Name..... Centre/Index No. .....

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P530/1
BIOLOGY
PAPER 1
July/August 2019
$2^1/_2$ hours

WAKISSHA JOINT MOCK EXAMINATIONS

Uganda Advanced Certificate of Education
BIOLOGY
(Theory)

Paper 1

2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of **40** questions in section **A** and **6** questions in section **B.**

Answer **all** questions in both sections **A** and **B**

Section A: Answers to this section must be written in the boxes provided.

Section B: Answers to this section should be written in the spaces provided and not anywhere else.
No additional sheet(s) of paper should be inserted in this booklet.

FOR EXAMINERS' USE ONLY			
SECTION		**MARKS**	**Examiners' initials & No.**
Section A:	1- 40		
Section B:	41		
	42		
	43		
	44		
	45		
	46		
TOTAL			

Turn Over

SECTION A (40 MARKS)

Write the letter corresponding to the most correct answer in the box provided on the right.

1. Viruses are considered to be non-living because they;
   A. Can mutate.
   B. Lack metabolic structures.
   C. Contain either DNA or RNA.
   D. Cannot reproduce.

2. Which one of the following is most likely to have the greatest concentration of smooth endoplasmic reticulum? A cell that;
   A. secretes enzymes.
   B. destroys pathogens.
   C. synthesises steroid hormones.
   D. engages in photosynthesis.

3. Why are ion channels necessary to transport ions into or out of a cell? The ions
   A. are too large to diffuse through the membrane.
   B. are charged particles and cannot diffuse through the hydrophobic interior of the membrane.
   C. are non-polar and cannot move through the membrane.
   D. bind to carrier proteins in the blood stream which must be removed before being transported into the cell.

4. Which of the following are removed from pyruvate during its conversion into acetyl group?
   A. Oxygen and hydrogen atoms.
   B. Carbon and hydrogen ions.
   C. Carbon dioxide and hydrogen atoms.
   D. Carbon dioxide and ATP.

5. When closely related individuals mate with each other, the offspring are often not as fit as the offspring of two unrelated individuals because;
   A. close relatives are genetically incompatible.
   B. the DNA of close relatives reacts negatively in the offspring.
   C. inbreeding increases chances of expression of mutations.
   D. inbreeding causes normally dormant alleles to be expressed.

6. Which one of the following events does not occur during interphase?
   A. DNA duplication.
   B. Organelle duplication.
   C. Increase in cell size.
   D. Separation of sister chromatids.

7. Which one of the following types of cells is most abundant in internal plant structures?
   A. Meristematic cells.
   B. Parenchyma cells.
   C. Sclerenchyma cells.
   D. Collenchyma cells.

8. In which one of the following organisms does unlimited growth occur?
   A. Annual plants.
   B. Insects.
   C. Most fish.
   D. Mammals.

9. Figure 1 below shows a transverse section through the thorax of an insect.

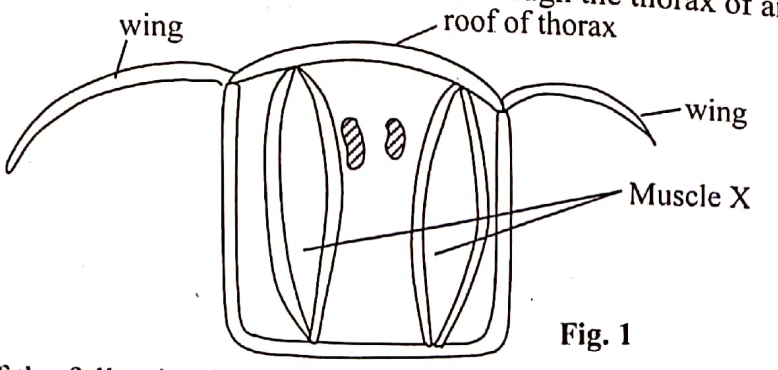

Fig. 1

Which of the following is the correct state of the roof of the thorax and the direction of the wing beat when muscles X contract?

	Roof the thorax	Direction of wing movement
A	Raised	Upwards
B	Flattened	Upwards
C	Raised	Downwards
D	Flattened	Downwards

10. A plant requiring a dark period of at least 14 hours will,
A. not flower if a 14 hour night is interrupted by a flash of light.
B. not flower if the nights are longer than 14 hours.
C. not flower if days are 14 hours long.
D. flower if a 14 hour night is interrupted by a flash of light.

11. Figure 2 below shows the expected and actual results of an experiment to investigate the uptake of glucose by human red blood cells.

