2022-DSE
BIO
PAPER 1A

CNEC CHRISTIAN COLLEGE
MOCK EXAMINATION (2021-2022)
FORM SIX

BIOLOGY PAPER 1

Time allowed: 2 hours 30 minutes
This paper must be answered in English

GENERAL INSTRUCTIONS

1. There are **TWO** sections, A and B, in this paper. You are advised to finish Section A in about 35 minutes.

2. Section A consists of multiple-choice questions in this question paper. Section B contains conventional questions printed separately in Question-Answer Book **B**.

3. Answer to Section A should be marked on the Multiple-choice Answer Sheet while answers to Section B should be written in the spaces provided in Question-Answer Book **B**. **The Answer Sheet for Section A and the Question-Answer Book for Section B will be collected separately at the end of the examination.**

INSTRUCTIONS FOR SECTION A (MULTIPLE-CHOICE QUESTIONS)

1. Write your Name, Class and Class Number in the spaces provided on this cover and insert the information required in the spaces provided on the Answer Sheet.

2. When told to open this paper, you should check that all the questions are there. Look for the words '**END OF SECTION A**' after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS.** You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.

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.

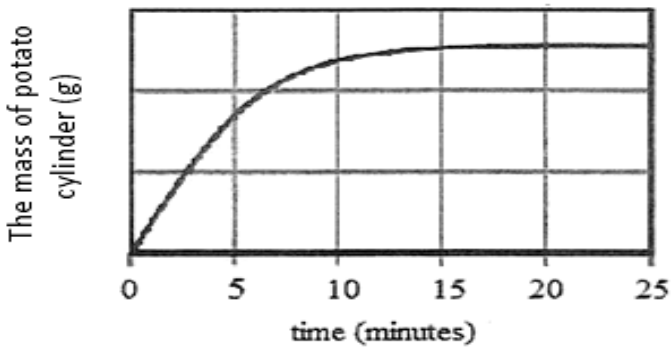
6. No marks will be deducted for wrong answers.

Name		Class		Class Number	

There are 36 questions in this section.

The diagrams in this section are NOT necessarily drawn to scale.

Directions: Questions 1 and 2 refer to the graph below, which shows the change in mass of a potato cylinder immersed in 0.5% sucrose solution.



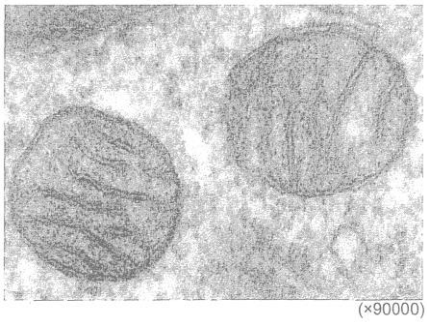
1. The rate of osmosis is the highest during the

   A. 0 to 5th minutes
   B. 5th to10th minutes
   C. 10th to 15th minutes
   D. 15th to 20th minutes

2. Which of the following statements is true from the 20th to 25th minutes?

   A. Some potato cells burst.
   B. Water is simultaneously entering and leaving the potato cells.
   C. The sucrose concentration in the cytoplasm of the potato cells is the same as that of the 0.5% sucrose solution.
   D. Water molecules stop entering the potato cells.

3. The electron micrograph below shows part of a cell from an organism.

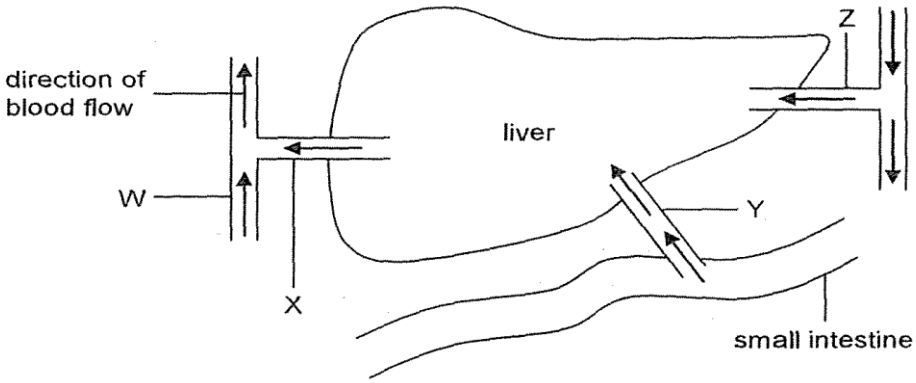


This organism may belong to the kingdom

(1) Protista. (2) Eubacteria. (3) Fungi.

