

HONG KONG CERTIFICATE OF EDUCATION EXAMINATION 2009

BIOLOGY PAPER 2

(1 hour)

<b>Subject Code 150</b>
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1. Read carefully the instruction on the Answer Sheet and insert the information required (including the Subject Code) in the space provided.
2. When told to open this book, you should check that all the questions are there. Look for the words “**END OF PAPER**” after the last question.
3. All questions carry equal marks.
4. **ANSWER ALL QUESTIONS.** You should mark all your answers on the Answer Sheet.
5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.
6. No marks will be deducted for wrong answers.

***There are 36 questions in Section A and 24 questions in Section B.  
The diagrams in this paper are NOT necessarily drawn to scale.***

**SECTION A**

1. A student examined four animals, P, Q, R and S. He constructed the dichotomous key below to identify these animals :

1a with vertebral column.....2

1b without vertebral column.....P

2a with wet scales.....Q

2b without wet scales.....3

3a with hairs.....R

3b without hairs.....S

One of them is a reptile. Which one is it ?

A. P

B. Q

C. R

D. S

2. Which of the following statements about plants is/are correct ?

(1) Pine trees can produce seeds.

(2) Pine trees can produce fruit.

(3) Pine trees have xylem.

A. (1) only

B. (1) and (2) only

C. (1) and (3) only

D. (2) and (3) only

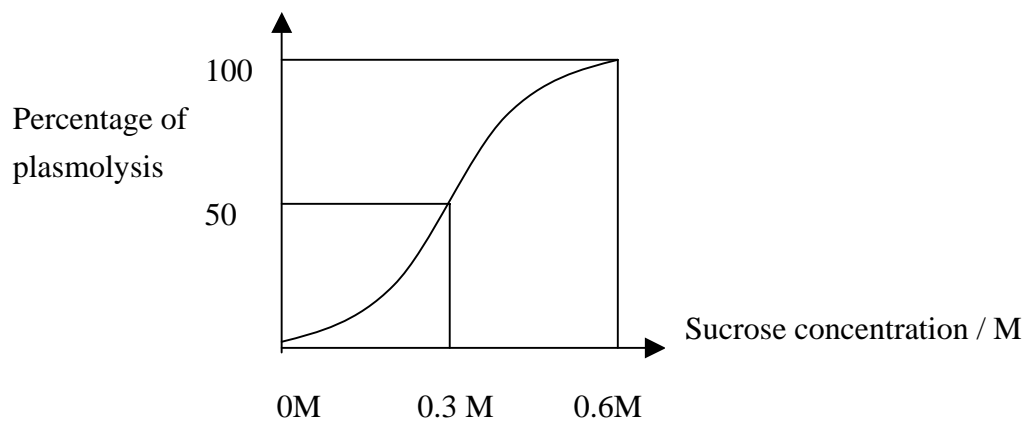
3. Which of the following correctly compares a root tip cell and an epidermal cell of a leaf ?

- | <i>root tip cell</i>     | <i>epidermis cell</i> |
|--------------------------|-----------------------|
| A. without chloroplasts  | with chloroplasts     |
| B. without nucleus       | with nucleus          |
| C. without cell wall     | with cell wall        |
| D. without large vacuole | with large vacuole    |

4. Which of the following statements about protease in stomach is correct ?

- A. The optimum pH is around 2.
- B. Enzymes are denatured at 0°C.
- C. Enzymes become active again as cooling down from 80°C
- D. The enzyme digest protein into amino acids

**Directions :** Question 5 and 6 refer to the graph below which shows the percentage of plasmolysed cell in different concentration of sucrose solution :



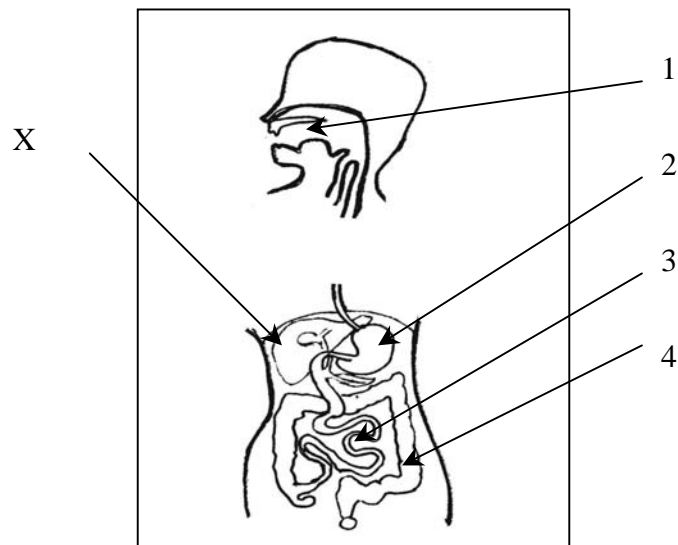
5. Which of the following is a correct description.

- A. At 0M, no water exits the cells and show no plasmolysis.
- B. 50% cells are 0.3M
- C. >50% cells conc. are greater than 0.3M
- D. No cells are greater than 0.6M.

