



حاضر
غائب

امتحان شهادة دبلوم التعليم العام للمدارس الخاصة (ثنائية اللغة)
للعام الدراسي ١٤٣٤/١٤٣٥هـ - ٢٠١٣/٢٠١٤م
الدور الأول - الفصل الدراسي الأول

- المادة : الأحياء.
- الأسئلة في (١٣) صفحة.
- زمن الإجابة : ثلاث ساعات.
- الإجابة في الورقة نفسها.

تعليمات وضوابط التقدم للامتحان:

- الحضور إلى اللجنة قبل عشر دقائق من بدء الامتحان للأهمية.
 - إبراز البطاقة الشخصية لمراقب اللجنة.
 - 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 مبرك الامتحان كتباً 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 - عاصمة سلطنة عمان هي:
- القاهرة. ○ الدوحة.
● مسقط. ○ أبو ظبي.
- ملاحظة:** يتم تظليل الشكل (●) باستعمال القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.
- صحيح ● غير صحيح ○ × ⊖ ⊕ ⊙

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مُسَوِّدَة، لا يتم تصحيحها

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Question 1**(28 marks)****Shade the correct answer for each of the following questions.****1-** Stomata close when the guard cells:

- lose water.
- become turgid.
- gain potassium ions.
- have low internal CO₂ concentration.

2- Which part of the brain detects the change in level of CO₂ in blood?

- the pons.
- the tectum.
- the medulla.
- the cerebellum.

3- During an asthma attack:

- bronchioles dilate.
- bronchioles obstruct.
- the alveolar wall disintegrates.
- the respiratory tract produces less mucus.

4- Air rushes into the lungs of humans during inhalation because:

- pressure in the alveoli increases.
- the rib muscles and diaphragm contract, increasing the lung's volume.
- the internal muscles contract and the external intercostal muscles relax.
- the atmospheric pressure is lower than the pressure inside the lungs .

5- The actual places of gas exchange within the gills of fish are:

- the gill plates.
- the operculum.
- the buccal cavities.
- the bone surfaces within the gill arches.

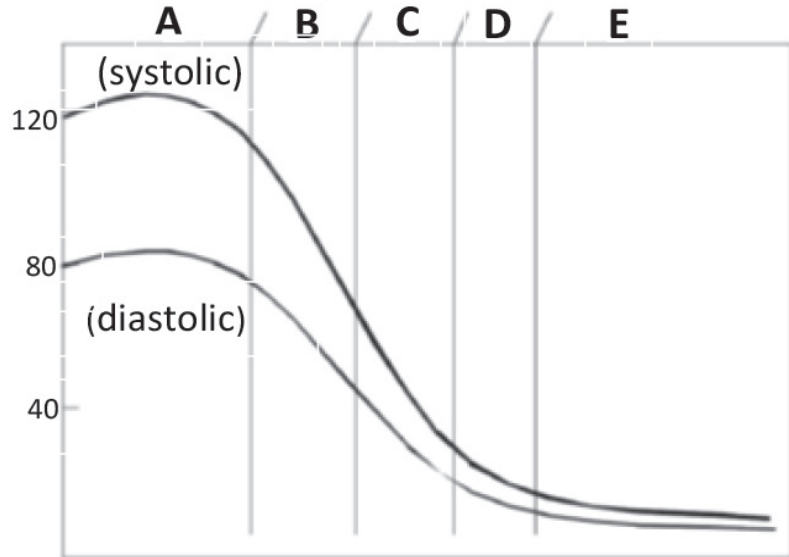
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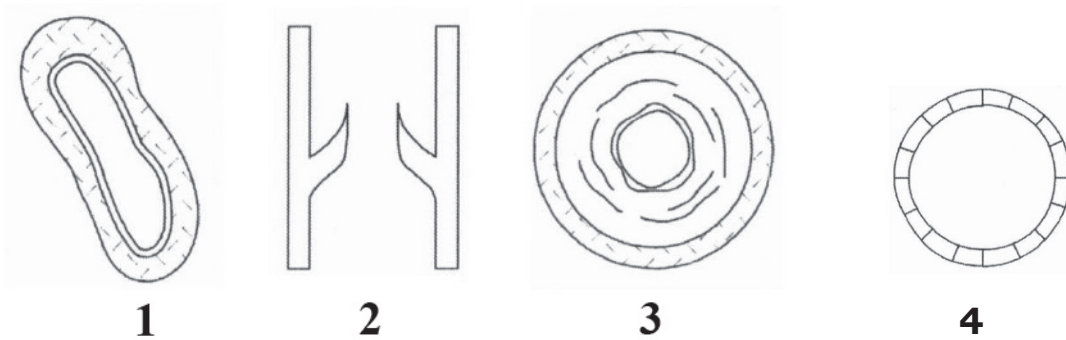
6- The following graph represents the pressure (systolic and diastolic) of a volume of blood moving through the circulation system via different blood vessels labelled A-E.

