MAKTAB RENDAH SAINS MARA

PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA 2005

BIOLOGI

Kertas 1

Satu jam lima belas minit

4 5 5 1 / 1

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*

2. *Soalan di halaman kiri adalah dalam bahasa Melayu. Soalan di halaman kanan adalah yang sepadan dalam bahasa Inggeris.*

3. *Calon dikehendaki membaca maklumat di halaman 2 atau halaman 3.*

Kertas soalan ini mengandungi 77 halaman bercetak dan 3 halaman tidak bercetak

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INFORMATION FOR CANDIDATES

1. *This question paper consists of 50 questions in three sections*: **Section A, Section B** and **Section C**.

2. *Answer* **all** *questions*.

3. *Answer each question by blackening the correct space on the answer sheet provided.*

4. *Blacken only* **one** *space for each question.*

5. *If you wish to change your answer, erase blackened mark that you have made. Then blacken the space for the new answer.*

6. *Diagrams in the question provide you with useful information. The diagrams are not drawn to scale unless stated.*

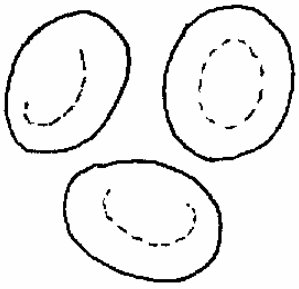
7. You *may use a non-programmable scientific calculator.*

For Questions 1 to 50, each question is followed by four alternative answers, **A, B, C** *or* **D**. *Choose* **one** *correct answer for each question and blacken the corresponding space in your objective answer sheet.*

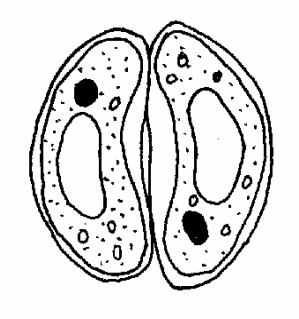
SECTION A

1 Of the cells below, which does not have a nucleus?

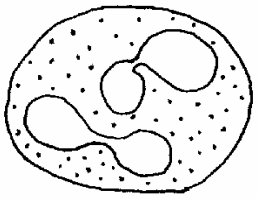
A



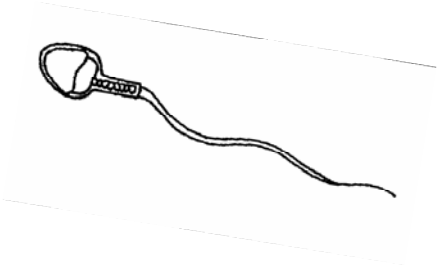
B



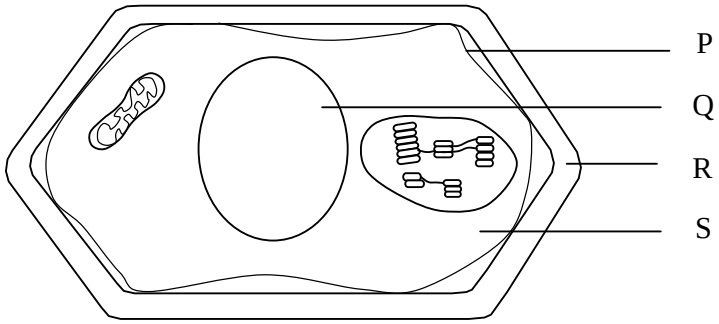
C



D



2 The figure below shows a plant cell.



Which parts contribute to the cell's turgidity ?

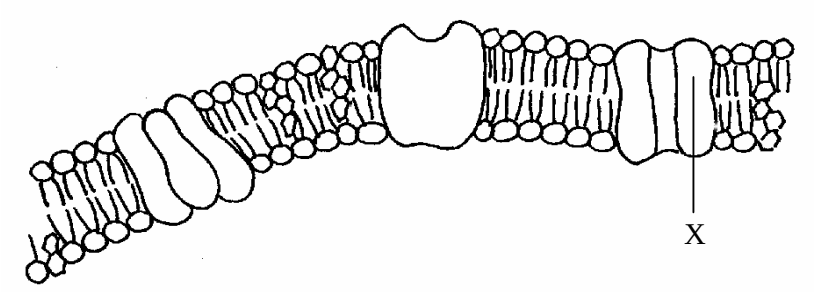
A P and R

B Q and S

C P, Q and R

D P, Q and S

3 The figure shows a model of the plasma membrane.



What is X?

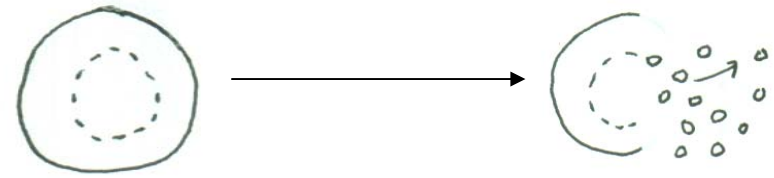
A Lipid

B Phospholipid

C Channel protein

D Carrier protein

4 The figure shows the change in an erythrocyte when placed in a certain solution for 10 minutes.



Beginning of experiment End of experiment

At the end of the experiment, the cell was

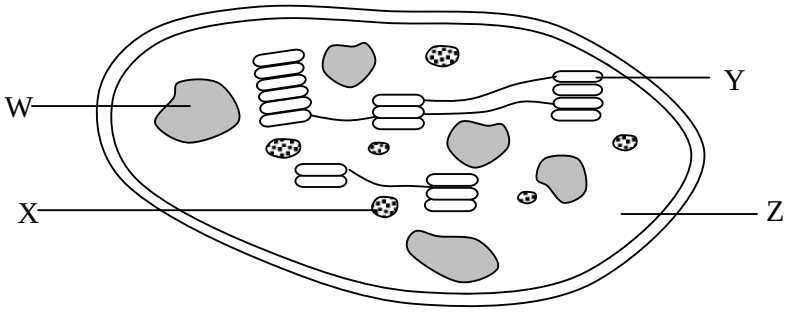
A plasmolysed

B crenated

C deplasmolysed

D hemolysed

5 The figure shows an organelle found in a plant cell.



In which of the following structure does photolysis occur during photosynthesis?

A Structure Z

B Structure Y

C Structure X

D Structure W

6 The statements below describe a particular food class.

- Releases twice the amount of energy
- Provides physical protection
- Dissolves vitamins A, D, E and K

Which class does the food belong to?

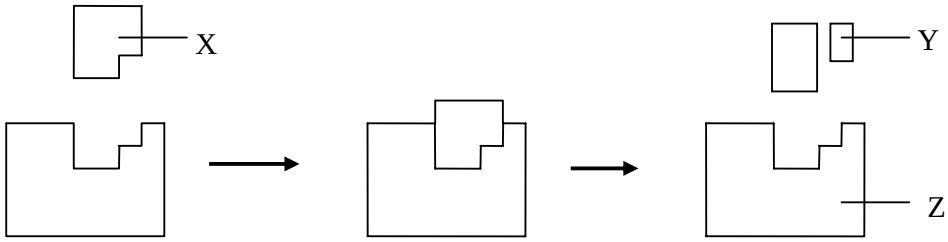
A Carbohydrate.

B Roughage

C Protein.

D Fat

7 The figure shows an enzyme reaction.



Of the following, which represents X, Y and Z?

	X	Y	Z
A	enzyme	product	substrate
B	enzyme	substrate	product
C	substrate	enzyme	product
D	substrate	product	enzyme

8 Which tissues are found in plants?

I epidermis

II ground tissue

III connective tissue

IV vascular tissue

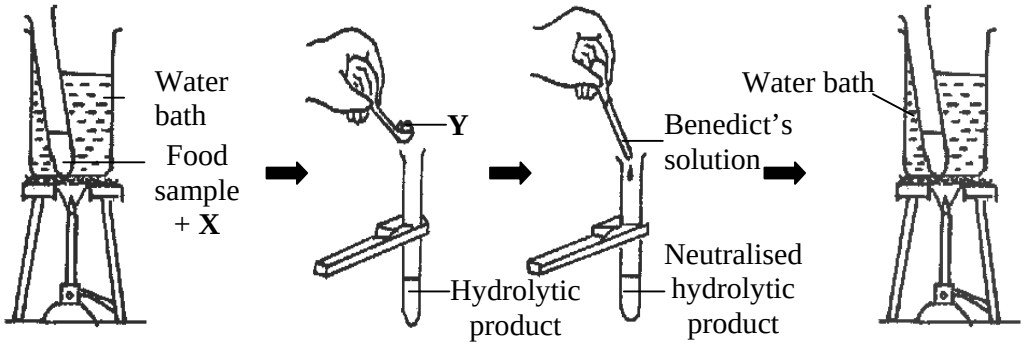
A I, II and III only

B I, II and IV only

C I, III and IV only

D I, II, III and IV

9 The figure below shows the steps to determine the presence of a non-reducing sugar.

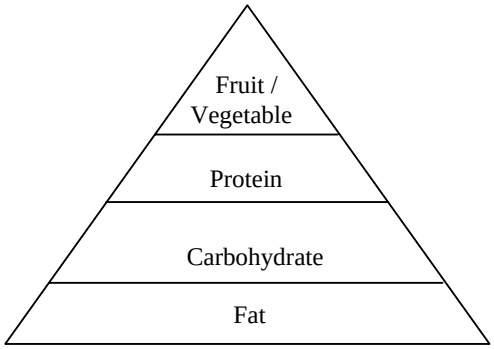


What is X and Y ?