6. The average cells concentration is

- A. 0.5 M
- B. >0.5 M
- C. 0.3 M
- D. <0.3 M

**Directions :** Questions 7 to 9 refer to the diagram below, which shows the human digestive system :



7. Protein digestion occurs mainly in

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

8. Water absorption can occur in

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

9. Which of the following is **not** a function of X?

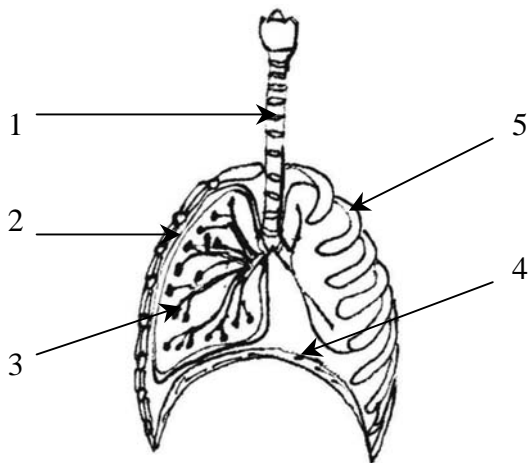
- A. production of heat.
- B. storage of glycogen
- C. production of proteins.
- D. storage of vitamin C.

10. Which of the processes in a green plant can occur in the absence of light ?

- (1) synthesis of chlorophyll
- (2) lysis of water to release oxygen.
- (3) conversion of carbon dioxide into starch

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

**Directions :** Questions 11 and 12 refer to the diagram below which shows some of the structures in the human thoracic cavity :



11. Which one of the following is **correct** description about respiratory system ?

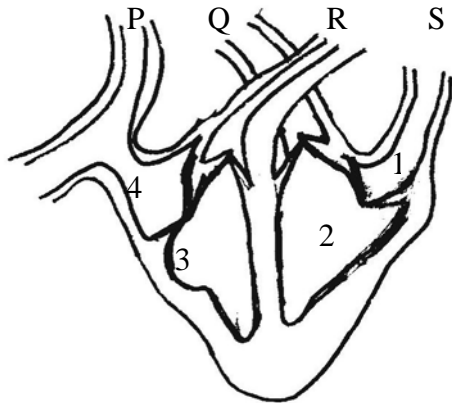
- A. 1 contains hair and mucus.
- B. 2 contracts while 4 relaxes.
- C. 3 are elastic in nature.
- D. 4 in a contracted state.

12. Which of the following are the functions of structure 5 ?

- (1) forming red blood cells
- (2) protecting the lungs
- (3) helping ventilation

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

**Directions :** Questions 13 and 14 refer to the diagram below which shows a section of the mammalian heart :



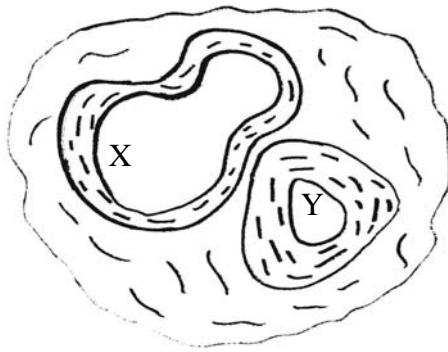
13. With reference to the diagram, which heart chambers are contracting ?

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

14. Which blood vessels are connected to the lungs ?

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

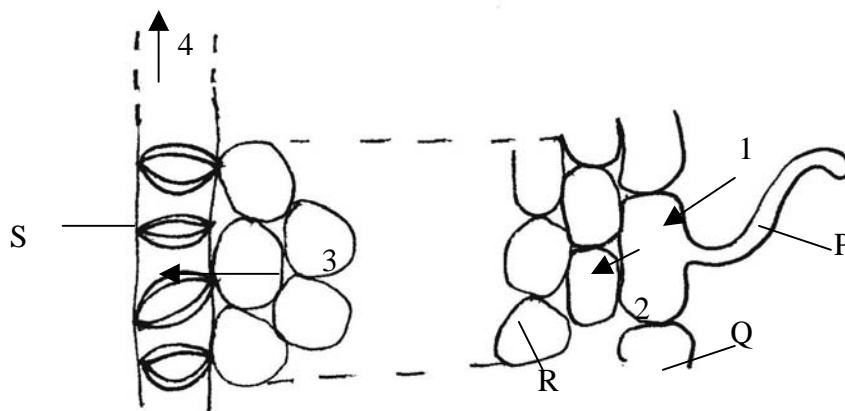
15. The photomicrograph below, which shows the transverse section of two blood vessels associated with testis :



Which of the following statements between the blood in vessels X and Y is correct ?

- A. male sex hormone conc. in X is higher than in Y
- B. oxygen conc. in X is higher than in Y
- C. carbon dioxide conc. in X is lower than in Y
- D. glucose conc. in X is higher than in Y

**Directions :** Questions 16 to 18 refer to the diagram below which shows the pathway of water movement from the soil into the root of a plant :



16. In which part(s) of the pathway does osmosis occur ?

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

17. Which of the following correctly states the functions of P and R ?

- | <i>P</i>                  | <i>R</i>           |
|---------------------------|--------------------|
| A. absorption of minerals | support            |
| B. storage of food        | transport of water |
| C. absorption of water    | storage of food    |
| D. absorption of water    | support            |

