سلطنة عمان
وزارة التربية والتعليم

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

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

**تعليمات وضوابط التقدم للامتحـان:**

- الحضور إلى اللجنة قبل عشر دقائق من بدء الامتحان للأهمية.
- إبراز البطاقة الشخصية لمراقب اللجنـة.
- 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 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 - عاصمـة 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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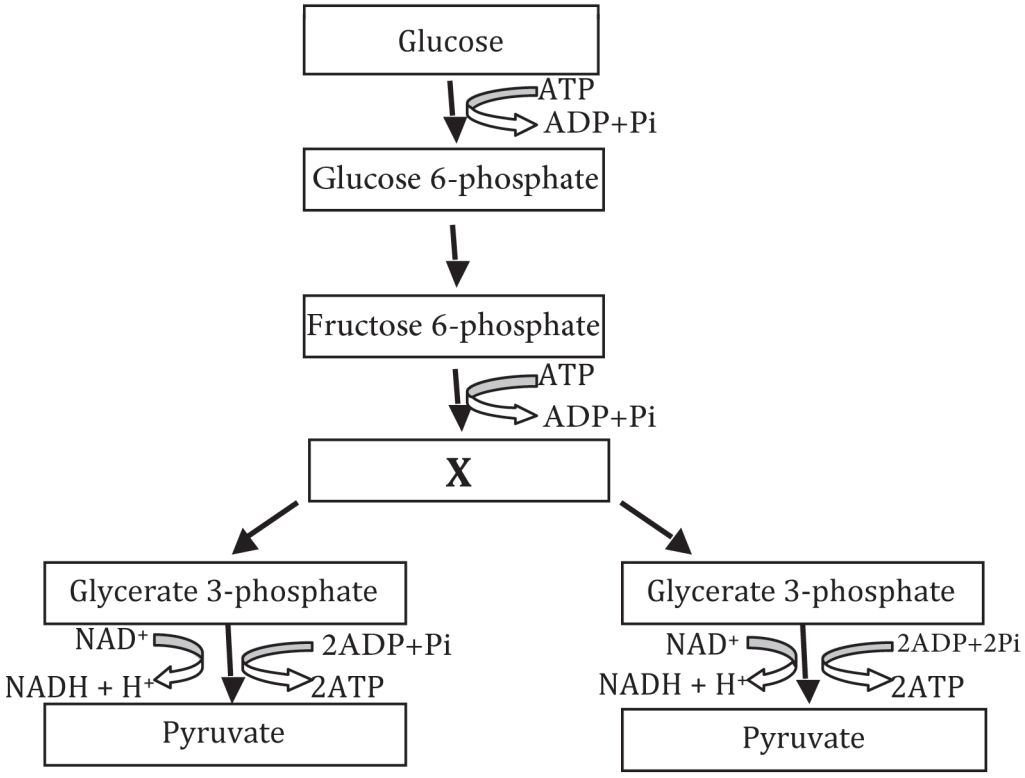
## Part 1: Multiple choice items (28 marks)

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

**1)** The figure below shows a stage in aerobic respiration.




How many direct ATP molecules are made at the end of this stage if the compound labelled (X) is put through it?

- ○ 1
- ○ 2
- ○ 3
- ○ 4

**2)** During chemiosmosis in aerobic respiration, protons are pumped:

| | Out of | Into |
|---|---|---|
| ○ | the intermembrane space of the mitochondria | the mitochondrial matrix |
| ○ | the mitochondrial matrix | the intermembrane space of the mitochondria |
| ○ | the cell cytoplasm | the matrix of the mitochondria |
| ○ | the matrix of the mitochondria | the cell cytoplasm |

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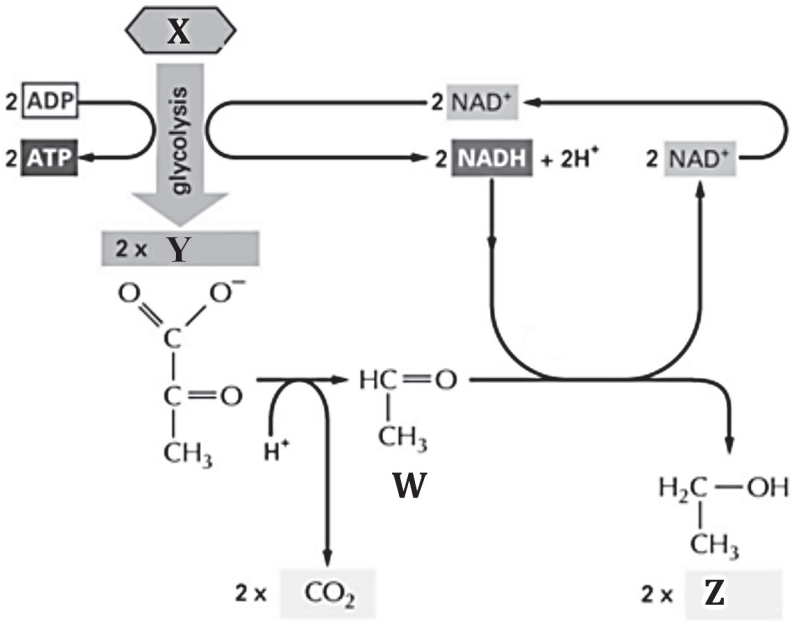
## Part 1 continued

**3)** The figure below shows the steps of fermentation:




The compound to which reduced $NAD^+$ passes its hydrogen is:

- ☐ X
- ☐ Y
- ☐ W
- ☐ Z

**4)** The leaves of a plant appear to be reddish- yellow. What wavelengths of visible light are being absorbed by this pigment?