Which vessels are represented under the letter A?

- veins.
- venules.
- arteries.
- arterioles.



7- The diagram below shows blood vessels.



Which of the following correctly lists the types of the blood vessels?

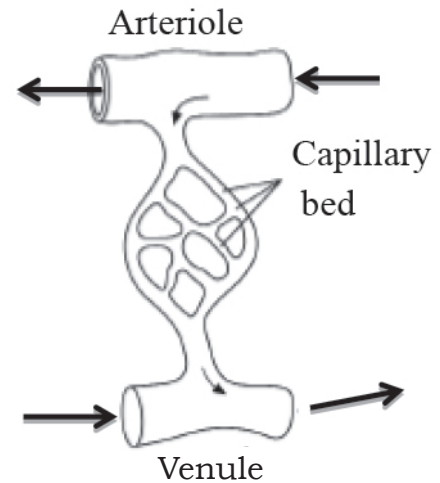
	1	2	3	4
<input type="radio"/>	Vein	Vein	Artery	Capillary
<input type="radio"/>	Artery	Vein	Capillary	Artery
<input type="radio"/>	Vein	Capillary	Artery	Vein
<input type="radio"/>	Artery	Capillary	Vein	Capillary

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- 8- The diagram below represents a part of the circulatory system of the skin. Which of the following correctly identifies changes in concentrations which would take place in the blood as it flows from the arteriole to the venule?

	Concentration	
	Glucose	CO ₂
<input type="radio"/>	High	Low
<input type="radio"/>	Low	Low
<input type="radio"/>	High	High
<input type="radio"/>	Low	High



- 9- Which of the following is dead at functional maturity?
- the companion cell. the sieve tube.
- the xylem vessel. the guard cell.
- 10- The term that describes the sticking of water molecules to other water molecules is:
- tension. adhesion.
- cohesion. capillarity.
- 11- The vascular bundle consists of all of the following **EXCEPT**:
- xylem. phloem.
- collenchyma. sclerenchyma.

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12- All of the following cell types are correctly matched with their functions **EXCEPT**:

	Cell type	Function
<input type="radio"/>	xylem vessel	water transport
<input type="radio"/>	sieve tube	sugar transport
<input type="radio"/>	guard cell	regulation of transpiration
<input type="radio"/>	companion cell	provide mechanical support

13- Which of the following reactions takes place in the systemic capillaries (where CO₂ is increased and O₂ is decreased)?

- $\text{HCO}_3^- + \text{H}^+ \rightarrow \text{H}_2\text{CO}_3$
 $\text{HbO}_8 + \text{H}^+ \rightarrow \text{HHb} + 4\text{O}_2$
- $\text{H}_2\text{CO}_3 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 $\text{HHb} + 4\text{O}_2 \rightarrow \text{HbO}_8 + \text{H}^+$