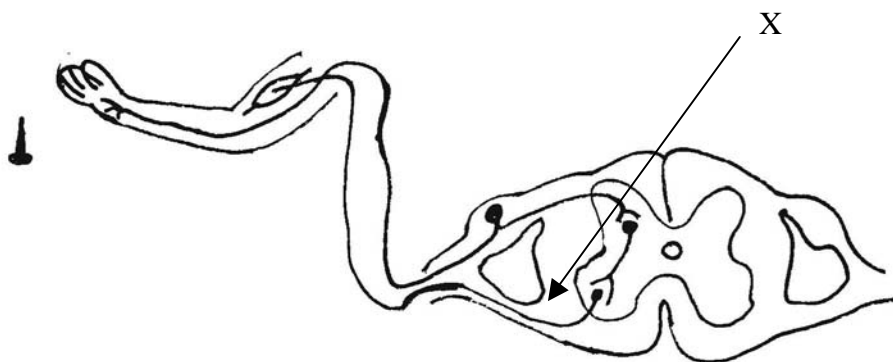
18. Which one of the cells has lowest water potential ?

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

19. Which of the following comparisons between cerebrum and spinal cord is *correct* ?

- | <i>Cerebrum</i>                | <i>Spinal cord</i>                    |
|--------------------------------|---------------------------------------|
| A. protected by bones          | not protected by bones                |
| B. grey matter inside          | white matter outside                  |
| C. nourished by blood only     | nourished by cerebrospinal fluid only |
| D. can interpret nerve impulse | cannot interpret nerve impulses       |

*Directions :* Questions 20 and 21 refer to the diagram below which shows the reflex arc involved in the withdrawal reflex :

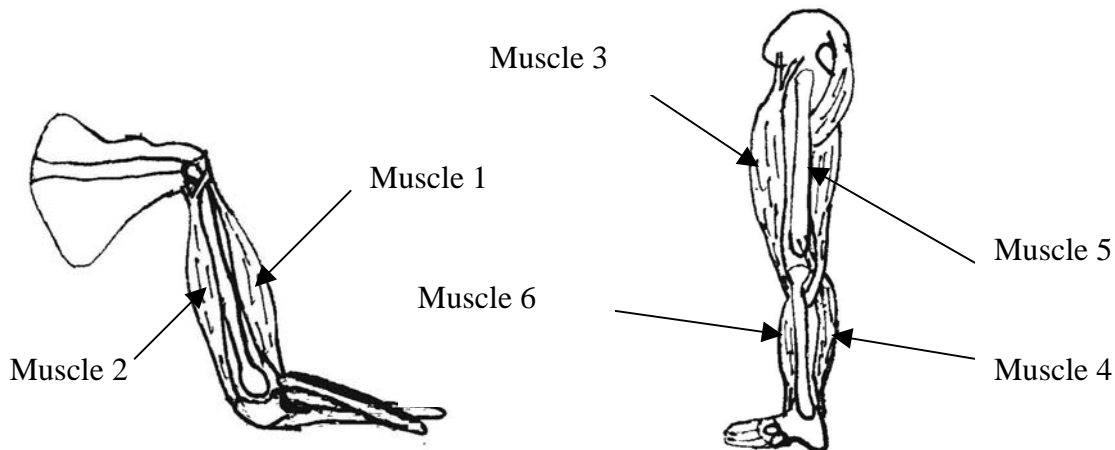


20. Which of the following is correct if structure X of a person is damaged ?
- A. The person can neither detect the stimulus nor give any response.
  - B. The person can detect the stimulus but cannot give any response.
  - C. The person cannot detect the stimulus but can pick up the hand if he wishes.
  - D. The withdrawal reflex is not affected.

21. The withdrawal reflex

- A. is acquired after birth.
- B. does not require a receptor.
- C. is initiated by the cerebrum.
- D. always produces the same responses.

22. The diagrams below which show the human arm and the leg :



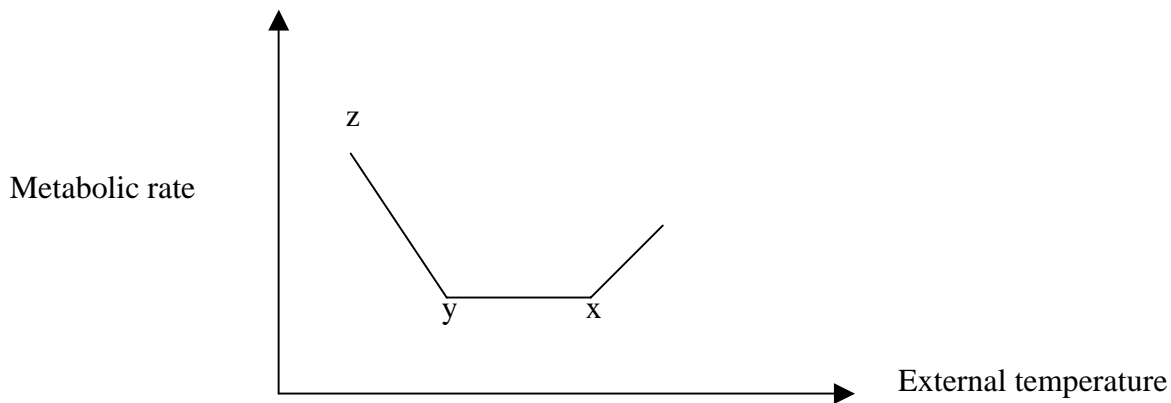
Which muscles will bring about straightening of the limbs when they contract ?

