

231/2

— **BIOLOGY** —
(THEORY)

Paper 2



Apr. 2021 – 2 hours

Name Index Number

Candidate's Signature Date

Instructions to Candidates

- (a) Write your name and index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided above.
- (c) This paper consists of **two** sections; **A** and **B**.
- (d) Answer **all** the questions in section **A** in the spaces provided.
- (e) In section **B** answer question **6 (compulsory)** and either question **7** or **8** in the spaces provided after question **8**.
- (f) This paper consists of **12 printed pages**.
- (g) Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.
- (h) Candidates should answer the questions in English.

For Examiner's Use Only

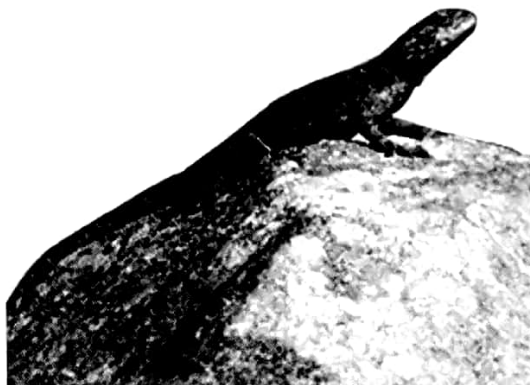
Section	Question	Maximum Score	Candidate's Score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
		20	
Total Score		80	



SECTION A (40 marks)

Answer **all** questions in this section in the spaces provided.

1. Below are photographs E and F, of two organisms, taken from their natural habitats.



E



F

- (a) (i) State the **main** nitrogenous waste product of the organism in photograph **E**. (1 mark)

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- (ii) Give a reason for your answer in a(i) above. (1 mark)

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- (b) State why the organism in photograph **E** is usually found on top of rock surfaces even during hot, sunny days. (1 mark)

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- (c) (i) Which of the two organisms would have a higher biomass if both were left in their natural ecosystem. (1 mark)

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- (ii) Give a reason for your answer in c(i). (1 mark)

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- (d) With reference to observable features, explain why the organism in photograph F is usually found in a wider range of habitats. (3 marks)

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2. The genetic make-up of a man was found to be XXY.

- (a) Name the syndrome the individual could be suffering from. (1 mark)

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- (b) Explain how the syndrome occurs. (4 marks)

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- (c) (i) State how the chemical, colchicine induces polyploidy in plants. (1 mark)

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- (ii) State **one** advantage of polyploidy in wheat farming. (2 marks)

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3. In an experiment to investigate the effect of temperature on seed germination, soaked maize seeds were subjected to varying temperatures as tabulated below.

Temperature (°C)	0	6	12	17	28	33	41.5	51
Percentage germination (%)	0	0	2.5	5	13	44	26	3

- (a) Account for the percentage germination at:

- (i) 6 °C; (3 marks)

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- (ii) 33 °C. (3 marks)

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- (b) State **two** internal factors that affect seed germination. (2 marks)

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4. A student could clearly read a book placed 10 cm away but could not clearly identify a fellow student 12 m away.

(a) Name the eye defect the student was suffering from. (1 mark)

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(b) Explain why the student could **not** clearly identify his colleague yet could read the book. (3 marks)

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(c) Using a diagram, illustrate how the defect can be corrected. (3 marks)

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(d) Name the vitamin whose deficiency in the diet results in poor vision. (1 mark)

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5. The table below shows the volume of gases contained in 100 cm³ of a blood sample tapped at two points in the mammalian circulatory system.

Gas	Blood entering lungs (cm ³)	Blood leaving lungs (cm ³)
Oxygen	8.65	20.25
Nitrogen	0.75	0.75
Carbon (IV) oxide	55.60	31.65

- (a) Account for the difference in the gaseous composition of:

- (i) Blood entering the lungs; (2 marks)

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- (ii) Blood leaving the lungs. (2 marks)

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- (b) Name the blood vessel through which blood enters the lungs. (1 mark)

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- (c) Explain why most athletes prefer training from high altitude areas. (3 marks)

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SECTION B (40 marks)

