

Candidate Name

Candidate Number

Centre Name

Centre Number

Paper 1 : Biology**Model Paper****(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.
- 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.

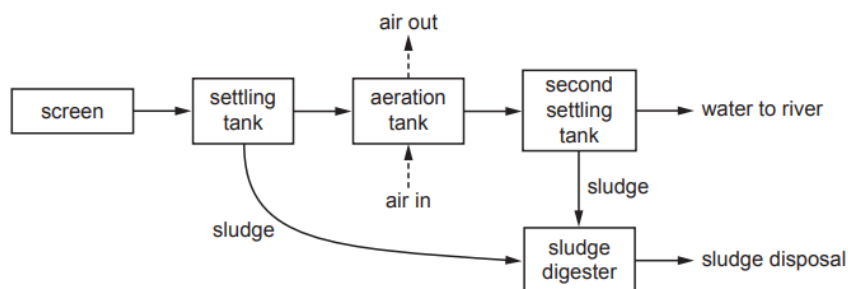
INFORMATION:

- 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.

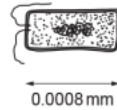
Objective Section

Marks: 25

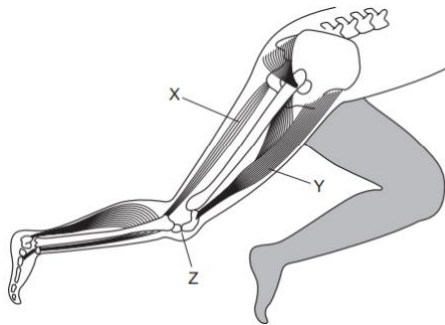
1. In the diagram, air is being supplied to the aeration tank. Why is this happening?



- A. to encourage microorganisms to reproduce quickly
B. to float the sludge
C. to settle the sludge
D. to stop microorganisms from reproducing too quickly
2. Which diet causes the liver to produce more urea?
A. high carbohydrate, low fat
B. high protein, low carbohydrate
C. high fat, low protein
D. high fat, high fibre
3. Which of the following gases contribute to global warming?
A. carbon dioxide and methane
B. methane and oxygen
C. oxygen and sulfur dioxide
D. sulfur dioxide and carbon dioxide
4. Which hormone stimulates follicle maturation in the ovary?
A. FSH
B. LH
C. estrogen
D. progesterone
5. The development of a new treatment occurs to reduce pain in the joints. What will be the effect of this treatment on the genotype and phenotype of an individual?
A. Changes the genotype only
B. Changes in both the phenotype and genotype
C. No change to their phenotype or genotype
D. Changes the phenotype only
6. Photosynthesis occurs during the day but aerobic respiration occurs all the time. Why does a plant cell release more energy during the night?
A. Photosynthesis is exothermic taking in energy and aerobic respiration is endothermic.
B. Photosynthesis is endothermic taking in energy and aerobic respiration is exothermic.
C. Aerobic respiration is endothermic taking in energy and photosynthesis is exothermic.
D. Aerobic respiration is exothermic taking in energy and photosynthesis is endothermic.
7. The human eye can detect objects as small as 0.1 mm. What minimum magnification is required for the human eye to see the disease-causing bacterial cell shown in the figure below?



- A. 12.5×
B. 1250×
- C. 12500×
D. 125×
8. Heroin and alcohol are metabolized by which organ?
A. bladder
B. kidney
C. brain
D. liver
9. Why bread-making involves the use of yeast?
A. Anaerobic respiration produces alcohol.
B. Aerobic respiration produces alcohol.
C. Anaerobic respiration produces carbon dioxide.
D. Aerobic respiration produces carbon dioxide.
10. The benefit of having a short food chain is?
A. Few producers can support a large number of consumers.
B. Less energy is lost in the food chain.
C. It is easier for consumers to find food.
D. Less food is required by the consumers.
11. The bones and muscles in the human leg are shown in the figure below. If muscle X contracts, what will be the effect on muscle Y and joint Z?