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

Directions: Questions 4 and 5 refer to the diagram below, which shows some blood vessels connected to the liver.



4. Shortly after a fatty meal, the blood in which of the labelled blood vessels will contain the largest amount of lipid?

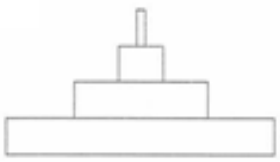
A. W B. X

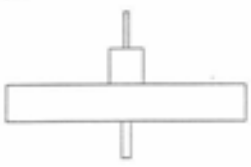
C. Y D. Z

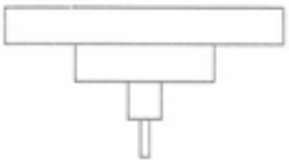
5. If a person has been fasting for 24 hours, which of the following comparisons between the blood in vessel X and Y is correct?

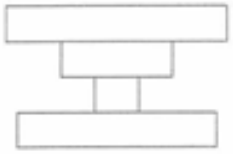
	Blood in vessel X	*Blood in vessel Y*
A.	Higher glucose concentration	Lower glucose concentration
B.	Lower urea concentration	Higher urea concentration
C.	Lower amino acid concentration	Higher amino acid concentration
D.	Higher insulin concentration	Lower insulin concentration

6. A single tree provides food for a large population of caterpillars. Several small birds eat the caterpillars. The small birds are eaten by a large bird.
Which of the following pyramids of biomass can represent the above food chain?

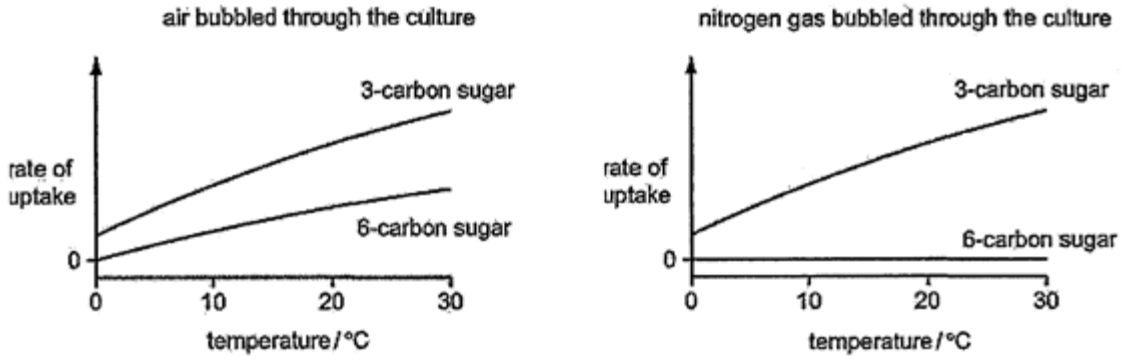
A. 

B. 

C. 

D. 

7. The graphs show the rate of uptake of sugars by a culture of animal cells under different conditions.



How are the sugars taken up by the cells when air is bubbled through the culture?

	3-carbon sugar	*6-carbon sugar*
A.	diffusion	active transport
B.	diffusion	diffusion
C.	active transport	active transport
D.	active transport	diffusion