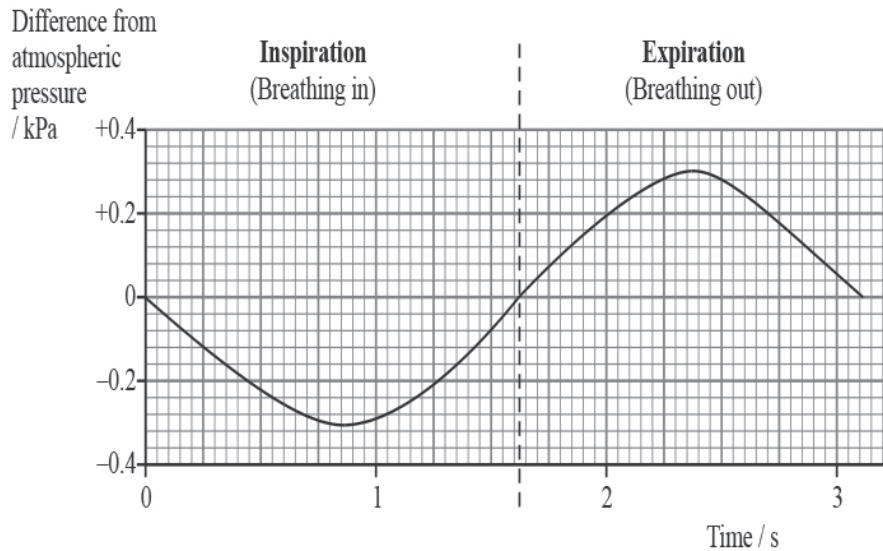
14- Freshwater fish excrete:

- urea.
 ammonia.
- urea & uric acid.
 uric acid & ammonia.

Question 2

(14 marks)

15. The graph below shows changes in the pressure of lungs during the period of one breath (inspiration+ expiration) in a person at rest. (3 marks)



a- From the graph describe the changes in the alveolar pressure of lungs during:

i) inspiration.

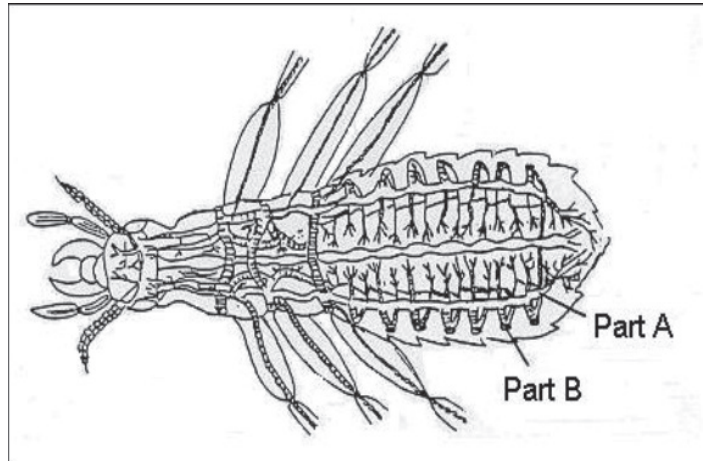
ii) expiration.

b- Using the information in the graph, calculate the difference in alveolar pressure between the minimum during inspiration and the maximum during expiration. Show your calculations.

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16. The diagram below shows the gas exchange system of an insect. (5 marks)



a- Identify the parts labeled A and B.

A: _____ B: _____

b- Describe the role of the tracheoles in gas exchange.

c- Explain how this gas exchange system facilitates the exchange of respiratory gases.

d. Give one disadvantage of this type of gas exchange system.

