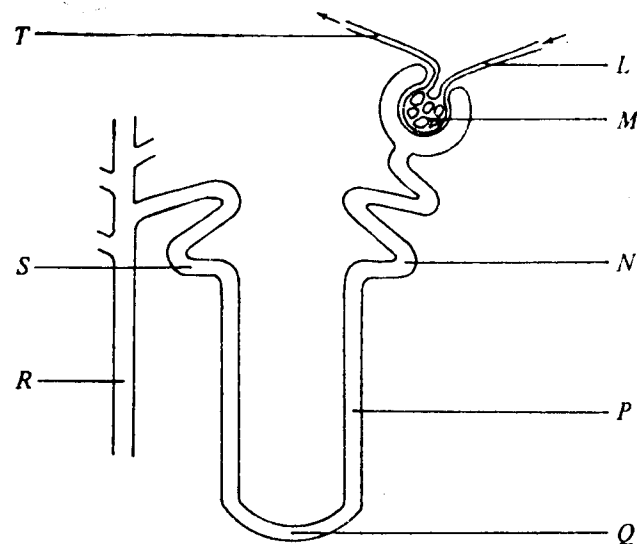


There are 60 questions in this paper.

Direction : Questions 1 to 3 refer to the diagram below which shows a typical nephron and its associated blood supply :



Which of the following is true ?

		in vessel <i>L</i>	in vessel <i>T</i>
A.	blood protein	less concentrated	more concentrated
B.	urea	less concentrated	more concentrated
C.	red blood cells	present	absent
D.	glucose	more concentrated	less concentrated

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2. The substances normally found in both *P* and *R* include

- A. salt and urea.
- B. urea and glucose.
- C. glucose and water.
- D. water and protein.

3. The regions concerned with ultra-filtration and reabsorption are :

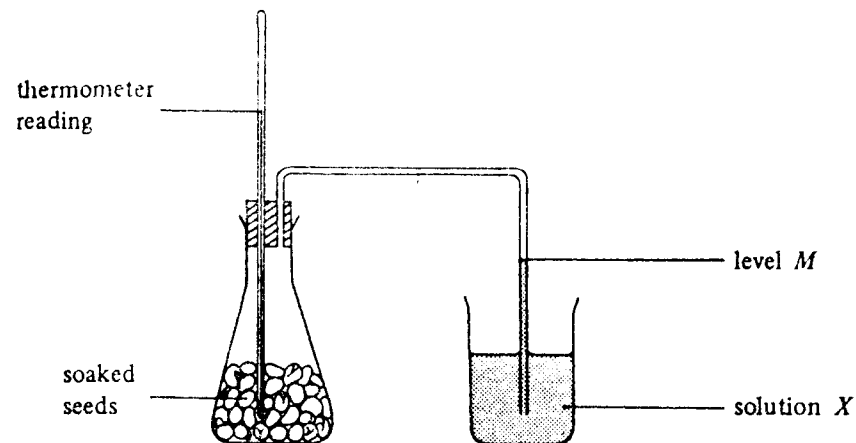
	<u>ultra-filtration</u>	<u>reabsorption</u>
A.	<i>Q</i>	<i>S</i>
B.	<i>S</i>	<i>M</i>
C.	<i>M</i>	<i>N</i>
D.	<i>N</i>	<i>Q</i>

4. Which of the following may be found in the exhaust gases of motor cars ?

- I carbon monoxide
- II carbon dioxide
- III sulphur dioxide

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

Direction : Questions 5 to 7 refer to the diagram below which shows the germination of soaked seeds under constant environmental temperature and pressure :



5. In order to obtain a more accurate result, the conical flask should be surrounded by

- A. cool air.
- B. hot water.
- C. iced water.
- D. cotton wool.

