ختم المركز

سلطنة عمان
وزارة التربية والتعليم

حاضر ☐
غائب ☐

امتحان دبلوم التعليم العام للمدارس الخاصة (ثنائية اللغة)
للعام الدراسي ١٤٣٦/١٤٣٥ هـ - ٢٠١٤ / ٢٠١٥ م
الدور الأول - الفصل الدراسي الأول

تنبيه
- المادة: الإحياء.
- الأسئلة في (١٦) صفحة.
- زمن الإجابة: ثلاث ساعات.
- الإجابة في الورقة نفسها.

تعليمات وضوابط التقدم للامتحـــان:

- الحضور إلى اللجنة قبل عشر دقائق من بدء الامتحان للأهمية.
- إبراز البطاقة الشخصية لمراقب اللجنـــة.
- يمنع كتابة رقم الجلوس أو الاسم أو أي بيانات أخرى تدل على شخصية الممتحن في دفتر الامتحان، وإلا ألغي امتحانه.
- يحظر على الممتحنين أن يصطحبوا معهم بمركز الامتحان كتبا دراسية أو كراسات أو مذكرات أو هواتف محمولة أو أجهزة النداء الآلي أو أي شيء له علاقة بالامتحان كما لا يجوز إدخال آلات حادة أو أسلحة من أي نوع كانت أو حقائب يدوية أو آلات حاسبة ذات صفة تخزينية.
- يجب أن يتقيد المتقدمون بالزي الرسمي (الدشداشة البيضاء والمصر أو الكمة للطلاب والدارسين والزي المدرسي للطالبات واللباس العماني للدارسات) ويمنع النقاب داخل المركز ولجان الامتحان.
- لا يسمح للمتقدم المتأخر عن موعد بداية الامتحان بالدخول إلا إذا كان التأخير بعذر قاهر يقبله رئيس المركز وفي حدود عشر دقائق فقط.
- يتم الالتزام بالإجراءات الواردة في دليل الطالب لأداء امتحان شهادة دبلوم التعليم العام.
- يقوم المتقدم بالإجابة عن أسئلة الامتحان المقالية بقلم الحبر (الأزرق أو الأسود).
- يقوم المتقدم بالإجابة عن أسئلة الاختيار من متعدد بتظليل الشكل (☐) وفق النموذج الآتي:

س - عاصمـــة سلطنة عمـــان هي:
☐ القاهرة ☐ الدوحة
■ مسقط ☐ أبوظبي

ملاحظة: يتم تظليل الشكل (■) باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

صحيح ■ **غير صحيح** ▭ ◉ ◔ ☒ ☑

مُسَوَّدَة، لا يتم تصحيحها

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Question 1 (28 marks)

There are 14 multiple-choice items worth two marks each.
Shade in the **correct** answer for each of the following items .

1) In all of the following organisms, the gaseous exchange during respiration takes place through external gills **EXCEPT**:

- ⬭ axolotl.
- ⬭ annelids.
- ⬭ lugworm.
- ⬭ nudibranch.

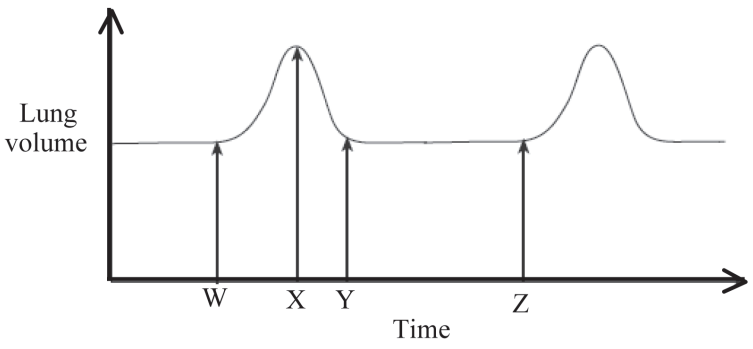
2) Carotid and aortic bodies monitor the levels of:

- ⬭ O_2 and CO_2 in the lungs.
- ⬭ O_2 and CO_2 in the blood.
- ⬭ O_2 in the blood and CO_2 in the lungs.
- ⬭ O_2 in the lungs and CO_2 in the blood.

3) Surfactant helps to prevent the alveoli from collapsing by:

- ⬭ sticking the surfaces of alveoli.
- ⬭ humidifying the air inside the alveoli.
- ⬭ reducing the surface tension of alveoli.
- ⬭ increasing the surface tension of alveoli.

4) The diagram below shows change in lung volume over time.



When does the diaphragm contract during breathing?