17. Define the following: (2 marks)

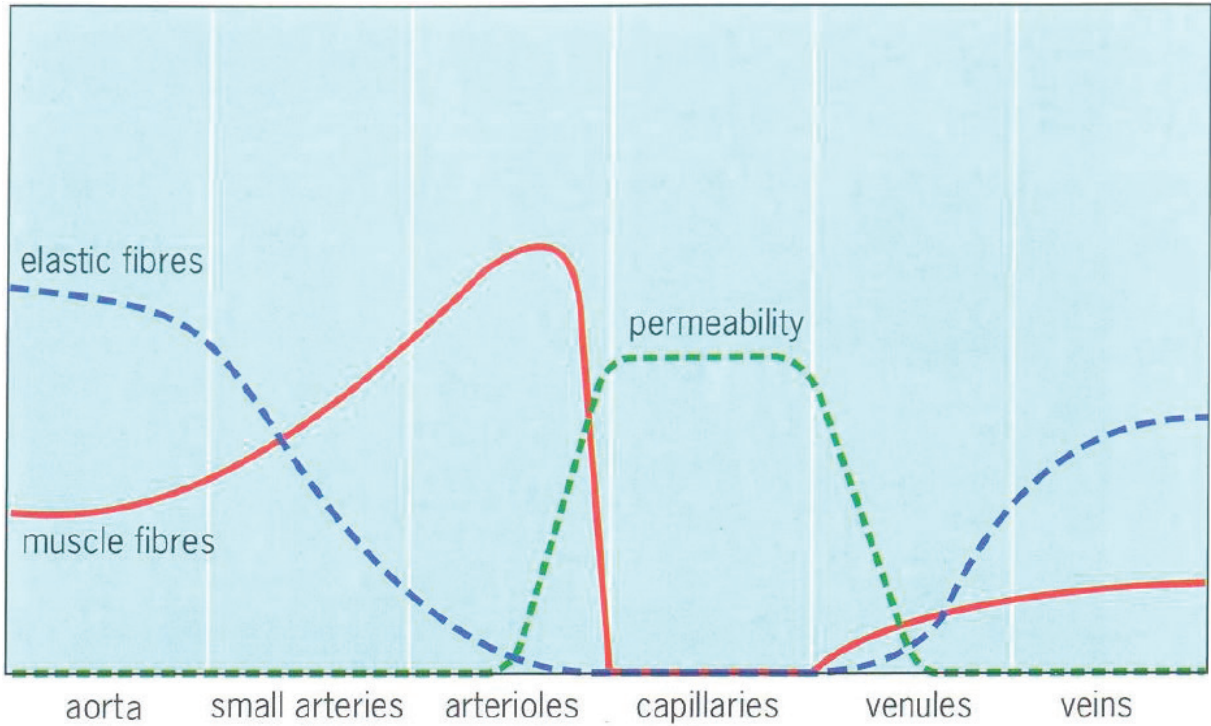
a- Capillarity.

b- Xylem parenchyma.

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18. The diagram below shows variations in certain features of blood vessels in different parts of the circulatory system. (4 marks)



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a) Describe the difference in the ratio of elastic fibers to muscle fibers between the aorta and the arterioles.

b) Explain the importance of this ratio (elastic fibers to muscle fibers) in:
 (i) the aorta.

(ii) the arterioles supplying blood to the skin.

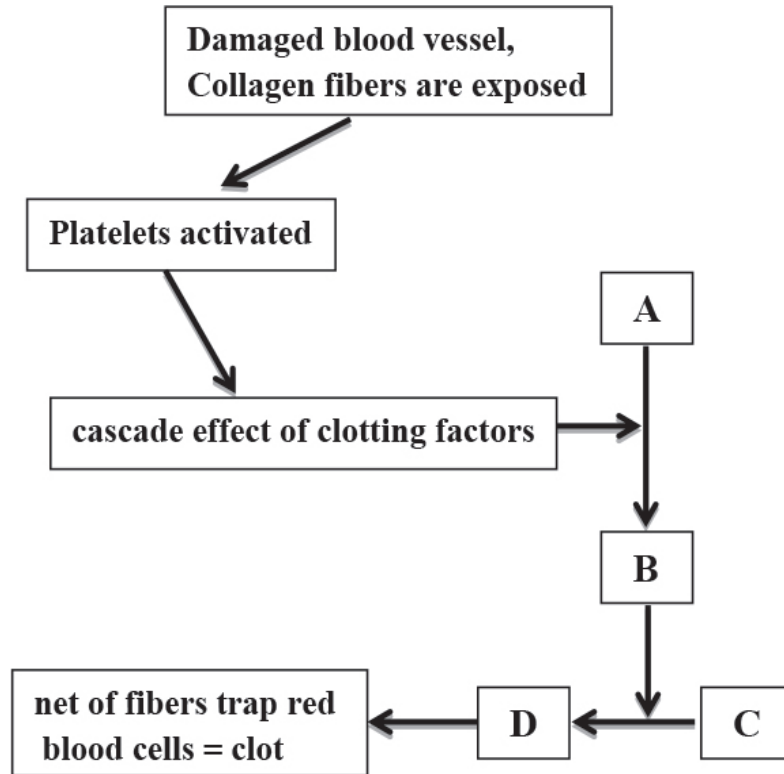
c) Explain how the features of the capillaries shown in the diagram are related to their function.

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Question 3

(14 marks)

19. The figure below outlines the roles of plasma proteins A to C in the process of blood clotting. (4 marks)



a- Name the proteins A to D.