6. After making the improvement suggested in Question 5, what observations would be expected if liquid X were potassium hydroxide or sodium hydroxide solution ?

	thermometer reading	level M
A.	rising	rising
B.	rising	falling
C.	falling	rising
D.	falling	falling

7. If distilled water were used instead of the potassium hydroxide or sodium hydroxide solution in Question 6, the expected observations would become

	thermometer reading	level M
A.	rising	rising
B.	rising	no change
C.	no change	falling
D.	falling	falling

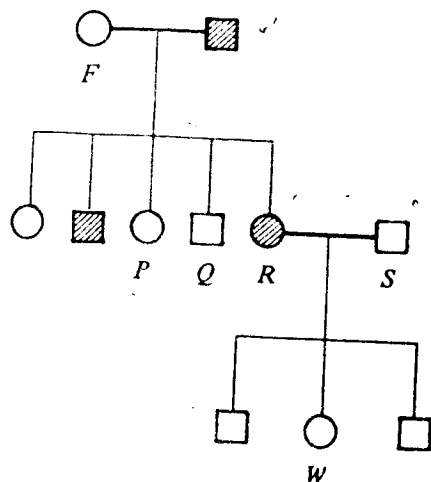
8. Which of the following sets of information about food tests is correct ?

	food	treatment	result
A.	corn oil	shaken with alcohol	white precipitate formed
B.	egg albumen	mixed with copper sulphate solution	purple precipitate formed
C.	glucose solution	heated with Benedict's / Fehling's solution	red precipitate formed
D.	starch solution	mixed with iodine solution	blue-green precipitate formed

9. Which of the following groups contains a WRONG example ?

	group	examples
A.	non-flowering plants	pine and pineapple
B.	flowering plants	grass and <i>Gladiolus</i>
C.	vertebrates	fish and frog
D.	mammals	mouse and man

Direction : Questions 10 to 13 refer to the following family pedigree which shows the inheritance pattern of the ability to roll the tongue. Tongue-rolling is a dominant character.



Key :

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

10. Which of the following is true for *F*?

	genotype	phenotype
A.	homozygous	roller
B.	heterozygous	roller
C.	heterozygous	non-roller
D.	homozygous	non-roller

11. Which of the following statements is true?

The genotype of

- A. *P* is similar to that of *F* but different from that of *W*.
- B. *P* is similar to that of *W* but different from that of *F*.
- C. *W* is similar to that of *F* but different from that of *P*.
- D. *W* is similar to that of *F* and also similar to that of *P*.

12. If *R* and *S* can never have a non-roller child, their genotypes should be

	<i>R</i>	<i>S</i>
A.	homozygous	homozygous
B.	homozygous	heterozygous
C.	heterozygous	homozygous
D.	heterozygous	heterozygous

13. If the genotype of *S* is similar to that of *Q*, the chance of *R* and *S* having a non-roller child is

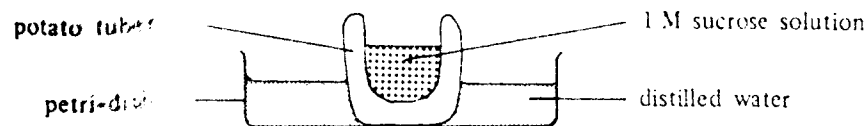
- A. 0%.
- B. 25%.
- C. 50%.
- D. 75%.

14. Which of the following statements about crop rotation is correct?

- I It can increase the fertility of the soil.
- II It can reduce the spread of diseases among the plants.
- III It can yield different crops at the same time.

- A. I only
- B. II only
- C. I and II only
- D. I, II and III

Direction : Questions 15 to 17 refer to the diagram below. A peeled potato tuber was boiled and a cavity was made in it. The cavity was then filled with 1 M sucrose solution and the tuber was later placed in a petri-dish containing distilled water as shown :



15. After a few hours, the liquid level in the cavity
- would have risen.
 - would have dropped to the same level as that in the dish.
 - would have dropped below that in the dish.
 - would remain unchanged.
16. The result in Question 15 can be expected because the cell membranes of boiled potato cells are
- semi-permeable.
 - selectively permeable.
 - completely permeable.
 - impermeable.
17. The result in Question 15 is due to
- osmosis.
 - diffusion.
 - plasmolysis.
 - dialysis.