- A. muscles 1, 2 and 5
- B. muscles 1, 5 and 6
- C. muscles 2, 3 and 4
- D. muscles 2, 4 and 6

23. Which of the following comparisons between rods and cones in the eye is correct ?

- A. Cones are more sensitive to light than rods.
- B. There are three types of rods but only one type of cones.
- C. Rods are responsible for colour vision while cones are responsible for black and white vision.
- D. Cones are concentrated at the centre of the retina while rods are more abundant on the part away from the centre

*Directions :* Question 24 and 25 refer to the diagram below which shows the relationship between external temperature and metabolic rate of a man.



24. When external temperature drops from X to Y, which of the following responses is/are correct ?

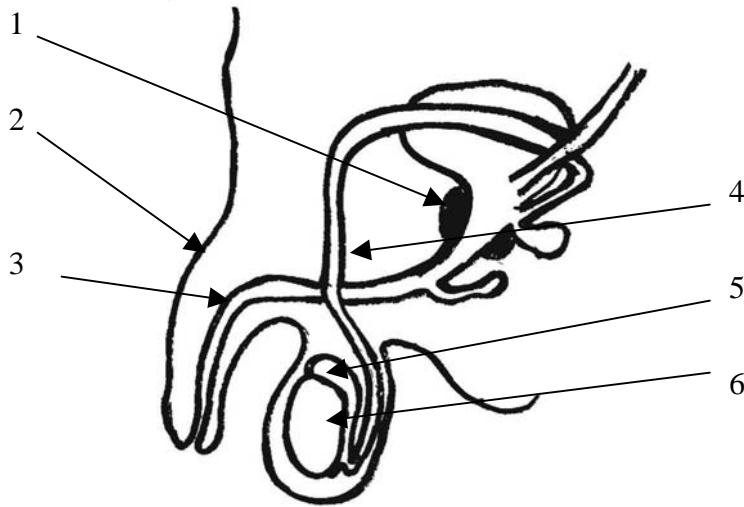
- (1) hairs erected
- (2) superficial blood vessels constricted
- (3) shivering

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

25. Which one of the following conditions will cause the curve shift upward ?

- A. in air-conditioned room
- B. in low relative humidity
- C. in low wind movement
- D. in winter

*Directions :* Question 26 and 27 refer to the diagram below which shows part of the urinogenital system of man :



26. Which structure is involved in both excretion and reproduction ?

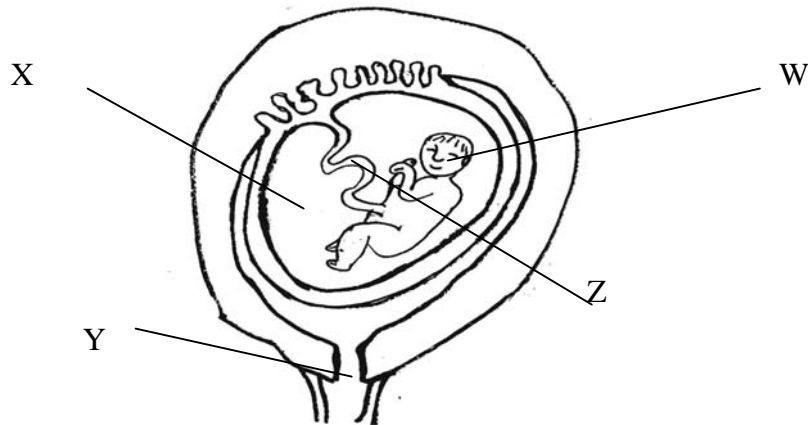
- A. 1
- B. 3
- C. 4
- D. 6

27. Which of the following may still occur after structure 4 on both sides of the body are tied up and cut ?

- (1) structure 6 produce sperm
- (2) structure 5 produce male sex hormone
- (3) structure 2 enlarge during sexual excitement

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

28. The diagram below shows a foetus. How does it obtain oxygen ?



- A. oxygen is breathed in by the foetus through W.
- B. dissolved oxygen in X diffuses into the body of the foetus.
- C. oxygen enters from Y and diffuses into the foetus.
- D. oxygen is obtained through Z.

29. Which of the following statements about the menstrual cycle is correct ?

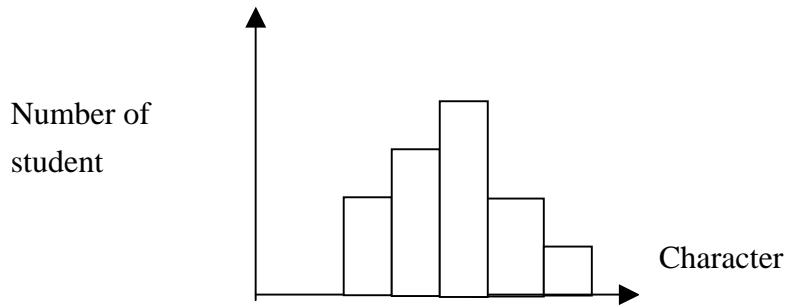
- A. it is caused by changes in the hormone levels
- B. it refers only to the events occurring in the ovaries.
- C. it refers only to the events occurring in the uterus.
- D. it repeats regularly every 28 days in a normal healthy woman.

30. Birth control in humans is important because it helps to

- (1) reduce pollution
- (2) reduce rate of depletion of natural resources.
- (3) prevent the spread of sexually transmitted diseases.

