رقم الورقة	
رقم المغلف	

حاضر ☐

غائب ☐

سلطنة عمان

وزارة التربية والتعليم

امتحان دبلوم التعليم العام للمدارس الخاصة (ثنائية اللغة)

للعام الدراسي ١٤٣٥/١٤٣٤ هـ - ٢٠١٣ / ٢٠١٤ م

الدور الأول - الفصل الدراسي الثاني

تنبيه:
- المادة: الأحيـــاء.
- 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 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 - عاصمـة سلطنة عمـــان هي:

☐ القاهرة ☐ الدوحة

■ مسقط ☐ أبوظبي

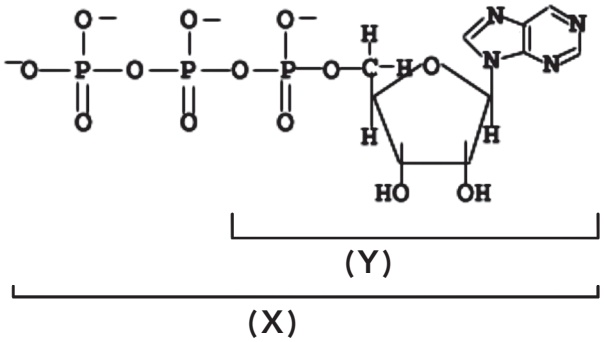
ملاحظة: يتم تظليل الشكل (■) باستخدام القلم الرصاص وعند الخطأ، امسح بعناية لإجراء التغيير.

صحيح ■ **غير صحيح** ☐ ◉ ◒ ⊗ ☑

Question 1 (28 marks)

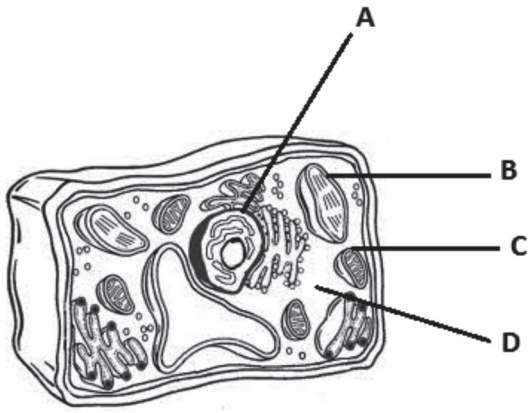
Shade the correct answer for each of the following questions.

1) The diagram shows the structure of an ATP molecule. The amount of free energy in kJ mol^{-1} that will be produced from the hydrolysis of molecule (X) to (Y) is equal to:



- ▢ 30
- ▢ 60
- ▢ 90
- ▢ 120

2) The diagram shows the structure of a plant cell.
In which part is glucose converted to pyruvic acid?

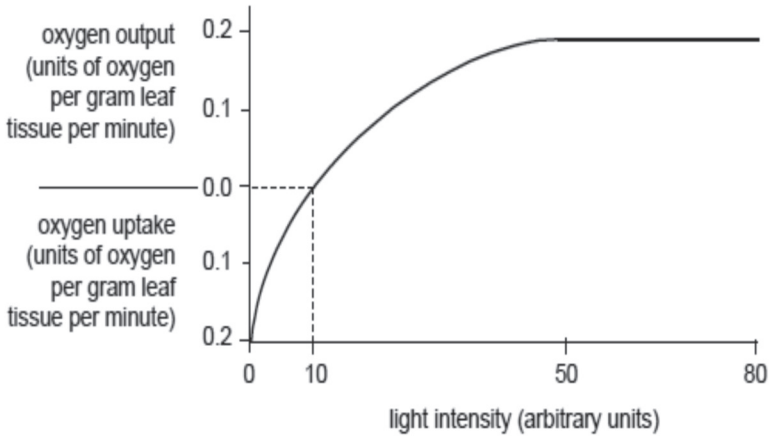


- ▢ A
- ▢ B
- ▢ C
- ▢ D

3) Which of the following substances are produced during the Krebs cycle?

- ▢ CO_2 and H^+
- ▢ O_2 and H_2O
- ▢ ATP and O_2
- ▢ ATP and NAD^+

4) The graph below shows the relationship between light intensity and the net amount of oxygen uptake and output by a particular green plant.