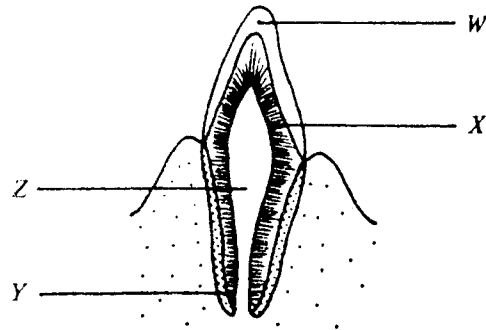
Direction : Questions 18 and 19 refer to the table below which shows certain sets of conditions for cultivating three similar maize seedlings :

seedling	X	Y	Z
light condition :	dark	light	light
culture solution :	complete	complete	lacking magnesium

(All other conditions being normal)

18. After two weeks, yellow leaves may be seen in seedling(s)
- X.
 - X and Y.
 - Y and Z.
 - Z and X.
19. After two weeks, which of the seedlings would be the tallest ?
- X only
 - Y only
 - Z only
 - X and Y
-
20. Both dodder and tapeworm are regarded as parasites because they
- are not green.
 - are heterotrophs.
 - can produce a lot of offspring.
 - withdraw nutrient from other living organisms.

Direction : Questions 21 and 22 refer to the diagram below which shows the vertical section of a mammalian tooth :



21. The hardest part of the tooth is

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

22. The structures present in Z in a healthy tooth

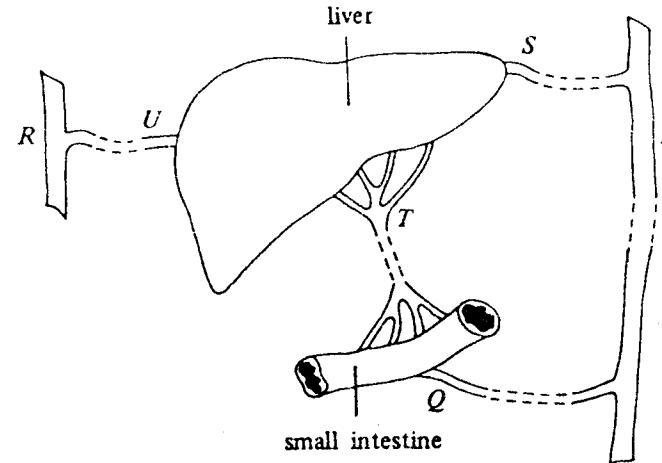
- I transmit nerve impulses.
- II supply glucose and minerals.
- III transport oxygen and carbon dioxide.

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

23. The Water Supplies Department has added a suitable amount of fluoride to our drinking water for the purpose of

- A. killing germs.
- B. aerating the water.
- C. strengthening bones.
- D. preventing tooth decay.

Direction : Questions 24 to 26 refer to the diagram below which shows the liver, part of the small intestine, and their associated blood vessels.
(The parts are not drawn to the same scale.)



24. Letters are used to label various vessels. The correct labelling is :

	aorta	artery	portal vein	vein	vena cava
A.	P	Q	R	S	T
B.	Q	R	S	T	U
C.	P	S	T	U	R
D.	R	U	S	P	Q