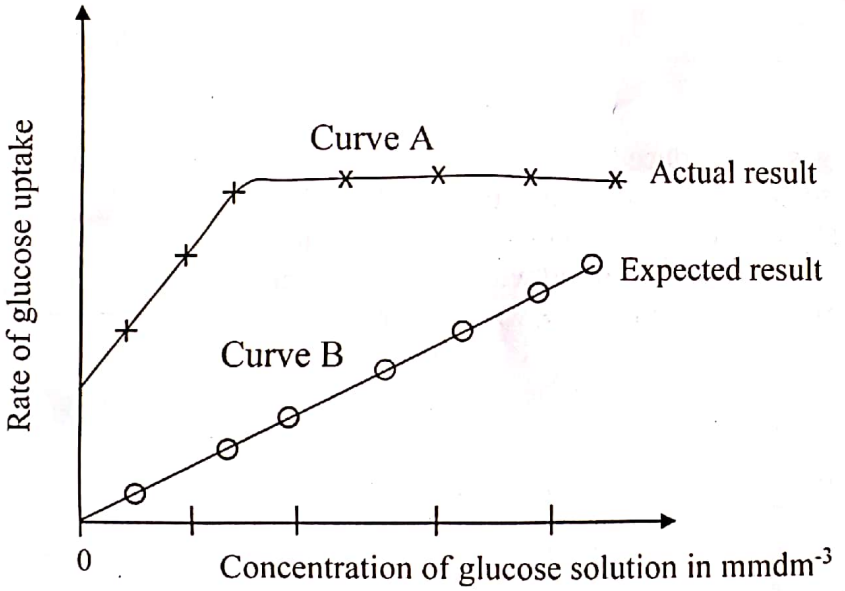

Fig. 2

The mechanism for exchange of materials that led to the actual result was?
A. Facilitated diffusion.
B. Simple diffusion.
C. Osmosis.
D. Active transport.

12. A person who has significant learning problems may have a defect with
A. medulla oblongata.
B. hypothalamus.
C. cerebellum.
D. cerebrum.

13. Which one of the following permanent plant tissues does **not** originate from the procambium during primary growth in plants?
A. Primary phloem.
B. Primary xylem.
C. Vascular cambium.
D. Cortex.

14. Figure 3 below shows chemical path ways involved in respiration and photosynthesis.

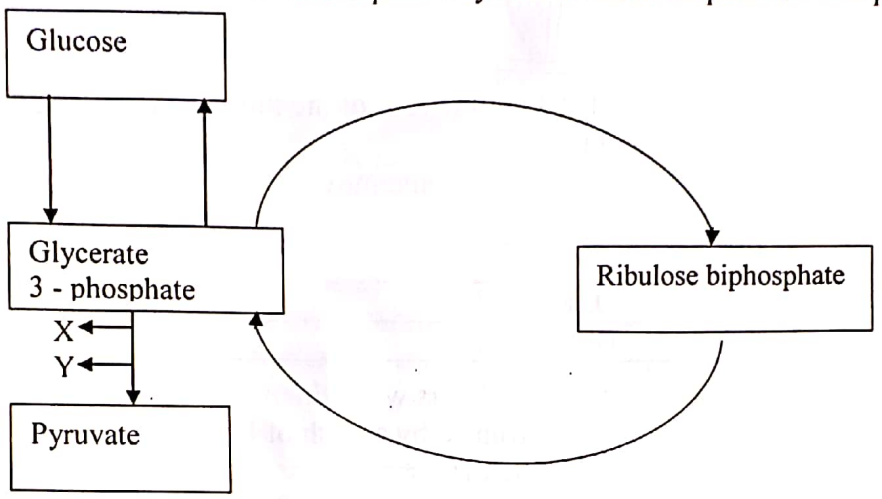

Fig. 3

X and Y are respectively;
A. NADH and CO_2.
B. NADPH and ATP.
C. NADH and ATP.
D. NADPH and CO_2.

15. In diploid pathogenesis, eggs are produced by;
A. meiosis and give rise to diploid offspring without fertilization.
B. mitosis and give rise to diploid offspring without fertilization.
C. mitosis and give rise to haploid offspring without fertilization.
D. meiosis and give rise to haploid offspring without fertilization.

16. Table 1 below shows differences in actions of the sympathetic and parasympathetic systems. Which one of the pairs is incorrect?