- ☐ red and yellow
- ☐ green and red
- ☐ blue and violet
- ☐ green and yellow

**5)** If photosynthesizing green algae are provided with $CO_2$ synthesized with heavy oxygen ($^{18}O$), all of the following compounds produced by the algae contain the ($^{18}O$) label **EXCEPT**:

- ☐ $O_2$
- ☐ GALP.
- ☐ $C_6H_{12}O_4$
- ☐ RuBP.

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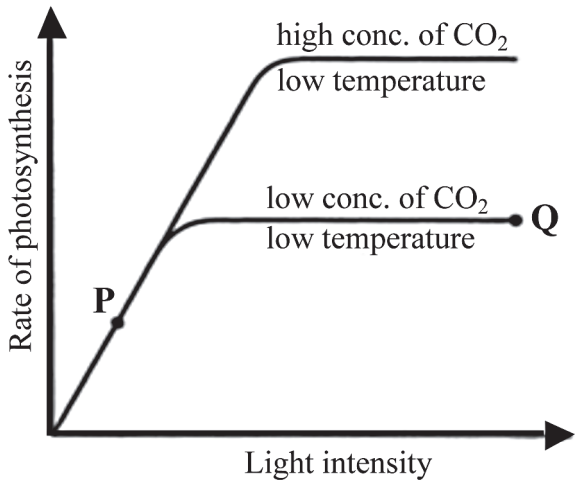
## Part 1 continued

**6)** The graph below shows the effect of light intensity, concentration of carbon dioxide and temperature on the rate of photosynthesis.




Which factors are limiting the rate of photosynthesis at points P and Q on the graph?

| | P | Q |
|---|---|---|
| ☐ | light | carbon dioxide |
| ☐ | light | temperature |
| ☐ | carbon dioxide | temperature |
| ☐ | temperature | light |

**7)** A compound formed in an organism for inhibiting growth of pathogens is an:

☐ antigen. ☐ antibody.

☐ antibiotic. ☐ antiallergic.

**8)** All of the following is true about the influenza virus **EXCEPT:**

☐ We can not rely upon the body's own defenses for treatment.

☐ Antibiotics are ineffective against viral infection.

☐ Transmission is more likely in crowded places.

☐ The virus affects the respiratory passages.

## Part 1 continued

**9)** The antigen binding site in an antibody is found:

- ☐ between one heavy and one light chain.
- ☐ between two heavy chains.
- ☐ between two light chains.
- ☐ in the hinge region.

**10)** Sara and Ahmed are sister and brother, Sara cannot receive Ahmed's blood but Ahmed can receive Sara's blood.

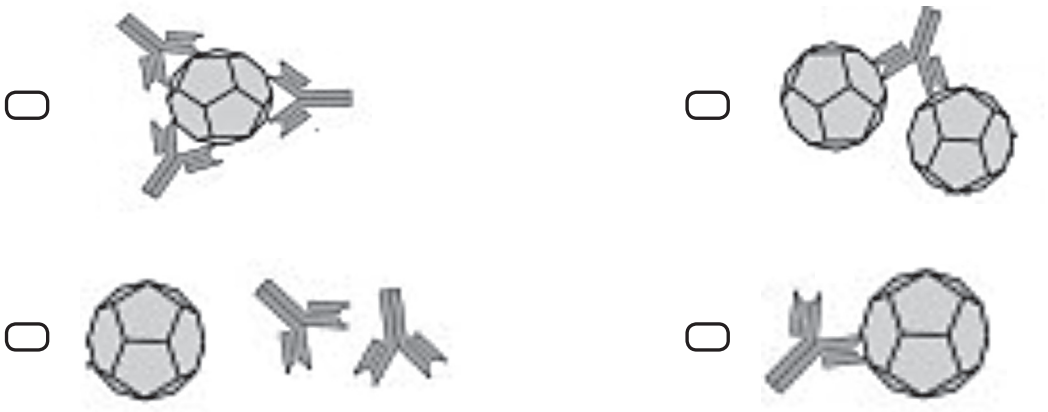
| Blood type | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Antigen on red blood cells |  |  |  |  |
| Plasma antibodies |  |  | None |  |

According to the figure above, the correct blood groups of Sara and Ahmed are:

| | Sara | Ahmed |
|---|---|---|
| ☐ | 1 | 2 |
| ☐ | 4 | 3 |
| ☐ | 2 | 1 |
| ☐ | 1 | 4 |

