

Candidate Name**Candidate Number****Centre Name****Centre Number**

Paper 2 (2 hour)

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:

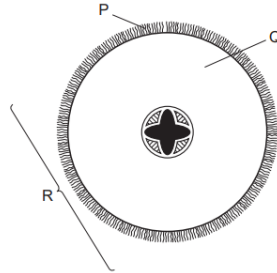
- You must write your name, candidate number, center name, and center number on the answer sheets in the designated spaces.
- The objective section consists of 25 questions, and you must attempt all of them.
- Each question has four options labelled A, B, C, and D. Select the option that you think is correct. Mark it on the multiple-choice answer sheet using a soft pencil.
- Attempt all the questions from the 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.
- You are allowed to use a calculator if needed.

INFORMATION:

- This paper has a total of 100 marks.
- In the objective section, there are 25 questions, each carrying one mark.
There is no negative marking for incorrect responses.
- Subjective section comprises 75 marks
- The number of marks assigned for every question or its parts is indicated within brackets ().
- Rough work must be completed on this question paper.

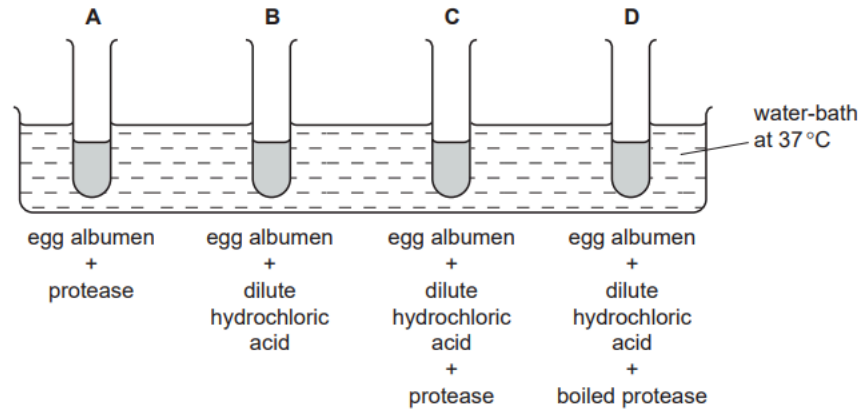
Objective Portion**Marks: 25**

1. Which vertebrate organism has dry scales on its body?
 - A. amphibian
 - B. mammal
 - C. fish
 - D. reptile
2. What are the levels of organization of the labelled structures of a root?

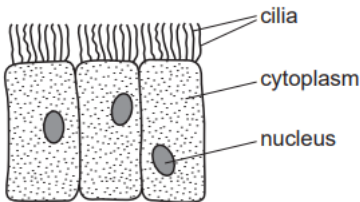


	cell	or	tissue
A	P		R
B	P		Q
C	Q		P
D	R		P

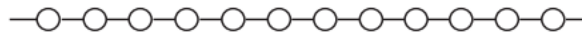
3. Active transport involves the movement of:
 - A. Particles from a region of lower concentration to a region of higher concentration using energy from respiration.
 - B. Water through a partially permeable membrane from a more dilute to a more concentrated solution.
 - C. Urine by relaxation of a sphincter muscle in the bladder.
 - D. Molecules from a region of their higher concentration to a region of their lower concentration.
4. Water is a good solvent means:
 - A. It flows easily through vessels.
 - B. Many substances dissolve well in it.
 - C. It is permeable to gases.
 - D. It dissolves well in many other substances.
5. Digestion of the protein in egg albumen is illustrated below. Digestion occurs by protease, taken from the human stomach. In which test tube the protein will be quickly digested?



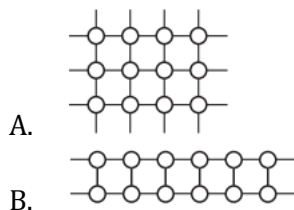
6. Which substance moves out of a green leaf through its stomata as a product of photosynthesis?
- A. carbon dioxide
B. oxygen
C. water
D. glucose
7. Treatment for persistent diarrhea is:
- A. drinking pure water
B. eating protein such as boiled eggs
C. eating more fiber
D. drinking a solution of sugar and salt
8. To classify organisms as flowering plants, which of the following features is used?
- A. roots with hairs
B. single-celled spores
C. seeds within fruits
D. underground stems
9. Where are the following cells found?