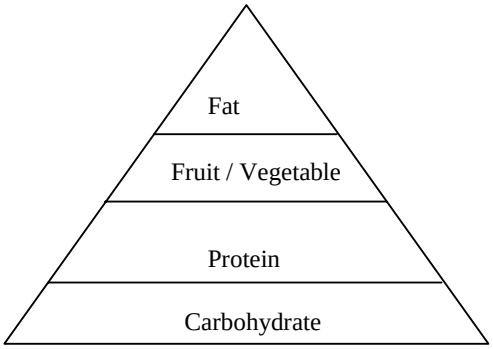
	X	Y
A	dilute hydrochloric acid	sodium bicarbonate
B	dilute hydrochloric acid	sodium chloride
C	sodium bicarbonate	dilute hydrochloric acid
D	sodium chloride	dilute hydrochloric acid

10 Which food pyramid fulfills the needs of a growing child?

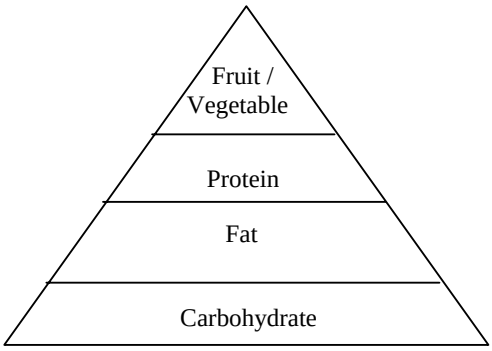
A



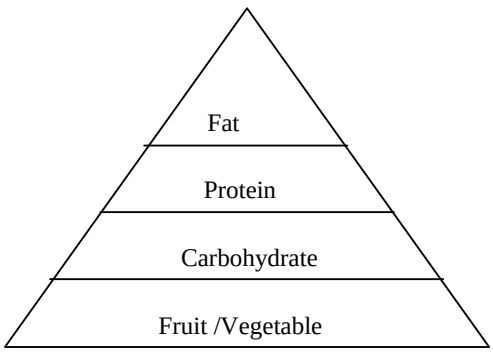
B



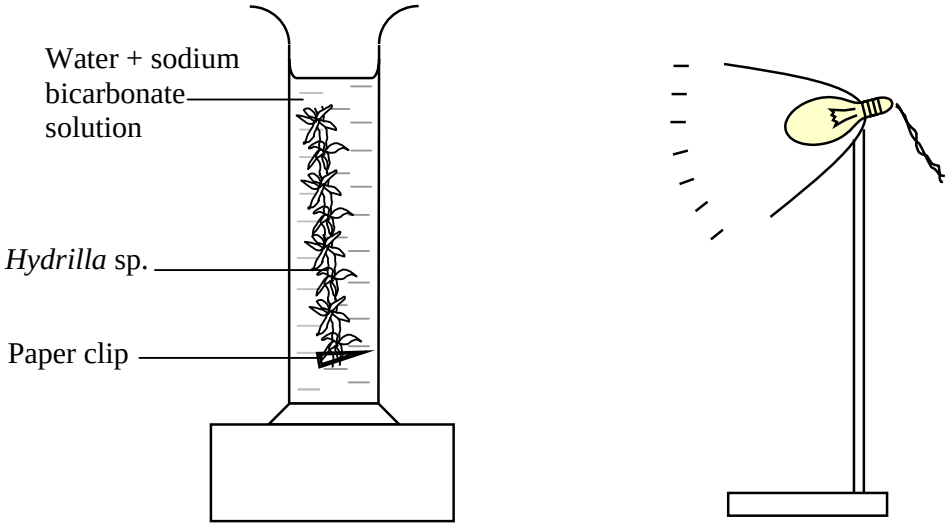
C



D



11 The figure shows an experiment on the effect of light intensity on photosynthesis.



State the function of natrium bicarbonate solution.

A To provide oxygen to the *Hydrilla* sp.

B To provide carbon dioxide to the *Hydrilla* sp.

C As a universal indicator to test for the presence of oxygen.

D As a universal indicator to test for the presence of carbon dioxide.

12 Of the following, which causes continuous variation in the human population?

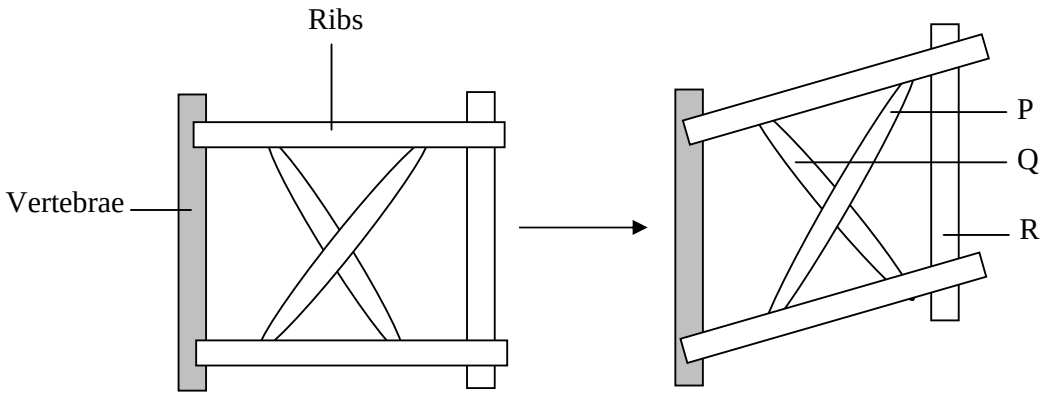
A Gen mutation

B Chromosomal mutation

C Environmental factor

D Certain genotype traits

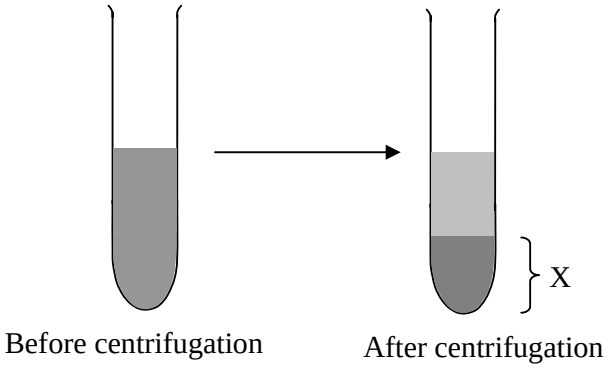
13 The figure shows a model of the ribs during respiration.



Which correctly represents P, Q and R ?

	P	Q	R
A	External intercostal muscles	Internal intercostal muscles	Sternum
B	External intercostal muscles	Internal intercostal muscles	Diaphragm
C	Internal intercostas muscles	External intercostal muscles	Sternum
D	Internal intercostal muscles	External intercostal muscles	Diaphragm

14 The figure shows a blood sample in a test tube before and after centrifugation.



Which is **not** found in X ?

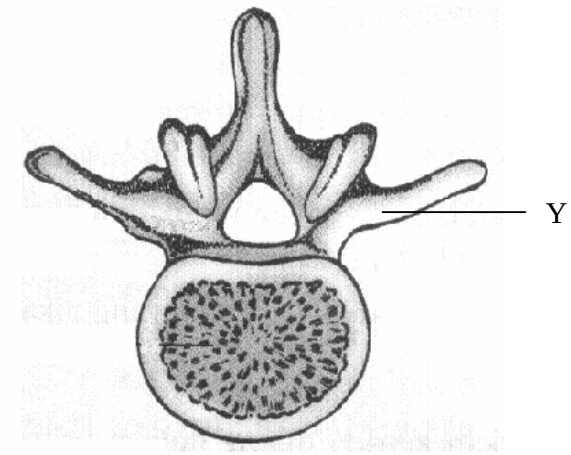
A Platelet

B Erythrocyte

C Antibody

D Leucocyte

15 The figure shows a human vertebra.



What is the function of Y?

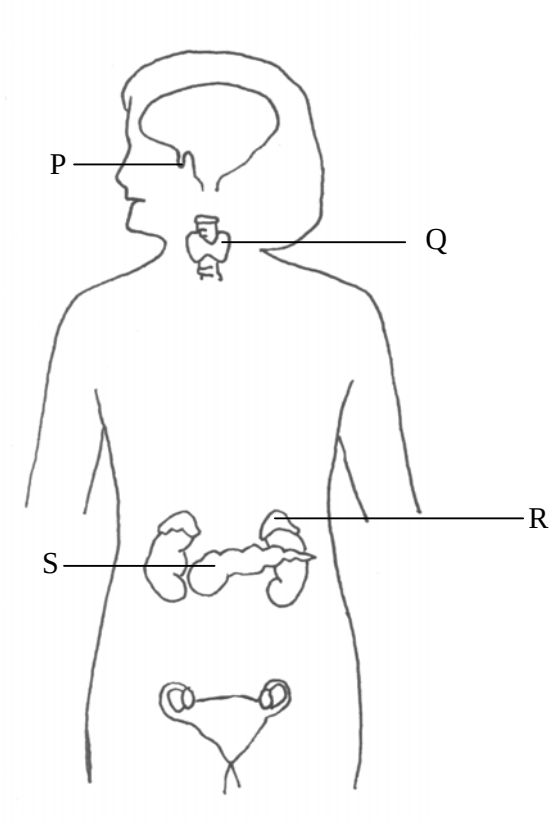
A For muscle attachment

B To protect the spinal cord

C To form joints with the ribs

D To form joints with the vertebral column

16 The figure shows the endocrine glands of a woman.



Which of the following glands secretes adrenaline?

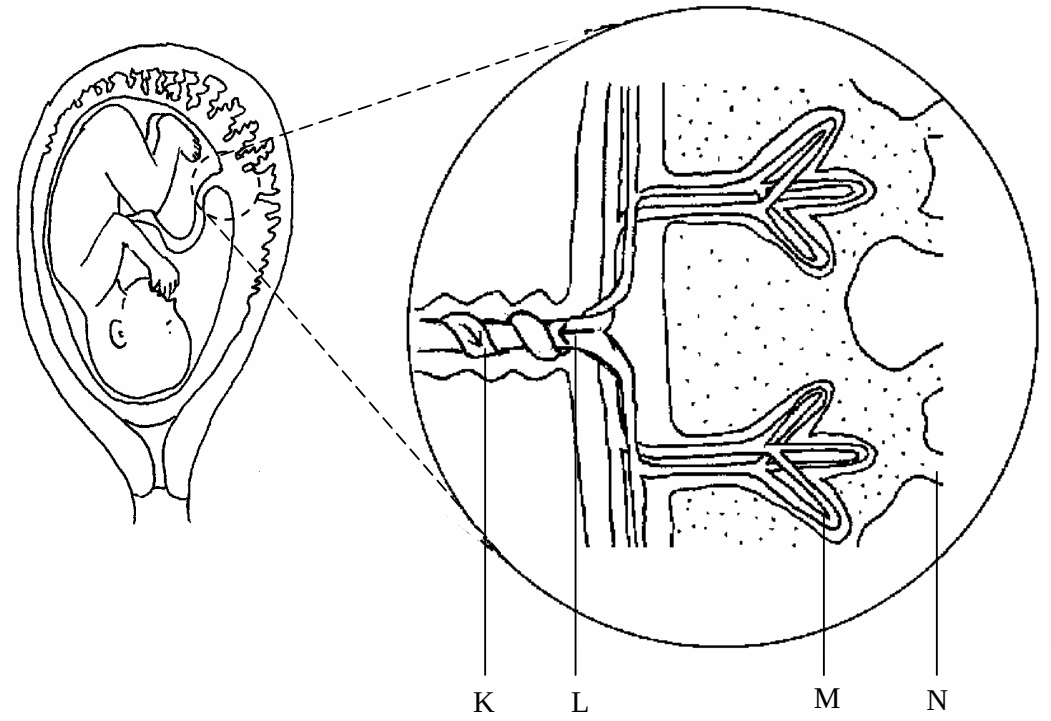
A Structure S

B Structure R

C Structure Q

D Structure P

17 The figure shows the structure of the placenta in the uterus.



Of the following, which is the umbilical artery?