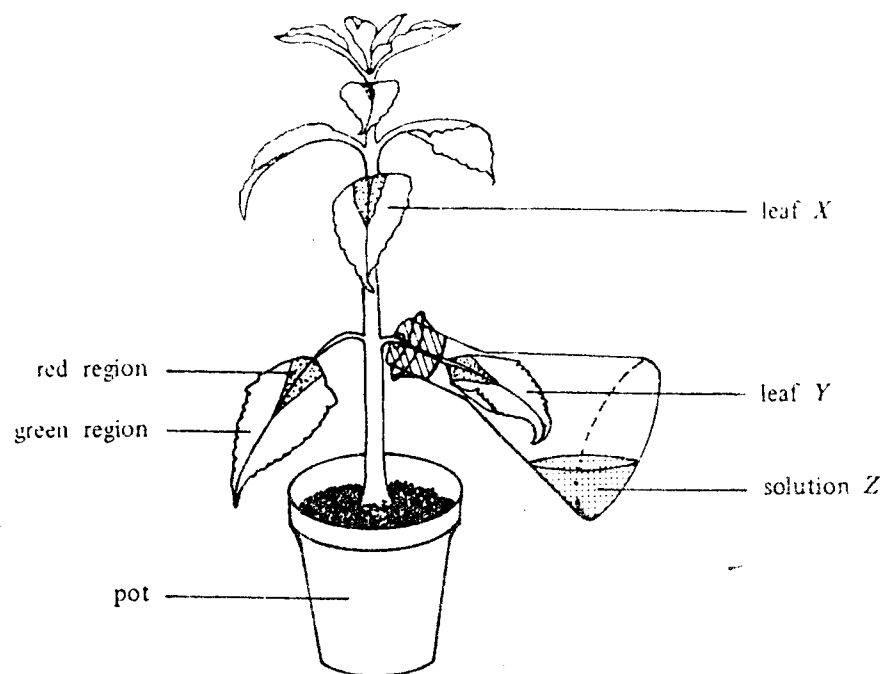
25. The correct route of the blood flow through this region is

- A. P → S → T → U → R.
- B. R → U → T → Q → P.
- C. R → U → T → S → P.
- D. P → Q → T → U → R.

26. In which blood vessels is the blood with the highest content of oxygen, carbon dioxide and digested food normally found ?

	oxygen	carbon dioxide	digested food
A.	S	U	Q
B.	P	R	T
C.	Q	T	S
D.	T	S	P

Direction : Questions 27 to 30 refer to the diagram below which shows an experiment, in which a potted plant with variegated leaves was used to investigate some of the conditions necessary for photosynthesis.



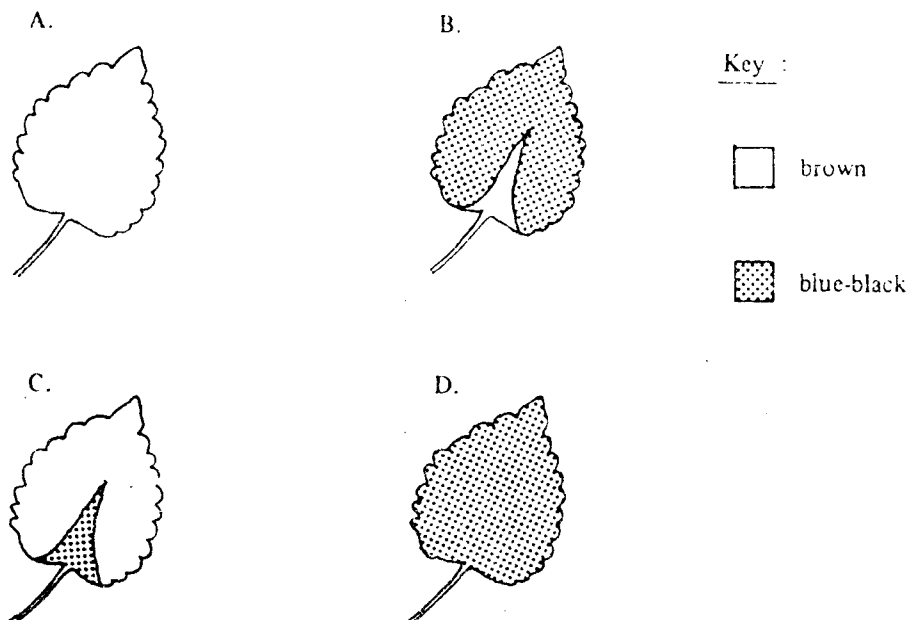
27. Before the experiment, the plant should be destarched by

- A. dipping the leaves in alcohol for two minutes.
- B. not watering the plant for one day.
- C. wrapping the pot with a plastic bag.
- D. keeping the plant in darkness for two days.

28. The solution Z used should be

- A. limewater.
- B. bicarbonate indicator solution.
- C. potassium hydroxide or sodium hydroxide solution.
- D. alkaline pyrogallol.