- ⬭ W ⟶ X
- ⬭ W ⟶ Y
- ⬭ X ⟶ Y
- ⬭ Y ⟶ Z

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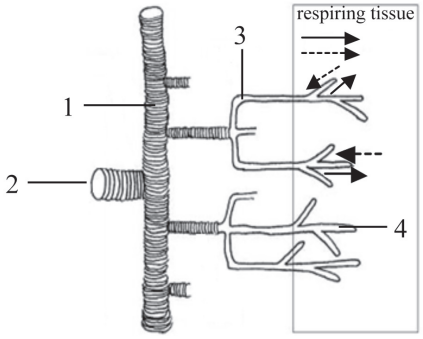
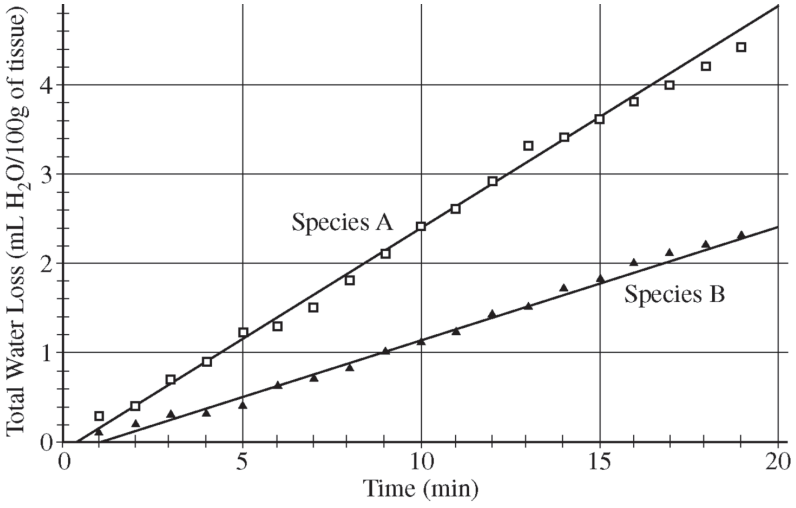
Question 1 continued

5) The diagram shows the gas exchange system in an insect. The part that can open and close like valves is:



- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

6) The graph shows the relationship between water loss and time for two plants species.

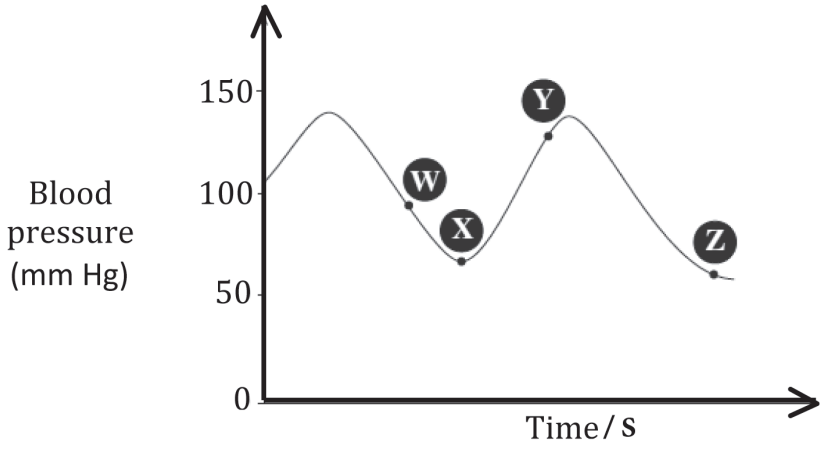


Identify the different structural adaptations that could account for the different transpiration rates of species A and B.

	Species A	Species B
☐	A small number of stomata and rolling up leaves.	A large number of stomata and rolling up leaves.
☐	More stomata and wider leaves with a thin cuticle.	Less stomata and smaller leaves with a thick cuticle.
☐	Sunken stomata with leaf hairs.	Less stomata and wider leaves with a thin cuticle.
☐	Less stomata and smaller leaves with a thick cuticle.	More stomata and wider leaves with thin cuticle

Question 1 continued

7) The graph shows changes in blood pressure in the aorta over time.



Which letter would indicate when ventricular systole is occurring?

- ☐ W
- ☐ X
- ☐ Y
- ☐ Z

8) The table describes the wall structure of three blood vessels.

Vessel 1	Vessel 2	Vessel 3
- Thick layer of elastic fibers - Smooth muscles	- No elastic fibers - No smooth muscles	- Thin layer of smooth muscles - Few elastic fibers

What are vessels 1, 2 and 3?

	Artery	Capillary	Vein
☐	3	1	2
☐	2	3	1
☐	1	2	3
☐	3	2	1

Question 1 continued

9) Carbon dioxide in the blood is transported in three forms:

I	a dissolved gas
II	hydrogen carbonate
III	carbamino-haemoglobin

Which of the following shows the correct order of their concentration in the blood from highest to lowest?