	Sympathetic system	**Parasympathetic system**
A	Accelerates heart beat	Slows heart beat
B	Dilates pupil of eye	Constricts pupil of eye
C	Contracts bladder	Relaxes bladder
D	Constricts arterioles in skin of limbs	Dilates arterioles in skin of limbs.

17. The reason for competition among organisms of different species is:-
A. limited resources.
B. territoriality.
C. fewer mates.
D. environmental resistance.

18. The female butterfly *hypolimnas missipus* occurs in different colour forms. This illustrates;
A. polymorphism.
B. sexual dimorphism.
C. camouflage.
D. mimicry.

19. The main reason for mitochondria in active cells having more cristae is to increase surface area for;
A. reaction of glycolysis.
B. oxidative phosphorylation.
C. reactions of Kreb's cycle.
D. lactate formation.

20. Fixed action patterns in organisms are forms of;
A. instinctive behaviour.
B. learned behaviour.
C. reflexes.
D. conditioning.

21. Plants do not have a circulatory system for transporting gases yet are sometimes extremely large. This is because;
A. they have few living cells as most of the plant is dead wood.
B. have a large surface area to volume ratio.
C. they are less metabolically active than animals.
D. the gases would normally block the xylem vessels.

22. Which one of the following is a role played by both Gibberellins and Cytokinins?
A. Induces apical dominance.
B. Reverse genetic dwarfism.
C. Delay leaf senescence.
D. Breaking seed dormancy.

23. Net primary production is often used to compare the efficiencies of different ecosystems because it;
A. is easy to obtain.
B. shows energy available to the consumers.
C. gives the energy to be used by an organism.
D. shows efficiency at each trophic level.

24. The importance of capacitation during fertilization is to;
A. ensure penetration of Oocyte.
B. ensure only one sperm fertilizes the Oocyte.
C. activate the sperm.
D. ensure sperms adapt to conditions in oviduct.

25. The process by which mRNA is formed is termed as
A. translation.
B. transcription.
C. deamination.
D. condensation.

26. Which one of the following occurs as animals become larger?
A. Its surface area grows more rapidly than its volume.
B. Its volume grows more rapidly than its surface area.
C. Its surface area and volume increase in perfect proportion to each other.
D. Its volume increases but its total surface area decreases.

27. Which one of the following describes the set point in a homeostatic system?
A. The cells that collect and transmit information about the state of the system.
B. The cells that receive information about the state of the system and direct changes to the system.
C. The various components that produce appropriate changes in the system.
D. The target value of homeostatic entity.

28. The overall role of the inflammatory response is to
A. contain and eliminate foreign cells and materials at the site of infection.
B. increase heat at the site of infection to activate enzymes needed in the immune response.
C. produce anti bodies that bind to invading cells to eliminate them.
D. increase blood flow at the same site of the wound to flush out invading pathogens.

29. The lungs of a toad have a lower surface area for gaseous exchange than the lungs of a mammal because;
A. toad tissues need more oxygen than mammalian tissue.
B. toads breath more quickly than mammals.
C. toads also obtain oxygen via diffusion across the skin.
D. toad living tissue has greatest density of capillary beds than. mammalian lung tissue.

30. The displacement of the oxygen haemoglobin dissociation curve by a change in pH is termed as
A. alkaline tide.
B. Bohr effect.
C. chloride shift.
D. decomposition.

31. The storage form of carbon dioxide in C_4 plants is
A. citric acid.
B. Mallic acid.
C. Oxaloacetic acid.
D. pyruvic acid.

32. In the chloroplast, the products of photophosphorylation are utilized in the
A. envelope.
B. granum.
C. stroma.
D. thylakoid.

33. A species of birds called Finches living on an isolated island showed variation in beak size. After a period of dry spell on the island, larger seeds were more plentiful than small seeds and the average size of the Finches' beaks increased. This is due to;
A. artificial selection acting against finches with small beaks.
B. directional selection acting against finches with small beaks.
C. increased rate of mutation resulting in finches with larger beaks.
D. stabilising selection acting against finches with smaller and larger beaks.

34. Which one of the following combinations of factors can lead to genetic variation in a population?

1. Crossing over and independent assortment.
2. Different environmental conditions.
3. Random mating and fertilization.
4. Mutation.