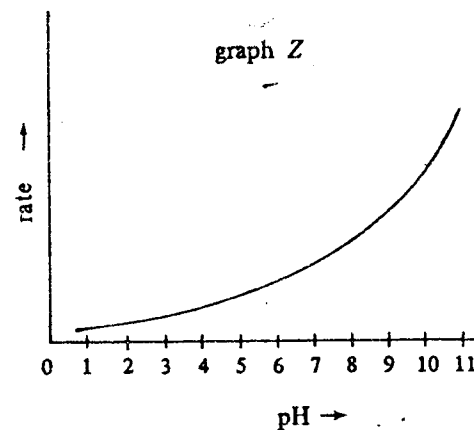
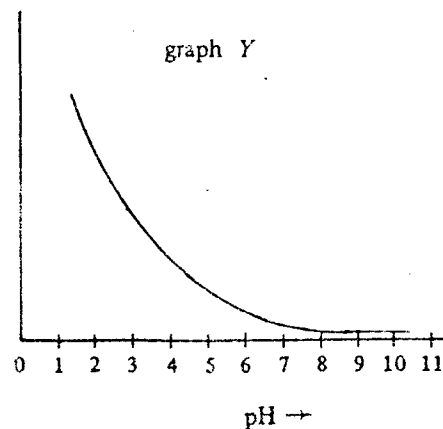
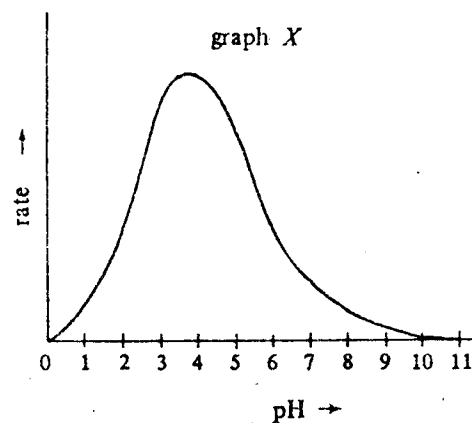
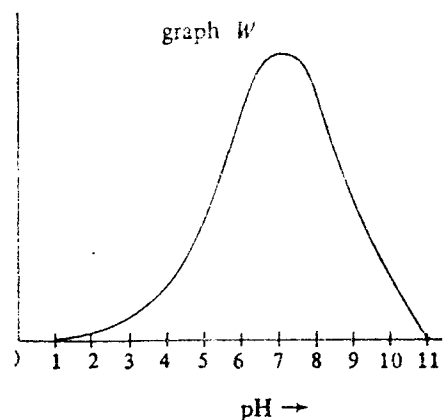
29. After exposing the plant to light for 6 hours, leaf Y is removed and tested for starch. The appearance of the leaf would resemble



30. At the end of the experiment, leaf X is also tested for starch. The results obtained from the starch test on leaves X and Y in this experiment show that photosynthesis requires

- A. chlorophyll and light.
- B. light and carbon dioxide.
- C. carbon dioxide and chlorophyll.
- D. chlorophyll, light and carbon dioxide.

Direction : Questions 31 and 32 refer to the graphs below which show the different effects of pH on the rate of certain enzymatic reactions :



31. Which graph illustrates that the enzyme involved is most effective in a neutral medium ?

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

32. The presence of hydrochloric acid helps the enzyme in gastric juice to digest protein. Which graph illustrates this ?

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

33. Which of the following statements about the diaphragm is true ?

- A. It is present in all vertebrates.
- B. It separates the heart from the lungs.
- C. It is involved in the breathing process.
- D. Its movement is controlled by the cerebellum.