	Muscle Y	Leg at point Z
A.	Contracts	Bends
B.	Contracts	Straightens
C.	Relaxes	Bends
D.	relaxes	Straightens

12. Which of the following substances are present in human blood plasma?
A. carbon dioxide, haemoglobin, and glucose
B. oxygen, urea, and starch
C. carbon dioxide, oxygen, and haemoglobin
D. glucose, hormones, and urea
13. What is the reason behind the conservation of plant species?
A. to obtain drugs for medicinal use
B. to absorb oxygen from the air
C. to release carbon dioxide into the air
D. to decrease rainfall

14. After a cross between a heterozygous tall pea plant (T) being dominant and a short pea plant being recessive (t), 100 offspring are produced. How many of them are likely to be tall?

- A. 25
- B. 75
- C. 100
- D. 50

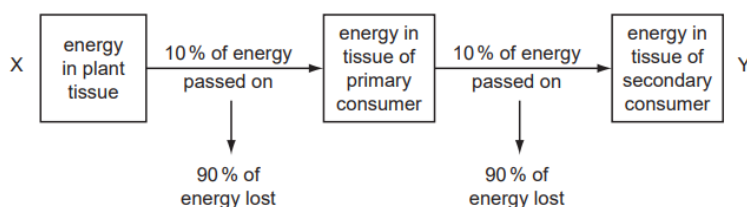
15. Which of the following groups contains substances transported in the blood?

- A. glucose, glycogen, and lactic acid
- B. amino acids, carbon dioxide, and cellulose
- C. salts, testosterone, and urea
- D. estrogen, oxygen, and starch

16. What is a mutation?

- A. a condition caused by a dominant allele
- B. a type of continuous variation
- C. a process used in genetic engineering
- D. a change in a gene or chromosome

17. Between X and Y in the diagram, energy flows through a food chain is shown. Through which processes energy is lost?



- A. growth and excretion
- B. photosynthesis and respiration
- C. growth and photosynthesis
- D. excretion and respiration

18. What is the process by which a gene for insulin is extracted from a human cell and inserted into a bacterium, which then makes human insulin?

- A. artificial selection
- B. natural selection
- C. heterozygous inheritance
- D. genetic engineering

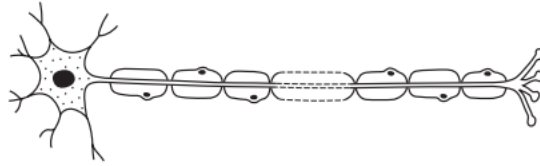
19. Where does the nitrogen in the exhaled air originate from?

- A. It is a product of proteins broken down in the mammal.
- B. It is in the air that was breathed in.
- C. It is exchanged for oxygen which is taken into the blood.
- D. It is a product of respiration.

20. Which substance is lost from the body of a healthy person by the kidneys, but not by the lungs?

- A. glucose
- B. water
- C. urea
- D. carbon dioxide

21. What type of cell is shown in the figure?



- A. motor neuron
- B. sensory neuron
- C. relay neuron
- D. ciliated cell

22. In the case of a rat, what do the two parts of the scientific name *Rattus rattus* refer to?

- A. genus and species
- B. variety and genus
- C. kingdom and genus
- D. kingdom and species