At a light intensity of 10 units:

- ☐ the rate of photosynthesis is zero.
- ☐ the rate of aerobic respiration is zero.
- ☐ the oxygen output is equal to the oxygen uptake.
- ☐ the oxygen output is twice equal to the oxygen uptake.

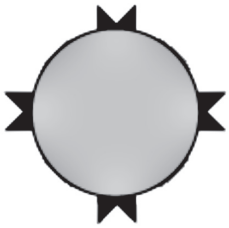
5) The main difference between cyclic and noncyclic photophosphorylation is:

- ☐ each of them uses different electron acceptors.
- ☐ only photosystem I is involved in the cyclic process.
- ☐ only photosystem II is involved in the cyclic process.
- ☐ noncyclic photophosphorylation does not produce ATP.

6) Oxygen is produced during photosynthesis when:

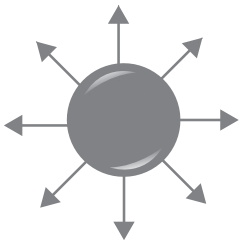
- ☐ water molecules are split to provide electrons for photosystem I.
- ☐ water molecules are split to provide electrons for photosystem II.
- ☐ the carbon is removed from carbon dioxide to make carbohydrates.
- ☐ hydrogen from water is added to carbon dioxide to make carbohydrates.

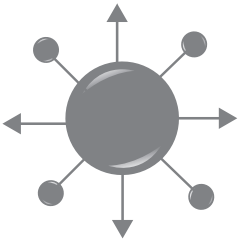
7) **A disease-causing bacterium has the following structure:**

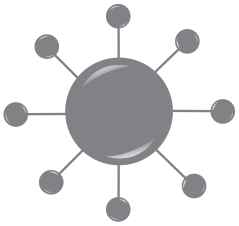


Which kind of antibodies would be most effective against this type of bacterium?

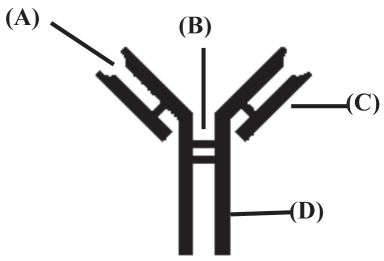
8) **Ahmed wants to donate blood for his friend Salim, who has the blood group (O), and the doctor tells him that his blood is compatible. Which of the following red blood cells would represent Ahmed's blood group?**







9) The heavy polypeptide chain of an antibody is represented by the letter:



- ☐ A.
- ☐ B.
- ☐ C.
- ☐ D.

10) Bacteria that grow best at temperatures below 20° C are called:

- ☐ cryophiles.
- ☐ mesophiles.
- ☐ thermophiles.
- ☐ hyperthermophiles.

11) Which of the following food handling practices may help to cause food poisoning by salmonella?

- ☐ Thorough cooking of poultry before eating.
- ☐ Storing cooked and fresh meat in the same container.
- ☐ Thorough washing of hands before preparation of food.
- ☐ Cleaning of cutting boards thoroughly after using with fresh meat.

12) One of the following correctly differentiates B-cells and T-cells:

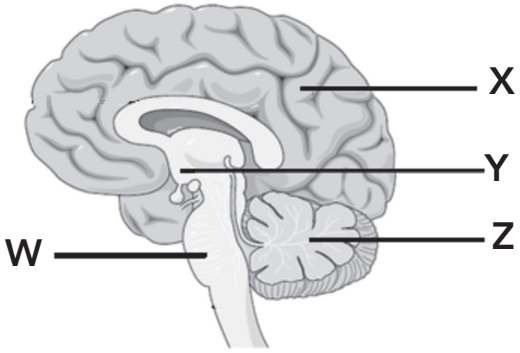
		T-cells	B-cells
☐	Can be stimulated to increase the rate of their cell cycles.	✓	x
☐	Produced from stem cells of the bone marrow.	x	✓
☐	Can directly attack and destroy invading pathogens.	✓	x
☐	Have surface markers.	✓	x

13) The minimum stimulus intensity that will cause a neuron to generate an action potential is called the:

- impulse.
- synapse.
- threshold.
- resting potential.