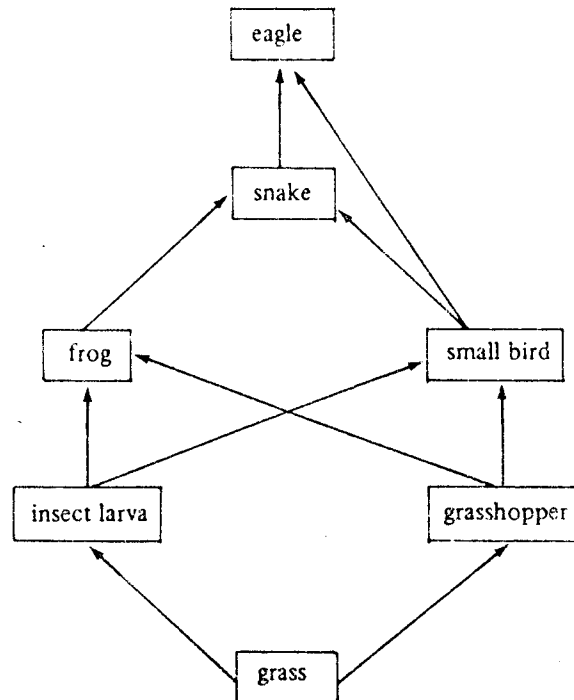
34. The eye defect known as short sight refers to the situation when the image of a distant object

- A. cannot be formed by the eye.
- B. is formed in front of the retina.
- C. is formed on the retina.
- D. is formed behind the retina.

35. Short sight is usually caused by

- A. roughening of the cornea.
- B. lengthening of the eyeball.
- C. shortening of the eyeball.
- D. stretching of the suspensory ligaments.

Direction : Questions 36 to 38 refer specifically to the food web below :



36. Which of the following pairs of organisms are secondary consumers ?

- A. insect larva and grasshopper
- B. snake and eagle
- C. frog and small bird
- D. frog and snake

37. The probable direction of energy flow in this food web is

- A. grass → insect larva → frog → eagle.
- B. grass → grasshopper → small bird → snake → eagle.
- C. eagle → snake → small bird → insect larva → grass.
- D. grass → insect larva → grasshopper → frog → snake → eagle.

38. This food web does NOT include

- A. producers.
- B. decomposers.
- C. primary consumers.
- D. tertiary consumers.

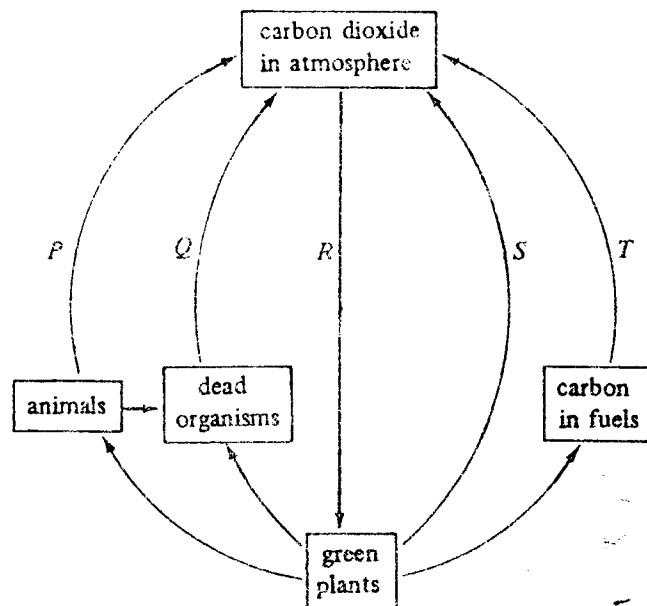
39. For a bisexual flower meiosis will take place in both

- A. sepals and petals.
- B. petals and anthers.
- C. anthers and ovules.
- D. ovules and sepals.

40. Bone formation requires

- A. iron and vitamin C.
- B. iron and vitamin D.
- C. calcium and vitamin C.
- D. calcium and vitamin D.

Direction : Questions 41 to 43 refer to the diagram below which shows some pathways by which carbon is cycled in a certain habitat :



41. Processes *P*, *Q* and *T*, which return carbon dioxide to the atmosphere, are

	<i>P</i>	<i>Q</i>	<i>T</i>
A.	combustion	decomposition	respiration
B.	respiration	decomposition	combustion
C.	combustion	respiration	decomposition
D.	decomposition	combustion	respiration