8. The table below shows the codons for four amino acids.

Amino acid	**Codon**
Val	GUU
Phe	UUC
Lys	AAG
Pro	CCU
Glu	GAA

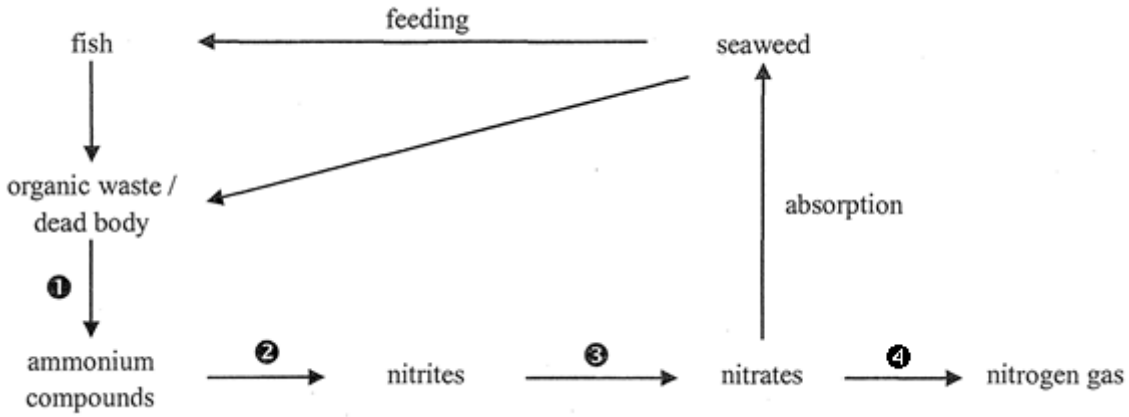
Certain part of an amino acid sequence of a polypeptide chain is shown below:

Glu — Lys — Val — Phe — Pro — Phe

Which of the following is a correct sequence of the coding strand of DNA that codes for the part of polypeptide shown above?

A. GAAAAGGUUUUCCCUUUC
B. GAAAAGGTTTTCCCTTTC
C. CTTTTCCAAAAGGGAAAG
D. CUUUUCCAAAAGGGAAAG

9. The diagram below shows the nitrogen cycle in an aquatic ecosystem.



Which of the above processes involve(s) decomposer?

A. ❶ only
B. ❹ only
C. ❶ and ❹ only
D. ❷ and ❸ only

10. The table below shows some descriptions about four different diseases.

	Disease			
statement about disease	**1**	**2**	**3**	**4**
infectious disease		✓	✓	
can be treated with antibiotics			✓	
caused by a virus				✓
transmitted by a vector	✓			

Key: ✓ = true

Which of the following correctly matches the four different diseases shown above?

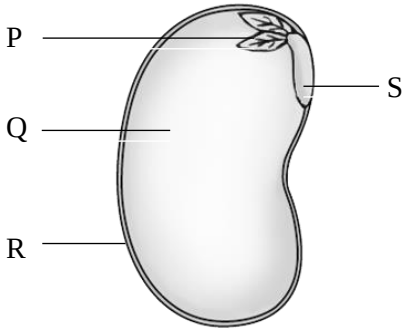
	1	**2**	**3**	**4**
A.	malaria	measles	cholera	influenza
B.	dengue fever	SARS	HIV/AIDS	smallpox
C.	common cold	influenza	malaria	SARS
D.	Japanese encephalitis	Lung cancer	hepatitis B	cholera

11. Which of the following statements about vitamin D for humans is/are correct?

(1) Vitamin D is absorbed into the lacteal in the small intestine.
(2) Vitamin D is one of the essential components of bones.
(3) Vitamin D must be obtained from diet.

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

Directions: Questions 12 and 13 refer to the diagram below, which shows a broad bean seed.

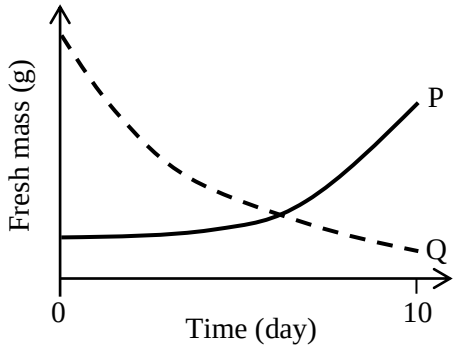


12. Which structure of the seed serves a similar function to amniotic fluid?

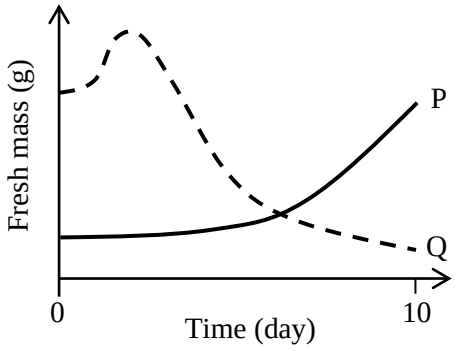
A. P
B. Q
C. R
D. S

13. Which of the following graphs correctly shows the changes in the fresh masses of structures P and Q during germination?

