

## IGCSE Biology P2 V4 Key

### Objective Portion

Marks: 25

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

## Theoretical Portion

Marks 45

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 ( $\text{H}_2\text{O}_2$ ).  
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 ( $\text{CO}_2$  in  $\text{O}_2$  out) and respiration ( $\text{O}_2$  in  $\text{CO}_2$  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

Marks: 30

1.

(i)

- Difference = Final Value - Initial Value =  $181 - 135 = 46$
- Percentage Increase =  $(\text{Difference} / \text{Initial Value}) * 100 = (46 / 135) * 100$
- $\approx 34\%$

(ii)

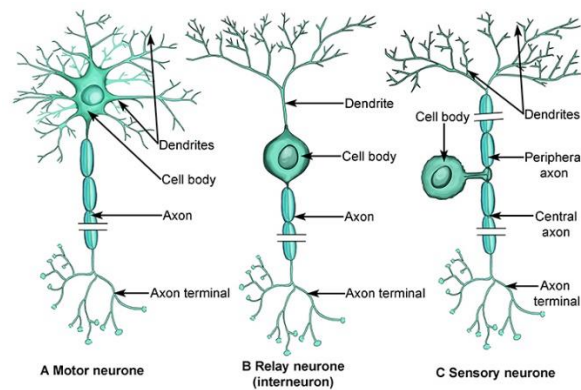
1. A control group who does not use computers.
2. Participants who use the computer randomly.
3. Group who use computers for longer periods.

(iii) mRNA strand: CCGAUCAAC

2.

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

(ii)



(iii)

- Difference = Energy in oak tree - Energy available to caterpillars =  $97,000 - 620 = 96,380$  kJ
- Percentage Loss =  $(\text{Difference} / \text{Energy in oak tree}) * 100\% = (96,380 / 97,000) * 100\%$
- $\approx 99.37\%$