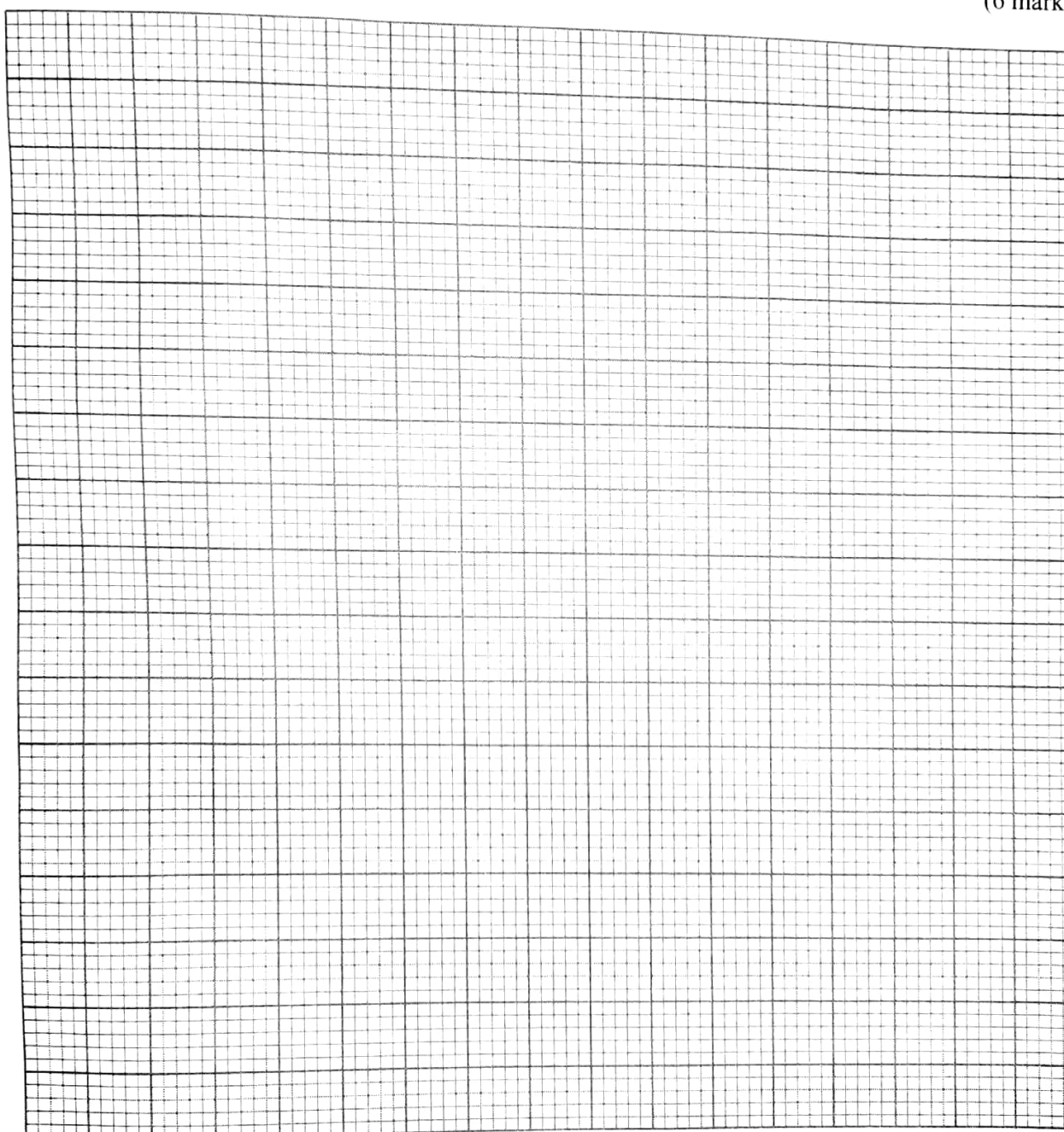
Answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8.

6. The data below shows the average number of ticks per animal in a certain farm before and after spraying the animals with a certain chemical. The spraying was done once every month. The data was tabulated as shown below.

Time (months)	0	2	4	6	8	10	12	14
Average number of ticks	200	90	40	20	16	25	45	90

- (a) Plot a graph of number of ticks against time.

(6 marks)



(b) Account for the shape of the graph between:

(i) 0 and 8 months; (3 marks)

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(ii) 10 and 14 months. (3 marks)

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(c) From the graph, determine the average number of ticks after spraying the animals for five months. (1 mark)

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(d) If the animals were allowed to graze in an open field, construct a food chain with five organisms in which ticks are secondary consumers. (4 marks)

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(e) State **three** methods by which the average number of ticks per animal could have been estimated. (3 marks)

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