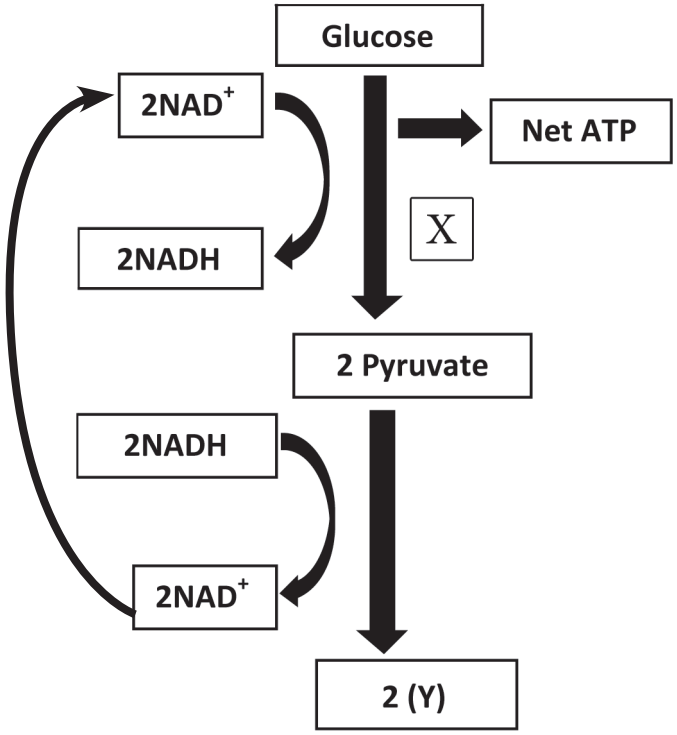
14) The diagram below shows a vertical section through the human brain. Which labeled part is responsible for increasing body temperature as a result of infection?

- W.
- X.
- Y.
- Z.



Question 2 (14 marks)

15) The diagram below shows a type of anaerobic respiration. (3 marks)



a. Name the process labeled (X).

_____

b. What is the total number of ATP molecules that can be produced from six molecules of glucose in this process?

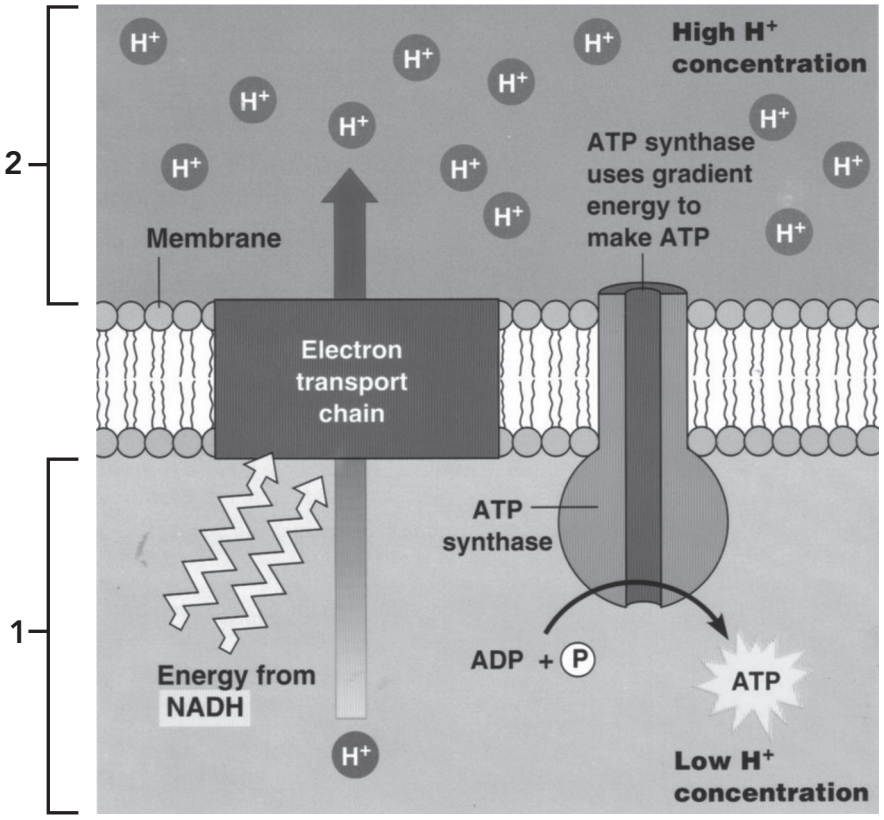
_____

c. State the importance of reducing NAD^+ in the process (X).