## Part 1 continued

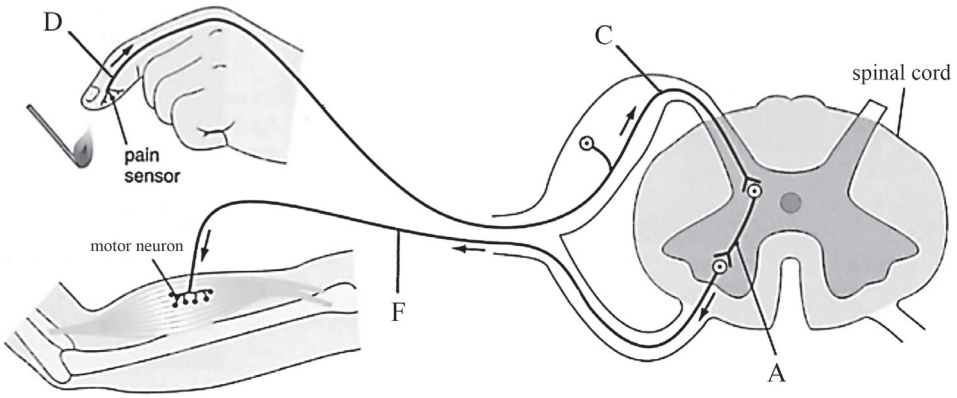
**11)** Antibodies act in different ways to destroy pathogens. The figure that shows agglutination is as follows:



**12)** Treatment of a snake bite by antivenin provides one of the following types of immunity:

- Artificial active.
- Artificial passive.
- Natural active.
- Natural passive.

**13)** The figure below shows a reflex arc.




The sequence of neurons involved in a reflex is:

- A, C, D, F
- F, A, C, D
- C, D, A, F
- D, C, A, F

## Part 1 continued

**14)** The figures below show the ion movements during the passage of an action potential.

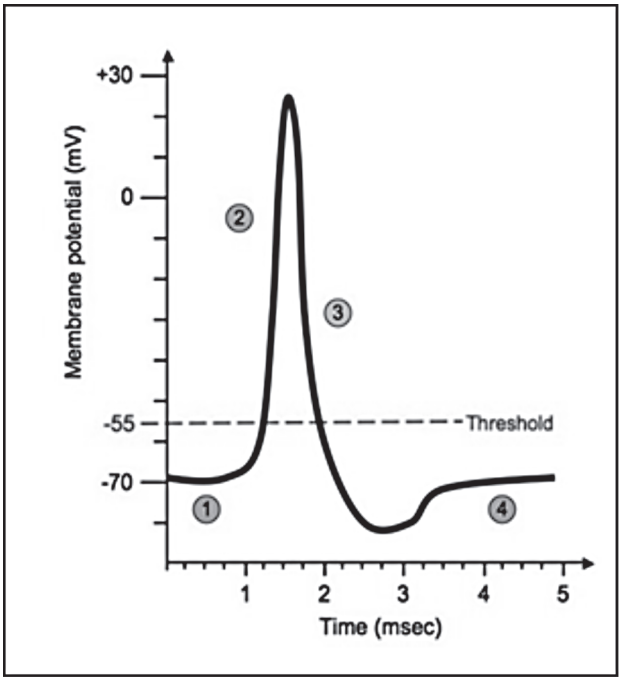



**Figure 1**

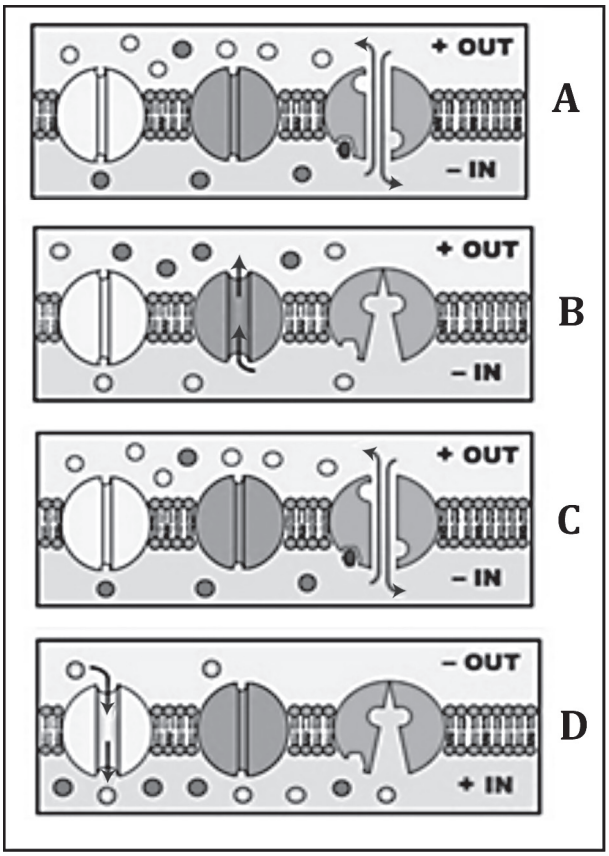
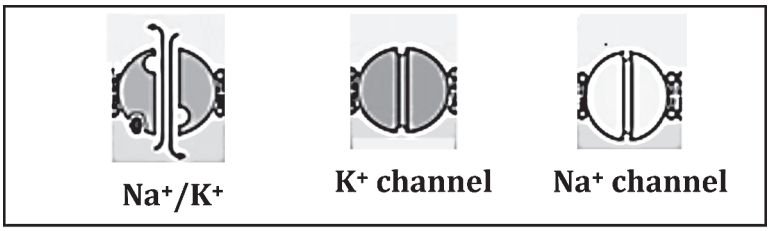



**Figure 2**




The correct order of steps in figure (2) that lead to the production of an action potential as shown in figure (1) is:

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| ○ | C | D | B | A |
| ○ | D | A | C | B |
| ○ | A | B | D | C |
| ○ | B | C | A | D |

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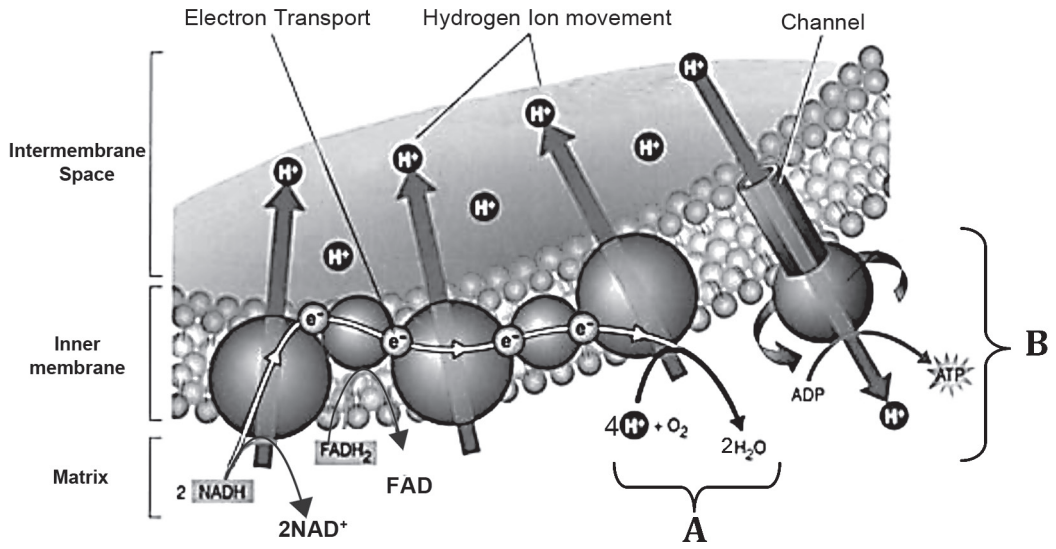
## Part 2: Extended Responses (42 marks)

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.

**15)** The figure below shows the electron transport chain. (2 marks)

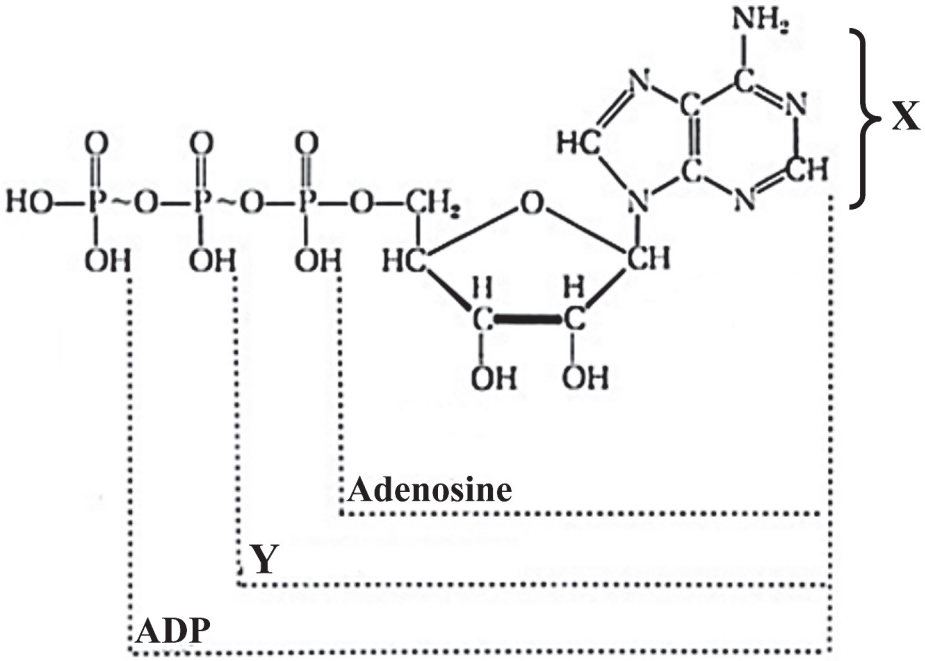



Write in the table the enzymes that are catalyzing the reactions labelled (A) and (B).