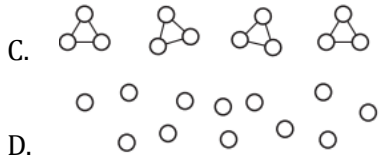


- A. blood
B. plant roots
C. bronchial wall
D. alimentary canal
10. How does water evaporate through the stomata of a leaf, on a sunny day?
- A. into the leaf by osmosis
B. out of the leaf by osmosis
C. out of the leaf by diffusion
D. into the leaf by diffusion
11. The starch molecule is shown in the diagram.



After complete digestion, which of the following shapes it will attain?





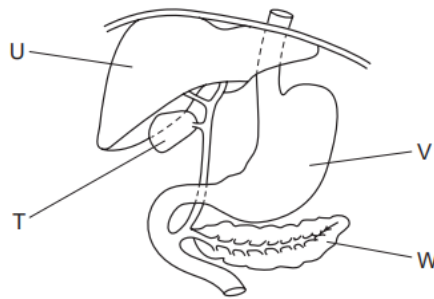
12. A human enzyme lactase is responsible for the breakdown of lactose in milk. Lactase works fastest at which temperature?

- | | |
|----------|---------|
| A. 18°C | C. 37°C |
| B. 100°C | D. 0°C |

13. A molecule of chlorophyll contains:

- | | |
|--------------|------------|
| A. iron | C. lead |
| B. magnesium | D. calcium |

14. The alimentary canal and associated organs are shown in the diagram below.



Enzymes for protein digestion are secreted by:

- | | |
|------------|------------|
| A. U and V | C. W and T |
| B. V and W | D. T and U |

15. Smokers have less oxygen-carrying capacity than that of non-smokers. Which component of cigarette smoke is responsible for this?

- | | |
|--------------------|-------------|
| A. carbon monoxide | C. tar |
| B. smoke particles | D. nicotine |

16. The following processes occur during embryo development.

- Breaking of the amniotic sac
- contraction of muscles in the uterus wall
- cutting of the umbilical cord

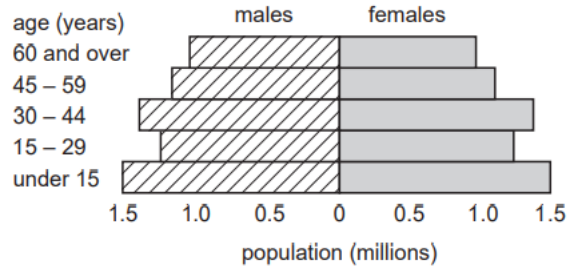
Arrange these phases.

- | | |
|--------------|--------------|
| A. 2 → 1 → 3 | C. 3 → 2 → 1 |
| B. 3 → 1 → 2 | D. 2 → 3 → 1 |

17. Albinism is an inherited condition having no pigment on the skin, hair, and eyes, with a recessive allele. How many chances of having an albino child from albino parents?

- | | |
|--------|---------|
| A. 0% | C. 75% |
| B. 25% | D. 100% |

18. Which age group contains the highest number of people, as depicted in the diagram showing the age structure of a human population?



- A. under 15
 B. 30-44
 C. 45-59
 D. 60 and over

19. If a disease causes a reduction in the number of herbivores in the given food chain, what will be the impact on the numbers of green plants and carnivores?

Green plant → herbivore → carnivore

	green plants	carnivores
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

20. In bread-making, what's the role of anaerobic respiration?

- A. to produce gas to make the bread rise
 B. to release enough lactic acid to kill the yeast
 C. to release enough energy to bake the bread
 D. to produce alcohol to flavor the bread

21. Plant species conserves:

- A. to decrease rainfall
 B. to release carbon dioxide into the air
 C. to obtain drugs for medicinal use
 D. to absorb oxygen from the air

