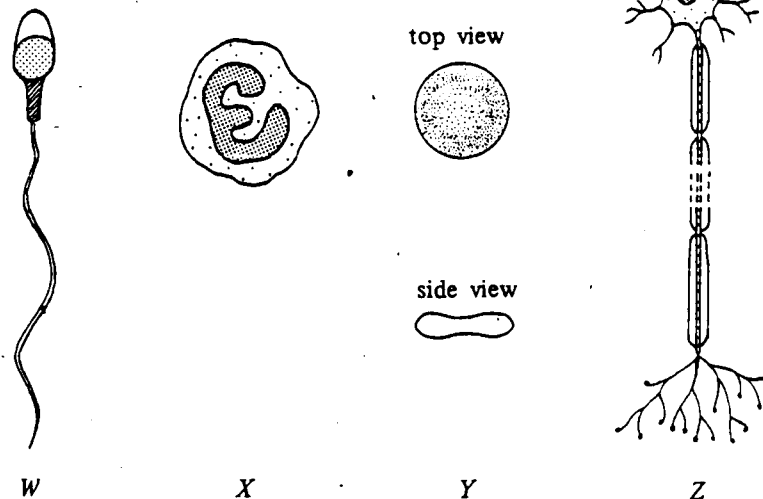


**Directions :** Questions 1 to 3 refer to the diagram below which shows different types of mammalian cells .  
(The cells are not drawn to the same scale.)



1. Which of the following cell types is responsible for transmitting genetic information ?

- A. W
- B. X
- C. Y
- D. Z

2. Which of the following cell type(s) can move by itself ?

- A. W only
- B. W and X only
- C. W, X and Y only
- D. W, X, Y and Z

3. Which two cell types belong to the same tissue ?

- A. W and X
- B. X and Y
- C. Y and Z
- D. Z and W

4. Which of the following when damaged would NOT affect clear vision ?

- A. the lens
- B. the optic nerves
- C. the hind part of the cerebrum
- D. the front part of the cerebellum

5. Which of the following characteristics are true for birds ?

- (1) absence of teeth
- (2) presence of feathers
- (3) presence of ear flaps
- (4) presence of scales on certain parts

- A. (1) and (2) only
- B. (1) and (3) only
- C. (1), (2) and (4) only
- D. (2), (3) and (4) only

6. Which of the following groups of plants possesses green leaves with veins, but never develops seeds ?

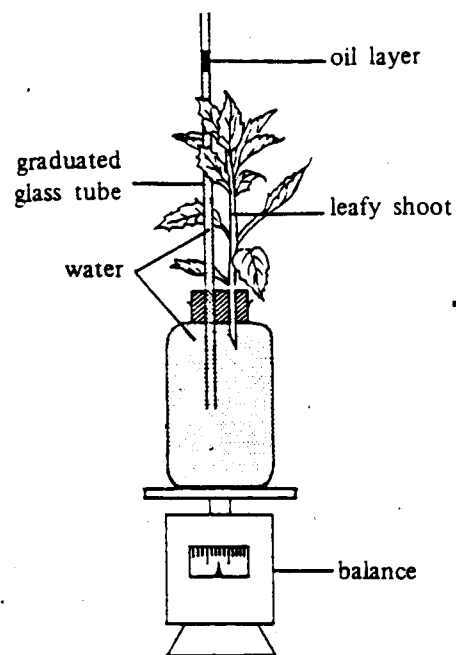
- A. fern
- B. moss
- C. fungus
- D. gymnosperm

7. The highest concentration of blood urea would be found in the vein draining the

- A. lungs.
- B. liver.
- C. kidneys.
- D. rectum.

18

Directions : Questions 8 to 11 refer to an experiment which a weight potometer shown in the diagram below was used :



Results of the experiment :

Initial weight of the potometer = 400 g

Final weight of the potometer = 390 g

Initial reading of the graduated glass tube = 20 cm<sup>3</sup>

Final reading of the graduated glass tube = 5 cm<sup>3</sup>

Duration of the experiment = 1 hour

Density of water = 1 g cm<sup>-3</sup>

8. The rate of transpiration of the leafy shoot is

- A. 20 cm<sup>3</sup>/hour.
- B. 15 cm<sup>3</sup>/hour.
- C. 10 cm<sup>3</sup>/hour.
- D. 5 cm<sup>3</sup>/hour.

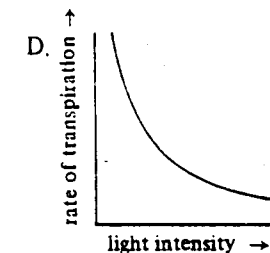
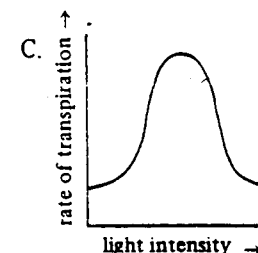
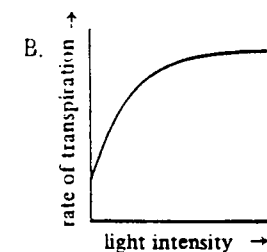
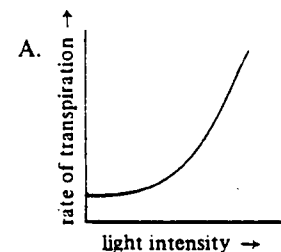
9. The amount of water retained by the leafy shoot during this period is

- A. 5 g.
- B. 10 g.
- C. 15 g.
- D. 20 g.