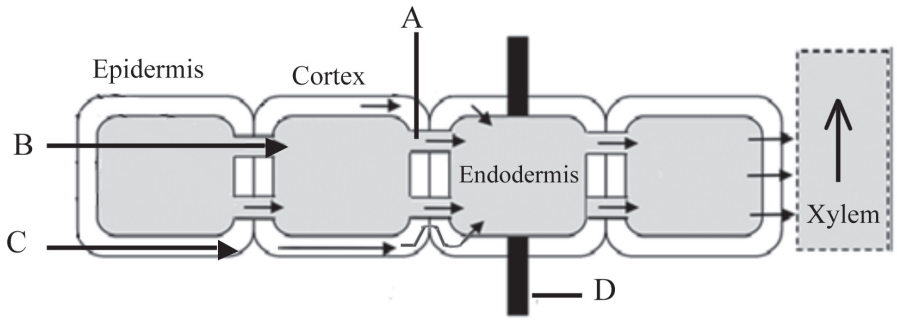
- ⬭ I, II, III
- ⬭ II, I, III
- ⬭ II, III, I
- ⬭ III, II, I.

10) All of the following are involved in the cohesion–tension theory of water movement in plants **EXCEPT**:

- ⬭ the evaporation of water through the stomata.
- ⬭ the presence of bonds that hold water molecules together.
- ⬭ the attraction of water molecules to the walls of the xylem.
- ⬭ the active transport of water from cells in the root to cells in the shoot.

Question 1 continued

11) The figure shows the transport of materials through the root.



Identify the labeled parts shown in the table.

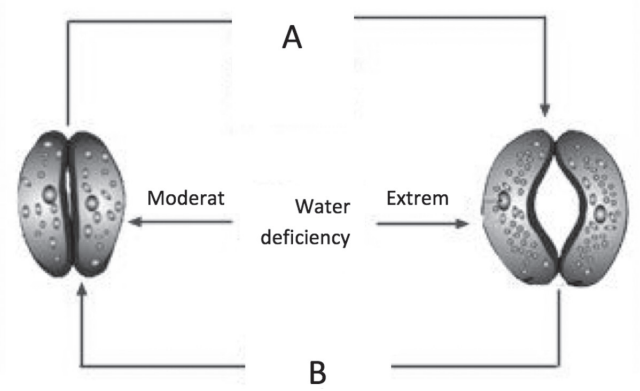
	A	B	C	D
☐	Apoplast pathway	Casparian strip	Plasmodesmata	Symplast pathway
☐	Plasmodesmata	Symplast pathway	Apoplast pathway	Casparian strip
☐	Casparian strip	Apoplast pathway	Symplast pathway	Plasmodesmata
☐	Symplast pathway	Casparian strip	Apoplast pathway	Plasmodesmata

12) If there is a problem in the production of ATP in the ascending limb of the loop of Henle, what would you expect?

- ☐ decreased Ca^{2+}ions in the urine output.
- ☐ increased Na^{+} and Cl^{-} ions in the urine output.
- ☐ decreased Na^{+} and Cl^{-} ions in the urine output.
- ☐ increased H_2O concentration in the urine output.

Question 1 continued

13) The diagram shows the opening and closing of a stomata.



The correct conditions (A) and (B) that lead to opening and closing are:

	A	B
☐	light, low CO_2, high ATP, K^+ intake	Dark, high CO_2, low ATP, K^+ output
☐	Dark, high CO_2, low ATP, K^+ intake	light, high CO_2, high ATP, K^+ intake
☐	Dark, high CO_2, low ATP, K^+ output	light, low CO_2, high ATP, K^+ intake
☐	light, high CO_2, high ATP, K^+ output	Dark, low CO_2, low ATP, K^+ output

14) The reason for losing weight in diabetics is that:

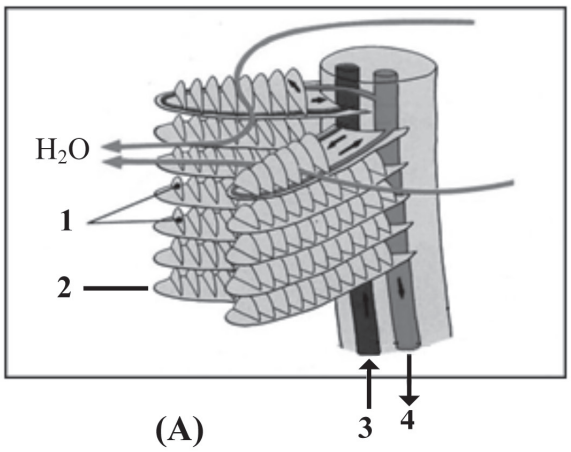
- ☐ the glucose is converted to glycogen.
- ☐ the blood has increased water potential.
- ☐ the kidneys reabsorb the high levels of glucose.
- ☐ the cells respire using proteins and fats instead of glucose.