A _____

B _____

C _____

D _____

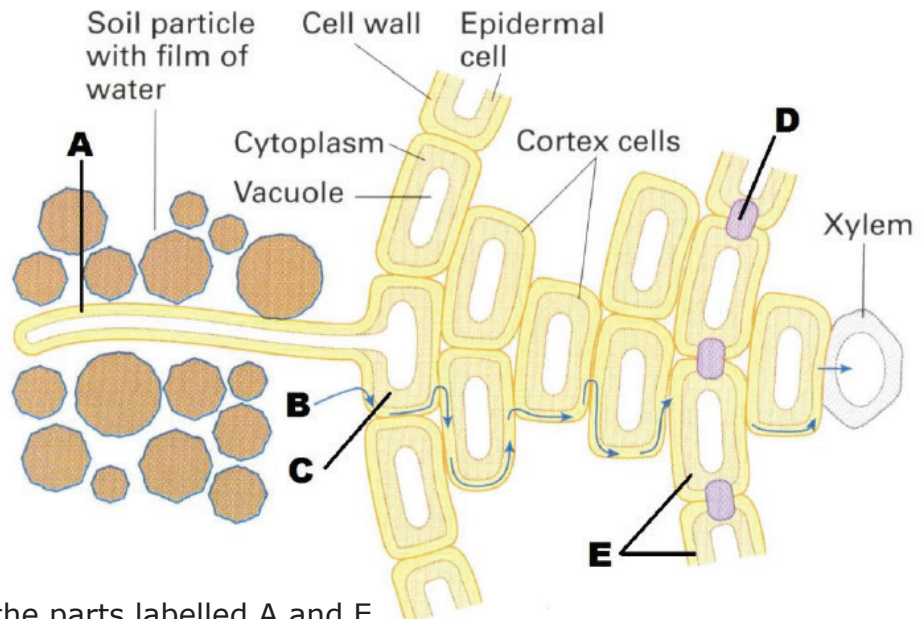
b- In some people, clotting factors are not produced so that proteins B and D cannot be made. Explain how the absence of these clotting factors may affect health.

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20. State two xerophyte adaptations which help them to live in hot and dry conditions. (2 marks)

21. The diagram below shows the transport of water from the soil into the xylem of a root. (5 marks)



a) Name the parts labelled A and E.

A: _____

E: _____

b) Name the water pathway labelled B.

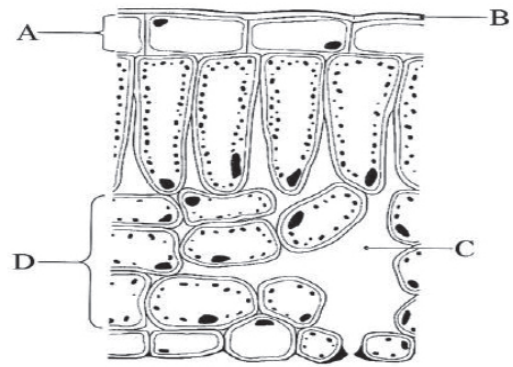
c) What is the function of part D?

d) Explain, in terms of the water potential gradient, why water moves from the soil to cell A.

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22. The diagram below shows part of a leaf. (3 marks)



a- Name parts labelled A and D.

A : _____

D : _____

b- Describe how part B is adapted to its function.

(c) Describe the role of part C.

Question 4

(14 marks)

23. The composition of air was analyzed from inhaled and exhaled air as shown in the table below. (2 marks)

Air component	Inhaled air (%)	Exhaled air (%)
Oxygen	20.71	14.60
Carbon dioxide	0.41	4.00
Water	1.25	5.90
nitrogen	78.00	75.50

