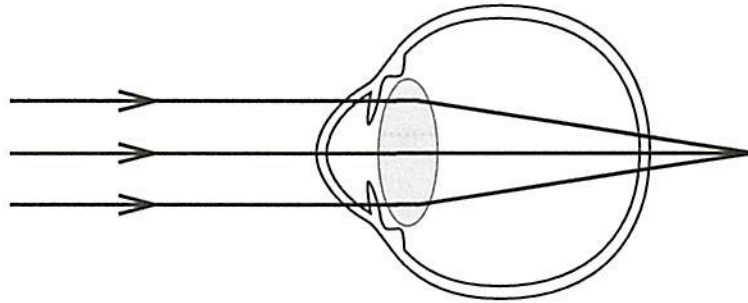
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(1 mark)





4. (a) Figure 7 shows a diagram of light rays passing through an eye that has a defect.



**Figure 7. Light rays passing through an eye with a defect**

- (i) Identify the eye defect shown in Figure 7. State ONE reason for your answer.

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**(2 marks)**

- (ii) Name the type of lens that could correct the eye defect identified in (a) (i).

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**(1 mark)**

- (b) Describe how EACH of the following images would appear to an individual with short-sightedness.

- (i) Distant objects

.....

**(1 mark)**

- (ii) Near objects

.....

**(1 mark)**

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- (c) Errol has been reading for hours. He hears a noise in the distance and looks up to see what is making the noise.

Explain the changes that need to take place in the ciliary muscles, suspensory ligaments and lens during the process of accommodation, in order for Errol to see the distant object clearly.

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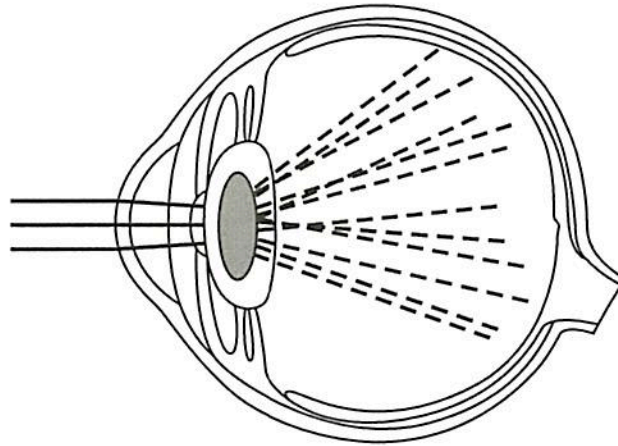
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**(5 marks)**



- (d) Erica is 70 years old and has blurry vision in her left eye because of a cataract. Figure 8 shows the movement of light through her left eye.



**Figure 8. Movement of light through Erica’s left eye**

- (i) Explain why a cataract causes Erica to have blurry vision.

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**(3 marks)**

- (ii) State ONE way in which Erica’s cataract could be corrected.

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**(1 mark)**

- (iii) As Erica got older, it became more difficult for her pupils to dilate. State why this condition would affect her ability to drive at night.

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**(1 mark)**

**Total 15 marks**

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- (c) Crude sewage may be discharged into the sea. Care is taken to ensure that it is discharged well out to sea with the outgoing tide to prevent contact with humans. However, it has been recommended that this practice be stopped.

Discuss ONE potential impact of the present practice of sewage disposal on the environment if this recommendation is NOT implemented.

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**(5 marks)**

**Total 15 marks**



6. (a) (i) Distinguish between HIV and AIDS.

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(2 marks)

(ii) Identify the immune cell in the body that is destroyed in an untreated HIV patient and state how the patient is affected as a result.

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(2 marks)

(iii) State TWO symptoms that an AIDS patient is likely to exhibit.

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(2 marks)





- (iii) Kim is in a monogamous sexual relationship with Branden. She does not use illegal intravenous drugs (drugs injected into the blood stream); however, Branden does. Kim feels confident that her lifestyle choices mean that her risk of contracting HIV is low.

Should Kim feel confident that her risk of contracting HIV is low? State TWO reasons for your answer.

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**(3 marks)**

**Total 15 marks**

**END OF TEST**

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













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SUBJECT: HUMAN AND SOCIAL BIOLOGY – Paper 02

PROFICIENCY: GENERAL

REGISTRATION NUMBER: 

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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.

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

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