22. Development is an increase in:

- A. Dry mass
 B. Number of cells
 C. Complexity
 D. Size

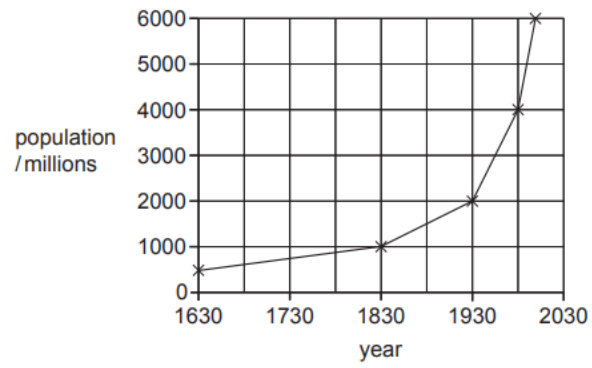
23. What will be the ratio of hairy: smooth stems in the offspring resulting from a cross between pure-breeding plants having smooth stems with a heterozygous plant with hairy stems?

- A. 1 hairy : 3 smooth
 B. 1 hairy: 1 smooth
 C. 3 hairy: 1 smooth
 D. all hairy

24. Which of the following is an example of discontinuous variation in humans?

- A. body mass
 B. height
 C. blood group
 D. width of hand

25. What was the longest time required for the population to double, as the graph shows the increase in the human population of the world since 1630?



- A. 100 years
- B. 200 years

- C. 300 years
- D. 400 years

Theoretical Portion

Marks 45

1. (i) If a mutation occurs in the RNA sequence, resulting in a change in nucleotide sequence:

G A C U G U A G U A C A C G C C

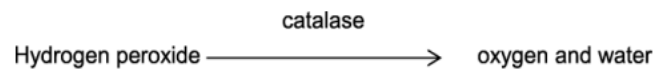
What effect will be on protein production?

[4]

- (ii) Explain the causes of cancer, including factors associated with its development.

[4]

- (iii) Enzyme investigation carried out by a group of students. The reaction equation is shown below.



Identify the substrate and the enzyme involved in this reaction.

[2]

[Total: 10]

2. (i) Consider the carbon cycle diagram and discuss whether it represents a closed-loop system or not, using factors like carbon atoms and energy.

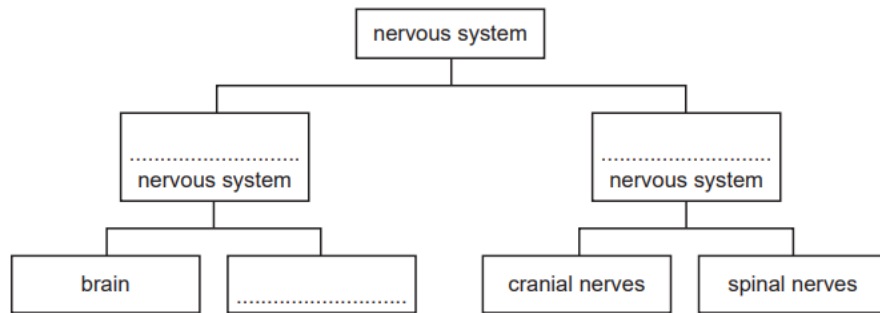
(ii) What will be the rapid response of the squirrel if a predator suddenly appears? Also, explain the physiological processes of initiating such a rapid response.

(iii) Demonstrate why single-celled organisms having cell walls do not contain contractile vacuoles.

(iv) Why rainforests are also referred to as stable ecosystems?

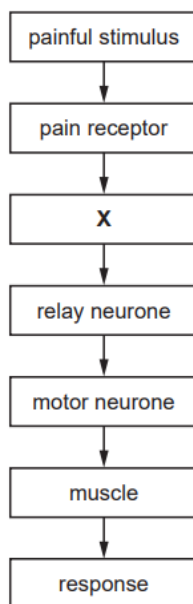
[Total: 17]

3. (i) The nervous system coordinates the animal responses to changing environment. Complete the figure by labelling the missing parts of the mammalian nervous system in the boxes.



[3]

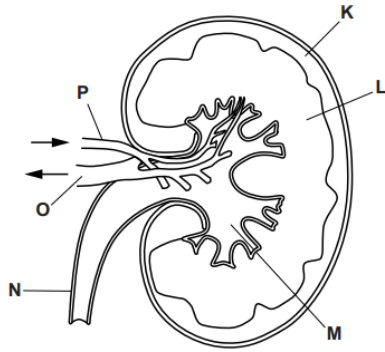
(ii) Control of involuntary action is shown in the table below:



Which type of involuntary action is shown in the table? Also, identify the structure at X.