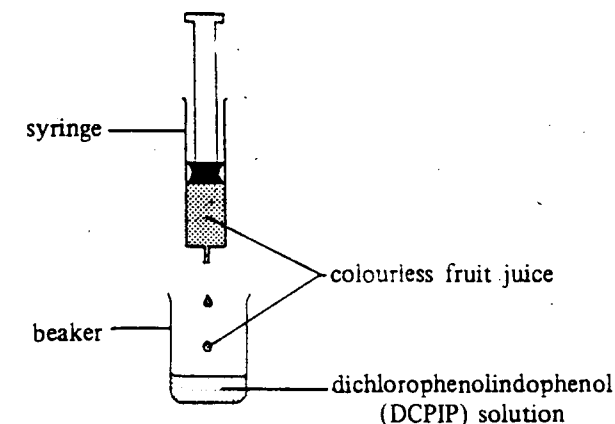
10. The purpose of introducing an oil layer into the graduated glass tube is to

- A. stop the entry of air.
- B. make the water meniscus more obvious.
- C. prevent direct evaporation of water.
- D. avoid condensation of water vapour.

11. If the weight potometer is exposed to light of varying intensities, the effect of light on rate of transpiration is best illustrated by



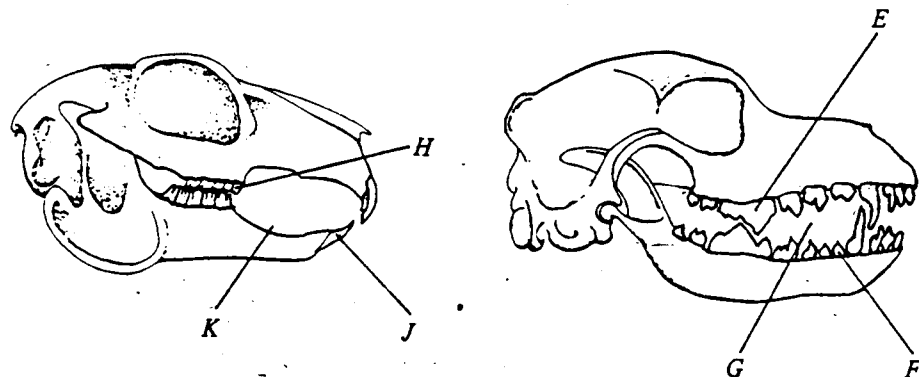
12.



If vitamin C is present in the fruit juice inside the syringe, it would finally turn the colour of the DCPIP solution in the beaker to

- A. red.
- B. blue.
- C. orange.
- D. colourless.

Directions : Questions 13 and 14 refer to the diagram below which shows the side view of the skulls of two mammals *X* and *Y* :



mammal X

mammal Y

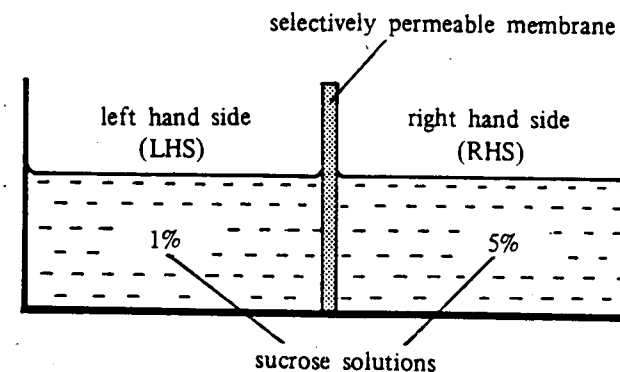
13. The correct labels for the following three parts are

	<u>incisor</u>	<u>diastema</u>	<u>caninial tooth</u>
A.	F	G	E
B.	F	G	H
C.	J	K	E
D.	J	K	H

14. The correct dental formula of *Y* as deduced from the diagram is

- A.  $\frac{3 \ 1 \ 2 \ 4}{3 \ 1 \ 4 \ 2}$
- B.  $\frac{3 \ 1 \ 3 \ 2}{3 \ 1 \ 4 \ 3}$
- C.  $\frac{3 \ 1 \ 4 \ 2}{3 \ 1 \ 3 \ 3}$
- D.  $\frac{3 \ 1 \ 4 \ 2}{3 \ 1 \ 4 \ 3}$

15.



Which of the following statements are correct for the set-up in the above diagram ?