Extended Questions

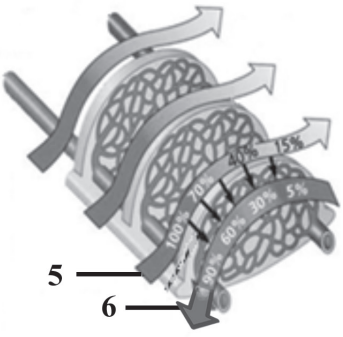
Write your answer for each of the following questions in the space provided. Be sure to show all your work, including the correct units where applicable.

Question 2 (14 marks)

15) The figures below show the gas exchange system in fish. (4 marks)



(A)



(B)

a. Identify the label of the blood vessel that carries the deoxygenated blood in figure (A).

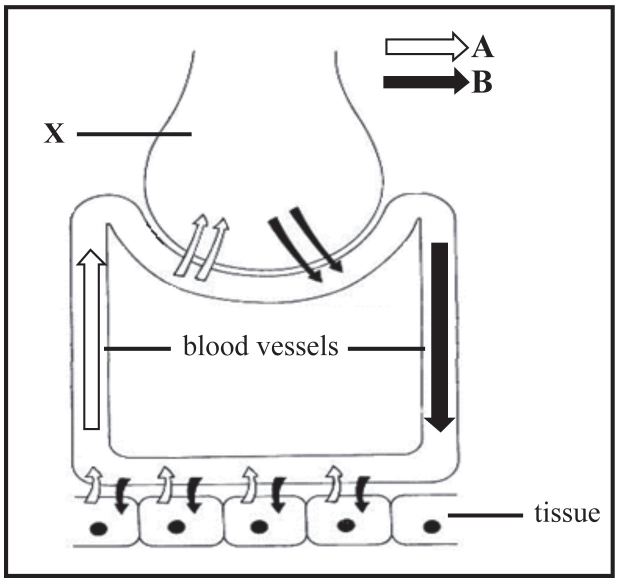
b Explain how the parts labeled (1) and (2) in figure (A) help to make gas exchange more efficient.

c. Explain the importance of the opposite directions labeled (5) and (6) in figure (B).

Question 2 continued

16) The diagram below shows gas exchange between alveolus, blood, and tissue.

(4 marks)



a. Name the gases labeled (A) and (B).

A: _____

B: _____

b. Explain the following about the part labeled (X):

i- It is surrounded by a capillary network.

_____

_____

ii- Its wall is made of a tissue which is one cell thick.

_____

_____

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Question 2 continued

17) A student compares the average number of stomata on the top side and the underside of leaves of different plants on a farm. (3 marks)

Plant	Average number of stomata (per square mm)	
	Top surface of the leaf	Bottom surface of the leaf
Pumpkin	29	275
Tomato	12	122
Bean	40	288

a. What generalization can you make regarding the difference in the number of stomata between the top and bottom surfaces of the leaf in each plant?

_____

b. How does this type of distribution of stomata help these plants to pass their permanent wilting point?

_____

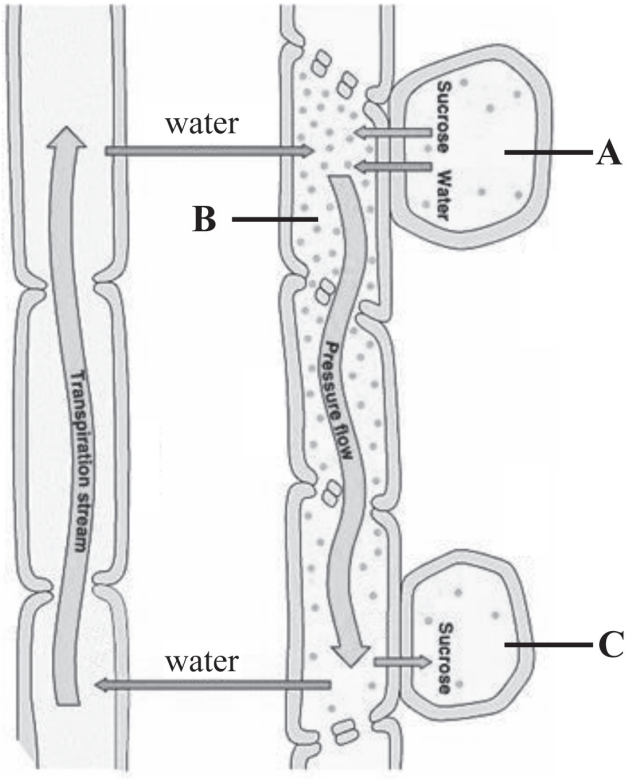
_____

c. Which plant will have the lowest respiration rate?

_____

Question 2 continued

18) The diagram below shows the transportation system in plants. (3 marks)



a. Identify the letter of the source cell.