| Reaction | Enzyme |
|---|---|
| A | |
| B | |

## Part 2 continued

**16)** The figure below shows the structure of ATP. (2 marks)




**a.** Name the molecule labelled (X).

_____

**b.** If one ATP molecule is converted into the molecule labelled (Y):

**i-** What is the name of the process?

_____

**ii-** What is the amount of energy (kJ $mol^{-1}$) that will be released?

_____

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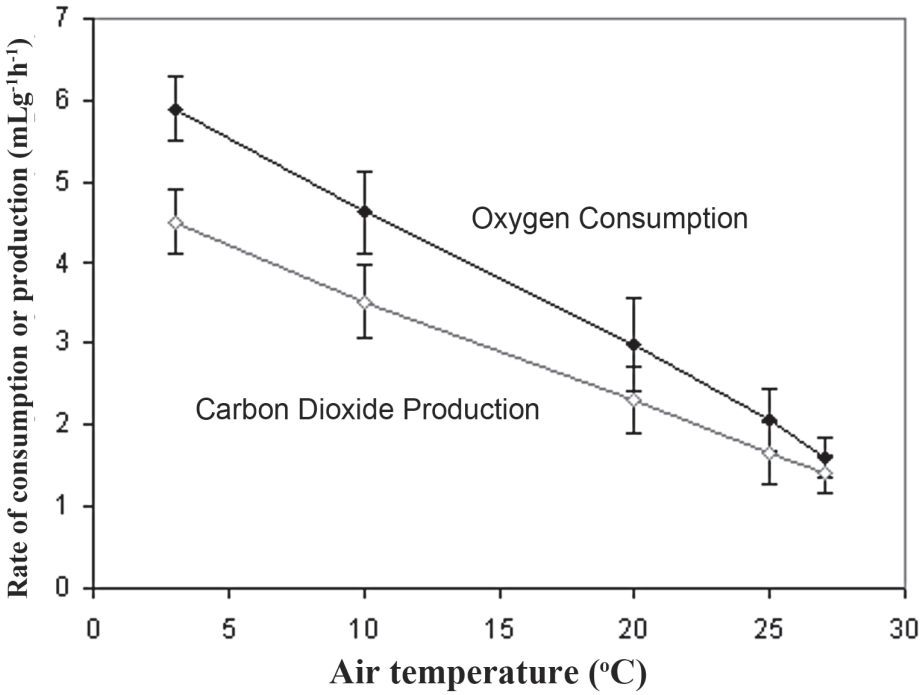
## Part 2 continued

**17)** The graph below shows changes in oxygen consumption and carbon dioxide production for the Siberian hamster approximately 1 hour after food access was removed. The type of food given the hamster did not change. (3 marks)



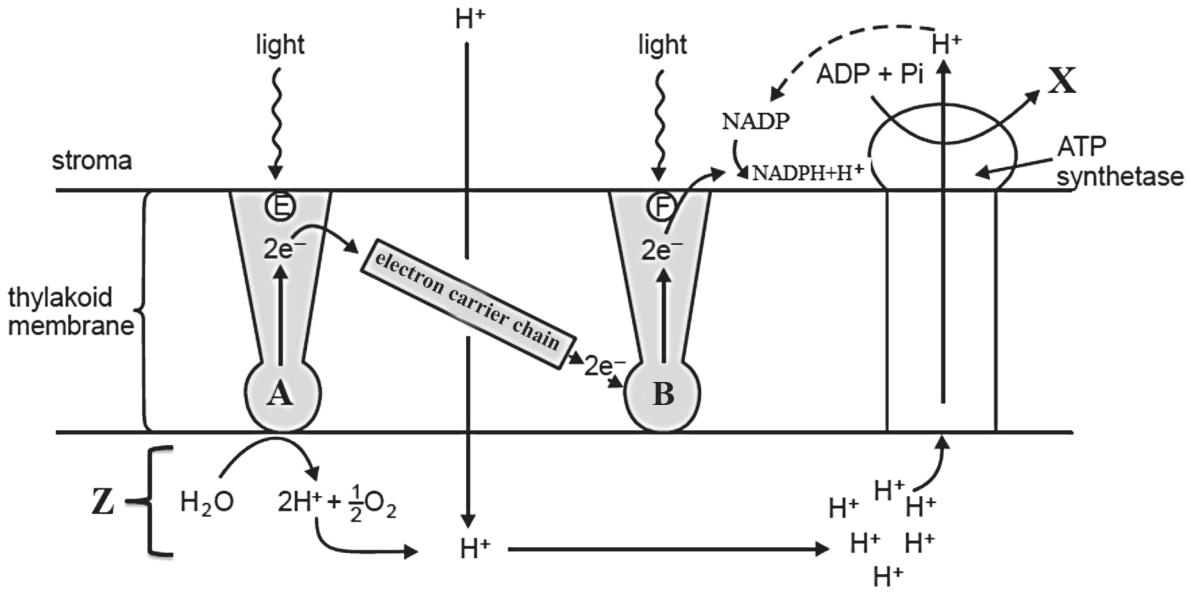

**a.** Calculate the RQ at temperature 27°C.

**b.** What is the respiratory substrate most likely to be used by the hamster at lower temperatures?

**c.** How would you explain the decline in oxygen consumption and carbon dioxide production with increasing air temperature?

## Part 2 continued

**18)** The figure below shows the light-dependent stage of photosynthesis. (5 marks)




**a.** Name the parts labelled (A) and (B).

A: _____

B: _____

**b.** Name the process labelled (Z).

_____

**c.** Explain how the substance labelled (X) is formed at this stage.

_____

_____

_____

_____

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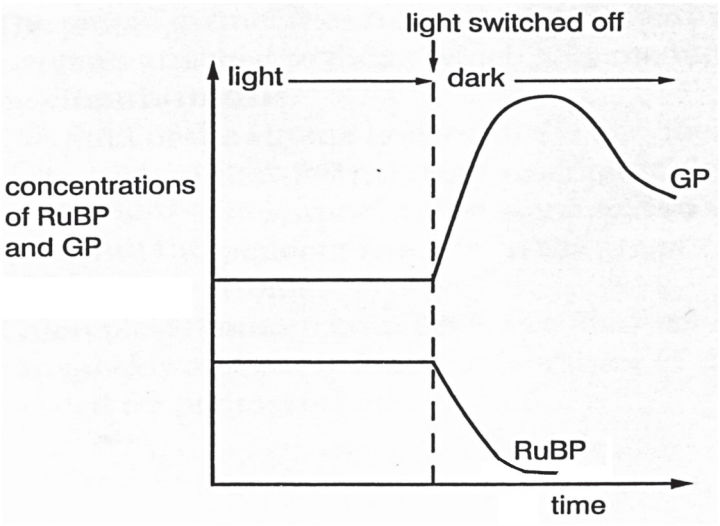
## Part 2 continued