- (1) The LHS solution has the higher water potential. ✓  
 (2) Water molecules can only move from LHS to RHS.  
 (3) The level of the solution on RHS will rise. ✓

- A. (1) and (2) only  
 B. (1) and (3) only  
 C. (2) and (3) only  
 D. (1), (2) and (3)

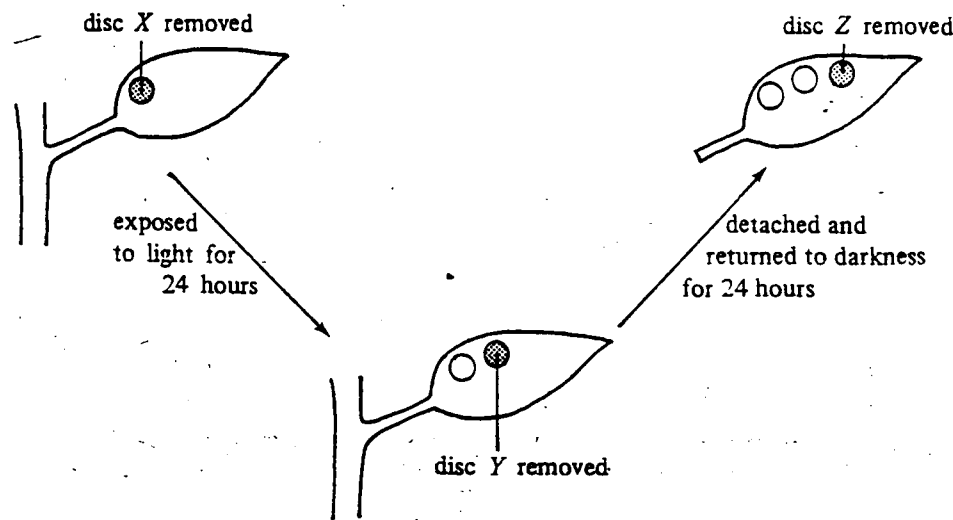
16. In *Mucor* / *Rhizopus*, the formation of the zygospore is an adaptation for

- A. wide dispersal.  
 B. rapid multiplication.  
 C. infection of new hosts.  
 D. survival through adverse conditions.

17. Some starchy seeds were germinated in the dark. After one week the changes in the quantities of cellulose and total carbohydrates in the seedlings would be

	<u>cellulose</u>	<u>total carbohydrates</u>
A.	increased	increased
B.	decreased	increased
C.	increased	decreased
D.	decreased	decreased

**Directions :** Questions 18 to 20 refer to an experiment in which discs of equal surface area were removed from the same gr. leaf of a potted plant which was first destarched and then treated as shown in the diagram below :



The dry weights of the discs (in g) were :

disc X = x ; disc Y = y ; disc Z = z .

18. The value  $(y - x)$  represents the NET amount of carbohydrate

- A. lost by respiration.
- B. lost by transpiration.
- C. gained by photosynthesis after respiration.
- D. gained by photosynthesis after transpiration.

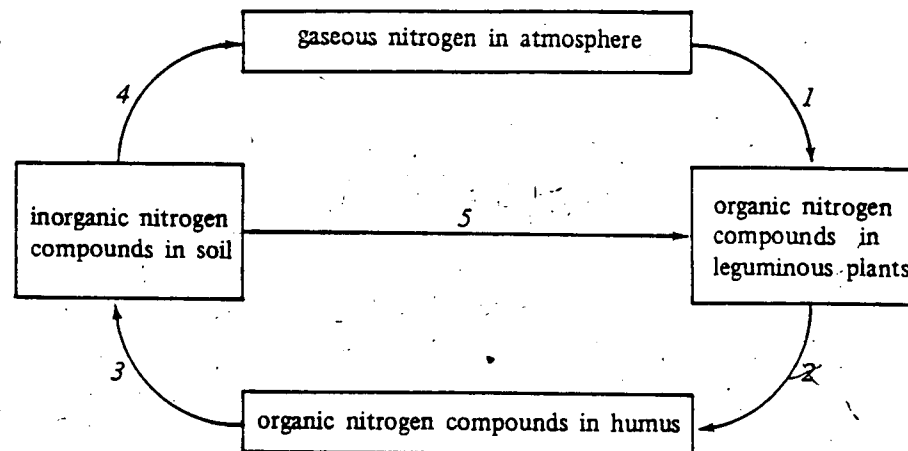
19. The value  $(y - z)$  should indicate the rate of

- A. respiration.
- B. translocation.
- C. transpiration.
- D. photosynthesis.

20. As part of the carbohydrate formed during photosynthesis would have been respired, the actual amount of carbohydrate formed could be expressed by

- A.  $y - z - x$
- B.  $y + z + x$
- C.  $(y - x) + (y - z)$
- D.  $(y - x) - (y - z)$

**Directions :** Questions 21 and 22 refer to the diagram below which shows some pathways by which nitrogen is cycled in a field of leguminous plants :