_____

b. Name the process by which sucrose is loaded from part (A) to part (B).

_____

c. Give two examples for part (C).

_____

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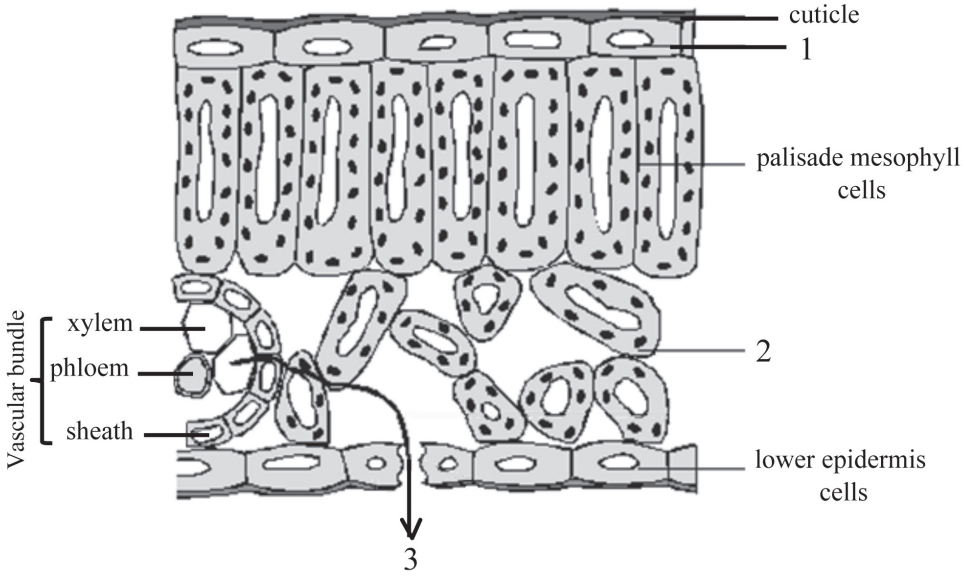
Question 3 (14 marks)

19) The figure shows the structure of a leaf. (5 marks)



a. Name the parts labeled (1) and (2).

1: _____

2 : _____

b. What is the substance indicated by the arrow labeled (3)?

_____

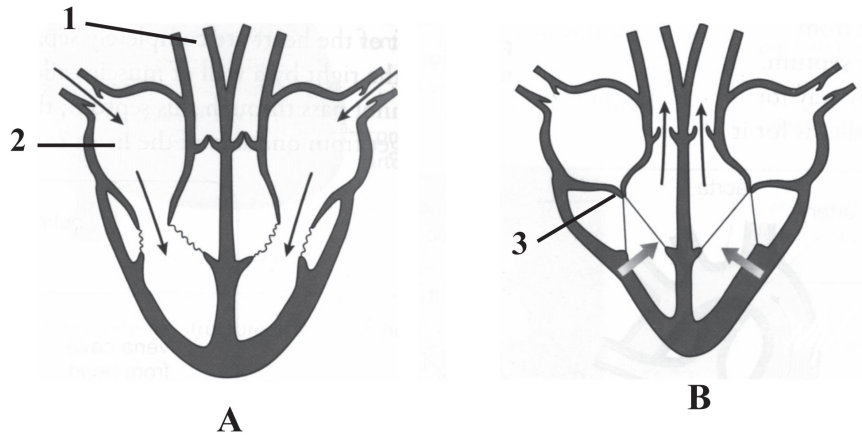
c. Name two structures that are shown in the figure and help in gas exchange in plants.

_____

_____

Question 3 continued

20) The diagram below shows two stages of the cardiac cycle. (6 marks)



a. Name the structures labelled (1) and (2).

1: _____

2 : _____

b. Explain what happens during the stage labelled (A).

_____

_____

_____

_____

_____

c. What would you expect to happen if the structure labelled (3) is deformed?