A. All the above
B. 1, 2 and 3
C. 1, 3 and 4
D. 2, 3 and 4

35. Fig. 4 below shows how energy flows through a community.

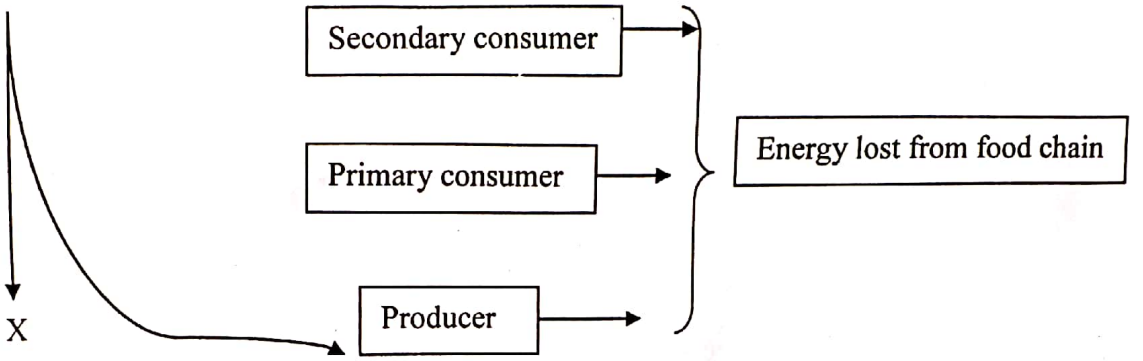

Fig. 4

The energy labelled X does not enter the food chain because it is

A. lost through respiration.
B. not of the right wave length to be used by producers.
C. lost as heat.
D. reflected by the producers.

36. Which one of the following explains the inheritance of the gene for haemophilia in a boy with the condition. The boy:

A. inherited the recessive allele from his mother.
B. inherited the dominant allele from his father.
C. can pass the recessive allele to his son when he grows up.
D. Can pass the dominant allele to a daughter when he grows up.

37. Which one of these is typical of pioneer organisms in new habitats that are stable?

A. High mortality rate and short life span.
B. Short generation time.
C. Reproductively slow and have a long life span.
D. Production of a large number of off spring.

38. Which one of the following glands is found in the sub-mucosa of the alimentary canal?

A. Salivary gland.
B. Brunner's gland.
C. Gastric gland.
D. Crypts of lieberkuhn.

39. The rigidity of the earth worms' skeleton is due to

A. hard exoskeleton.
B. embedded salts of calcium phosphate.
C. numerous inflexible collagen fibres.
D. the high component of water.

Turn Over

40. Fig. 5 below shows the effect of temperature on the rate of photosynthesis of a plant at different light intensities.

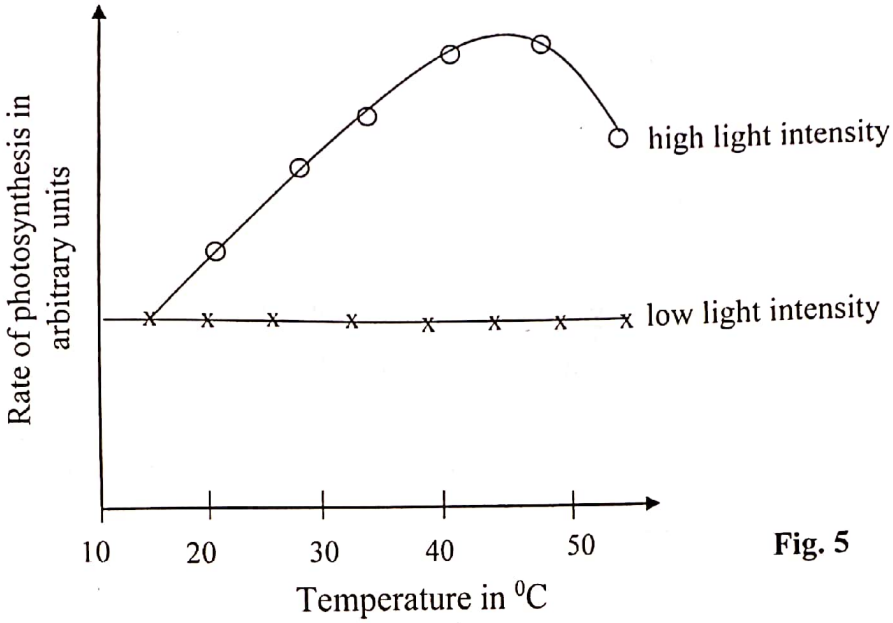

Fig. 5

Which one of these is the correct conclusion from the data?

A. At low light intensity temperature rise does not affect the rate of photosynthesis.
B. At high light intensity temperature rises rapidly.
C. at low temperature the rate of photosynthesis is the same.
D. High temperature affects plants at high light intensity but not at low intensity.