**19)** The graph below shows the changes in the relative concentrations of ribulose bisphosphate (RuBP) and glycerate 3-phosphate (GP) produced in the Calvin cycle before and after a light source is switched off. All other conditions are constant. **(2 marks)**



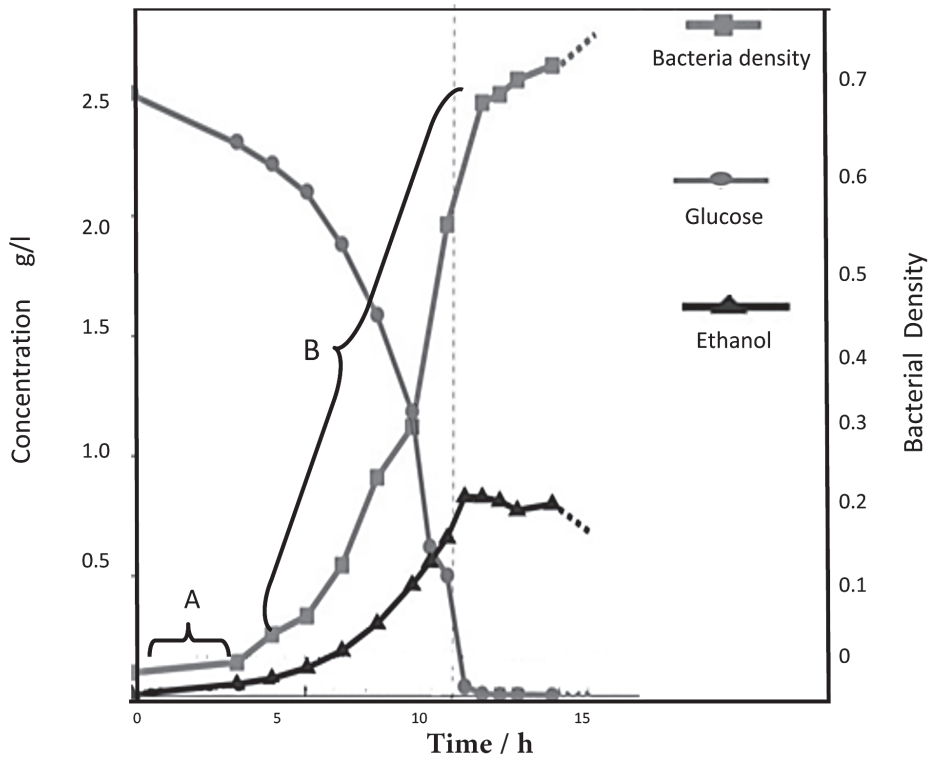

Explain the changes in the relative concentrations of RuBP and GP after the light source is switched off.

**20)** Complete the table below to compare Penicillin and Streptomycin. (2 marks)

| | Penicillin | Streptomycin |
|---|---|---|
| The way in which it destroys pathogens | | |

## Part 2 continued

**21)** The graph below shows an experiment conducted by a researcher to observe the growth of obligate anaerobic bacteria. (5 marks)




**a.** Name the phase labelled (B).

**b.** Describe the bacterial growth during the phase labelled (A).

**c.** Explain the drop in glucose concentration with time.

**d.** Identify the source of ethanol.

**e.** Predict what will happen to the bacterial density if oxygen is present at the beginning of this experiment? Explain your answer.