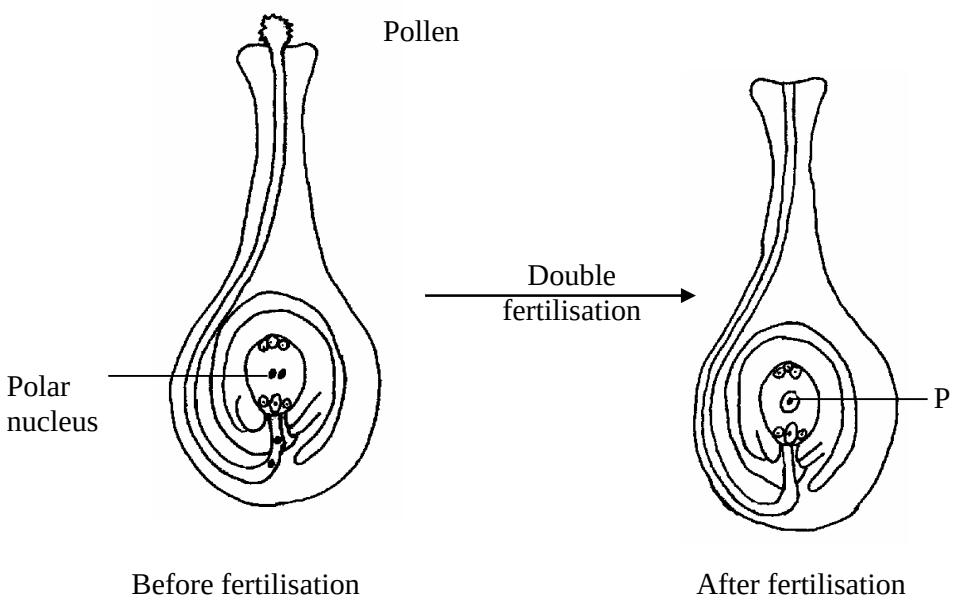
A Structure K

B Structure L

C Structure M

D Structure N

18 The figure shows a matured ovary and ovule before and after double fertilisation



What is P?

A Zygote

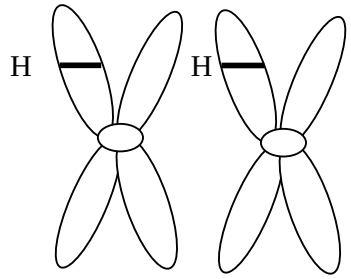
B Egg cell

C Antipodal cell

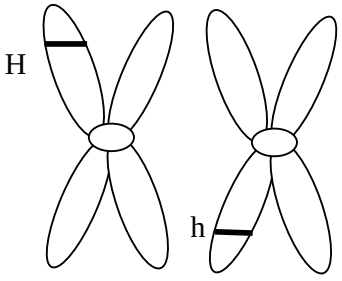
D Triploid nucleus of endosperm

19 Which figure shows a pair of alleles?

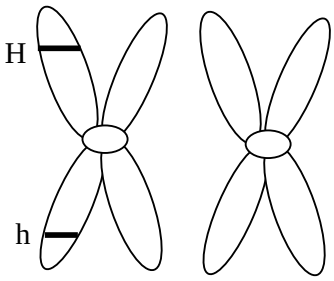
A



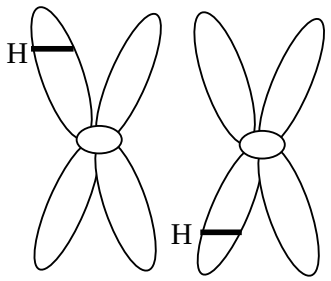
B



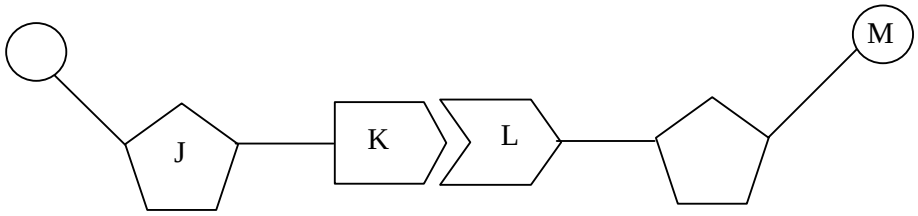
C



D



20 The figure shows a pair of nucleotides.



Which structure forms the backbone of DNA?

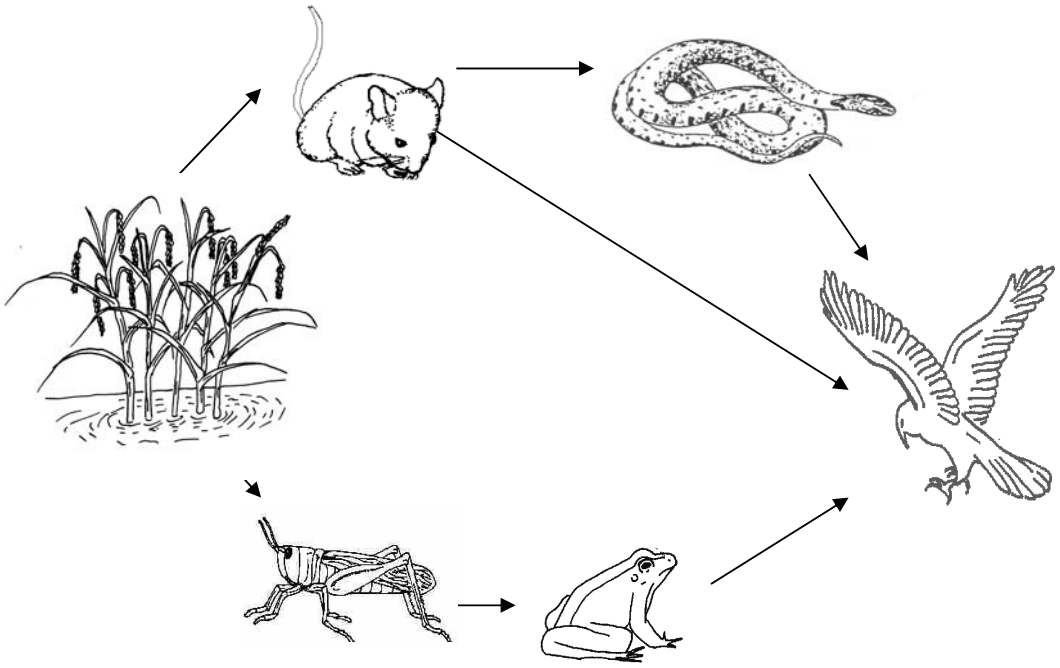
A J and M

B J and K

C K and L

D K and M

21 The figure shows a food web in an ecosystem.



Which of the following represents the third trophic level?

A Snake and frog

B Rat and grasshopper

C Rat, frog and snake

D Frog, snake and eagle

22 The density of a plant species in an area may be estimated using the following formula:

$$\text{Density} = \frac{S}{T \times U}$$

Which of the following represents S, T and U ?

	S	T	U
A	Number of quadrats	Total number of species studied	Area of one quadrat
B	Number of quadrats	Area of one quadrat	Total number of species studied
C	Total number of species studied	Number of quadrats	Area of one quadrat
D	Total number of species studied	Area of one quadrat	Number of quadrats

23 The following is a series of events which occur as a result of eutrophication.

K - Dead algae decomposed by bacteria.

L - Excess nitrate and phosphate flows into lake or river.

M - Encourages growth of aquatic plants like algae.

N - Dissolved oxygen decreases, BOD increases and fish will die

Which of the following sequence is true?

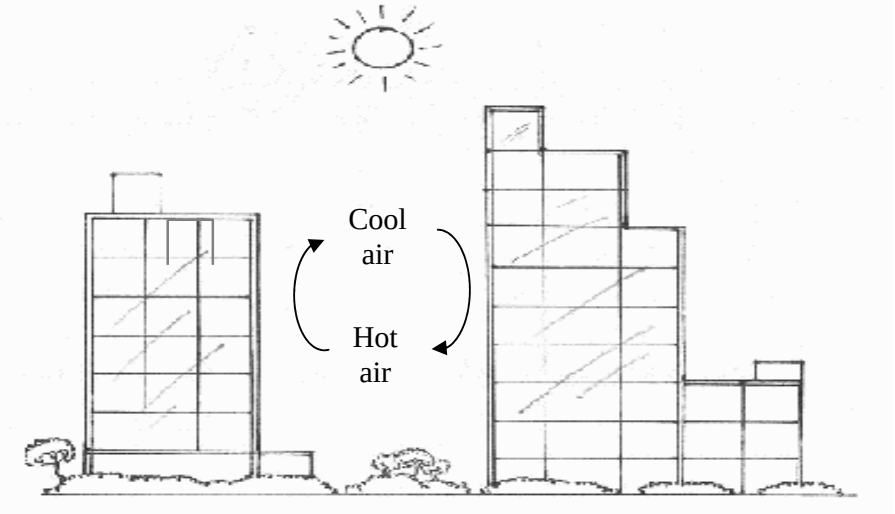
A L → M → K → N

B L → K → M → N

C M → L → K → N

D K → N → L → M

24 The figure shows a phenomenon in the city.



What is the phenomenon?

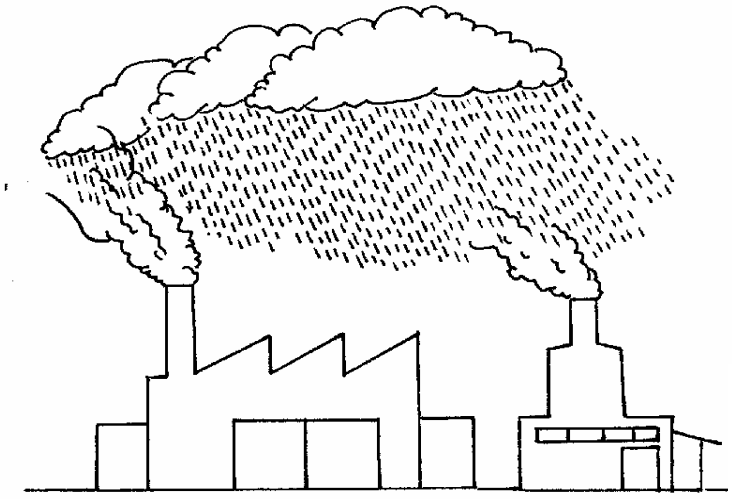
A Green house effect

B Formation of smog

C Heat is trapped

D Formation of acid rain

25 The figure shows a phenomenon in an industrial area.



What does the phenomenon cause?