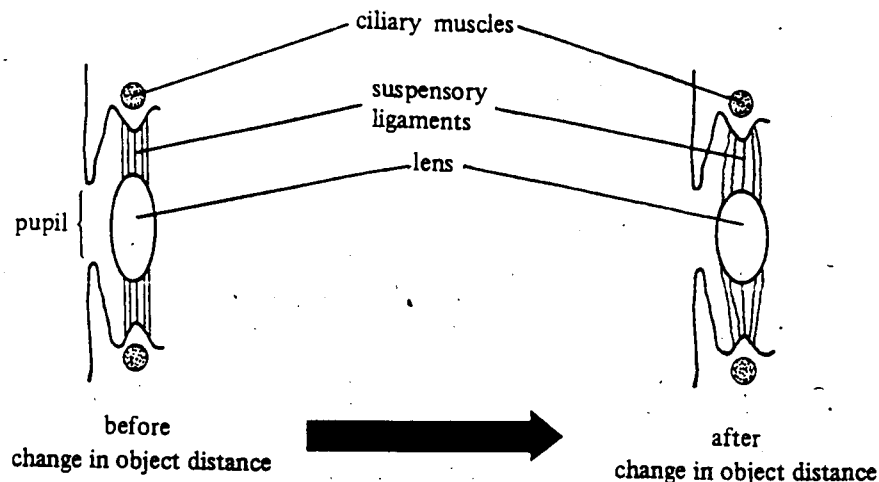
21. Processes 1 and 4 are respectively

- |    | process 1         | process 4       |
|----|-------------------|-----------------|
| A. | nitrification     | putrefaction    |
| B. | nitrogen fixation | putrefaction    |
| C. | nitrification     | denitrification |
| D. | nitrogen fixation | denitrification |

22. The processes requiring the action of micro-organisms are

- A. 2, 3 and 4.
- B. 3, 4 and 5.
- C. 4, 5 and 2.
- D. 5, 2 and 3.

Directions : Questions 23 and 24 refer to the diagram below which shows the responses of certain parts of a human eye following a change in object distance.



23. Which of the following shows the correct response of ciliary muscles to the actual change in object distance ?

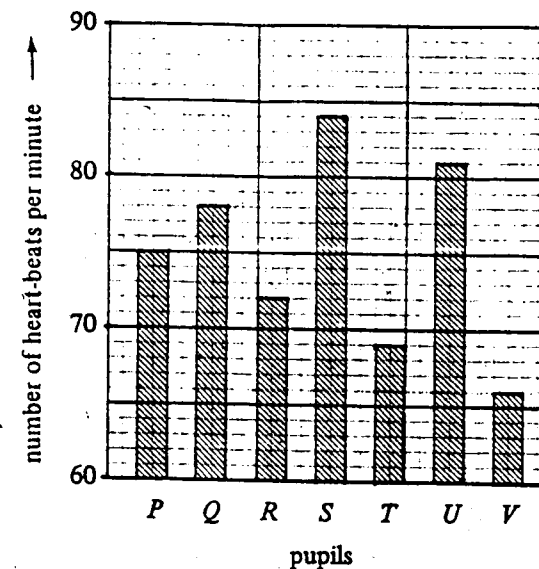
	object distance	ciliary muscles
A.	decreased	contracted
B.	decreased	relaxed
C.	increased	contracted
D.	increased	relaxed

24. Which of the following changes are being illustrated in the diagram ?

- (1) the size of the pupil
- (2) the tension in the suspensory ligaments
- (3) the convexity of the lens

- A. (1) and (2) only
- B. (2) and (3) only
- C. (3) and (1) only
- D. (1), (2) and (3)

Directions : Questions 25 and 26 refer to the bar chart below which shows the heart-beat rates of seven pupils (P to V) :



25. The average heart-beat rate of the seven pupils is

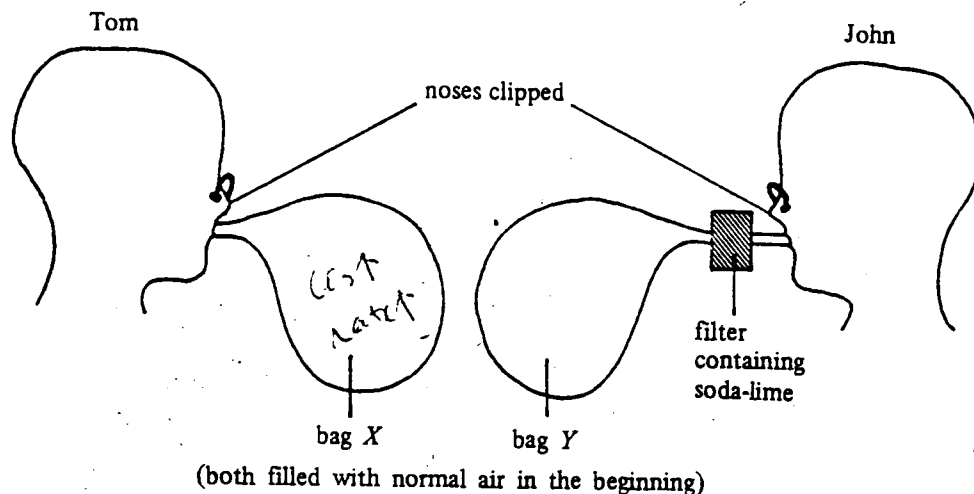
- A. 75 per minute.
- B. 76 per minute.
- C. 77 per minute.
- D. 78 per minute.

26. Which of the following statements about human heart-beat rates may be deduced from the above bar chart ?

- A. The minimum rate is 66 per minute.
- B. The normal rate is 78 per minute.
- C. The maximum rate is 84 per minute.
- D. The rate varies between individuals.

Direction:

Questions 27 and 28 refer to the diagram below which shows an experiment performed by two boys of similar age and size. Each boy breathed in and out of a bag for half a minute. (The parts are not drawn to the same scale.)