_____

_____

16) The diagram below represents the electron transport chain in the mitochondria.
(4 marks)



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

1) _____

2) _____

b. How many NADH molecules are needed in this chain to produce **9** ATP molecules?

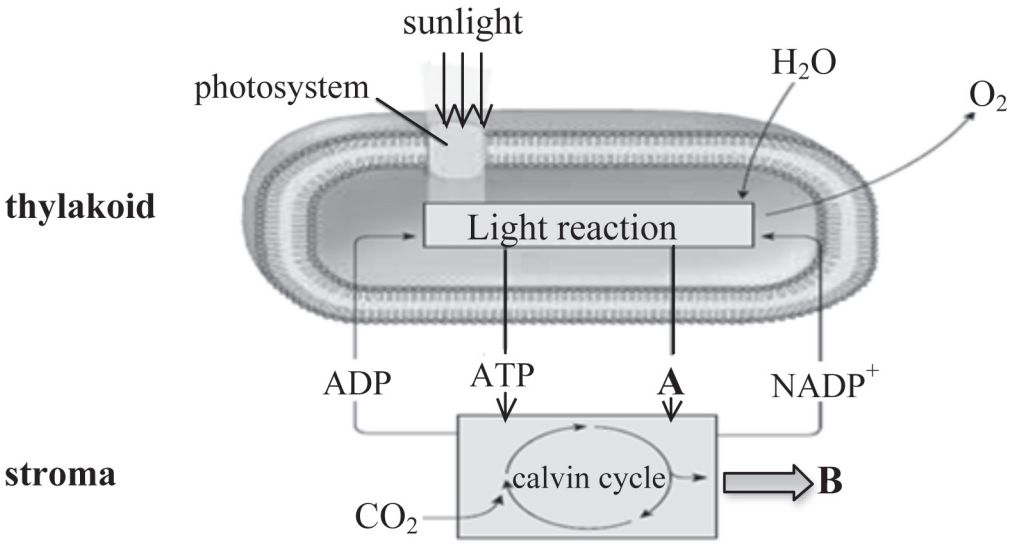
_____

c. What forces hydrogen ions to pass back into part (1)?

_____

Do not write in this space

17) The diagram below shows the reactions of photosynthesis that take place in the chloroplasts of leaf cells. (4 marks)



a. Name the substance labeled (B).

_____

b. What is the role of substance (A) in these reactions?

_____

_____

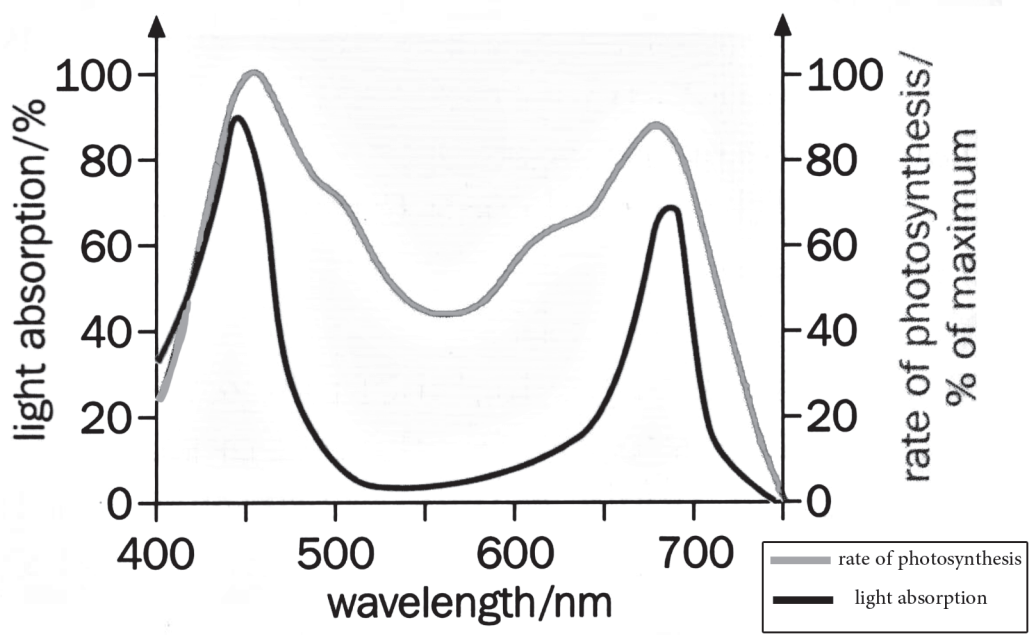
c. How many molecules of NADPH and ATP are required to reduce **6** molecules of carbon dioxide to glucose via photosynthesis?