A Air pollution

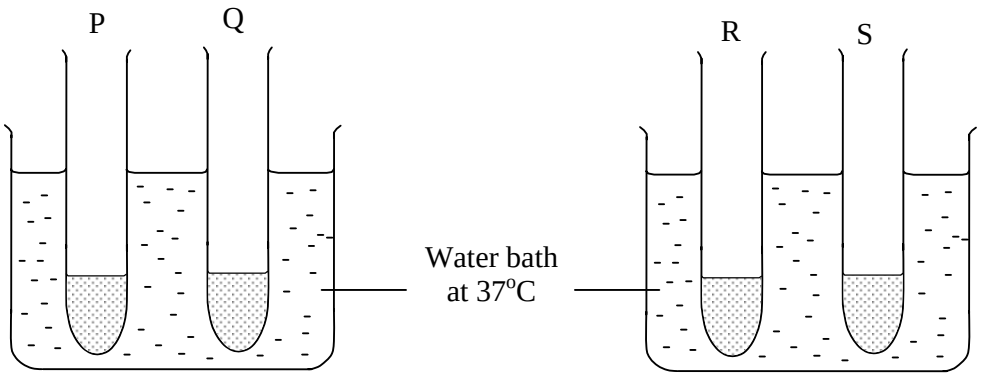
B Heat pollution

C Formation of haze

D Formation of acid rain

SECTION B

26 The figure shows an experiment to study the effect of pH on the reaction of an enzyme. The contents of each test tube were treated as stated in the table below.



Test tube	Treatment
P	Egg white + pepsin
Q	Egg white + sodium bicarbonate
R	Egg white + hydrochloric acid + pepsin
S	Egg white + sodium bicarbonate + pancreatic juice

Which test tubes remain cloudy after 60 minutes?

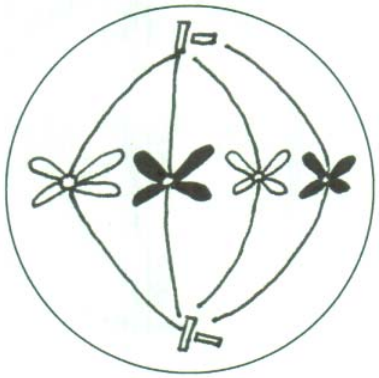
A P dan Q

B R dan S

C Q dan S

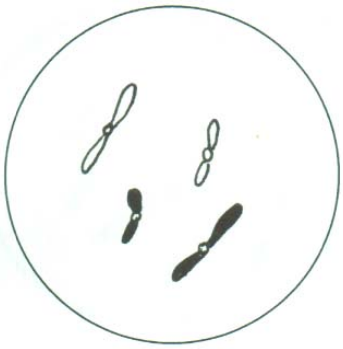
D P dan R

27 The figure shows a somatic cell in the metaphase stage of mitosis.

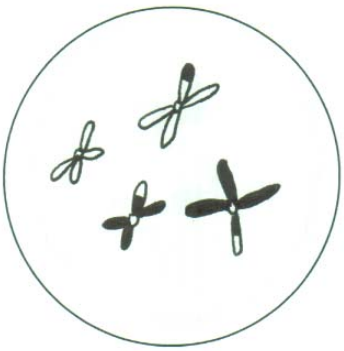


Which of the following shows the chromosomal content of the resulting offspring ?

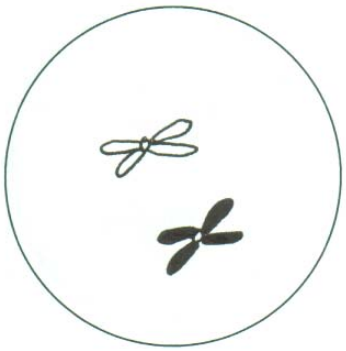
A



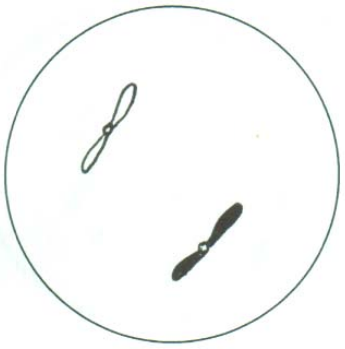
B



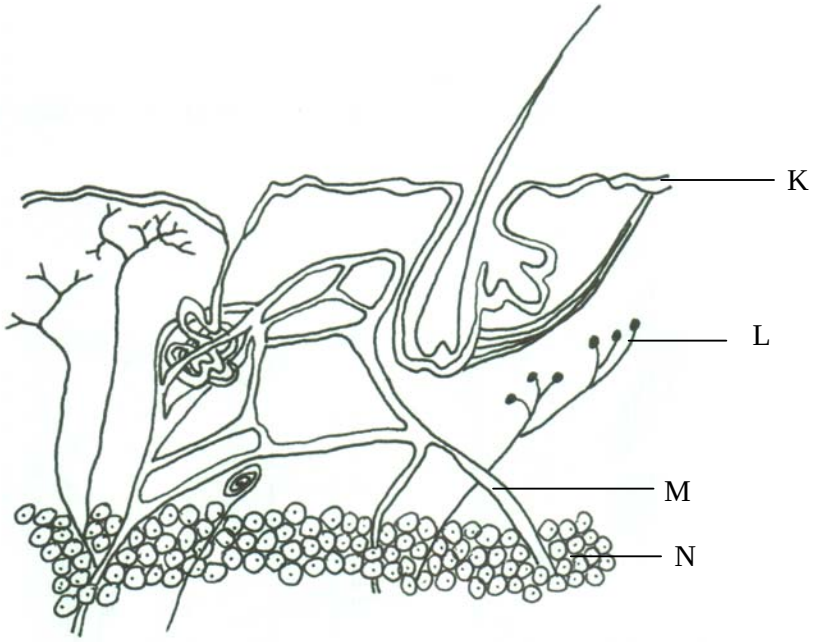
C



D



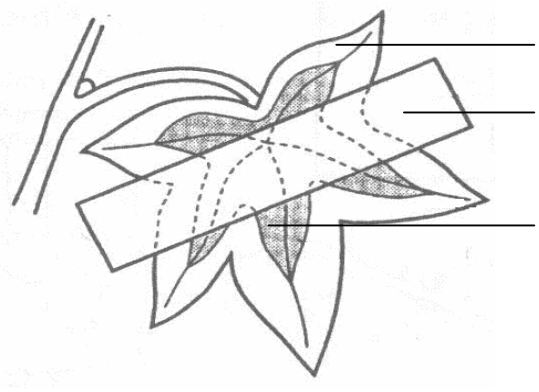
28 The figure shows a cross section of the human skin.



Of the following, which is true for K, L, M, and N?

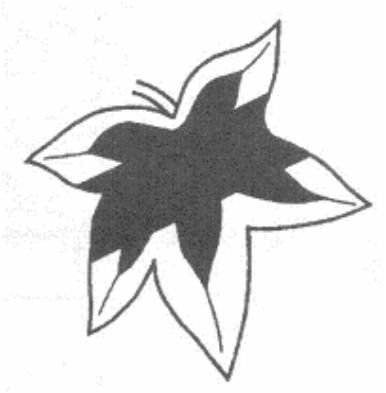
	TissueK	Tissue L	Tissue M	Tissue N
A	Epithelium	Nerve	Connective	Muscle
B	Epithelium	Nerve	Muscle	Connective
C	Muscle	Nerve	Muscle	Epithelium
D	Muscle	Connective	Epithelium	Nerve

29 The figure shows a leaf that has been exposed to sunlight for 48 hours.

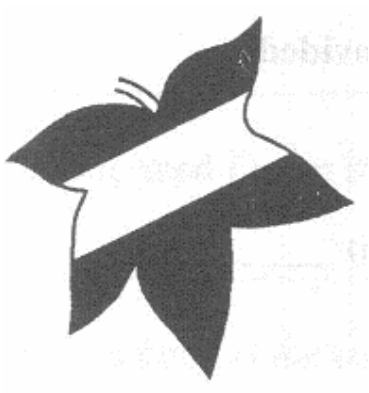


Which shows the outcome of the experiment after being tested with iodine solution ?

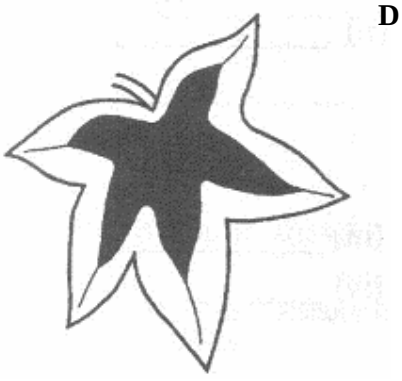
A



B

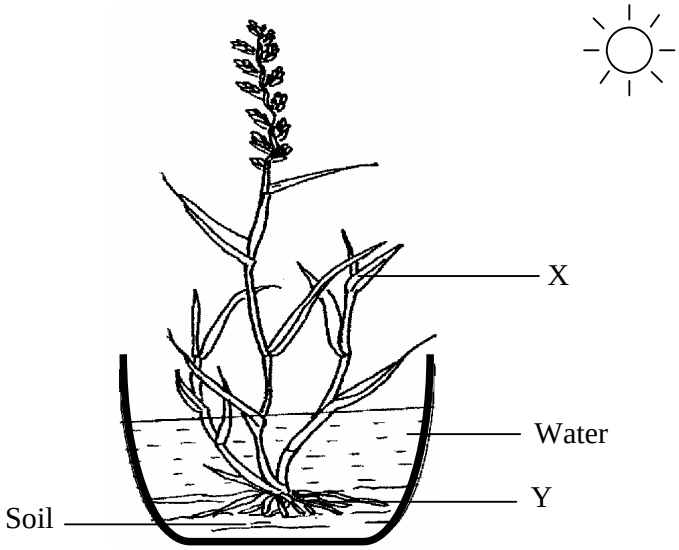


C



D

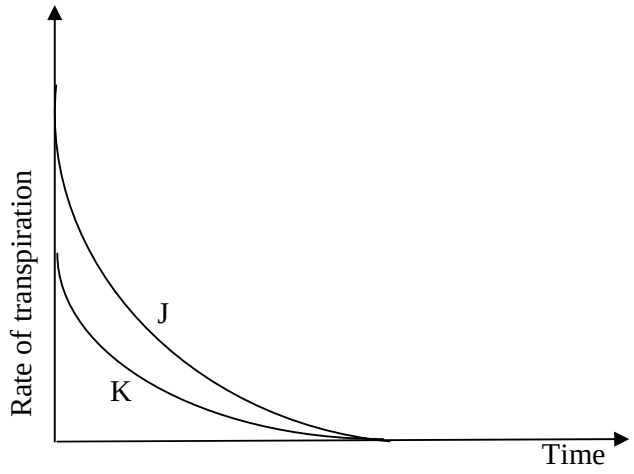
30 The figure shows a potted plant in the sun.



Which word equation describes what happens in X and Y?