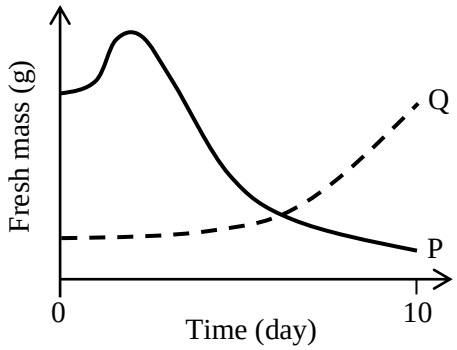
A.



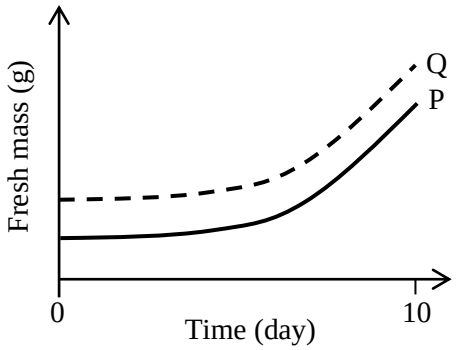
B.



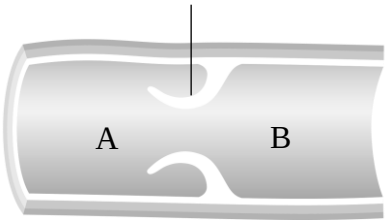
C.



D.



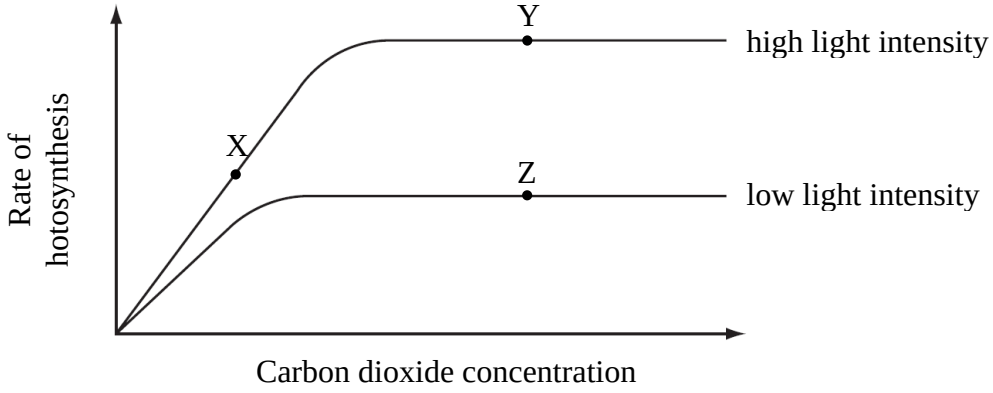
14. The diagram below shows the longitudinal section of a blood vessel.



Which of the following statements is correct?

A. The walls of the blood vessel contract to open the valves.
B. The elastic walls recoil to close the valves.
C. Blood flows from A to B and pushes the valves open.
D. The valves close to prevent the backflow of blood from A to B.

15. The graph below shows the effect of carbon dioxide concentration on the rate of photosynthesis at low and high light intensities.



Which of the following combinations correctly identify the limiting factors at points X, Y and Z?

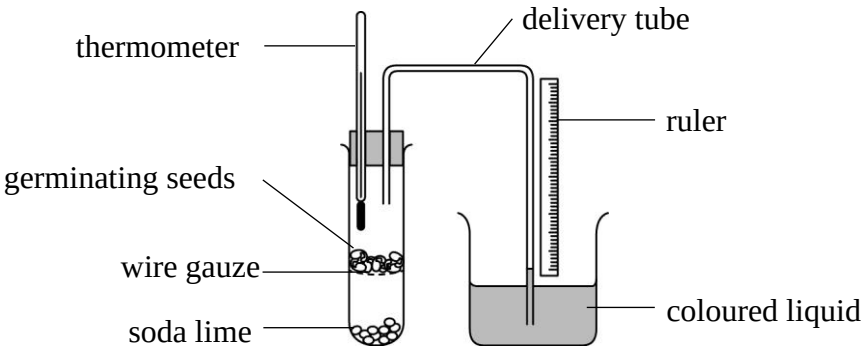
	X	***Y***	***Z***
A.	carbon dioxide	light intensity	light intensity
B.	carbon dioxide	light intensity	carbon dioxide
C.	light intensity	carbon dioxide	light intensity
D.	light intensity	carbon dioxide	carbon dioxide

16. In anaerobic respiration of skeletal muscles, pyruvate is converted to lactic acid.

Which of the following statements about this reaction is correct?