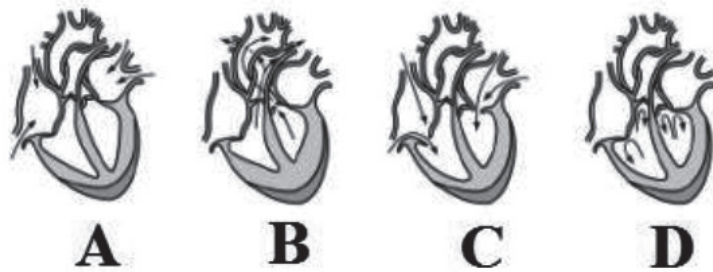
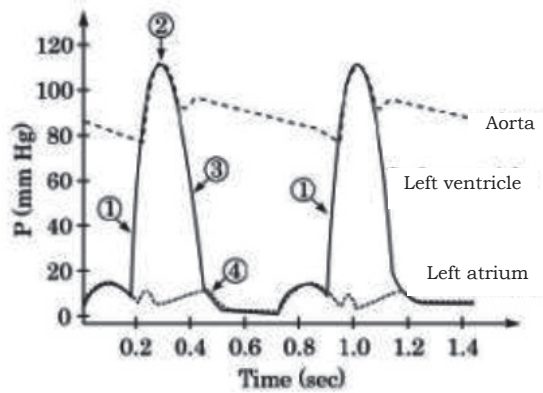
a- Explain why more water is found in exhaled air.

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b- Explain the difference in oxygen levels in inhaled and exhaled air.

24. The graph below shows the pressure changes in the aorta, left ventricle and left atrium that occur concurrently during the mammalian cardiac cycle. Below the graph are sketches of the heart illustrating blood flow and valve status (opened/closed). (4 marks)



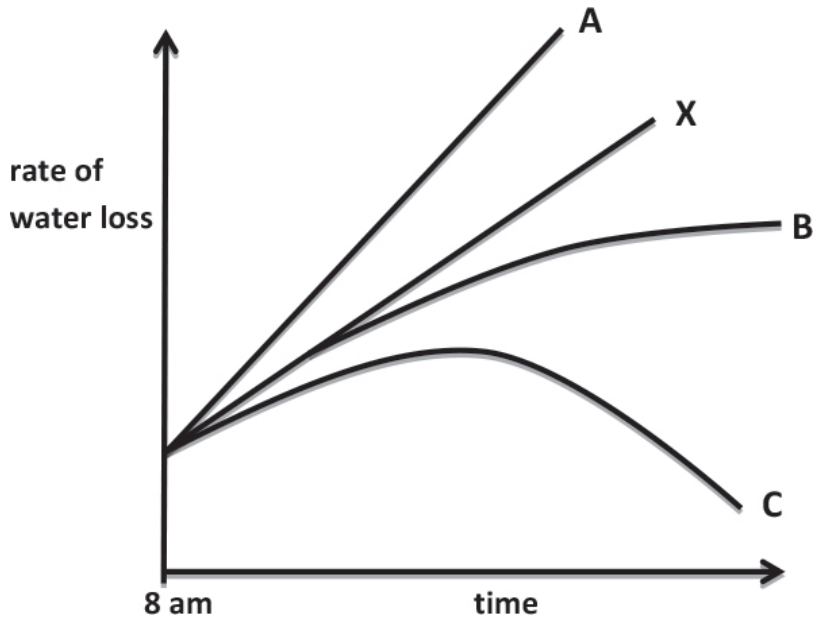
Match each numbered stage in the cardiac cycle graph with the letter of its corresponding heart sketch.

No. of stage	Letter of heart sketch
1	
2	
3	
4	

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25. The graph below shows the rate of water loss by a number of similar leafy shoots of a plant under different conditions. (2 marks)



Line X shows the rate of water loss by a shoot in slow moving air as the temperature increases from 8 am onwards.

Suggest which line would show the rate of water loss by a shoot in fast moving air as the temperature increases from 8 am onwards.

Line _____

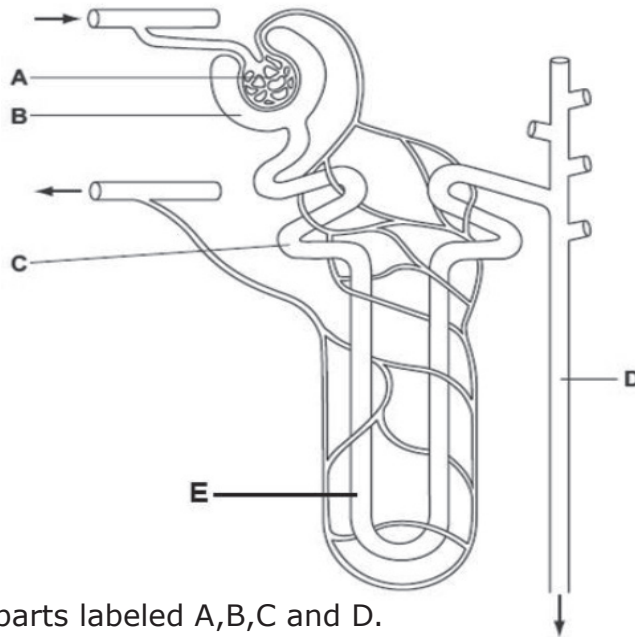
Explain your answer.