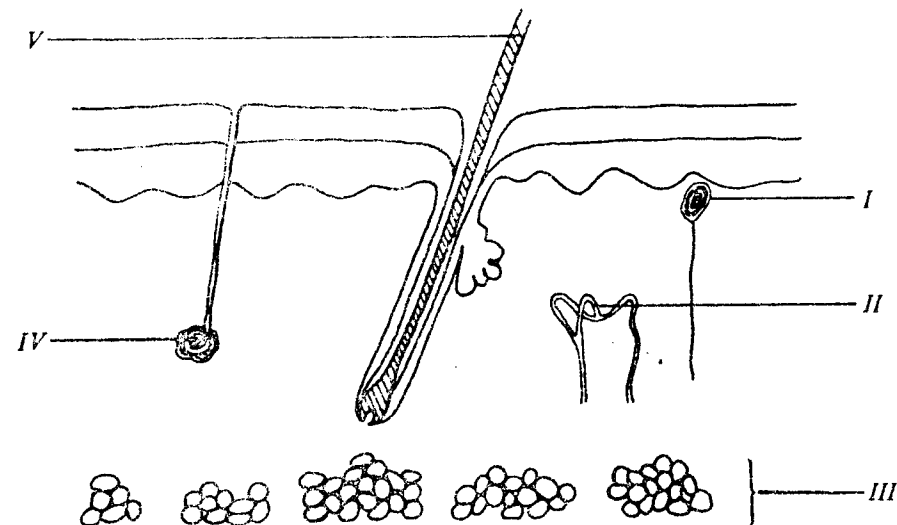
42. In this century, the carbon dioxide content in the atmosphere has been increasing. The process mainly responsible for this is

- A. *P*.
- B. *Q*.
- C. *S*.
- D. *T*.

43. The process which is most similar to *S* is

- A. *P*.
- B. *Q*.
- C. *R*.
- D. *T*.

Direction : Questions 44 to 46 refer to the diagram below which shows the different structures found in a vertical section of a skin sample.
(The parts are not drawn to the same scale.)



44. The structures found only in mammals are

- A. *II* and *III*.
- B. *III* and *IV*.
- C. *IV* and *V*.
- D. *V* and *I*.

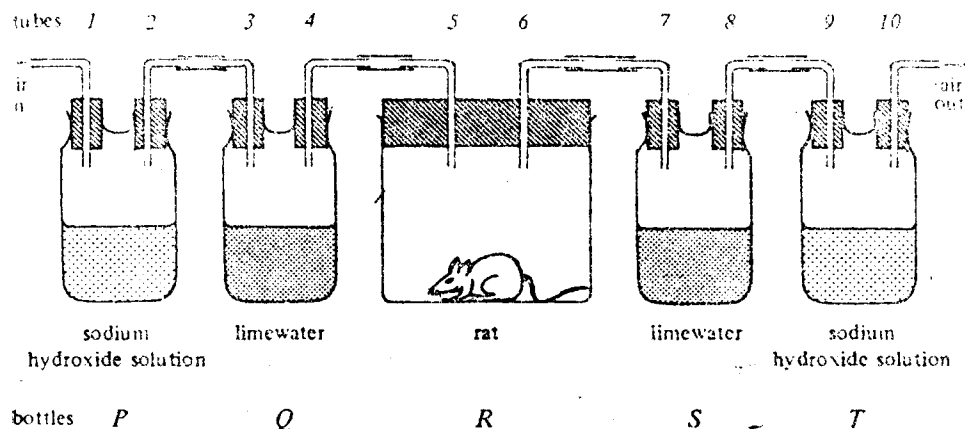
45. The structures involved in keeping the body warm are

- A. *I* and *III*.
- B. *II* and *IV*.
- C. *III* and *V*.
- D. *V* and *I*.

46. The structures which are directly involved in the cooling of the body are

- A. *I* and *V*.
- B. *II* and *IV*.
- C. *III* and *I*.
- D. *IV* and *III*.

Direction : Questions 47 to 50 refer to the diagram below which shows the apparatus (not properly assembled) used in an experiment to investigate respiration in the rat.
(The parts are not drawn to the same scale.)