A. Two ATP are produced.
B. NADH is oxidized to NAD.
C. Carbon dioxide is produced.
D. The reaction occurs in the mitochondrial matrix.

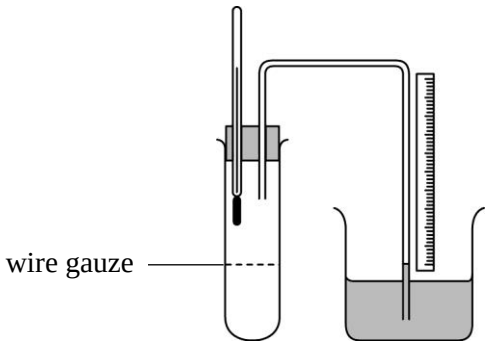
Directions: Questions 17 and 18 refer to the set-up below, which is used to investigate respiration in germinating seeds.



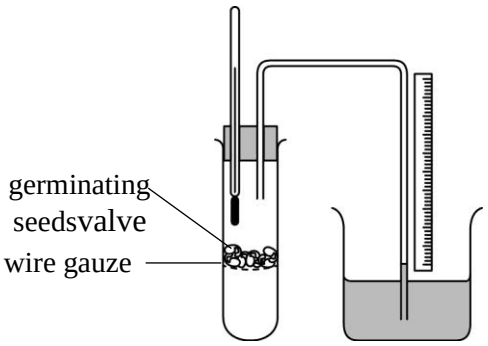
17. After four hours, the liquid level in the delivery tube will
    A. fall because of the carbon dioxide given out by the germinating seeds.
    B. rise because of the oxygen taken in by the germinating seeds.
    C. rise because of the heat released by the germinating seeds.
    D. remain unchanged because the volume of carbon dioxide given out equals the volume of oxygen taken in.

18. Which of the following can be used as a control set-up for this investigation?

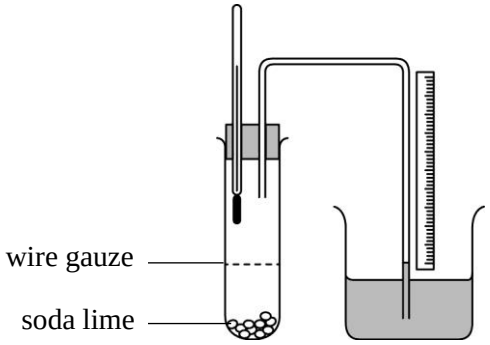
A.



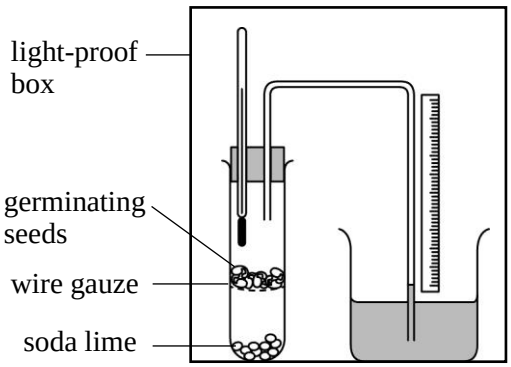
B.



C.



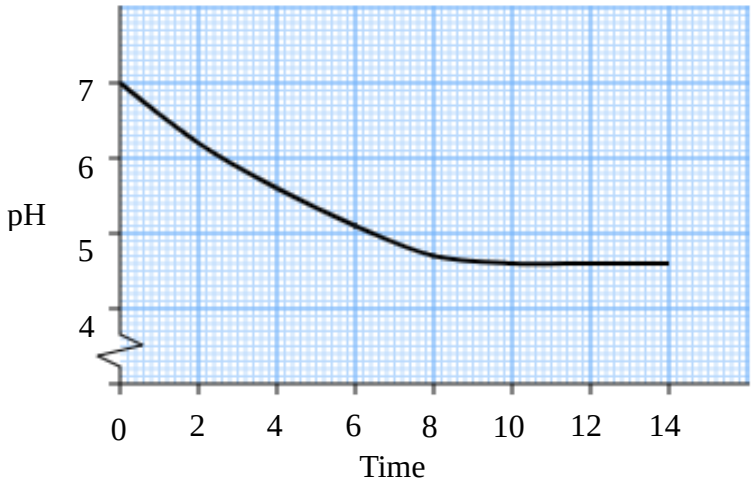
D.