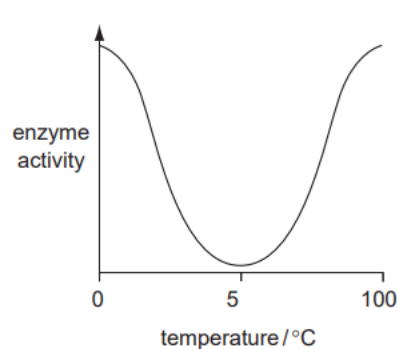
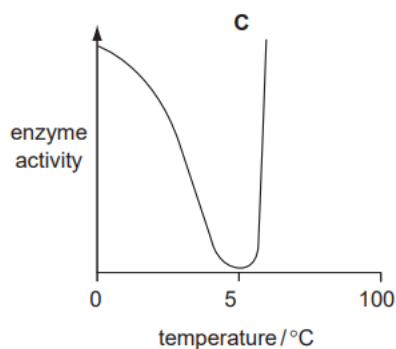
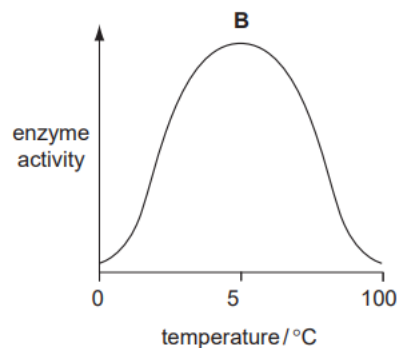
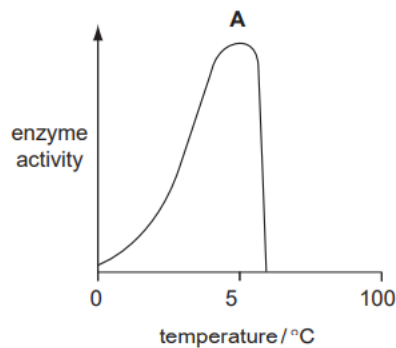
23. Which substance causes the colour change to a leaf cell after staining it with an iodine solution? The obtained colour is blue-black.

- A. protein
- B. starch
- C. reducing sugar
- D. chlorophyll

24. Which substance causes the production of amino acids when added to meat?

- A. an enzyme
- B. water
- C. an oil
- D. a hormone

25. Identify the graph showing the effect of temperature changes on enzyme activity.



THEORETICAL PORTION

Marks: 45

1. (i) Explain how the gene sequence determines the order of amino acids in a protein, particularly antigens present in pathogens.

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- (ii) Discuss the effects of deforestation on land.

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- (iii) Explain the benefits to the human body of producing memory cells due to vaccination.

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2. (i) What's the purpose of bees collecting nectar?

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(ii) Explain the distinctions between cell division by mitosis and cell division by meiosis.

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3. (i) Elaborate on the process of cloning used to create a mammal e.g. Dolly the sheep, a well-known example of cloning.

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(ii) Explain ways monoclonal antibodies are utilized in medical diagnosis.

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(iii) Rats pose significant challenges as pests worldwide. They affect food security and facilitate the spread of diseases. Warfarin is a chemical used as a rat poison as it inhibits the activity of platelets in blood. Explain the role of platelets in the blood.

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..... [3]

4. (i) Erythromycin is a drug given to patients, enclosed in a capsule. The capsule contains multiple small drug-containing spheres with varying wall thicknesses, made of a carbohydrate polymer. Explain the process through which the drug is discharged from the spheres in the small intestine.

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- (ii) Cactus plant thrives in dry environments. Suggest three adaptations that help prevent cactus consumption by animals.

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- (iii) Which type of defence mechanism occurs in plants that produce toxins, which make animals ill?

..... [3]

Practical Portion

Marks: 30

1. (i) Conduct a series of experiments to detect carbon dioxide (CO₂) through limewater and hydrogen carbonate indicators. Also, observe the initial and final colours in the tests to get positive and negative results.

[8]

- (ii) Examine the difference in colour changes during the reaction rate analysis.

[3]

2. Write down the procedures including the observation of diffusion under specific conditions, including:

- (i) Temperature changes

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- (ii) the presence of starch

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(iii) use of chemicals
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3. (i) Draw and label a nucleotide consisting of a phosphate group, pentose sugar, and nitrogenous base.

[5]

(ii) Why is a filter paper disc moved using sterile forceps?
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(iii) Make a model to demonstrate the presence of tar in smoke using filters.

