LRN International GCSE: Biology (6210)

Candidate Name

Candidate Number

Centre Name

Centre Number

Paper 2:   **Model Paper V4 Marking Scheme**

(2 hours)

It is necessary to respond on the answer sheets provided alongside this question paper. Additionally, you must have a soft pencil (preferably of type B or HB),a clean eraser and a dark blue or black pen.

INSTRUCTIONS:

- You must write your name, candidate number, centre name and centre number on the answer sheets in the designated spaces.
- Objective section consists of 25 questions, and it is essential that you attempt all of them.
- Each question has four options labelled A, B, C, and D. Select the option that you think is correct. Mark it on the multiple-choice answer sheet using a soft pencil.
- Attempt all the questions from subjective section using a dark blue or black pen.
- It is important to follow the instructions provided on the answer sheets.
- Do not use correction fluid.
- Avoid writing on any bar codes.

INFORMATION:

- This paper has a total of 100 marks.
- In objective section there are 25 questions, each carries one mark. There is no negative marking for incorrect responses.
- In subjective section, 45 marks are for extended theory and 30 marks for practical component.
- The number of marks assigned for every question or its parts is indicated within brackets [ ].

OBJECTIVES PORTION: **[Total 25 marks]**

1. D
2. C
3. A
4. B
5. C
6. B
7. D
8. C
9. C
10. B
11. D
12. C
13. B

14. B
15. A
16. B
17. B
18. A
19. C
20. A
21. D
22. D
23. B
24. C
25. C

THEORY PORTION: **[Total 45 marks]**

1.
(i) Mutations e.g. silent, missense, frameshift, nonsense mutations alter protein function or make it nonfunctional, disrupting cellular processes and protein structure.

(ii) Caused by genetic mutations. Factors: Smoking, UV sunrays, inherited mutations, obesity, age, weak immunity, virus, bacteria, etc.

(iii) Substrate: hydrogen peroxide (H_2O_2).
Enzyme: Catalase.

2.
(i) Closed-loop system. It shows the continuous recycling of carbon atoms maintaining a constant number. Energy is needed to drive photosynthesis and respiration within the carbon cycle.

(ii) Fight-or-flight response involves threat perception activates the sympathetic nervous system and releases epinephrine. It increases heart rate, dilates the pupil, and releases glycogen. Squirrels exhibit responses like freezing, fleeing, or fighting to enhance survival chances.

(iii) Cell walls of single-celled organisms provide structural support and prevent them from bursting. They rely on passive diffusion or ion pumps for osmoregulation.

(iv)

- Rich biodiversity
- Efficient nutrient cycling
- Climatic regulation

3.

(i) Central nervous system ➡ Brain, Spinal cord

Peripheral nervous system ➡ Cranial nerves, Spinal nerves

(ii) Spinal Cord

(iii)

Function	name of part	letter from Fig. 4.1
blood is filtered	Glomerulus	K
The concentration of urine is determined	Medulla	L
urine flows to the bladder	Ureter	O
blood is carried into the kidney	Renal artery	N
blood flows out of the kidney	Renal vein	M

4.

(i)

- **Active Transport:** requires energy to uptake minerals like K and P ions and are pumped by specialized proteins in root cells.
- **Diffusion:** involves passive movement of molecules and facilitates gas exchange during photosynthesis (CO_2 in O_2 out) and respiration (O_2 in CO_2 out).

(ii) mRNA translation starts with initiation where it binds to a ribosome, and tRNA-carrying methionine attaches to the start codon. During elongation, the ribosome moves along the mRNA, resulting in the peptide bonds between amino acids. During termination, a stop codon releases the polypeptide chain.

PRACTICAL PORTION: **[Total 30 marks]**

1.

(i)

- Difference = Final Value - Initial Value = 181 - 135 = 46
- Percentage Increase = (Difference / Initial Value) * 100 = (46 / 135) * 100
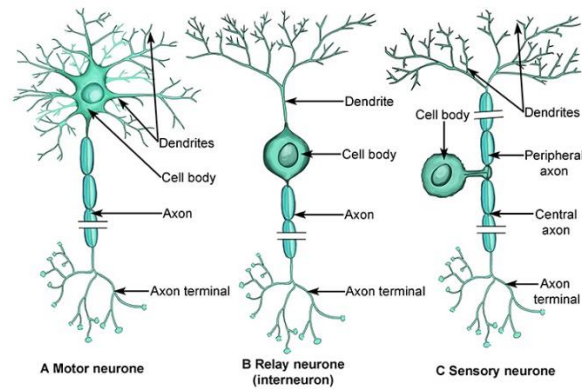- ≈ 34%

(ii)

1. A control group who does not use computers.
2. Participants who use the computer randomly.
3. Group who use computers for longer periods.

(iii) mRNA strand: CCGAUCAAC

2.

(i) 40 individuals. 65% have brown eyes.

(ii)

Diagram showing three types of neurones: A Motor neurone, B Relay neurone (interneuron), C Sensory neurone — with labels Dendrite, Dendrites, Cell body, Axon, Axon terminal, Peripheral axon, Central axon.

(iii)

- Difference = Energy in oak tree - Energy available to caterpillars = 97,000 - 620= 96,380 kJ
- Percentage Loss = (Difference / Energy in oak tree) * 100% = (96,380 / 97,000) * 100%
- ≈ 99.37%