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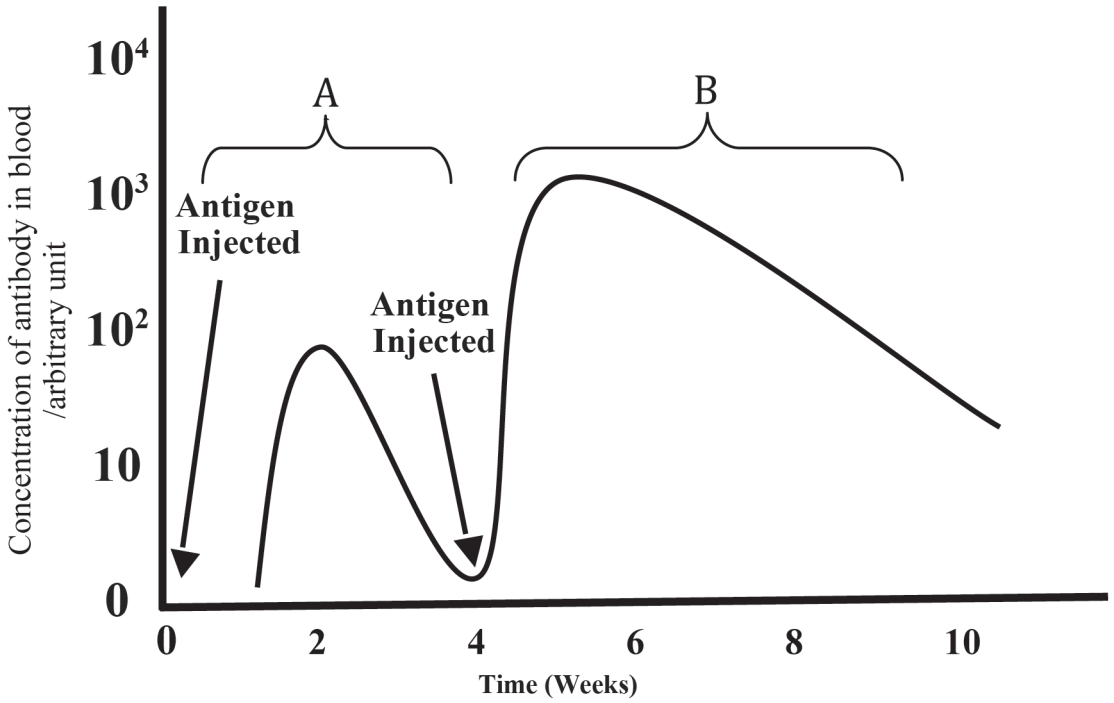
## Part 2 continued

**22)** The graph below shows antibody mediated immunity. (3 marks)




**a.** Name the responses labelled (A) and (B).

A: _____

B : _____

**b.** Explain the low level of antibodies at (A).

_____

_____

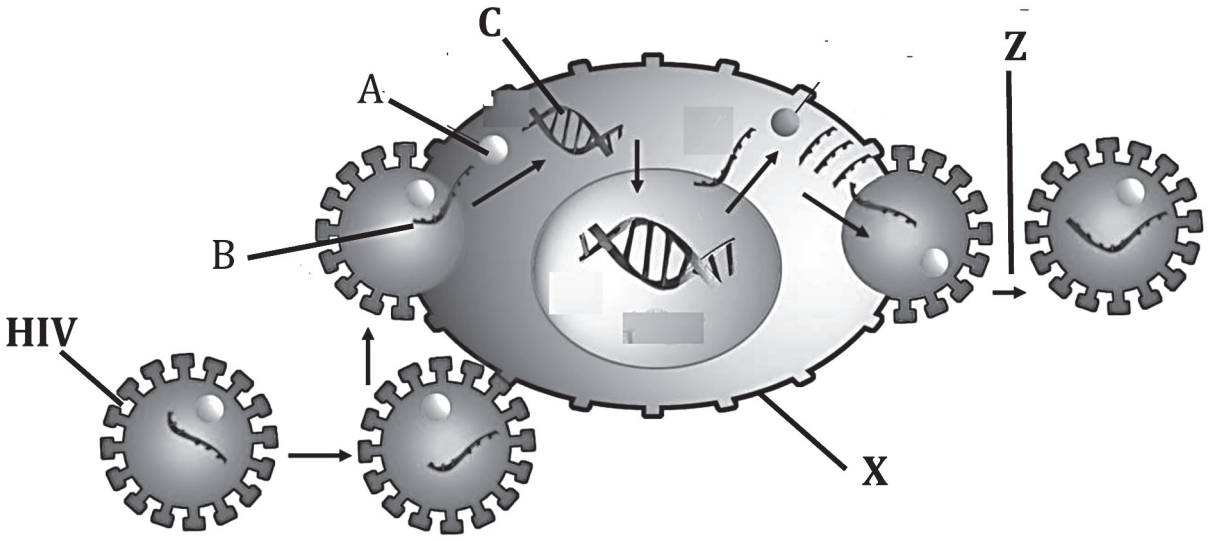
_____

**23)** Compare food poisoning and tuberculosis in the following table: (4 marks)

| | Food poisoning | Tuberculosis |
|---|---|---|
| Symptoms | | |
| Way of transmission | | |