27. After the experiment, the air in bags X and Y would contain

	bag X	bag Y
A.	about 20% oxygen	less than 0.03% carbon dioxide
B.	about 20% oxygen	more than 0.03% carbon dioxide
C.	less than 20% oxygen	less than 0.03% carbon dioxide
D.	less than 20% oxygen	more than 0.03% carbon dioxide

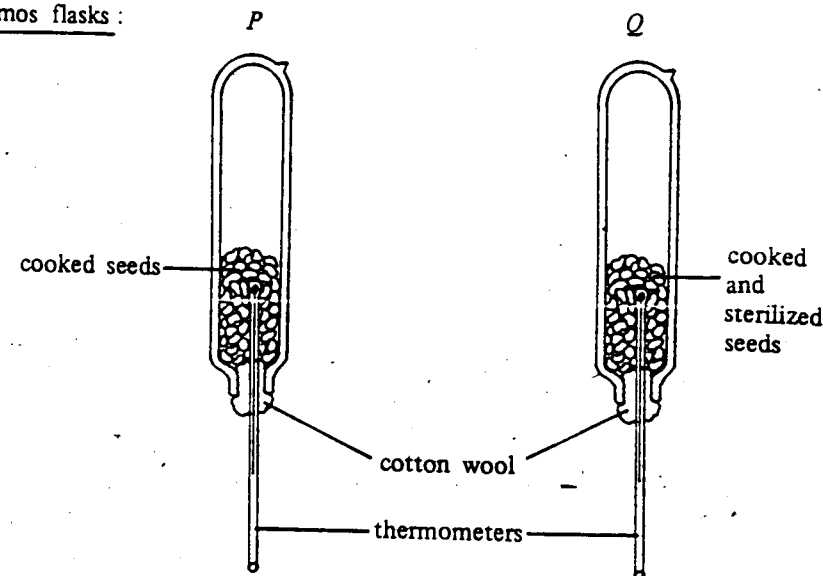
28. Immediately after the experiment, both the rate and depth of breathing in the two boys would

	Tom	John
A.	decrease	increase
B.	decrease	remain the same
C.	remain the same	decrease
D.	increase	decrease

Directions :

Questions 29 and 30 refer to an experimental set-up shown in the diagram below :

thermos flasks :



result after one day :

temperature  
slightly increased

temperature  
remained unchanged

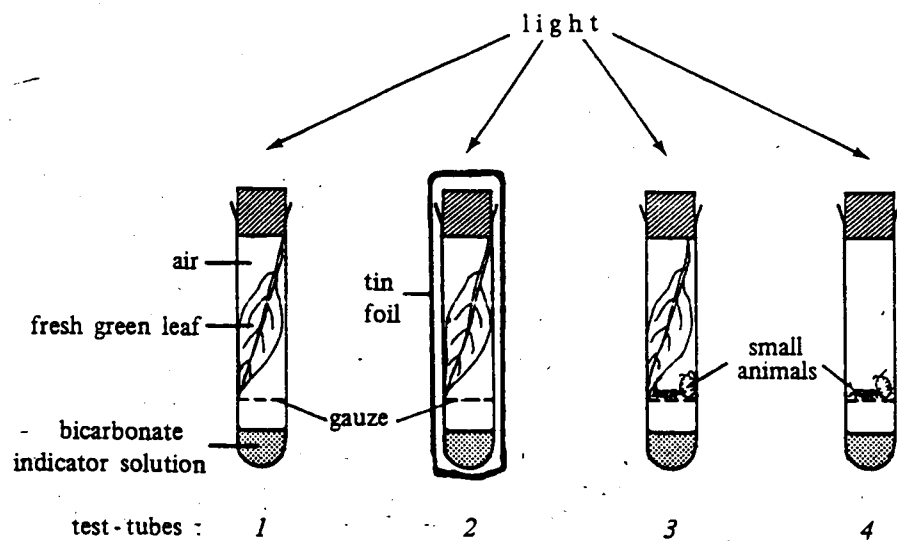
29. The rise in temperature in flask P is caused by the heat

- A. retained by the seeds after cooking.
- B. released from the seeds during germination.
- C. produced by the growth of micro-organisms.
- D. absorbed by the air in the flask from the surroundings.

30. One apparent advantage of setting the flasks upside-down instead of having them upright in this experiment is that

- A. seeds would not be squashed by the thermometers.
- B. heat lost by conduction can be totally prevented.
- C. fresh air cannot reach the seeds and affect the temperature readings.
- D. temperature readings can be taken without withdrawing the thermometers from the flasks.

**Directions :** Questions 31 and 32 refer to the diagram below which shows four stoppered test-tubes containing bicarbonate indicator solution originally orange in colour.