	Part	Word equation
A	X	Carbon dioxide + water $\xrightarrow{\text{light}}$ glucose+ carbon dioxide
		Glucose $\longrightarrow$ ethanol + carbon dioxide
	Y	Carbon dioxide + water $\xrightarrow{\text{light}}$ glucose + oxygen
B	X	Glucose + oxygen $\longrightarrow$ carbon dioxide + water + energy
	Y	Glucose $\longrightarrow$ ethanol + carbon dioxide + energy
C	X	Carbon dioxide + water $\xrightarrow{\text{light}}$ glucose + oxygen
	Y	Glucose + oxygen $\longrightarrow$ carbon dioxide + water + energy
D	X	Carbon dioxide + water $\xrightarrow{\text{light}}$ glucose + oxygen
		Glucose + oxygen $\longrightarrow$ carbon dioxide + water + energy
	Y	Glucose $\longrightarrow$ ethanol + carbon dioxide + energy

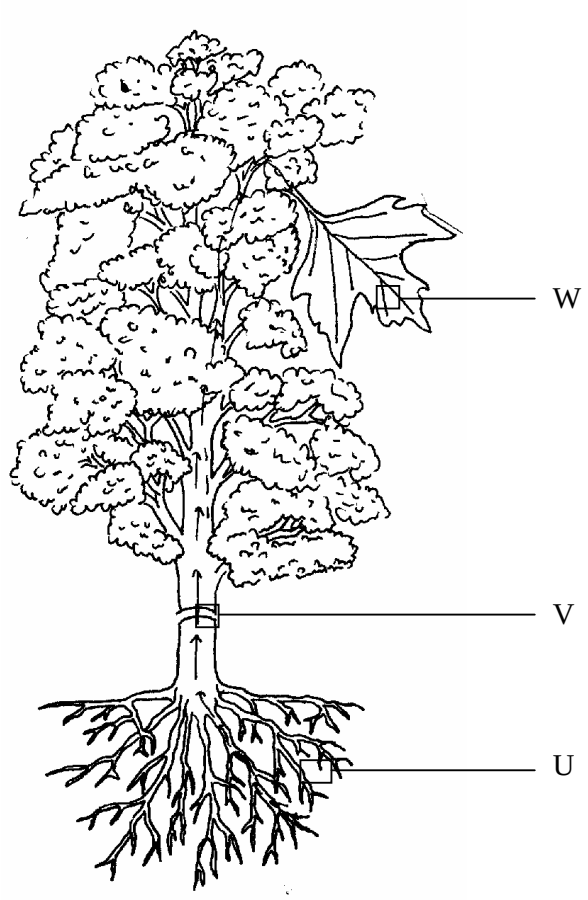
31 The graph shows the rate of transpiration in a plant due to air humidity.



Of the following, which pair of factors is suitable for the rate of transpiration at K to change to J ?

	Temperature	Air movement
A	High	Slow
B	High	Fast
C	Low	Fast
D	Low	Slow

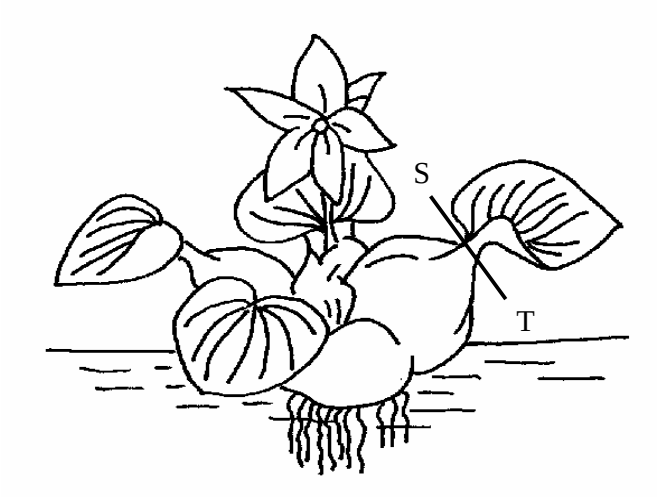
32 The figure shows the movement of water molecules from the soil until it is transpired through the leaves.



Of the following, which correctly describes the force and the process which helps water movement in U, V dan W ?

	U	**V**	**W**
A	Active transport and root pressure	Capillary action	Osmosis
B	Active transport and root pressure	Capillary action and transpiration pull	Capillary action
C	Osmosis and root pressure	Capillary action and transpiration pull	Transpiration pull and osmosis
D	Osmosis and root pressure	Transpiration pull only	Active transport

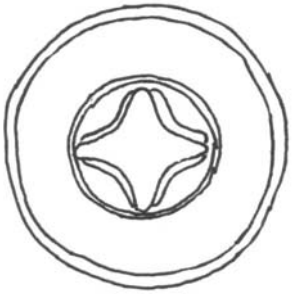
33 The figure shows a water plant in a pond.



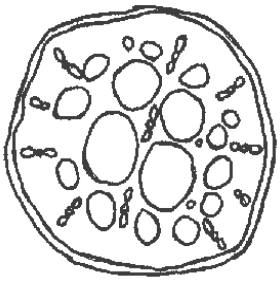
Of the following, which shows the arrangement of tissues in a cross section through S – T?

A

B



C

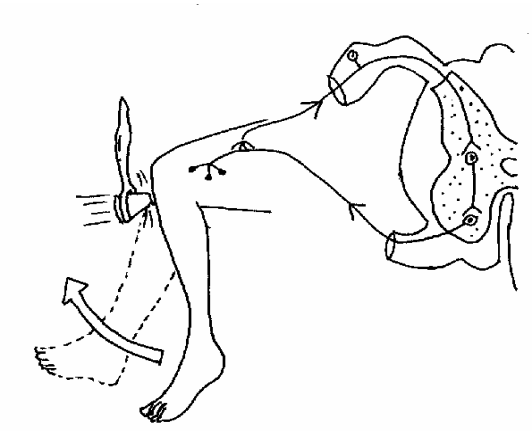


D

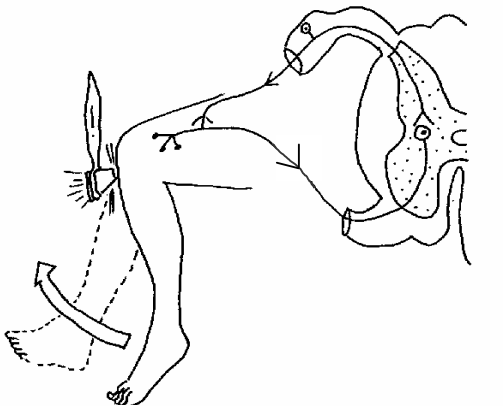
34 The figure shows the knee jerk test on a student.

Which of the following is true for the sequence of events happening in the reflex arch ?

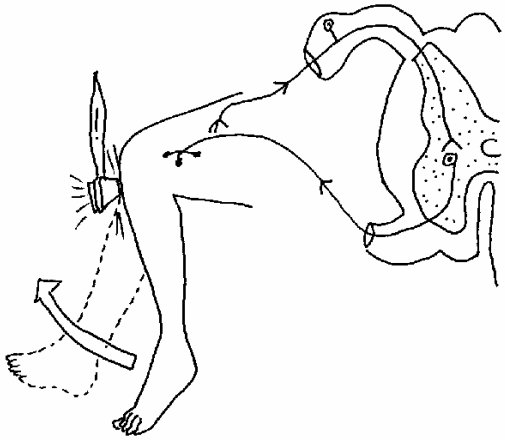
A



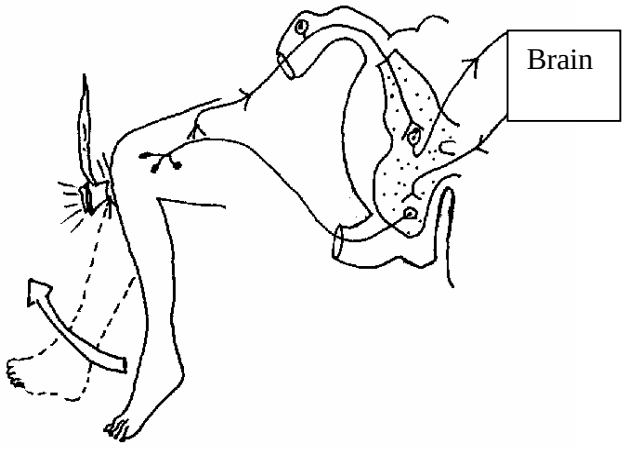
B



C

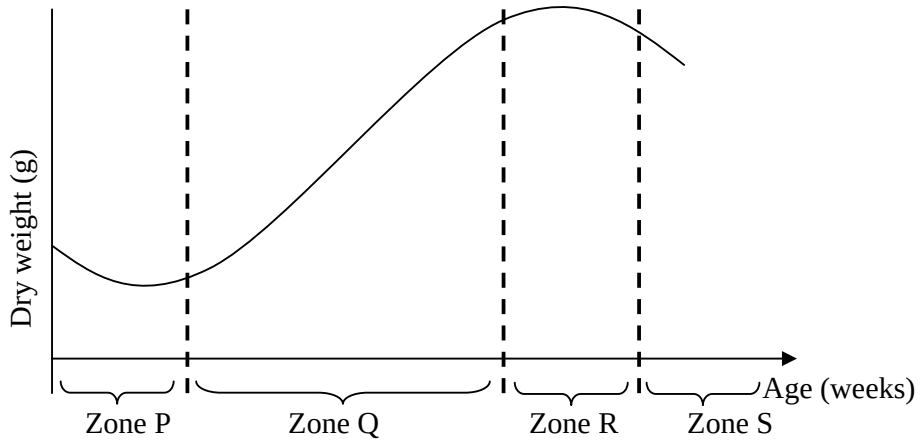


D



35 The graph shows the growth pattern of a dicotyledonous plant. A student makes the following conclusion:

- The endosperm of the seed is used for germination.
- The seedling has not undergone photosynthesis.



Which zone is true for the above statements?

A Zone P

B Zone Q

C Zone R

D Zone S

36 The statements below are related to a method of contraception.

- A plastic dome is inserted into the cervix before sexual relations.
- The efficiency is 90%.