SECTION B (60 MARKS)

41. (a) What is meant by the term photoperiodism? (01 marks)

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(b) Fig. 6 below shows the responses of two flowering plants A and B to day length.

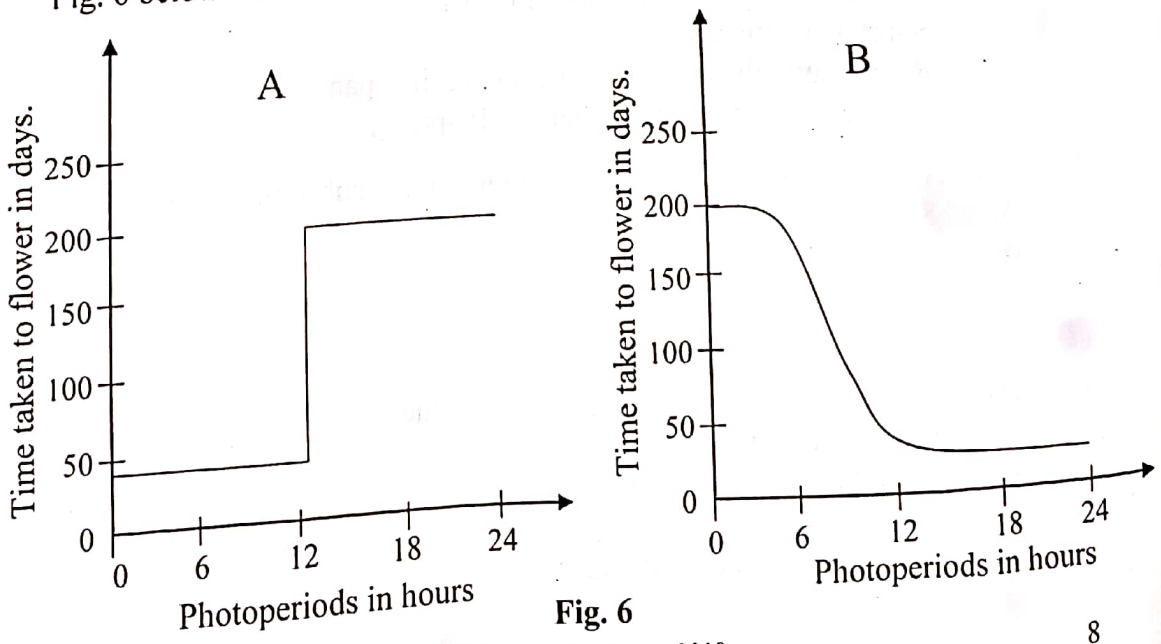

Fig. 6

Giving a reason from the graphs above, state the plant that is a

i) Long Day Plant (02 marks)

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ii) Short Day Plant (02 marks)

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(c) Explain the response of flowering plants between 12hrs and 24hrs in;

i) **A** (02 marks)

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ii) **B** (02 marks)

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(d) State why a short – day plant does not flower when subjected to a long photoperiod. (01 mark)

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42. (a) Distinguish between monoecious and dioecious plants. (02 marks)

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(b) Outline the adaptations that promote out breeding in monoecious plants. (04 marks)

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(c) Explain the reproductive adaptations which have promoted survival of angiosperms on land. (04 marks)

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Turn Over

43. Fig. 7 shows results obtained from an experiment to determine response of pancreatic cells in a person who ingested only water for 12 hours then had a hot drink of glucose solution. The amount of insulin, glucagon and glucose in her blood was determined at one hour interval.