_____

_____

_____

18) The graph below shows the absorption spectrum of chlorophyll a and the rate of photosynthesis over the same range of wavelengths. (3 marks)

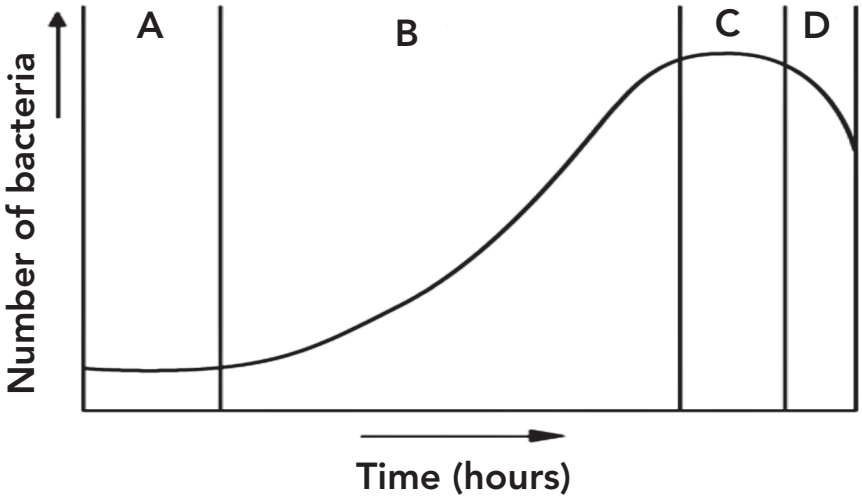


a. Explain why the photosynthesis is still in progress at wavelengths 550-600 nm although the light absorption is very low.

b. In terms of definition, write the difference between the absorption spectrum and the action spectrum of photosynthetic pigments in green plants.

Question 3 (14 marks)

19) The diagram below shows the growth curve for a population of bacteria. (4 marks)



a. Name phases (B) and (C).

B: _____

C: _____

b. Explain the following:

(i) The number of bacteria in phase (A) is constant.

_____

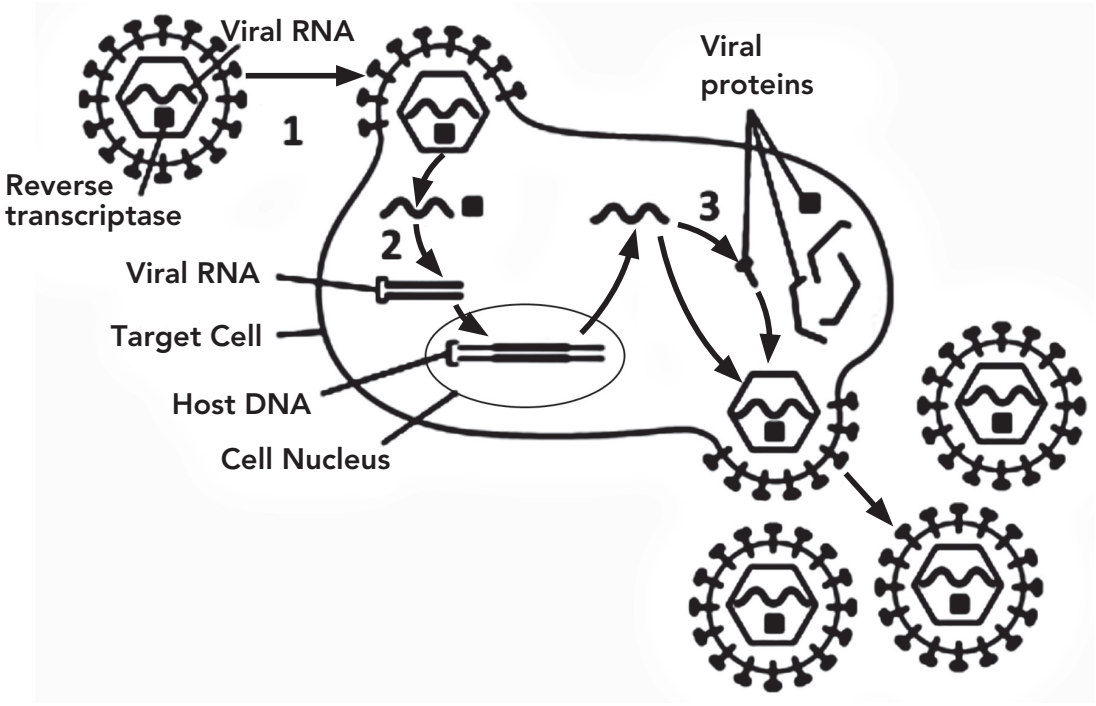
(ii) The number of bacteria in phase (D) is declining.