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26. The diagram below shows the simplified structure of a kidney tubule (nephron).

(6 marks)



a- Name the parts labeled A,B,C and D.

A _____

B _____

C _____

D _____

b- write the letter that indicates the part of the nephron where glucose is reabsorbed.

c- Name two other substances which are reabsorbed in the same part of the nephron as glucose.

d- The ability of the nephron to reabsorb water from the filtrate is important in maintaining the water balance of the body.

Describe how the concentration changes in part E assist in water reabsorption from the filtrate back into the body.

END OF THE EXAMINATION

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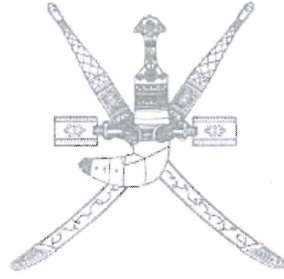
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SULTANATE OF OMAN
MINISTRY OF EDUCATION
DIRECTORATE GENERAL OF EDUCATIONAL EVALUATION

**GENERAL EDUCATION DIPLOMA EXAMINATION
FOR BILINGUAL PRIVATE SCHOOLS**

BIOLOGY

First Session - First Semester

2013 / 2014

MARKING GUIDE

[This guide consists of 7 pages]



ANSWERS

QUESTION 1 (28 marks)

Each answer 2 marks

Question number	Answer				
1	lose water.				
2	the medulla.				
3	bronchioles obstruct.				
4	the rib muscles and diaphragm contract, increasing the lung's volume.				
5	the gill plates.				
6	arteries.				
7	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">Vien</td> <td style="padding: 2px 10px;">Vien</td> <td style="padding: 2px 10px;">Artery</td> <td style="padding: 2px 10px;">Capillary</td> </tr> </table>	Vien	Vien	Artery	Capillary
Vien	Vien	Artery	Capillary		
8	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">Low</td> <td style="padding: 2px 10px;">High</td> </tr> </table>	Low	High		
Low	High				
9	the xylem vessel.				
10	cohesion.				
11	collenchyma.				
12	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">companion cell</td> <td style="padding: 2px 10px;">provide mechanical support</td> </tr> </table>	companion cell	provide mechanical support		
companion cell	provide mechanical support				
13	$\text{HbO}_8 + \text{H}^+ \rightarrow \text{HHb} + 4\text{O}_2$				
14	ammonia.				

Written Response

QUESTION 2 (14 marks)

15. (3 marks)

a.

i) inspiration.

Decreases from zero to a minimum of (–0.29 OR –0.3 OR –0.31) (kPa); Then returns to zero (at the end of inspiration) (1 mark)

ii) Expiration

Increases from zero to a maximum of (0.29 OR 0.3 OR 0.31) (kPa); Then returns to zero (at the end of expiration) (1 mark)

b.

Changes from {–0.29 / –0.3 / –0.29} (kPa) to {0.29 / 0.3 / 0.31} (kPa); Overall change of {0.58 – 0.62} kPa (1 mark)

16. (5 marks)

a.

A = tracheal tube (½ mark) , B = spiracle (½ mark)

b. Tracheoles increases surface area for gas exchange , and they are in contact with tissues to provide them with O₂ and remove CO₂. (1 mark)

c.