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

31. A certain character of a class of students was measured and the results are shown in the graph below :

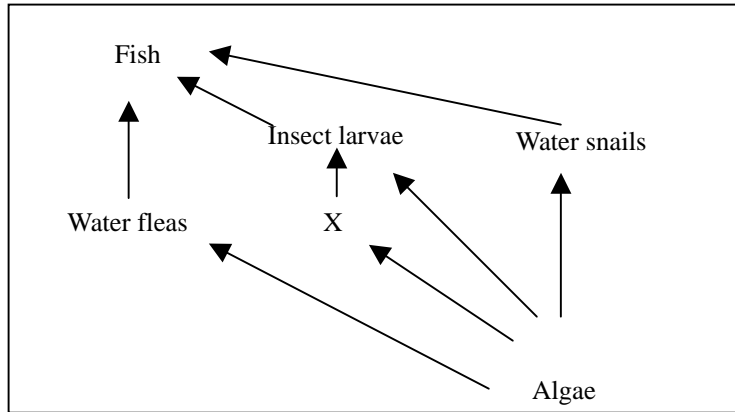


This character is probably

- A. eye colour
  - B. intelligence
  - C. blood groups
  - D. tongue-rolling ability
32. The grey male cat are mated with white female cat. The female gives birth to 6 young grey and 2 young white cats. Which of the following deduction is correct ?
- A. Grey is dominant to white because more grey cats produce,
  - B. Grey is dominant to white because the young cats ratio of grey to white is 3 to 1.
  - C. Grey is heterozygous because both types are produced.
  - D. No deduction
33. Which of the following practice may cause soil erosion in cultivated fields ?
- A. use of manure.
  - B. application of pesticides
  - C. use of heavy machinery in cultivation.
  - D. cultivation of leguminous plants.
34. Which of the following processes of sewage treatment require(s) the action of microorganisms ?
- (1) settling of small particles
  - (2) breakdown of organic matters
  - (3) digestion of sludge

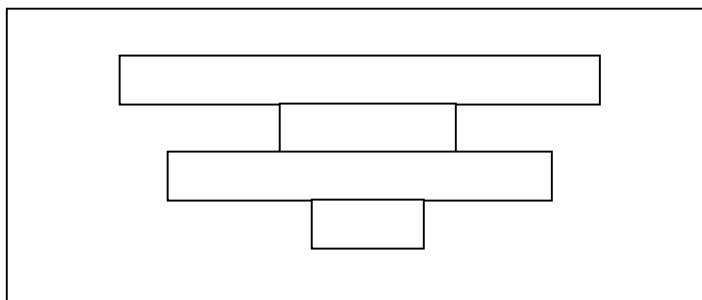
- A. (1) only
- B. (3) only
- C. (1) and (2) only
- D. (2) and (3) only

35. The diagram below shows a food web in a pond :



X may be

- A. bacteria
  - B. fungi
  - C. protozoan
  - D. shrimp
36. The following diagram show the relative number of organisms in a food chain.



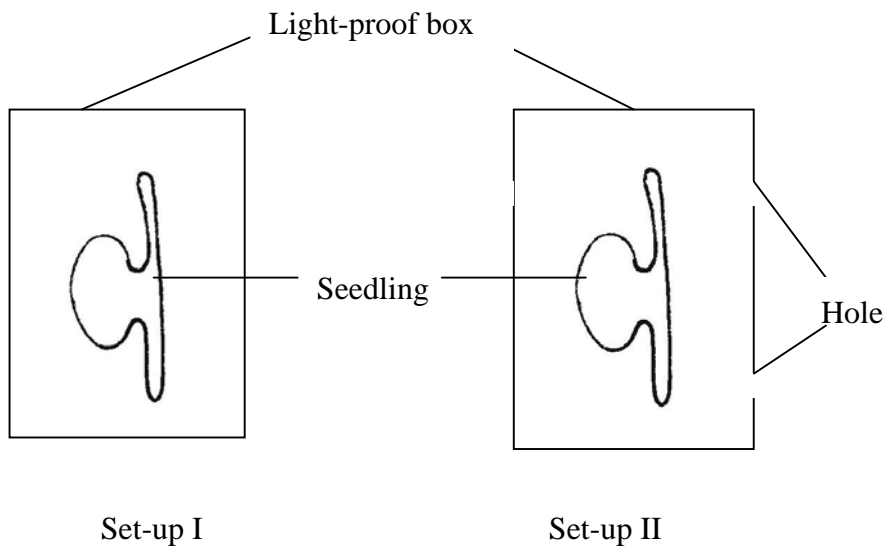
The food chain is

- A. grass → insect → snake → bird
- B. grass → insect → lizard → bird
- C. tree → insect → lizard → parasite
- D. tree → insect → snake → bird