19. Which of the following does ***not*** require energy released by respiration?

A. uptake of oxygen from air sacs
B. uptake of glucose from the small intestine
C. release of neurotransmitters into the synaptic cleft
D. release of antibodies by lymphocytes

20. The following experiment is to investigate changes in pH when lipase is added to a food sample having a high fat content. The graph below shows the results.



Which of the following is/are the possible explanation(s) of the results between 10 minutes and 14 minutes?

(1) All the lipase active sites are occupied.
(2) Substrate concentration becomes the limiting factor.
(3) Lipase becomes denatured.

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

21. After a woman receives a surgery to tie and cut both of her oviducts, which of the following may still occur?

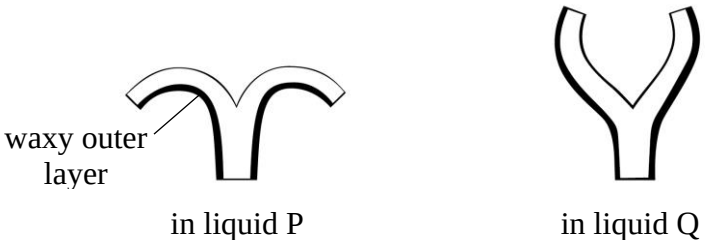
(1) ovulation
(2) menstruation
(3) production of female sex hormones

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

22. In a family, the mother has blood group B and the two children have blood groups A and O. What is the probability that her next child will be a girl of blood group A?

A. ¾
B. $^1/_2$
C. ¼
D. $^1/_8$

23. The diagrams below show the appearance of two sections of spring onion that have been split longitudinally halfway and immersed in two different liquids.



Which of the following statements are correct?

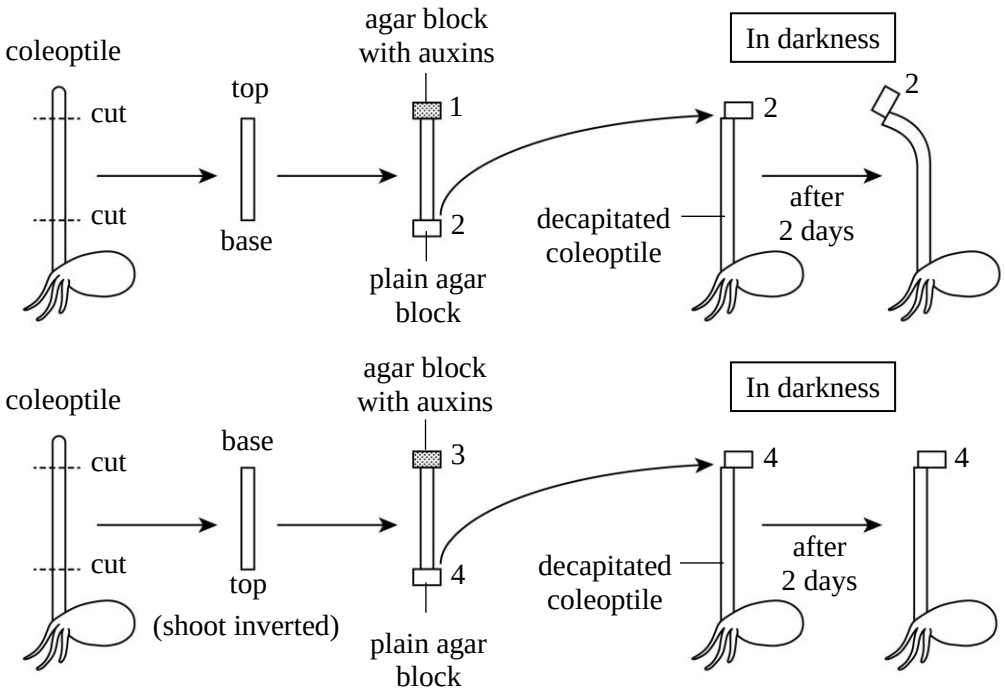
(1) In liquid P, cells in the outer layer of the spring onion expand more than those in the inner layer.

