Q1. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

The causes of variation and its biological importance.

(Total 25 marks)

Q2. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

How the structure of proteins is related to their functions.

Q3. This question should be answered in continuous prose.

Quality of Written Communication will be assessed in the answer.

(i) Starting with mRNA, describe how the process of translation leads to the production of a polypeptide.

- (4)
- (ii) Normal tomato plants have an enzyme that softens tomatoes as they ripen. Genetically engineered tomatoes ripen and soften more slowly. A gene was inserted which reduces the amount of softening enzyme produced.

The diagram shows matching parts of the base sequences for the mRNA produced by the gene for the softening enzyme and that produced by the inserted gene.

	Softening gene mRNA	AAUCGGAAU
	Inserted gene mRNA	UUAGCCUUA
Sugg	gest how the inserted gene reduce	es the production of the softening enzyme.

(2) (Total 6 marks)

Q4. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Energy transfers which take place inside living organisms.

(Total 25 marks)

Q5. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

The process of osmosis and its importance to living organisms.

Q6. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Enzymes and their importance in plants and animals

(Total 25 marks)

- **Q7.** Research scientists can increase the nutritional value of potatoes by genetically engineering potato plants. A gene which results in increased protein production has been removed from cells of an amaranth plant and inserted into cells of a potato plant.
 - (a) Describe how a gene could be removed from cells of an amaranth plant and inserted into cells of a potato plant.

(6)

(b) Describe the advantages of using vegetative propagation rather than sexual reproduction to reproduce genetically engineered potato plants.



Q8. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Mean temperatures are rising in many parts of the world. The rising temperatures may result in physiological and ecological effects on living organisms. Describe and explain these effects.

Q9. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Negative feedback in living organisms.

(Total 25 marks)

Q10. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Cells are easy to distinguish by their shape. How are the shapes of cells related to their function?

Q11. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

How carbon dioxide gets from a respiring cell to the lumen of an alveolus in the lungs.

(Total 25 marks)

Q12. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Ways in which different species of organisms differ from each other.

Q13. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

The transfer of energy between different organisms and between these organisms and their environment.

- **Q14.** Homeostatic mechanisms maintain a constant environment in the body.
 - (a) The graph shows changes in plasma glucose concentration that occurred in a person who went without food for some time.



Use evidence from the graph to explain the role of negative feedback in the control of plasma glucose concentration.

..... (5) Explain how normal core body temperature is maintained when a person moves into (i) a cold room. (5)

(b)

S (ii) How does maintaining a constant body temperature allow metabolic reactions in cells to proceed with maximum efficiency?

(5) (Total 15 marks)

Q15. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Condensation and hydrolysis and their importance in biology.

Q16. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Negative feedback and its importance in biology.

(Total 25 marks)

Q17. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Bacteria affect the lives of humans and other organisms in many ways. Apart from causing disease, describe how bacteria may affect the lives of humans and other organisms.

Q18. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Inorganic ions include those of sodium, phosphorus and hydrogen. Describe how these and other inorganic ions are used in living organisms.

(Total 25 marks)

Q19. (a) The table describes some reproductive hormones in a female mammal. Complete the table by adding the name of the hormone which matches each description.

Hormone	Description
	Produced by the corpus luteum
	Produced by the pituitary gland and stimulates growth of the corpus luteum
	Produced by the developing follicle

(3)

(b) Menopause is the time when women stop ovulating and the menstrual cycle stops. There are very few follicles remaining in the ovaries of a woman at menopause. Explain why the FSH concentration in the blood rises at menopause.

..... (Total 6 marks)

Q20. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Heat and many different substances are transferred within the body and between the body and the environment. Explain how surface area is linked to this transfer.

(Total 25 marks)

(3)

Q21. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Polymers have different structures. They also have different functions. Describe how the structures of different polymers are related to their functions.

(Total 25 marks)

Q22. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

The causes of variation and its biological importance.

Q23. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Mean temperatures are rising in many parts of the world. The rising temperatures may result in physiological and ecological effects on living organisms. Describe and explain these effects.

(Total 25 marks)

Q24. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

The causes of disease in humans.

Q25. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Carbon dioxide may affect organisms directly or indirectly. Describe and explain these effects.

(Total 25 marks)

Q26. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

A cycle is a biological pathway or process in which the end product of one cycle becomes the starting point for the next cycle. Write an essay about cycles in biology.

Q27. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

Using DNA in science and technology

(Total 25 marks)

Q28. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

How bacteria can affect the lives of humans and other organisms.

Q29. Essay

You should write your essay in continuous prose.

Your essay will be marked for its scientific accuracy.

It will also be marked for your selection of relevant material from different parts of the specification and for the quality of your written communication.

The maximum number of marks that can be awarded is

Scientific	16
Breadth of knowledge	3
Relevance	3
Quality of written communication	3

Write an essay on the following topic:

The importance of shapes fitting together in cells and organisms.