The method of contraception described above is the use of

A spermicide

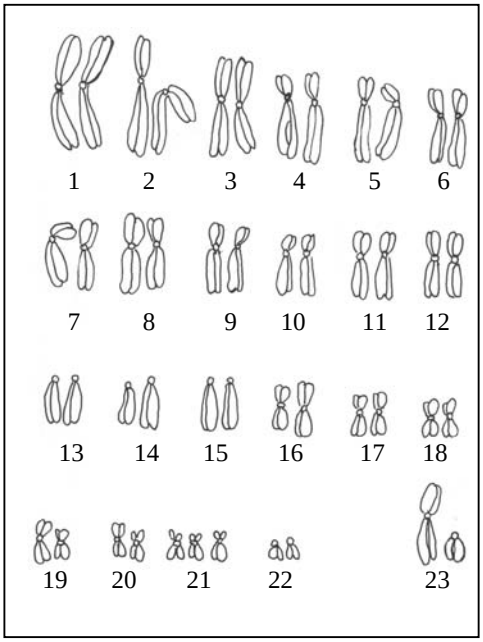
B diaphragm

C tubectomy

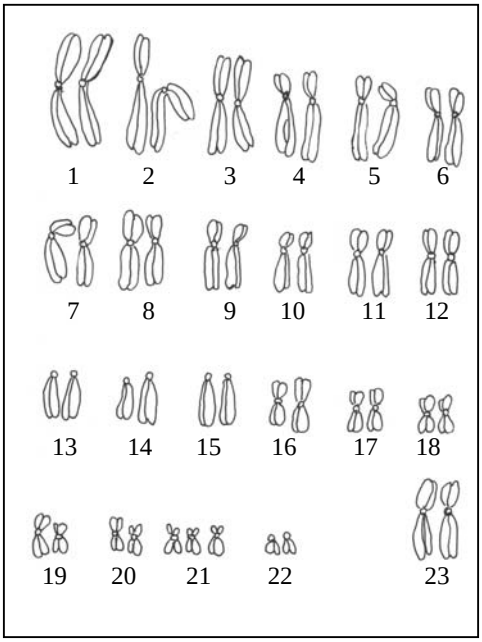
D intra-uterine device (IUD)

37 Which of the karyotypes below shows a man suffering from Down's syndrome?

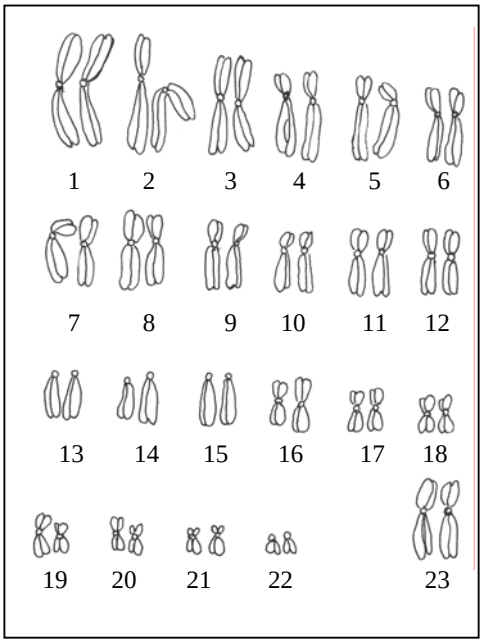
A



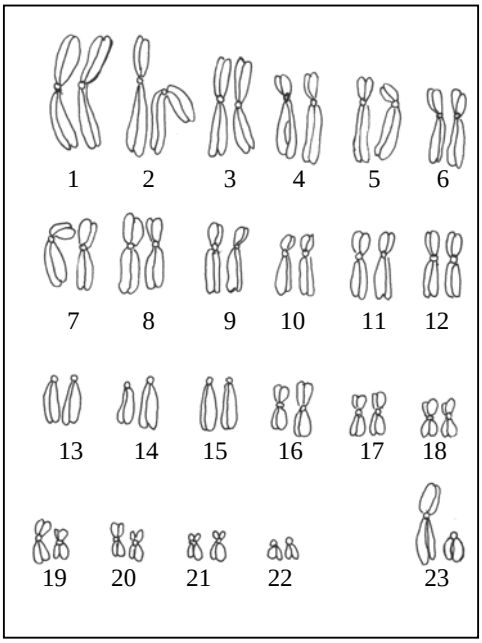
B



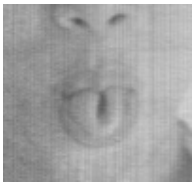
C



D

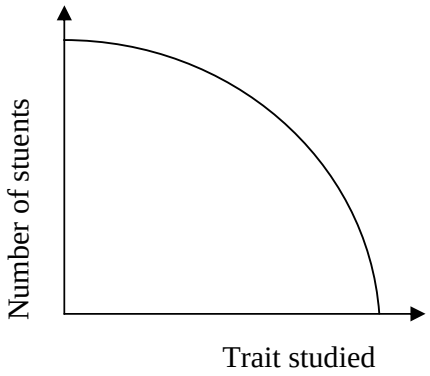


38 The pictures below show traits that were studied in a group of students.

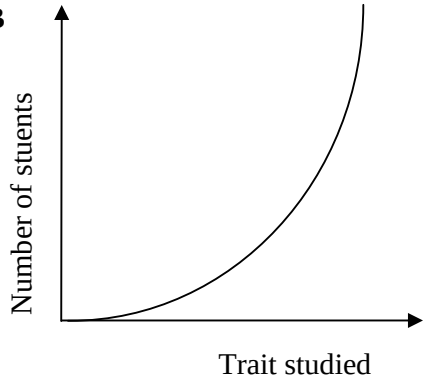
Observation of traits		
A	**B**	**C**
		
		

Which graph represents the above observations?

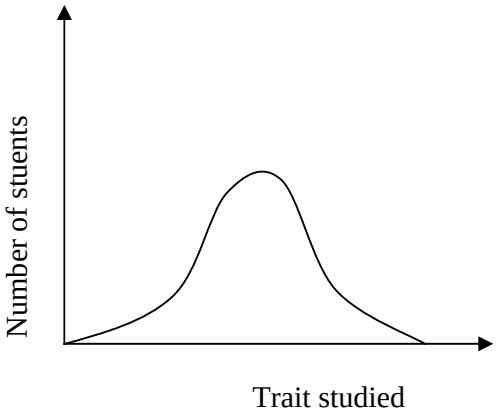
A



B



C



D

39 Tall tree, red flowers and short tree, white flowers (true breeding) were bred. The phenotype of offspring F2 are shown in the table below.

Tall tree, red flowers

X

Short tree, white flowers

Phenotype F_2	**Ratio**
Tall tree, red flowers	9
Short tree, red flowers	3
Tall tree, white flowers	3
Short tree, white flowers	1

State the genotype of short tree, white flowers

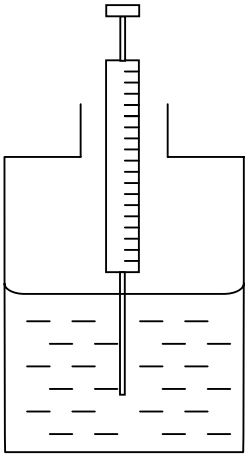
A ttmm

B ttMm

C TTMm

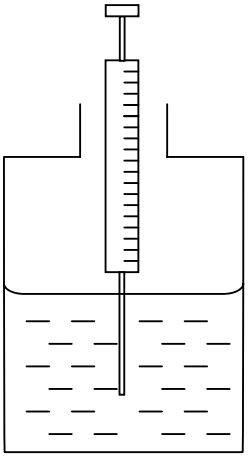
D TTMM

40 A student did an experiment on BOD to determine the level of pollution in rivers P and Q.



The time for methylene blue solution to decolourise is 30 seconds

Water sample from river P



The time for methylene blue solution to decolourise is 1 minute

Water sample from river Q

What conclusions can be made by the student?

I River P has a higher concentration of dissolved oxygen

II River P has more bacterial decomposers

III River Q has more aquatic organisms

IV River Q has a higher BOD value

A I dan III only

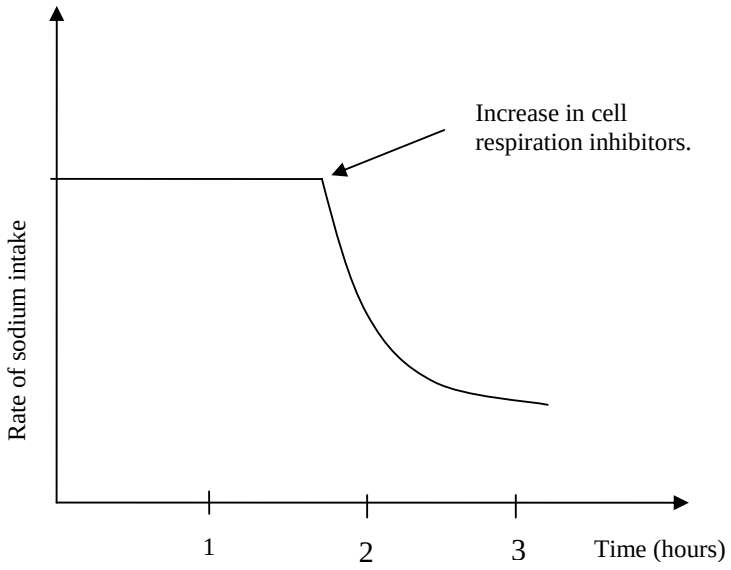
B I dan IV only

C II dan III only

D II dan IV only

SECTION C

41 The graph below shows the change in the rate of sodium intake in the root cells of a plant.



What can be concluded based on the graph above?

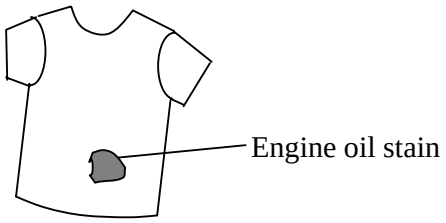
A The plant cells are in a hypertonic solution.

B The rate of sodium intake decreases due to lack of energy.

C The extracell osmotic concentration is equal to the intracell osmotic concentration.

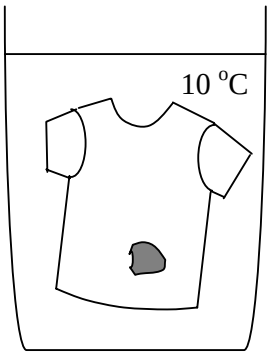
D The rate of sodium intake decreases because sodium diffuses outside.

42 The figure shows a dirty blouse that will be washed using a detergent containing enzymes.



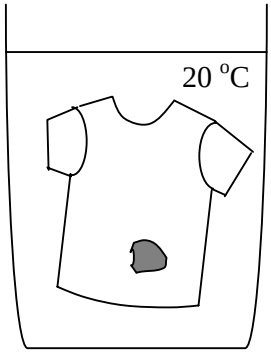
Which of the following conditions will clean the blouse in the shortest time?

A



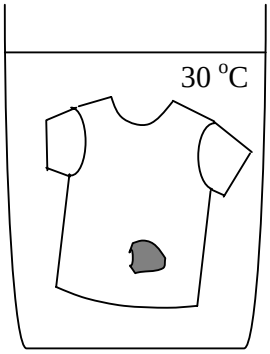
Detergent containing amylase

B



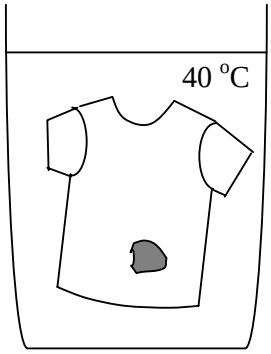
Detergent containing cellulase

C



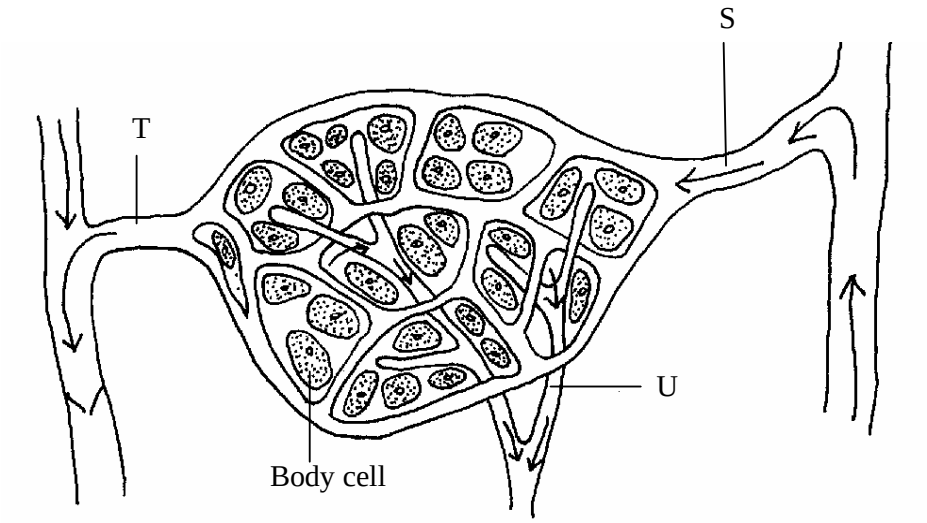
Detergent containing lipase

D



Detergent containing protease

43 The figure shows the relationship between the lymph capillaries, blood capillaries and the body cells.



Of the following, which statements are true?