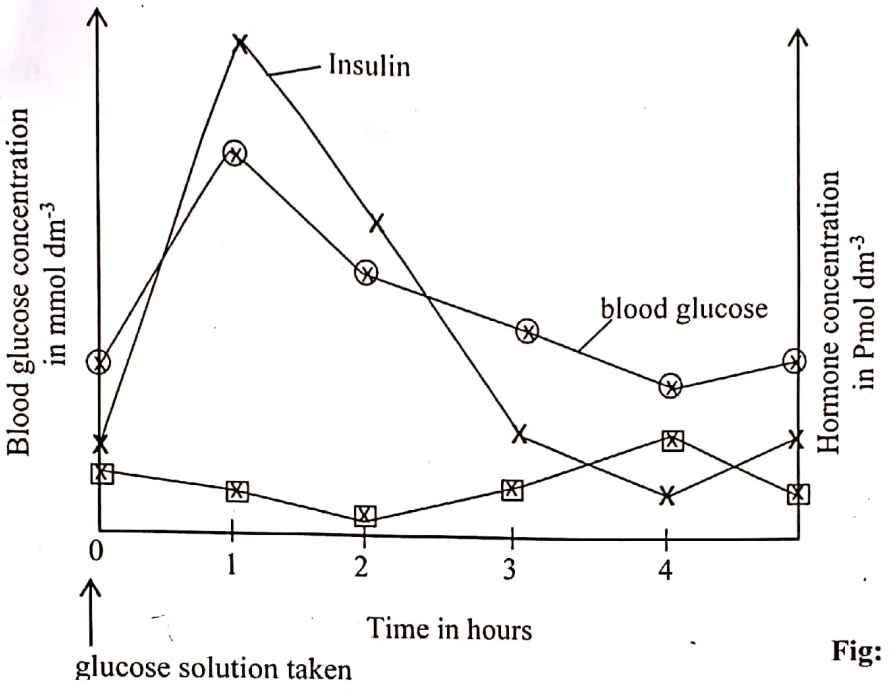

Fig: 7

(a) Explain the significance of the person ingesting only water for 12 hours before having the glucose drink? (02 marks)

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(b) Describe the changes in the blood glucose of the person. (03 marks)

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(c) Explain the increase in concentration of insulin in the first hour of the investigation. (02 marks)

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(d) Suggest how the results will change if the experiment continued for longer than five hours without the person taking anything. (03 marks)

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44. (a) Define a gene pool. (01 mark)

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(b) Explain how each one of the following causes change in allele's frequency:

i) Sexual selection (04 marks)

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ii) Small population size (03 marks)

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(c) Explain why natural selection is effective at population level, but not an organism level. (02 marks)

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45. Figure 8 below shows the relationship between rate of transpiration and rate of water up take for a particular plant. Study it carefully and answer the questions that follow.

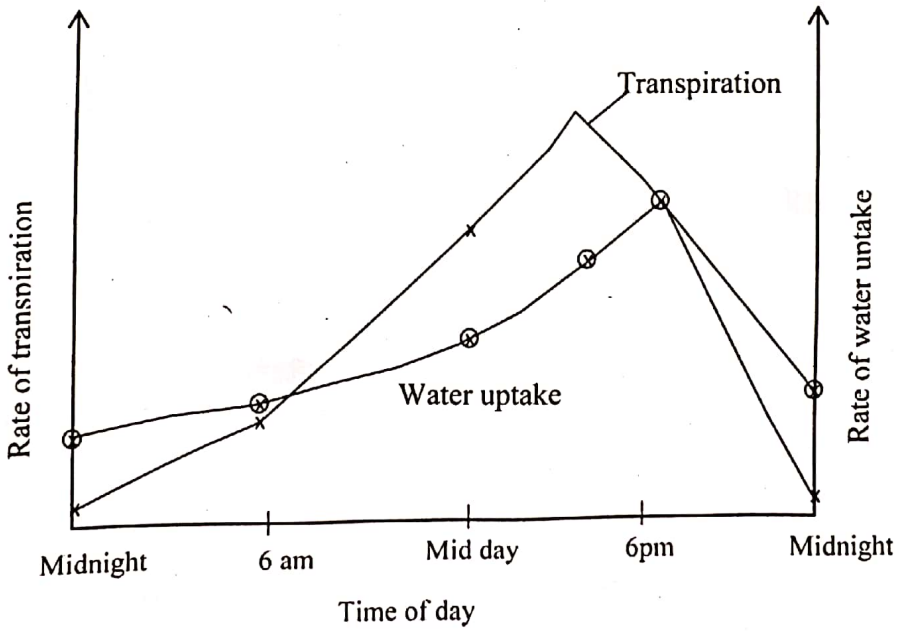

Fig: 8

(a) Compare the rates of transpiration and water up take. (03 marks)

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(b) Explain the relationship between rates of water uptake and transpiration up to midday. (03 marks)

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(c) State two environmental factors which are most likely to be affecting the rate of transpiration as shown in the graph above. (02 marks)

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(d) State two adaptations of xerophytic leaves to water stress. (02 marks)

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46. (a) Explain why air is a better respiratory medium than water. (05 marks)

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(b) State how each of the following respiratory systems have been modified to increase surface area for gaseous exchange.

i) Mammalian lungs (01 mark)

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ii) Tracheal system (01 mark)

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(c) Explain why a fish suffocates immediately when removed from water. (03 marks)

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END