[3]

(iii) The vertical section of the kidney is shown below:



Complete the following table including

- Identify the part of the kidney responsible for a specific function
- Use letters from the figure to indicate the part of the kidney mentioned.

One row has been completed for you.

function	name of part	letter from Fig. 4.1
blood is filtered		
concentration of urine is determined	medulla	L
urine flows to the bladder		
blood is carried into the kidney		
blood flows out of the kidney		

[4]

[Total: 10]

4. (i) Explain how active transport and diffusion contribute to supplying a plant with specific substances necessary for its growth.

[5]

(ii) Explain the process by which mRNA, transcribed from DNA strand, is used to synthesize proteins.

[3]

[Total: 8]

Practical Portion**Marks: 30**

1. (i) Two hours after a meal of rice, blood samples were taken. The table shows the concentration of glucose in the blood samples.

blood vessel	blood glucose concentration /mg per 100 cm ³
J	135
K	128
L	181
M	133

Calculate the percentage increase in blood glucose concentration between blood vessels J and L. Provide the answer to the nearest whole number along with calculation steps.

[6]

(ii) Research assumed that the increasing exposure to computers and screens can affect eyesight and reaction times. A scientist attempted to see if it is true or not, by testing the reaction times of 10 people under the same environmental conditions. They then followed the use of a computer for three hours and the reaction time was again tested.

List three ways that the scientist could enhance the experiment to determine the impact of prolonged use of a computer on reaction time.

[6]

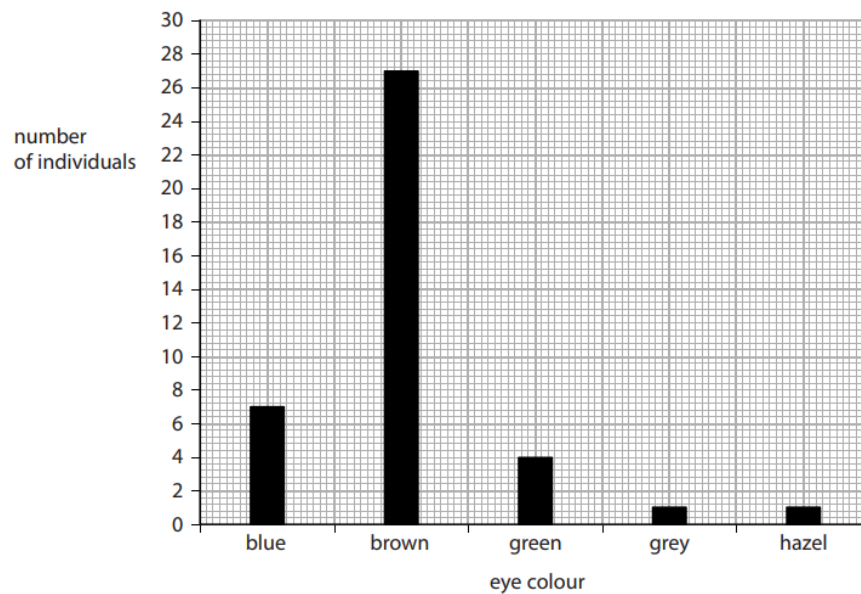
(iii) Complete the empty boxes in the table to show the DNA strand codes for this mRNA strand.

DNA strand	G	G	C	T	A	G	T	T	G
mRNA strand									

[5]

[Total: 17]

2. (i) Variation in eye color in a human population is shown in the graph.



Determine how many individuals' eye colors are recorded. Also, calculate the percentage of brown eyes individuals in this graph.

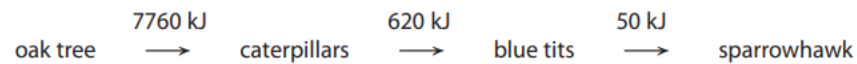
[4]

(ii) Draw and label the structures of the following types of neurons:

- sensory neuron
- relay neuron
- motor neuron

[6]

(iii) The food chain shows the energy transferred between organisms.



The energy available in the oak tree was 97,000 could be transferred to the caterpillars. Calculate the percentage loss of energy between the oak tree and the caterpillars.

[3]

[Total: 13]