(2) In liquid Q, cells in the inner layer of the spring onion become plasmolysed.

(3) The water potential of liquid P is higher than that of liquid Q.

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

24. The diagram below shows an experiment on auxins.



Which of the following conclusions can be drawn from the results of the experiment?

A. Auxins are produced at the tip of the coleoptile.
B. Transport of auxins is unidirectional.
C. Transport of auxins involves an active process.
D. Phototropism is due to the uneven distribution of auxins in the shoot.

25. Which of the following processes consume ATP?

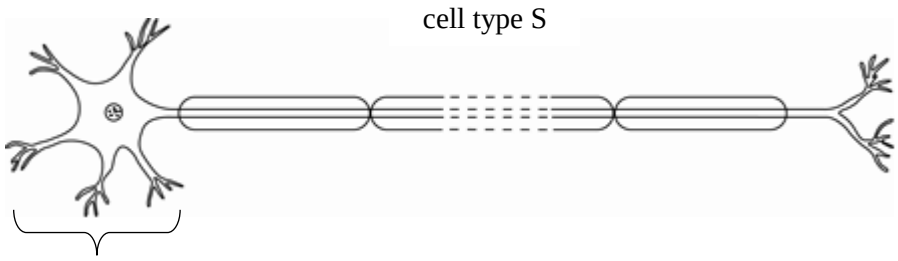
(1) Glycolysis
(2) Calvin cycle
(3) muscle contraction

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

26. Which of the following blood vessels has the greatest fluctuation in blood glucose levels within the day?

A. hepatic artery
B. hepatic vein
C. hepatic portal vein
D. aorta

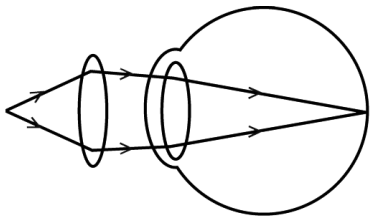
27. The diagram below shows a cell.



Structure X of cell type S is found in

A. the dorsal root ganglion of a spinal nerve.
B. the ventral root of a spinal serve.
C. the grey matter of the spinal cord.
D. the white matter of the cerebrum.

28. The diagram below represents the correction of a common eye defect.



Which of the following is the likely cause of this eye defect?

A. The cornea is not smooth.
B. The lens is cloudy.
C. The lens is too thick.
D. The eyeball is too short.

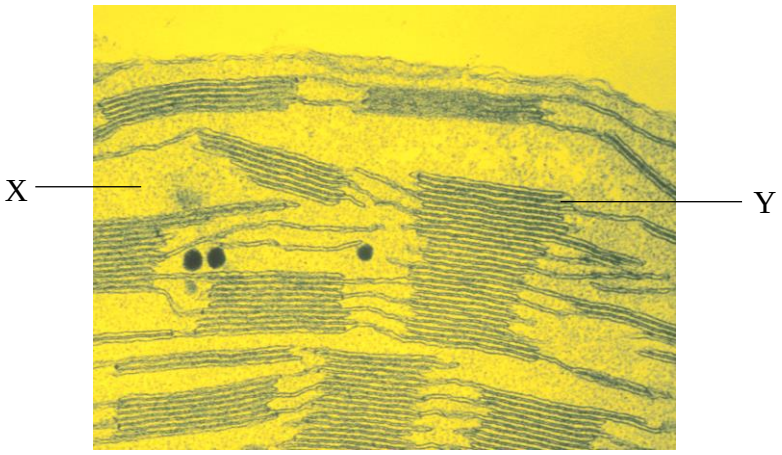
29. The table below shows the results of blood tests for the presence of antigens and antibodies of hepatitis B virus (HBV) in four individuals.