47. The proper way of arranging the apparatus is that

- A. the ends of tubes 1, 3, 7 and 9 should be immersed in the solutions.
- B. the ends of tubes 2, 4, 8 and 10 should be immersed in the solutions.
- C. bottles P and Q and bottles S and T should change places.
- D. bottle R should be covered with a black cloth throughout the experiment.

48. Which of the following statements is WRONG ?

- A. Bottle P is intended to remove a certain gas from the incoming air.
- B. Bottle Q is intended to prove this gas has been completely removed from the incoming air.
- C. Bottle S is intended to show this gas has passed out of bottle R.
- D. Bottle T is intended to absorb this gas from the outgoing air.

49. If the apparatus were properly arranged, the colour of the solutions in the bottles at the end of the experiment would be

	P	Q	S	T
A.	colourless	colourless	colourless	milky
B.	colourless	colourless	milky	colourless
C.	colourless	milky	colourless	colourless
D.	milky	colourless	colourless	colourless

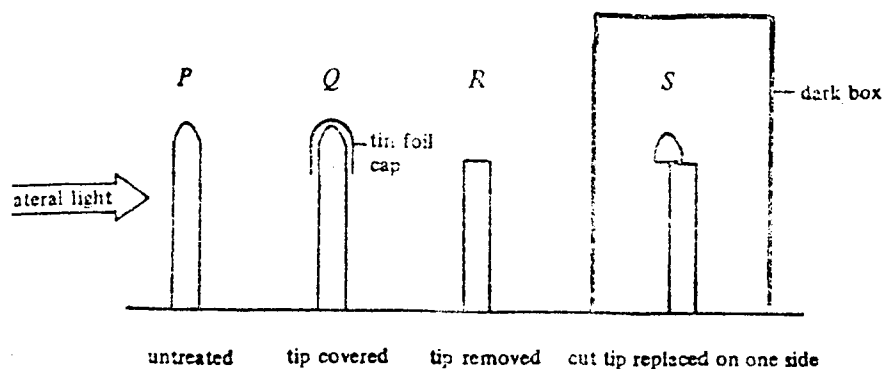
50. The result in Question 49 shows that during respiration the rat

- A. takes in oxygen.
- B. consumes carbohydrate.
- C. gives out water vapour.
- D. produces carbon dioxide.

51. Transpiration in plants

- A. removes metabolic waste.
- B. keeps the plant tissues turgid.
- C. promotes transportation of water.
- D. helps translocation of glucose.

Questions 52 to 54 refer to the diagram below which shows an experiment in which wheat coleoptiles *P*, *Q*, *R* and *S* are illuminated by unilateral light over a period of time :



2. The expected result is

	<i>P</i>	<i>Q</i>	<i>R</i>	<i>S</i>
A.	not elongated	elongated	elongated	elongated
B.	elongated	not elongated	elongated	elongated
C.	elongated	elongated	not elongated	elongated
D.	elongated	elongated	elongated	not elongated

3. Bending may be expected in

- A. *P* and *Q*.
- B. *Q* and *R*.
- C. *R* and *S*.
- D. *S* and *P*.

4. The bending expected in Question 53 will be

- A. towards the light source for both coleoptiles.
- B. away from the light source for both coleoptiles.
- C. at right angles to the light source for both coleoptiles.
- D. towards the light source for one coleoptile and away for the other.

Direction : 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. Anaerobic respiration of germinating seeds produces mainly lactic acid. Anaerobic respiration of germinating seeds is affected by their moisture content.
- 56. The lungs can be regarded as an excretory organ. The lungs expel carbon dioxide from the body.
- 57. Starch and glycogen are the insoluble carbohydrates formed by the process of photosynthesis in flowering plants. Starch and glycogen are the carbohydrates stored in plant and animal tissues respectively.
- 58. Both bile and pancreatic juice are involved in the digestion of fats. Fats are first emulsified by bile before their digestion by the pancreatic enzymes.
- 59. Refrigeration is one of the methods of food preservation. All micro-organisms are killed at temperatures below 0°C.
- 60. Sound vibrations are detected by the inner ear. Fluid motions within the semi-circular canals stimulate the sensory nerve endings.

END OF PAPER