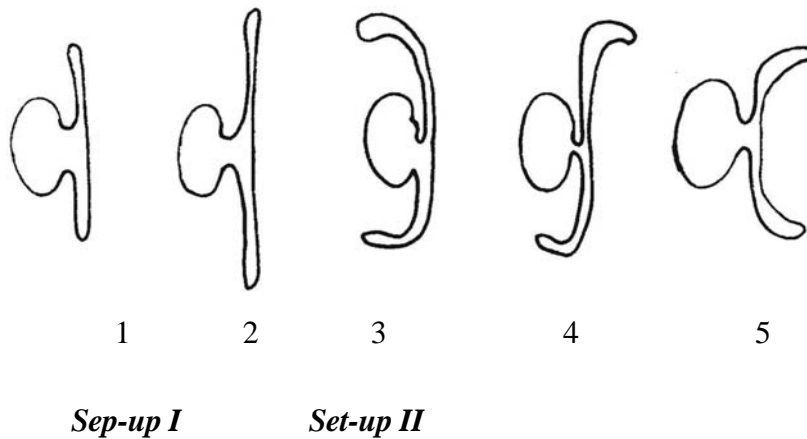
**END OF SECTION A**



**Directions :** Questions 39 and 40 refer to the diagram below which shows the experimental set-ups used to study the growth responses of plant seedlings :



39. After a few days, the appearance of the plant seedlings in the two set-ups would be

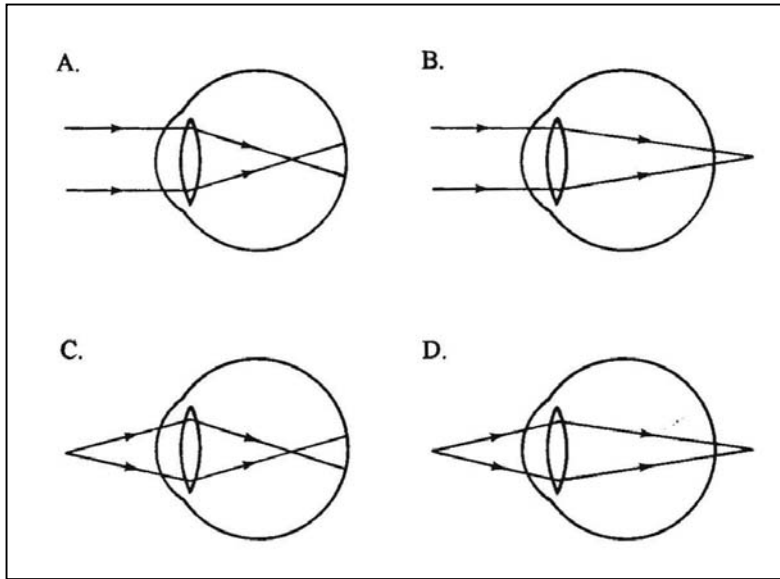


- |    |                 |                  |
|----|-----------------|------------------|
|    | <b>Set-up I</b> | <b>Set-up II</b> |
| A. | (1)             | (3)              |
| B. | (1)             | (4)              |
| C. | (2)             | (4)              |
| D. | (2)             | (5)              |

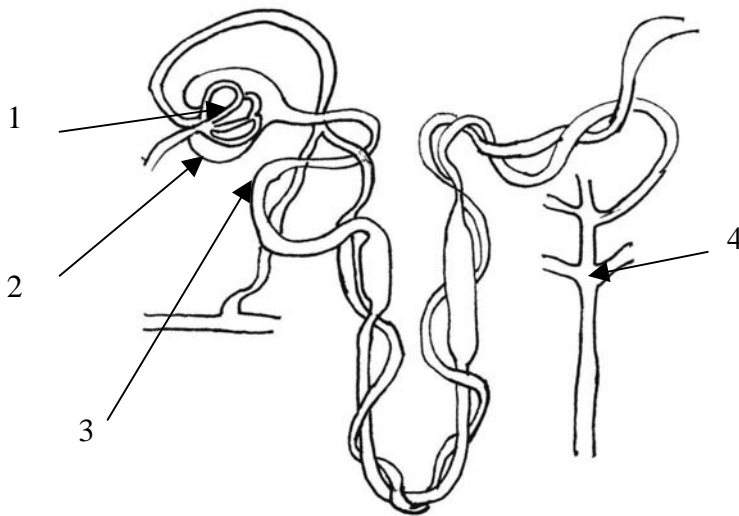
40. The result of set-up I shows

- A. etiolation
- B. geotropism
- C. positive phototropism
- D. negative phototropism

41. Which of the following diagrams correctly shows the path of light rays entering the eye when a long-sighted person tries to focus on nearby object ?



*Directions :* Questions 42 and 43 refer to the diagram below which shows a nephron :



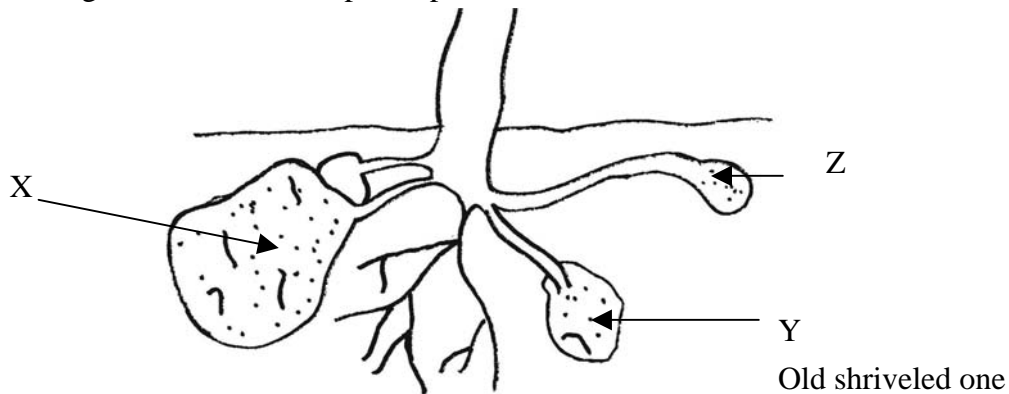
42. To assist ultrafiltration, which of the following descriptions of part 1 and 2 is **INCORRECT** ?

