

Candidate Name

Candidate Number

Centre Name

Centre Number

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**Paper 2:**

**Model Paper V3 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. C  | 14. A |
| 2. B  | 15. B |
| 3. D  | 16. B |
| 4. A  | 17. B |
| 5. D  | 18. C |
| 6. B  | 19. D |
| 7. A  | 20. A |
| 8. D  | 21. A |
| 9. C  | 22. B |
| 10. B | 23. C |
| 11. C | 24. B |
| 12. D | 25. C |
| 13. B |       |

**THEORY PORTION:****[Total 45 marks]****1.****(i)** The process involves

- Immunization of mice
- Selection of mice with high antibody production
- Myeloma cells preparation
- Myeloma and immune spleen cell fusion
- Cloning of hybridoma cell

**(ii)**

- Mitochondria: Responsible for generating ATP.
- Cytoplasm: Hosts glycolysis and facilitates fermentation that produces ATP in anaerobic conditions.

**(iii)**

The bison population relies on primary producers, impacting other herbivores. The deer population relies on herbs. Neanderthals are top predators that influence both bison and deer populations through their hunting behavior.

**2.****(i)**

- Increases metabolic rate to generate heat.

- Induces vasoconstriction to minimize heat loss.
  - Accelerates heart rate to help in temperature regulation.
  - Dilates pupils for better vision.
- (ii)** By saturating the ethanol with enzyme binding sites, it slows methanol metabolism, and prevents its conversion into toxic metabolites, making it a life-saving measure for methanol poisoning.
- (iii)** By transpiration pull, capillary action, root pressure, cohesion, and adhesion.

**3.**

- (i)** All statements relate to type 1 diabetes.
- (ii)** When body temperature rises, thermoreceptors send signals to the brain to activate cooling mechanisms.
- (iii)** Patient's blood passes through one side and dialysis solution containing waste products and excess ions passes through the other side of a semi-permeable membrane, aiding kidney function.

**4.**

**(i)**

| <b>Mitosis</b>  | <b>Meiosis</b>  |
|---|---|
| Identical cells are produced, with the same chromosome number | Non-identical cells are produced, with half the number of chromosomes in the parent cell. |
| One round of cell division                                    | Two rounds of cell division   |
| Essential for growth and repair                               | Essential for sexual reproduction   |

**(ii) A: Dendrites**

Functions: Receive, integrate, and transmit chemical signals.

**B: Nucleus**

Functions: Stores DNA, vital for maintenance, growth, and functions related to the nervous system.

**PRACTICAL PORTION:**

**[Total 30 marks]**

**1.**

**(i)** -4.9%

**(ii)** Advantages include comparison of salt concentrations, measurement standardization, and sensitivity to water movements.

**(iii)**

- Prepare agar plates inoculated with bacterial cultures.
- Soak paper discs in antiseptics and antibiotics then place soaked discs onto the agar surface.
- Incubate plates for bacterial growth.
- Measure inhibition zones and compare their sizes, to determine the impact of antiseptics and antibiotics on bacterial growth.

**2.**

**(i)** Adenine= 20%, Cytosine= 40%

**(ii)**

- **CO<sub>2</sub> Concentration:** Conduct experiments with different CO<sub>2</sub> levels to measure the photosynthesis rate.
- **Temperature:** Conduct experiments at different temperatures to measure the rate of photosynthesis at each temperature.
- **Light Intensity:** Conduct experiments with different light intensities to measure the rate of photosynthesis.

**(iii)**

- Place the quadrat and count clover plants within it.
- Conduct representative sampling.
- Calculate the average number of plants per quadrat and the total number by multiplying by the number of quadrats.
- Analyze the data to draw conclusions considering factors like soil composition and light.