	Antigen	**Antibodies**
Individual 1	Present	Present
Individual 2	Present	Absent
Individual 3	Absent	Present
Individual 4	Absent	Absent

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

A. Individuals 1 and 2 are infected with HBV, but only individual 1 can produce antibodies against the virus.
B. Individual 3 has recovered from an infection and has become immune to HBV.
C. Individual 4 has no previous infection and is not immune to HBV.
D. Vaccination can confer protective effect to individuals 2 and 4 against HBV.

30. The electron micrograph below shows a section of a chloroplast.



(×20, 000)

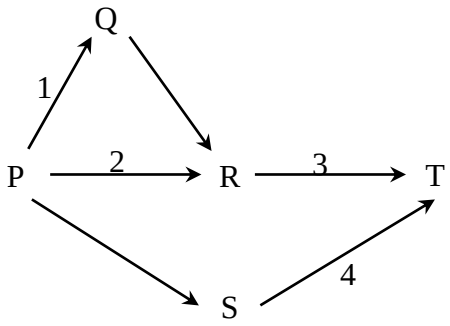
Which of the following correctly states the metabolites produced in the reactions that occur at X and Y?

	At X	***At Y***
A.	ATP	NADP
B.	NADP	oxygen
C.	NADP	glucose
D.	NADPH	ATP

31. Why is it necessary for a patient with a bacterial infection to take antibiotics at regular time intervals?

    A. to allow the antibiotics to build up slowly in the body
    B. to maintain the antibiotics in the body at a concentration high enough to kill the bacteria
    C. to prevent the mutation of the bacteria
    D. to select and kill all bacteria that are resistant to the antibiotics

Directions: Questions 32 and 33 refer to the diagrams below, which shows a food web consisting of five different species (P, Q, R, S and T).



32. Which of the following statements correctly describe the above species?

    (1) P is a producer.
    (2) R is a herbivore.
    (3) The biomass of T is less than that of Q.

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

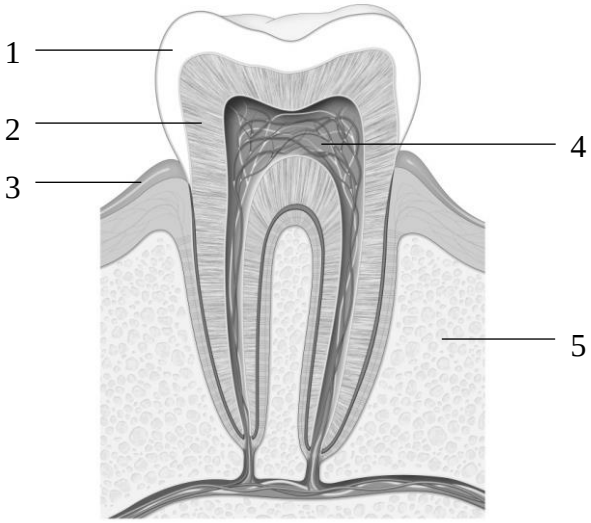
33. Assuming the energy input for each food chain is the same, the transfer of energy between two trophic levels is the smallest in

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

34. Which of the following are genetically identical?

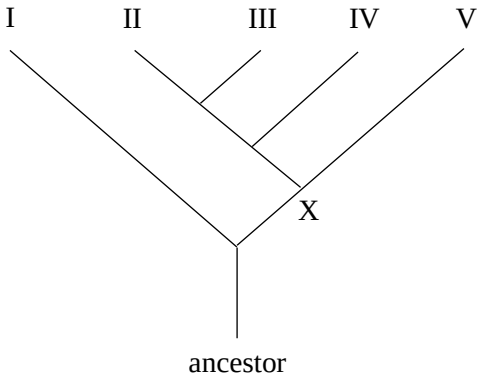
    A. the placenta and the uterine wall in a pregnant woman
    B. maize grains on the same cob
    C. sperms produced in a human testis
    D. buds of the same tuber

35. A deficiency disease is characterized by swelling and breeding of structure 3. Which food can be used to prevent this disease?



A. milk
B. liver
C. orange
D. egg yolk

36. The evolutionary tree below shows the phylogenetic relationships between five species (I to V).



Which of the following can be concluded from the evolutionary tree?

(1) Species I is the ancestor of species V.
(2) Species II and III are the most closely related.
(3) The point labelled X represents a common ancestor for species II, III, IV and V.

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

END OF SECTION A

Go on to Question-Answer Book B for questions on Section B