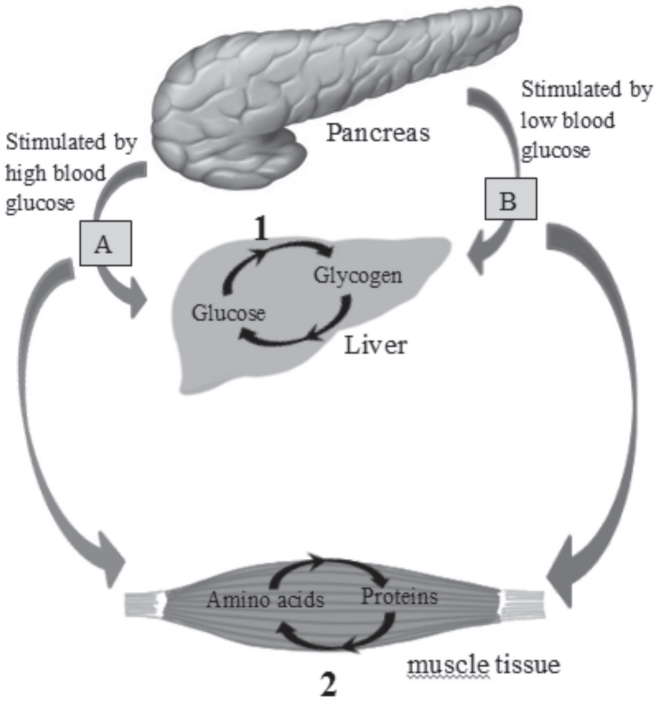
_____

d. Which valve opens during the stage labelled (B)?

_____

Question 3 continued

21) The figure shows the control of blood glucose in the human body. (3 marks)



a. Name the following:

i- The hormone labeled (A).

_____

ii- The process labeled (1).

_____

b. Explain the mechanism by which hormone (B) will affect the liver cells.

_____

_____

_____

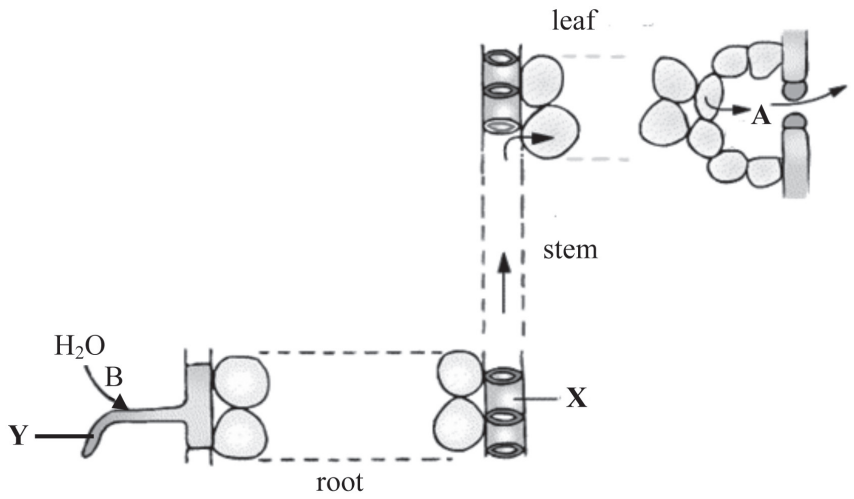
c. What happens to amino acids after the process labeled (2)?

_____

_____

Question 4 (14 marks)

22) The diagram below shows the pathway and direction of water movement through a plant. (5 marks)



a. Name the part labeled (X).

X: _____

b. What are the processes labeled (A) and (B)?

A: _____

B : _____

c. Explain why water in the part labeled (X) is not moving backwards towards the part labeled (Y).

_____

d. Describe how the part labeled (X) is adapted to its function.

_____

23) Write **one** function of each of the following: (2 marks)

a. Red blood cells.

_____

b. Platelets.

_____

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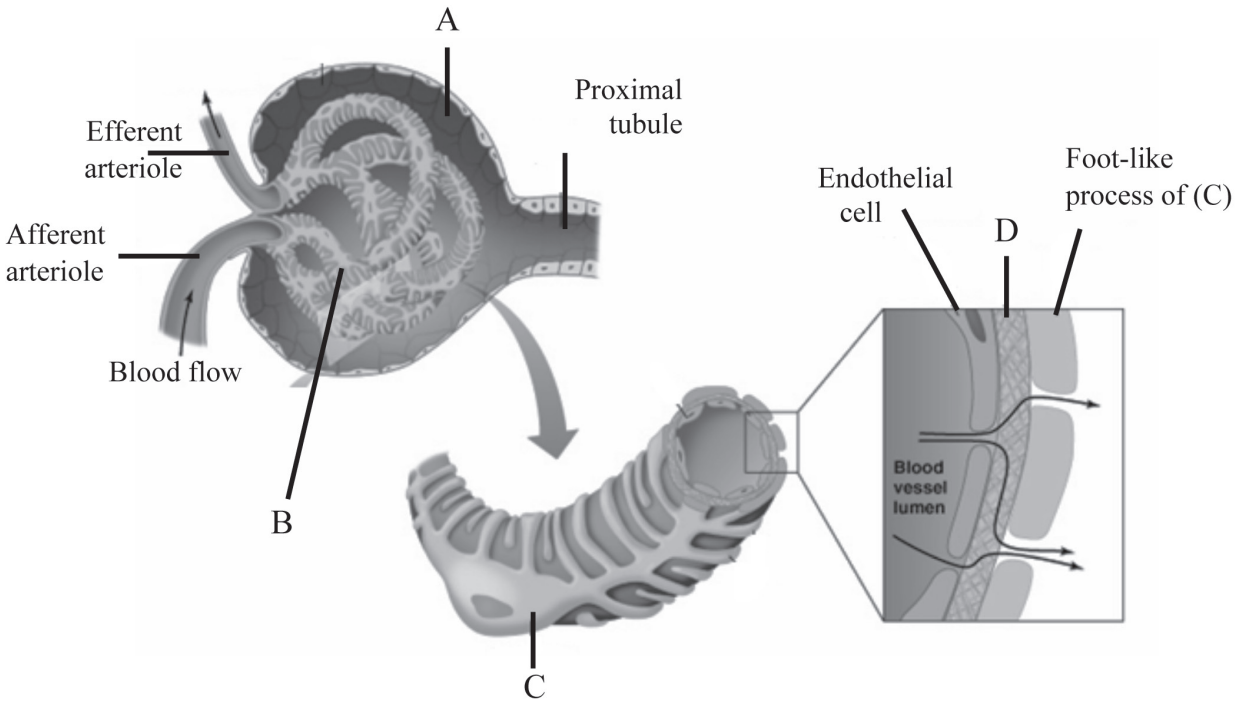
Question 4 continued