- A. Part 1 is in close contact with part 2.
- B. Part 1 is made up of a network of capillaries.
- C. The arteriole entering part 1 is smaller in diameter than that leaving it.
- D. The wall of part 2 is one-cell thick.

43. Which of the following correctly lists the substances that are found in the glomerular filtrate in different parts of the nephron ?

	<i>Part 2</i>	<i>Part 3</i>	<i>Part 4</i>
A.	salts	urea	glucose
B.	urea	glucose	plasma protein
C.	glucose	salts	urea
D.	plasma protein	urea	salts

44. The diagram below shows a potato plant :



Which of the following statements is **INCORRECT** ?

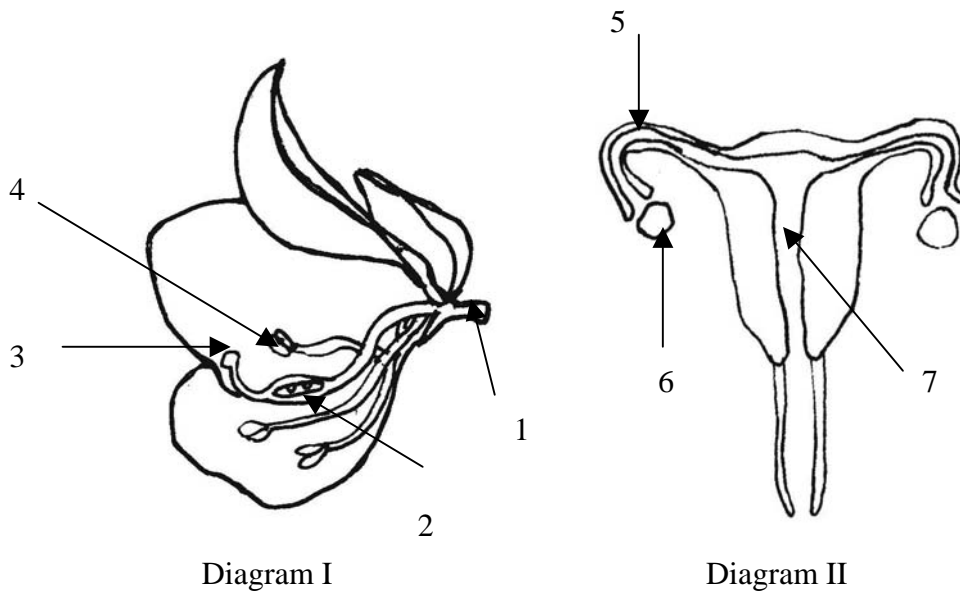
- A. The genotype of X and Y are the same.
- B. X and Z will develop into dependent plants.
- C. pathogen in Y may be transmitted into X and Z
- D. Food in Y will be transported to X and Z.

45. Which of the following produce offspring with identical genotypes ?

- (1) binary fission in bacteria
- (2) rhizome in ginger
- (3) seed formation in self-fertilization of flowering plant

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

**Directions :** Questions 46 and 47 refer to the diagram below. Diagram I shows a longitudinal section of a flower. Diagram II shows a section of the human female reproductive system.



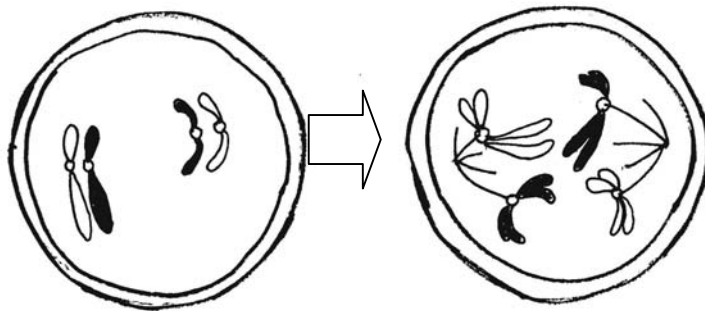
46. Where does fertilization normally occur ?

*Diagram I*      *Diagram II*

- |    |   |   |
|----|---|---|
| A. | 2 | 5 |
| B. | 3 | 5 |
| C. | 3 | 7 |
| D. | 2 | 7 |



**Directions :** Questions 50 and 51 refer to the diagram below which shows two stages of a type of cell division :



50. This type of cell division occurs in the

- A. skin.
- B. testis.
- C. anther
- D. root tip.