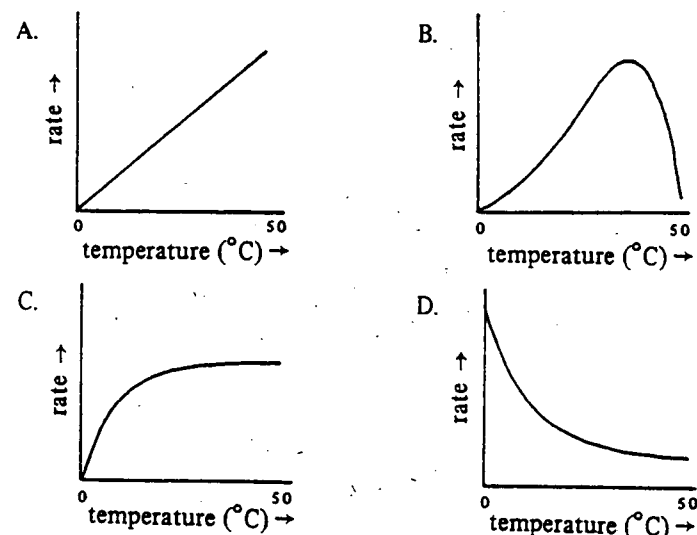
31. At the end of the experiment, the colour of the indicator solution in tubes 1, 2 and 4 would be

	tube 1	tube 2	tube 4
A.	purple	yellow	yellow
B.	yellow	purple	purple
C.	purple	yellow	purple
D.	yellow	purple	yellow

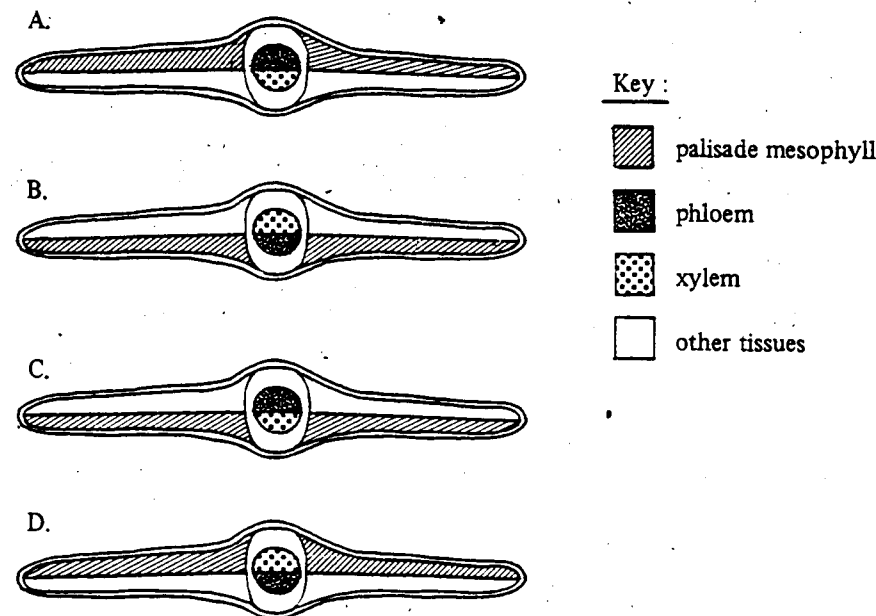
32. The indicator solution in tube 3 remained orange throughout the experiment, because the amount of

- carbon dioxide produced by the leaf and animals in respiration is equal to that taken in by the leaf in photosynthesis.
- carbon dioxide produced by the animals in respiration is equal to that taken in by the leaf in photosynthesis.
- oxygen produced by the leaf in photosynthesis is equal to that taken in by the animals in respiration.
- oxygen produced by the leaf in photosynthesis is equal to that taken in by the leaf and animals in respiration.

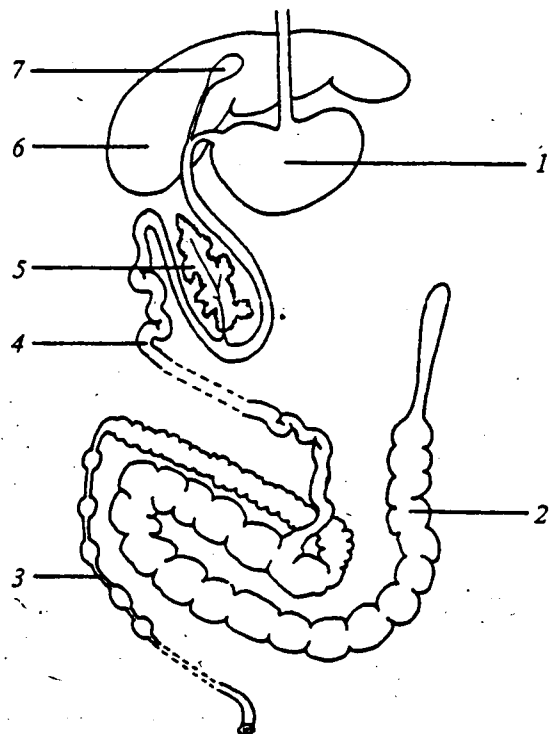
33. Which of the following graphs correctly illustrates the effect of temperature on the rate of enzymatic reactions?



34. Which of the following diagrams correctly represents the typical arrangement of tissues in transverse sections of leaves in general?



**Directions :** Questions 35 to 37 refer to the diagram below which shows parts of the alimentary canal in a herbivorous mammal. (The parts are not drawn to the same scale.)