## Part 2 continued

**24)** The figure below shows the life cycle of the HIV. (5 marks)




**a.** Name the following:

**i-** Enzyme labelled (A). _____

**ii-** Cell type labelled (X). _____

**b.** Explain how (B) changed to (C).

_____

_____

**c.** Explain what will happen after the step labelled (Z).

_____

_____

**d.** Explain why AIDS patients' immunity is very weak and why they are suffer badly from opportunistic infections.

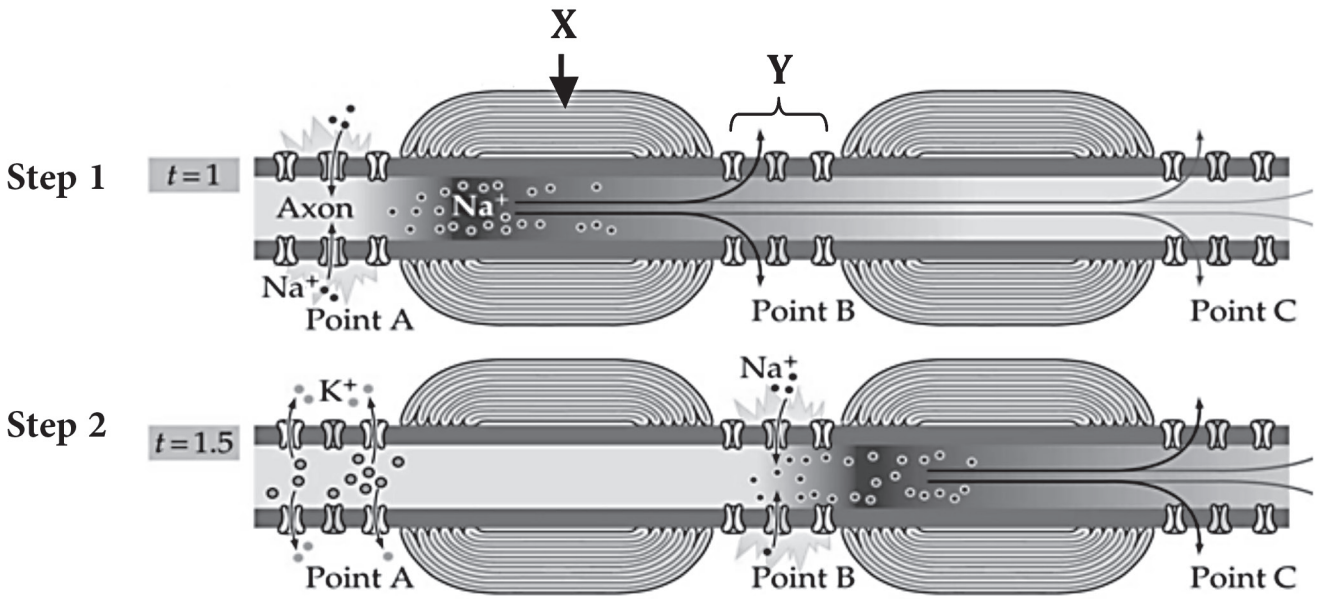
_____

_____

_____

## Part 2 continued

**25)** The figure below shows action potential propagation in an axon. (5 marks)




**a.** Name the parts labelled (X) and (Y).

(X) : _____

(Y) : _____

**b.** What is the name of this type of impulse transmission?

_____

**c.** Determine in step (2) the points of depolarization and repolarization.

**i-** Depolarization: _____

**ii-** Repolarization: _____

**d.** State one advantage for this type of conduction.

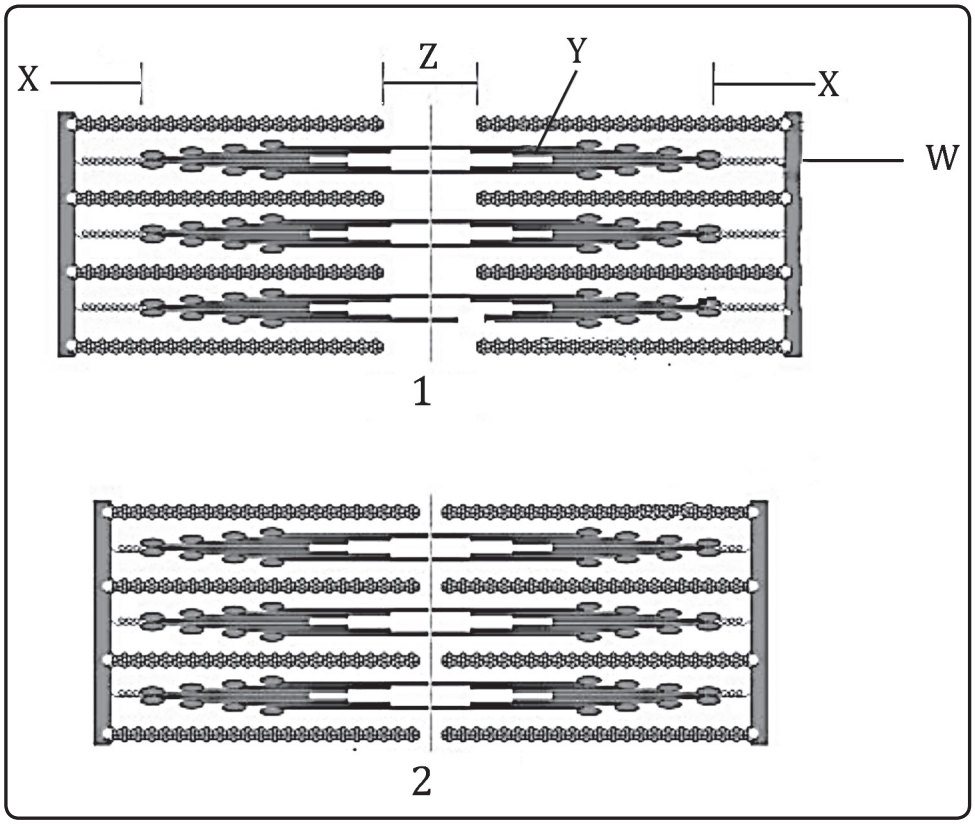
_____

_____

## Part 2 continued

**26)** The figure below shows the changes in sarcomere during muscle contraction.

(4 marks)




**a.** Name the parts labelled (W) and (Y).

W: _____

Y: _____

**b.** Which figure represents the contraction of the muscle?

_____

**c.** Describe the changes in parts labelled (X) and (Z) of the sarcomere in figure (2).

X: _____

Z: _____

**[ End of Examination ]**

# مُسَوَّدَة