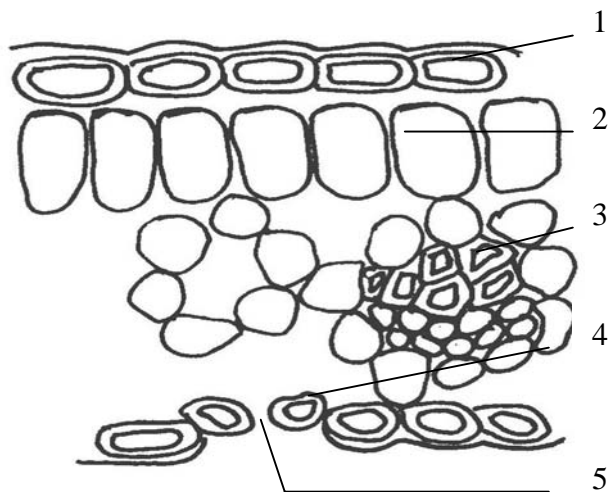
51. The number of chromosomes in the daughter cells at the end of this cell division is

- A. 1.
- B. 2.
- C. 4.
- D. 8

52. If the seawater contains a trace amount of DDT, which organism may have the highest concentration of DDT in its body ?

- A. green algae
- B. shrimp
- C. fish
- D. shark

*Directions* : Questions 53 and 54 refer to the diagram below which shows a section of a leaf :



53. Which cell types contain chloroplasts ?

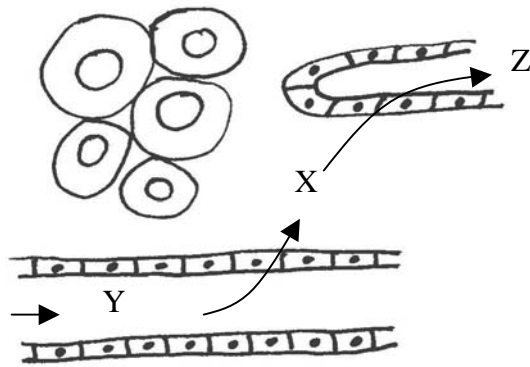
- A. 1 and 2 only
- B. 1 and 3 only
- C. 2 and 4 only
- D. 2, 3 and 4 only

54. Which of the following substance(s) are passing out from the structure 5 under bright light condition ?

- (1). carbon dioxide
- (2). oxygen
- (3). vapour

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

*Directions :* Questions 55 and 56 refers to the diagram below which shows the capillaries site in a mammal :



55. The fluid X, Y and Z are

	X	Y	Z
A.	blood	tissue fluid	lymph
B.	tissue fluid	blood	lymph
C.	lymph	blood	tissue fluid
D.	tissue fluid	lymph	blood

56. Which of the following substances is **NOT** found in fluid Z ?

- A. oxygen
- B. white blood cell
- C. glucose
- D. protein

57. Which one of the following diseases is inherited from the parents ?

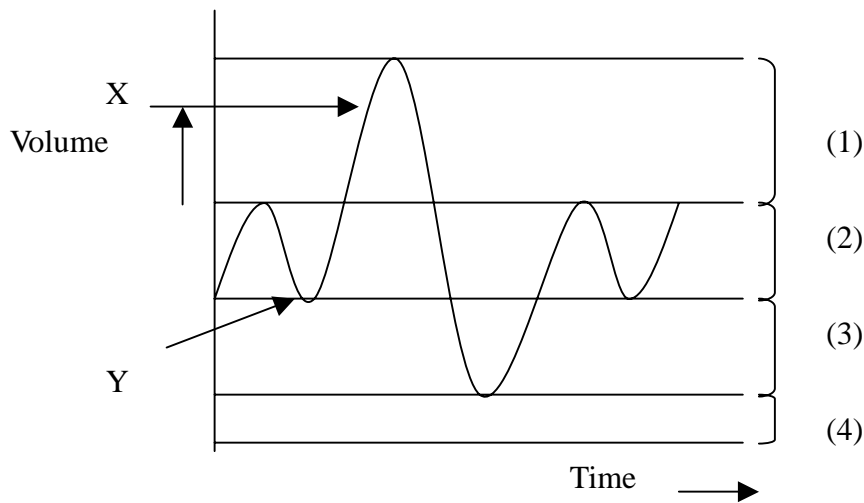
- A. Night-blindness
- B. Glucose-6-phosphate dehydrogenase deficiency
- C. Scurvy
- D. Rickets

58. Which of the following are advantages of seed dispersal ?

- (1) It reduces intraspecific competition
- (2) It prevents the spread of diseases.
- (3) it increases the chance of genetic variations.

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

**Directions :** Questions 59 and 60 refer to the diagram below which shows the changes in lung volumes recorded with a spirometer :



59. What are the states of the diaphragm in the body at points X and Y ?

- | <u>X</u>       | <u>Y</u>    |
|----------------|-------------|
| A. flattened   | dome-shaped |
| B. dome-shaped | flattened   |
| C. flattened   | flattened   |
| D. dome-shaped | dome-shaped |

60. Which of the following can be increased significantly through prolonged physical training ?

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

**END OF PAPER**

**Answer :**

1. D	31. B
2. C	32. D
3. D	33. C
4. A	34. D
5. D	35. C
6. C	36. C
7. C	37. D
8. D	38. D
9. D	39. C
10. B	40. A
11. C	41. D
12. D	42. C
13. C	43. C
14. C	44. D
15. A	45. A
16. B	46. A
17. C	47. B
18. D	48. A
19. D	49. A
20. B	50. C
21. D	51. B
22. C	52. D
23. D	53. C
24. C	54. D
25. D	55. B
26. B	56. D
27. B	57. B
28. D	58. A
29. A	59. C
30. A	60. C