24) The diagram below shows part of the nephron. (3 marks)



a. Name the parts labeled (A) and (C).

A: _____

C : _____

b. What is the function of the part labeled (D)?

_____

_____

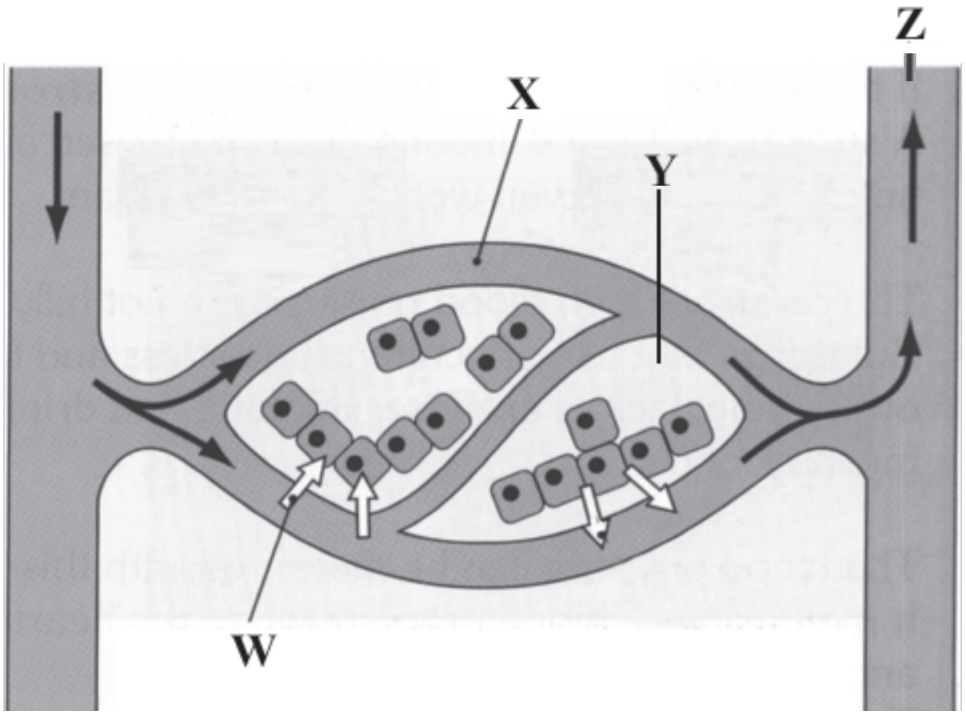
c. Explain why the pressure is high in the part labeled (B).

_____

_____

Question 4 continued

25) The diagram below shows the exchange of materials between the blood and the cells. (4 marks)



a. Name the following:

i- The fluid labeled (Y).

_____

ii- The part labeled (Z).

_____

b. Name two substances that would pass through the arrow labeled (W).

_____

c. Write two adaptations which help part labeled (X) to allow the exchange of materials between blood and cells.