I U contains antibodies to destroy pathogens

II The flow of blood from S to T will increase

III Interstitial fluid will diffuse into U according to the concentration gradient of dissolved substances

IV Oxygen and nutrients will diffuse out of S to the body cells for cell respiration

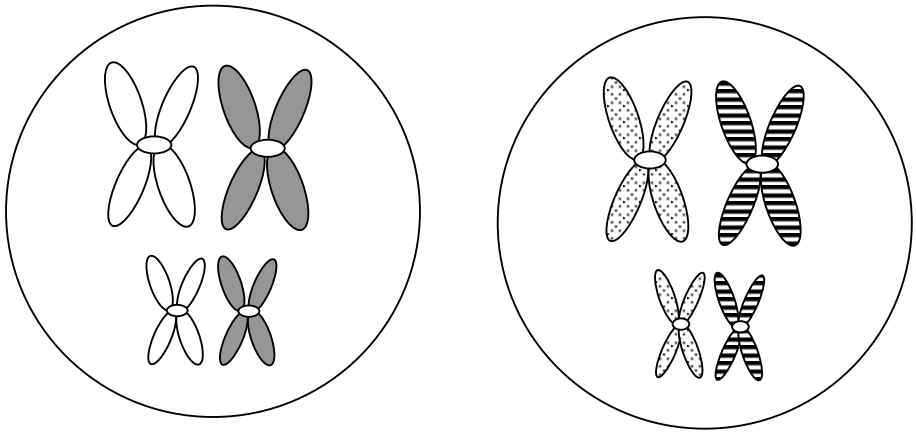
A I and III only

B II and IV only

C I, III and IV only

D II, III and IV only

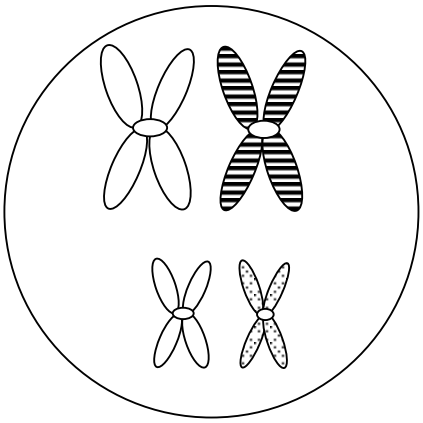
44 The figure shows the homologous chromosomes in organisms A and B before undergoing meiosis.



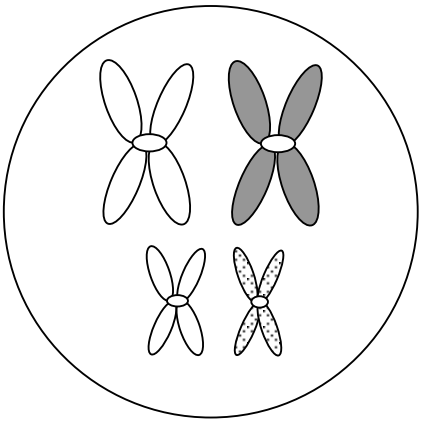
Organism A Organism B

Which of the following represents the products of fertilization between organisms A and B?

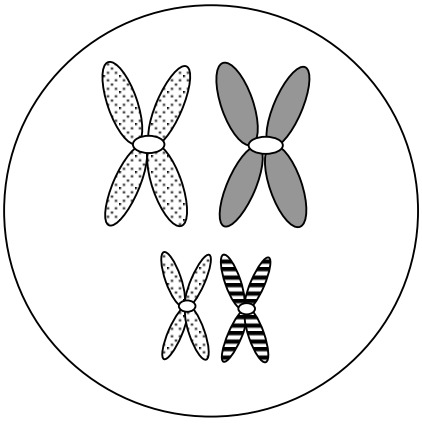
A



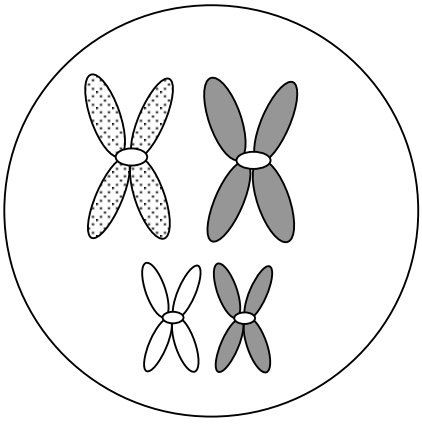
B



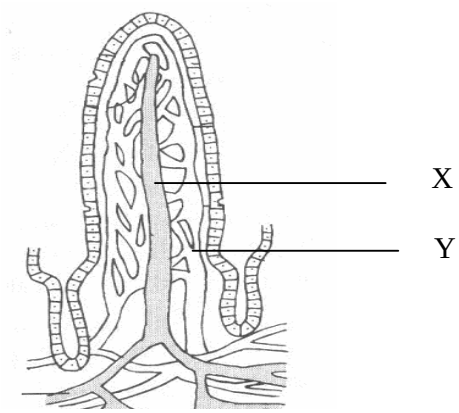
C



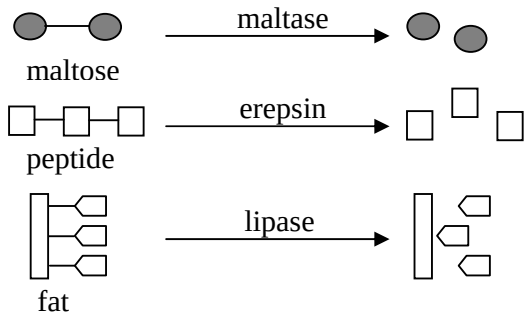
D



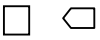
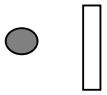
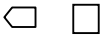
45 The figure shows structures X and Y in the villus.



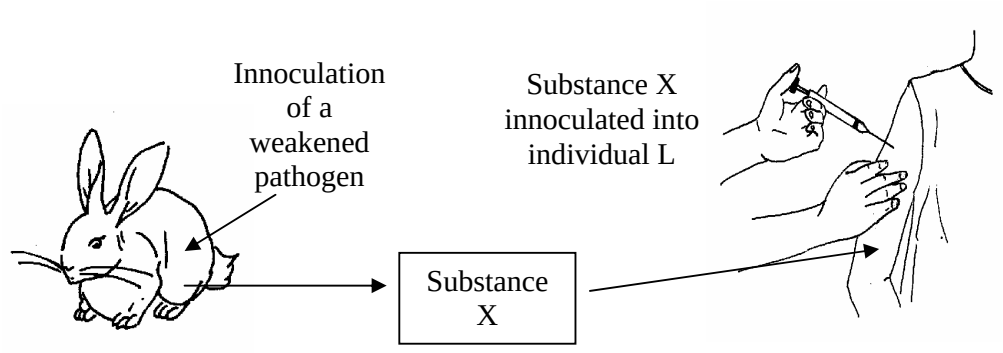
Hydrolysis of the food classes are represented by the symbols below:



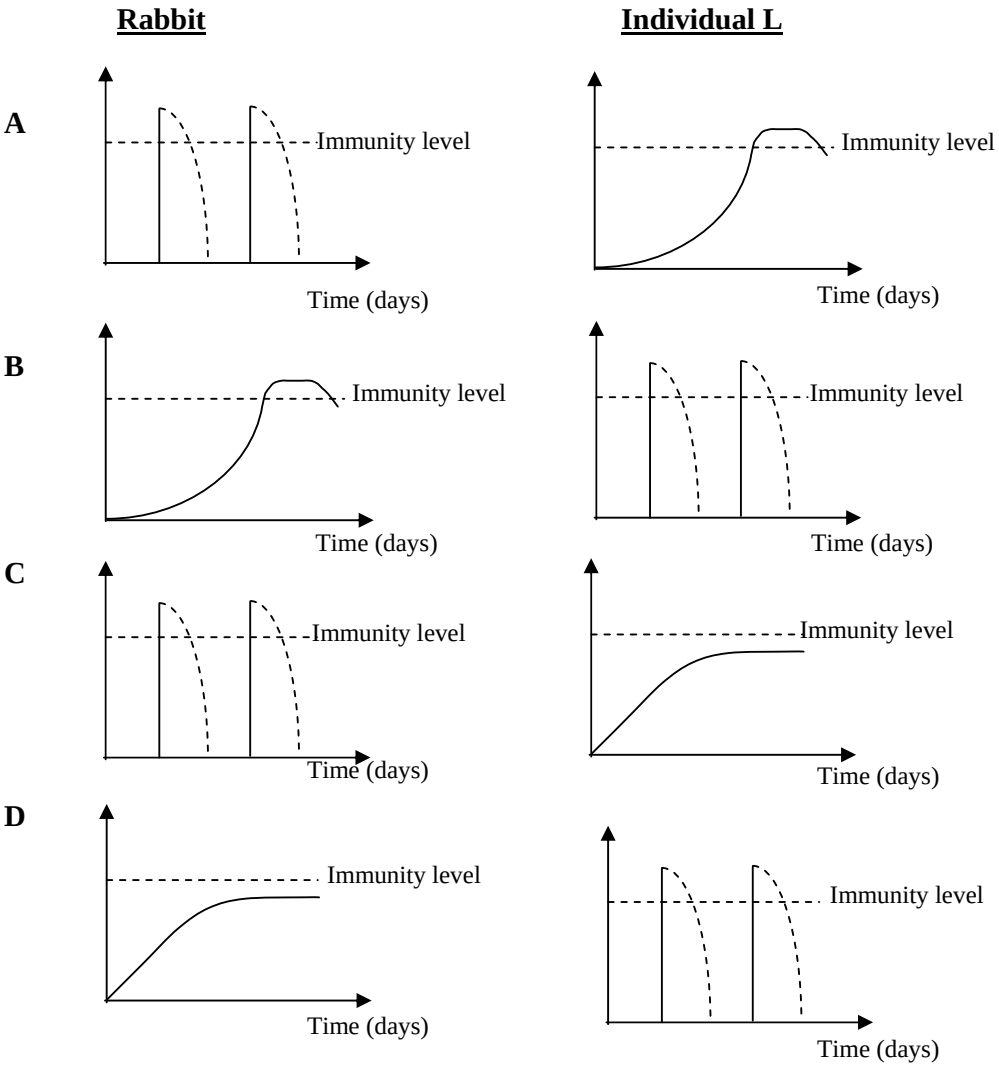
Of the following hydrolysis products which will enter into structure X or Y?