35. The structure which can produce both digestive enzyme(s) and hormone(s) is

- A. 3.
- B. 5.
- C. 6.
- D. 7.

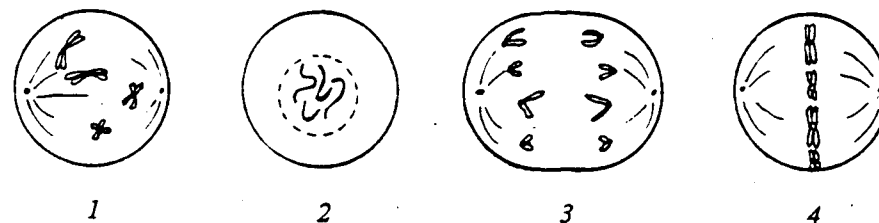
36. Digestion of cellulose may take place in structure

- A. 1.
- B. 2.
- C. 4.
- D. 6.

37. Which of the following would happen if structure 7 were removed ?

- A. Bile would no longer be produced.
- B. Fats could not be emulsified.
- C. Digestion of fats could not take place.
- D. The release of bile could not be regulated.

38. The diagram below shows the different stages of mitosis :



The correct sequence of the stages is

- A. 1 → 3 → 2 → 4
- B. 2 → 1 → 4 → 3
- C. 3 → 4 → 1 → 2
- D. 4 → 2 → 3 → 1

39. Which of the following is/are the correct function(s) of the mammalian kidney ?

- (1) remove urea from the blood
- (2) regulate the water content of the body
- (3) remove excess protein from the blood

- A. (2) only
- B. (1) and (2) only
- C. (2) and (3) only
- D. (1), (2) and (3)

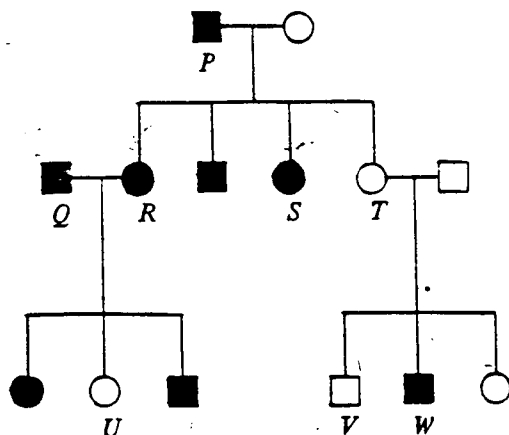
40. Which of the following characteristics is true for sandy soil ?

- A. It holds a lot of air.
- B. It resists root penetration.
- C. It becomes water-logged easily.
- D. It retains large quantities of mineral salts.



Directions:

Questions 41 and 42 refer to the following human pedigree which shows the inheritance of the ability to roll the tongue. Tongue-rolling is a dominant character.



Key:

- male roller
- female roller
- male non-roller
- female non-roller

41. In the pedigree, only one among the following four persons has been given the **WRONG** phenotypic representation. Which one is it?

- A. S
- B. U
- C. V
- D. W

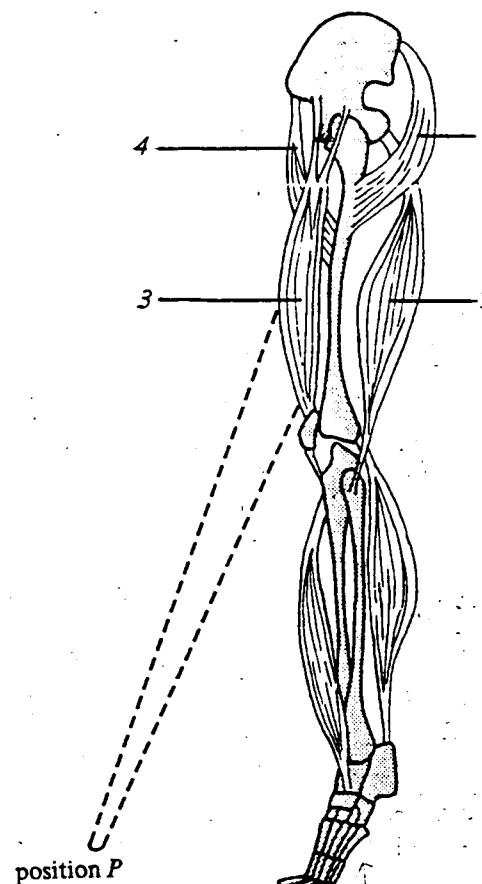
42. Which of the following statements is true?

- A. P is homozygous.
- B. T is heterozygous.
- C. Q and R have the same genotypes.
- D. P and R have different genotypes.

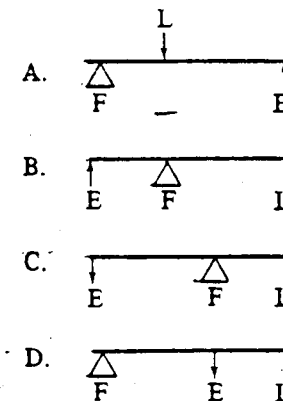
Directions:

Questions 43 and 44 refer to the diagram below which shows some of the bones and muscles in the leg of a person standing on the toes.

(The parts are not drawn to the same scale.)