_____

_____

[End of Examination]

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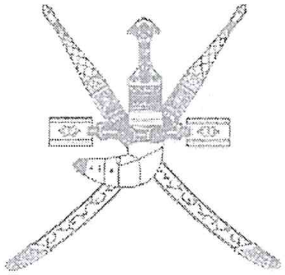

SULTANATE OF OMAN
MINISTRY OF EDUCATION
DIRECTORATE GENERAL OF EDUCATIONAL EVALUATION

GENERAL EDUCATION DIPLOMA EXAMINATION
FOR BILINGUAL PRIVATE SCHOOLS

BIOLOGY

First Session - First Semester

2014 / 2015

MARKING GUIDE

[This guide consists of 6 pages]

ANSWERS

QUESTION 1 (28 marks)

Each answer 2 marks

Question number	Answer
1	annelids
2	O_2 and CO_2 in the blood
3	reducing the surface tension of alveoli
4	W → X
5	2
6	Species A: More stomata and wider leaves with thin cuticle Species B: Less stomata and smaller leaves with a thick cuticle
7	Y
8	1 | 2 | 3
9	II, III, I
10	the active transport of water from cells in the root to cells in the shoot
11	Plasmodesmata | Symplast pathway | Apoplast pathway | Casparian strip
12	light, low CO_2, high ATP, K^+ intake | Dark, high CO_2, low ATP, K^+ output
13	the cells respire using proteins and fats instead of glucose
14	increased Na^+ and Cl^- ions in the urine output

Written Response

QUESTION 2 (14 marks)

15) (4 marks)

a. 3 (1 mark)

b. They provide a huge surface area for gas exchange (1 mark)

c. Blood of a relatively low oxygen concentration meets with blood which has had most of its oxygen removed and blood with relatively high oxygen concentration meets water with a lot of oxygen in it (1 mark), so there is still a diffusion gradient for oxygen into the blood across the gill plate (1 mark) .
OR to create a diffusion gradient for oxygen into the blood across the gill plate (2 marks).

16) (4 marks)

a. A: CO_2 (1 mark) B: O_2 (1 mark)

b. i- To maintain concentration gradients because the blood is always taking oxygen from the alveolus and returning with carbon dioxide. (1 mark)

ii- It helps diffusion by providing a very short diffusion pathway. (1 mark)

17) (3 marks)

a. Plants have fewer stomata on the top side of their leaves than on the bottom side. (1 mark)

b. Fewer stomata on the top side of leaves will reduce the water lose to avoid excessive transpiration which lead to death by passing its permanent wilting point. (1 mark)

c. Tomato. (1 mark)

18) (3 marks)

a. Source cell: A (1 mark)

b. Active transport (1 mark)

c. Root , flower ,stem (1 mark)

QUESTION 3 (14 marks)

19) (5 marks)

a. 1: Upper epidermal layer (1mark)
2: Spongy mesophyll cell (1 mark)

b. Water (1 mark)
c. Air spaces (1 mark)
Stomata (1 mark)

20) (6 marks)

a. 1: right pulmonary artery (1 mark)
2: right atrium (1 mark)

b. - The ventricles relax. (½ mark)
- The pressure inside the ventricles drops below that in the arteries. (½ mark)
- Blood under high pressure in the arteries causes the semi-lunar valves to shut, preventing blood from going back into the ventricles. (½ mark)
- Blood from the vena cava and pulmonary veins enters the atria. (½ mark)

c. Blood will go back into the atria. (1 mark)

d. Semi-lunar valves. (1 mark)

21) (3 marks)

a. A: Insulin (½ mark)
1: Glycogenesis (½ mark)

b. The hormone (B) or glucagon attaches to receptor sites on the cell membrane of liver cells (½ mark). This leads to the activation of the enzymes inside to convert glycogen to glucose (½ mark).

c. Amino acids will be broken down by deamination (½ mark). The amino part of the molecule is excreted, and the reminder can be converted to glucose (½ mark).

QUESTION 4 (14 marks)

22) (5 marks)

a. X: Xylem / vessels (1 mark)

b. A: Diffusion /evaporation/ transpiration (1 mark)
B: Osmoses (1 mark)

c. Because of the existence of casparian strip. (1 mark)

d. (Any one 1 mark)
-Loss of their end wall to produce a tubes of cells
-The walls strengthened by addition of lignin
-The protoplasm dies

23) (2 marks)

a. Transport of oxygen. (1 mark)

b. Their main role in blood clotting. (1 mark)

24) (3 marks)

a.

A: Bowman's capsule (½ mark)
C: Podocyte (½ mark)

b. To prevent the large molecules such as proteins and blood cells from passing through. **OR** act as a filter. **OR** only small soluble molecules can pass through the basement membrane. (1 mark)

c. Because the afferent arteriole has a wider diameter than the efferent arteriole. **OR** more blood goes to the glomerulus than comes away which will help to build up hydrostatic pressure. (1 mark)

25) (4 marks)

a.

i: (Y): Tissue Fluid (1 mark)

ii: (Z): Venule (1 mark)

b. (Any Two, 1 mark)

Oxygen, nutrients, glucose, amino acids, fatty acids, vitamins, ions

c. (Any Two, 1 mark)

- They have thin permeable walls, one cell thick
- There are so many of them to provide a huge surface area for exchange.
- Blood flows them very slowly.
- The body cells are never far from a capillary.

END OF ANSWER SCHEME