- 1- The branching of the tracheal tubes increases the surface area so more exchange of gases can take place.
- 2- Tracheoles are finer branches and lack chitin so they pass between individual cells.
- 3- Oxygen and carbon dioxide dissolve in the moist environment at the end of the tracheoles and diffuse in/out of the cell

(ANY TWO 2 marks)



d- It is not suitable for big organisms like mammals ($\frac{1}{2}$ mark) because they have a smaller surface to volume ratio compared to insects so diffusion will be very low or very slow ($\frac{1}{2}$ mark)

17. (2 Marks)

a. Capillarity: water tends to rise inside narrow tubes. (1 mark)

b. Xylem parenchyma: packing tissue that keeps the other xylem elements in place. (1 mark)

18. (4 marks)

a. There is a decrease in ratio of elastic fibres to muscle fibres. The ratio of elastic fibers: muscle fibers is greater in aorta than arterioles (1 mark)

b. (i) The elastic tissue help the aorta to withstand the high pressure of blood flowing in it and enable the aorta to stretch and recoil back to push the blood on its way. (1 mark)

(ii) The importance of this ratio in the arterioles supplying the skin is for contraction/relaxation of the muscle fibres, and it controls blood supply to surface vessels. (1 mark)

c. The capillaries are more permeability to allow the exchange of material between the blood and the cells. (1 mark)



QUESTION 3 (14 marks)

19. (4 marks)

- a. A prothrombin; ($\frac{1}{2}$ mark) B thrombin; ($\frac{1}{2}$ mark)
- C fibrinogen; ($\frac{1}{2}$ mark) D fibrin; ($\frac{1}{2}$ mark)

- b. blood does not clot; continue to bleed (for longer); haemophilia;
 internal, bleeding/bruising; entry of pathogens (2 mark)

20. (2 marks)

- a very thick waxy cuticle in the leaves.
 - Smaller leaves.
 - Rolling up of leaves.
 - Sunken stomata.
 - Leaf hairs are outgrowths of the epidermal cells of leaves.
 - Succulent leaves.
 - Succulent stems.
 - Close their stomata during daylight.
 - Shallow, extensive root systems.
 - Development of sclerenchyma tissue in the leaf.
- (ANY TWO 2 marks)

21. (5 marks)

- a. A = root hair (1 mark) , E = endodermis (1 mark)

- b. apoplast pathway. (1 mark)

- c. stops water passing along the endodermis cell walls OR
 stops apoplast route. (1 mark)

- d. because the water in the soil contain a very weak solution of mineral salts, so it has high water potential however, inside the root hair vacuole, there is relatively strong solution of sugar and other dissolved substances , giving low water potential. So the water passes from soil into the root hair cell down a water potential gradient by osmosis. (1 mark)



22. (3 marks)

a.

- A – Upper epidermis (½ mark)
- D – Spongy Mesophyll (½ mark)

b.

This layer of cells is **clear** and **thin** so allows light to pass through,
It also **waterproof** and **waxy** layer reducing water loss or evaporation.
(ANY TWO 1 mark)

c.

Allow gases to move/gas exchange quickly/easily (1 mark)

QUESTION 4 (14 marks)**23. (2 marks)****a.**

The lungs is moist organs and when the animal inhales dry air, there is higher water content in the lungs air than in the inhaled air. This water in lungs diffuses into exhaled air. (1 mark)

b. because the inspired air mixes with air already in the lungs(residual air), which has a lower percentage of oxygen **OR** it will contain more CO₂ and less O₂ since the O₂ is absorbed into the blood in the lungs, so its level in the air is reduced. (ANY ANSWER 1 mark)

24. (4 marks)

No.	letter
1	D
2	B
3	A
4	C

(4 marks)

25. (2 marks)

Line A (1 mark)

The loss of water will increase because fast moving air will disperse the water vapour away of the leaf, which increase the gradient in water potential and thus increasing the rate of transpiration. (1 mark)



26. (6 marks)

a.

A: glomerulus (½ mark)

B: bowman's capsule (½ mark)

C: proximal convoluted tubule (½ mark)

D: collecting tube (½ mark)

b. proximal convoluted tubule. (1 mark)

c.

1- ions / named eg: K / Na / Cl / Ca / Mg / SO₄ / PO₄ / HCO₃ / NH₃ / NH₄ / organic anions;

2- amino acids; vitamins / named eg; water; urea; (small) proteins / albumen; peptide hormones; uric acid;

(1 mark)

d.

the loop creates high ion / salt / Cl⁻ / Na⁺ / solute / urea concentration in medulla / interstitial fluid so water reabsorbed (or drawn out) by osmosis from collecting duct into blood .

(vasa recta / blood / capillary network (in medulla) (2 marks)

END OF ANSWER SCHEME