	Structure X	Structure Y
A		
B		
C		
D		

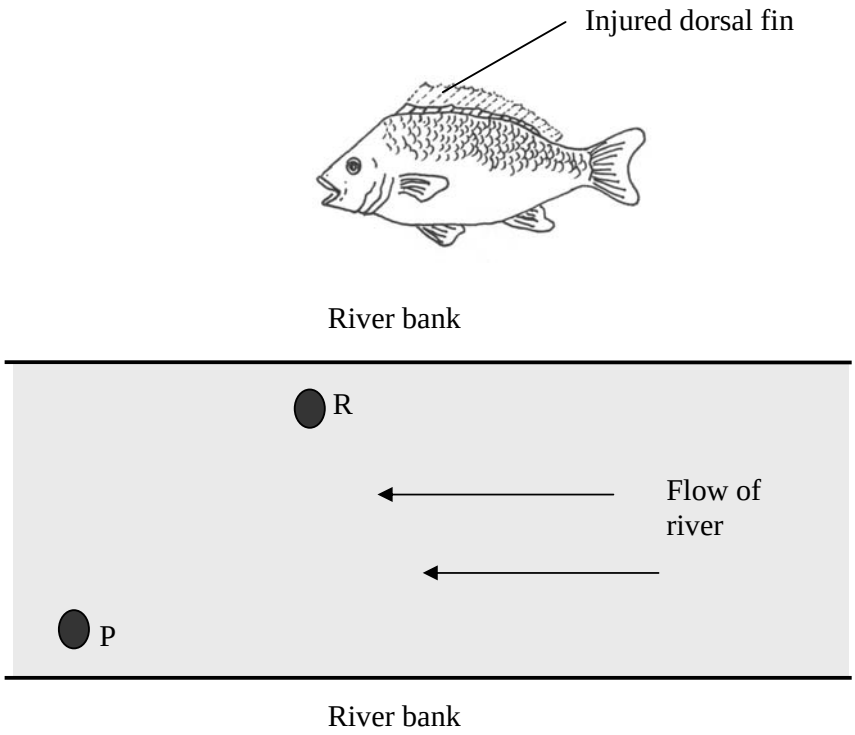
46 The figure shows a rabbit that was innoculated with a weakened pathogen to induce the immune system to produce substance X. Substance X was then innoculated into individual L to help fight a disease.



Of the following, which graph represents the type of immunity acquired by both the rabbit and individual L?



47 The figure shows a fish that was injured in its dorsal fin. The fish is at position P and its food is at position R.



What happens when the fish tries to get its food ?

A The fish will dive towards the river bed.

B The fish will be carried away by the flow of water.

C The fish will be pulled towards the river bed by the flow of water.

D The fish will still reach R by swimming in an unstable condition.

48

- Mr M is not colour blind.
- He has six children of which three sons are colour blind while three daughters are carriers.

Based on the information above, what is the genotype of Mr M's wife?

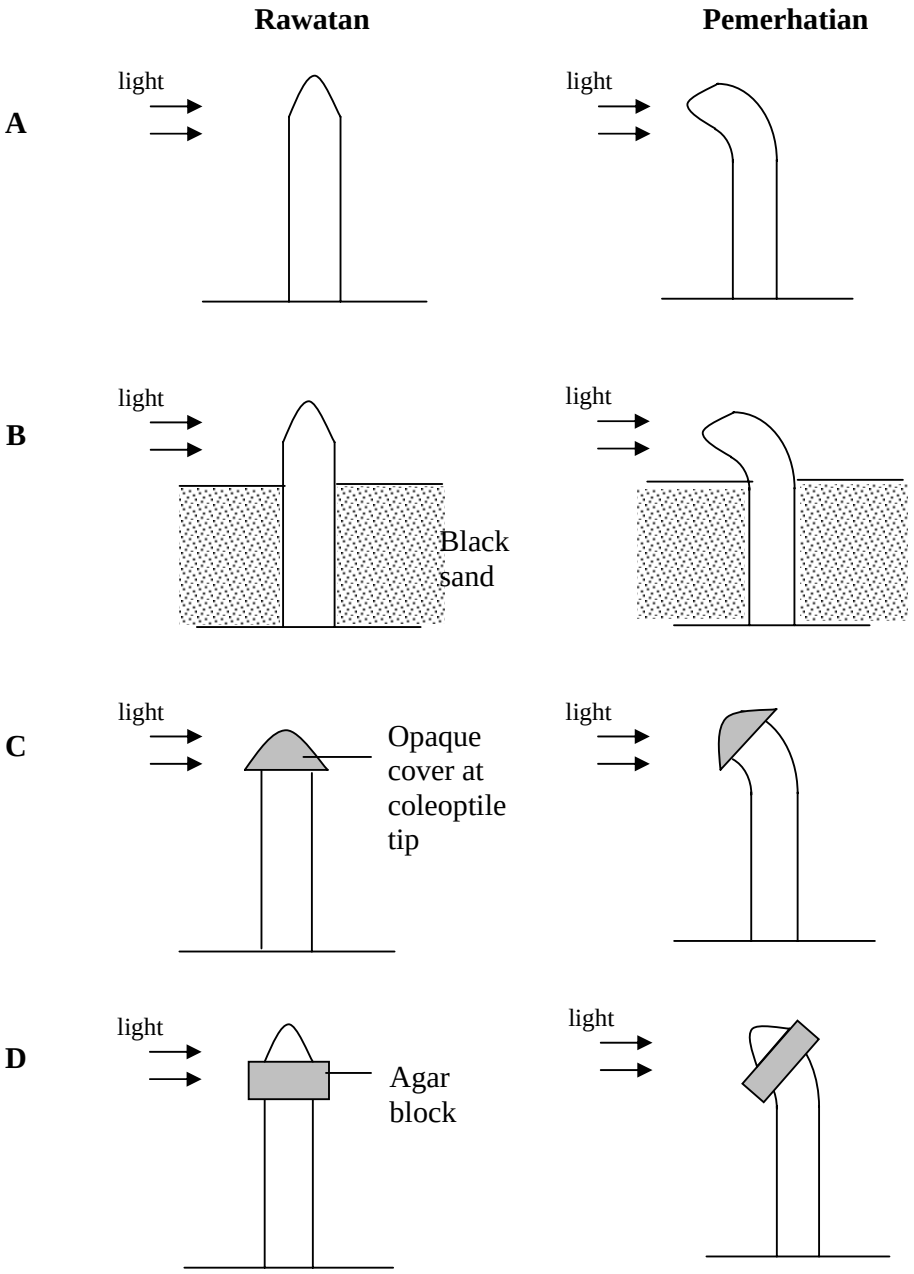
E $X^b X^b$

F $X^B X^b$

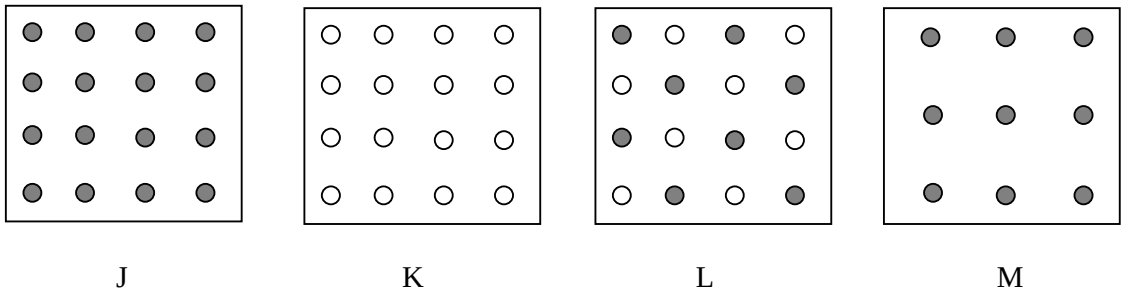
G $X^B X^B$

H $X^b X$

49 Of the following figures which **does not** show the effect of auxin on the growth of the coleoptile ?

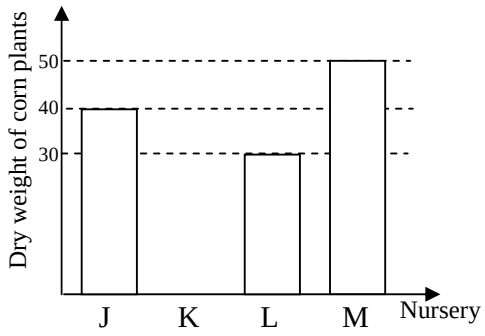


50 The figure shows nurseries J, K, L, and M in a study concerning interspecific and intraspecific competition.

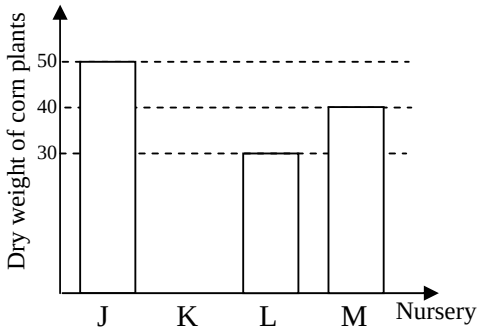


After 30 days, 5 corn plants were chosen randomly to determine their dry weight. Of the following, which shows the results of the experiment?

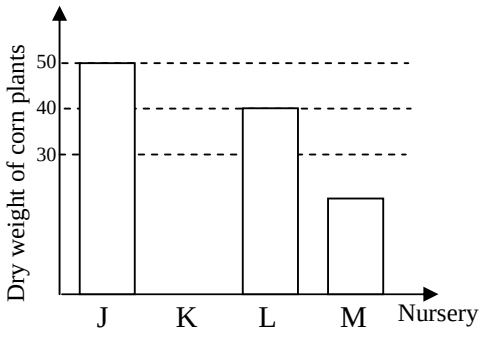
A



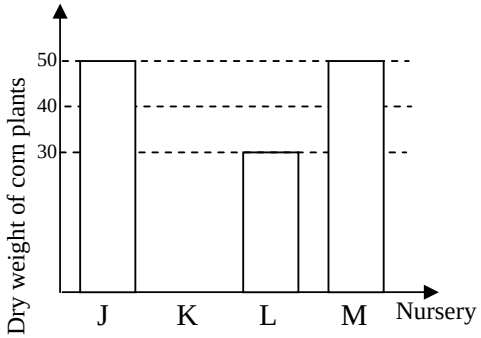
B



C



D



END OF QUESTION PAPER