43. Taking the toes as the fulcrum, the lever system for keeping the body in equilibrium can be represented by



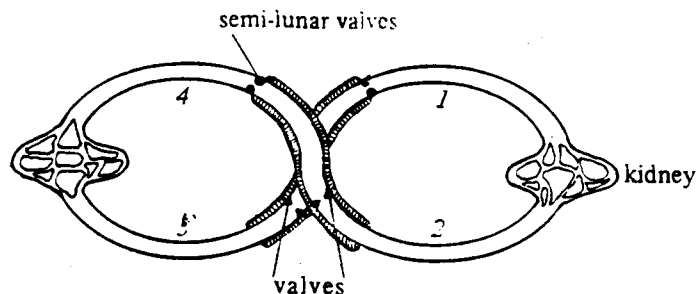
( E = effort, F = fulcrum, L = load )

44. The person may raise one of his legs to position P by contracting the muscles

- A. 1 and 2
- B. 2 and 3
- C. 3 and 4
- D. 4 and 1

Directions :

Questions 45 to 47 refer to the following diagrammatic representation of the mammalian circulation.



45. The correct direction of blood flow is indicated in

- A.
- B.
- C.
- D.

46. Blood vessel . . . represents the

- A. aorta.  
B. vena cava.  
C. pulmonary vein.  
D. pulmonary artery.

47. The nature of blood inside blood vessels 1, 2, 3 and 4 is :

	blood vessel 1	blood vessel 2	blood vessel 3	blood vessel 4
A.	deoxygenated	oxygenated	deoxygenated	oxygenated
B.	oxygenated	deoxygenated	deoxygenated	oxygenated
C.	oxygenated	deoxygenated	oxygenated	deoxygenated
D.	deoxygenated	oxygenated	oxygenated	deoxygenated

48. The medulla oblongata of the mammalian brain is concerned with the control of

- A. speech.  
B. the breathing rate.  
C. the knee jerk reflex.  
D. balance of the body.

49. When a freshly detached green leaf is completely immersed in warm water, which of the following may be observed first ?

- A. The leaf blade rolls up.  
B. The epidermis peels off.  
C. The water becomes green.  
D. Air bubbles appear on the leaf.

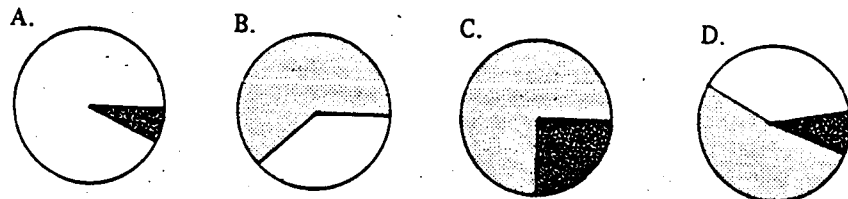
50. Discharging large quantities of chicken manure into a river will

- A. increase the turbidity.  
B. increase the oxygen content.  
C. decrease the bacterial population.  
D. decrease the inorganic nitrogen content.

51. Which of the following statements on the methods of food preservation is NOT true ?

- A. Pasteurization kills some micro-organisms.
- B. Fumigation using sulphur dioxide poisons micro-organisms.
- C. Dehydration slows down decomposition by micro-organisms.
- D. Refrigeration stops the reproduction of micro-organisms.

52. Which of the pie charts below correctly represents the relative food contents of peanuts ?



Key :



carbohydrate



fat



protein

53. The final consumer in a food chain seldom goes much higher than the tertiary level, because

- A. the energy available decreases progressively at each level. ✓
- B. the producers are inefficient in making use of light energy.
- C. there are insufficient herbivores.
- D. there are too many carnivores.

54. Which of the following is INCORRECTLY matched ?

	relationship	example
A.	parasitism	pea plants and nitrogen-fixing bacteria in their root nodules
B.	mutualism	fungi and green algae in lichens
C.	competition	crop plants and weeds in the same field
D.	saprophytism	yeast cells in fermenting grape juice

**Directions :** Each question below (Questions Nos. 55 to 60) consists of two separate statements. Decide whether each of the two statements is true or false; if both are true, then decide whether or not the second statement is a correct explanation of the first statement. Then select one option from A to D according to the following table :

- A. Both statements are true and the 2nd statement is a correct explanation of the 1st statement.
- B. Both statements are true but the 2nd statement is NOT a correct explanation of the 1st statement.
- C. Only one statement is true while the other is false.
- D. Both statements are false.

1st statement	2nd statement
55. Conservation measures in Hong Kong are only carried out in the country parks.	All wild animals in Hong Kong are kept in the country parks.
56. The mosquito larva living in water can take in air from the atmosphere.	The mosquito adult living on land also breathes in air.
57. Some flowering plants may reproduce asexually by means of their vegetative organs.	Vegetative reproductive organs bear buds.
58. The tapeworm firmly attaches itself to the intestinal wall by means of its suckers.	The tapeworm uses its suckers for absorbing food.
59. Reflex actions are not under the control of the will.	Reflex actions never involve the brain.
60. Sweating can lower the body temperature.	Evaporation of sweat takes away heat.

END OF PAPER