_____

_____

_____

20) The diagram below shows the replication of HIV. (3 marks)

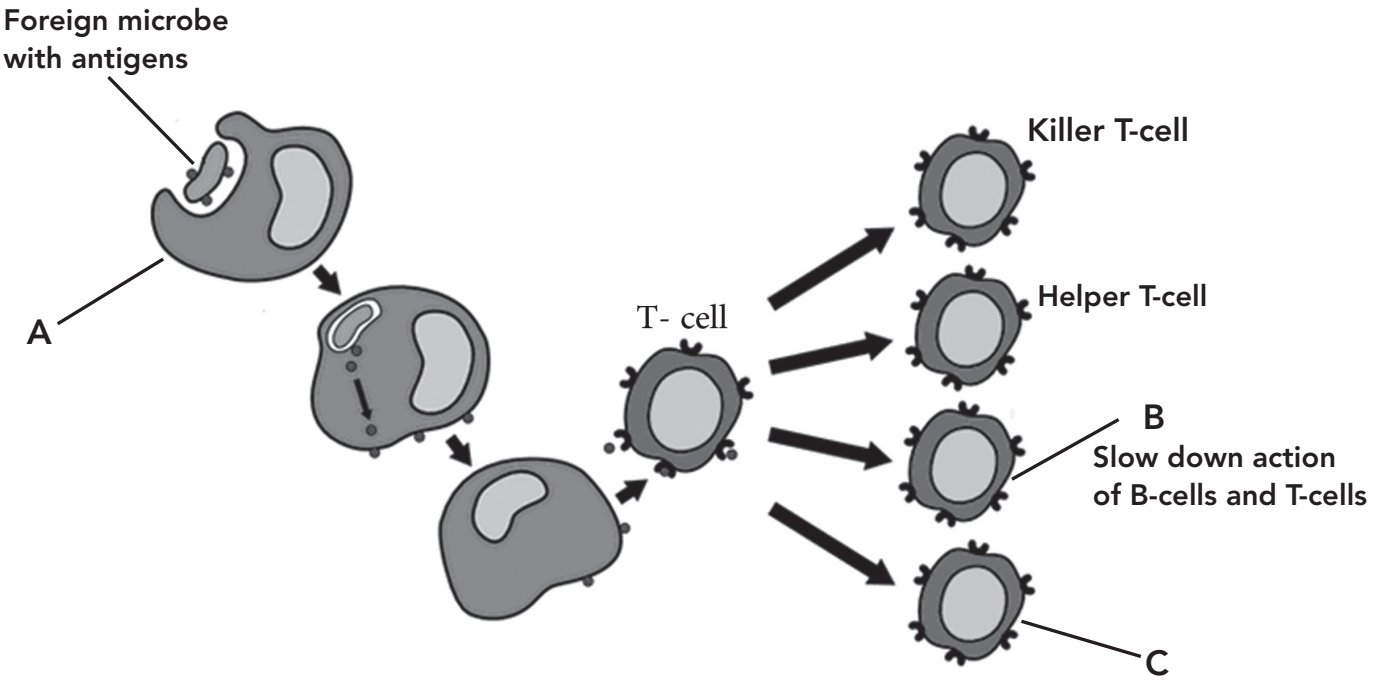


a. Name the type of host cells that are attacked by this virus.

b. Explain why step (2) is called reverse transcription.

c. Describe what is happening in step (3).

21) The diagram below represents one type of immune response. (4 Marks)



a. What is the type of immune response represented by the diagram?

_____

b. Name the cells labeled (A) and (B).

A: _____

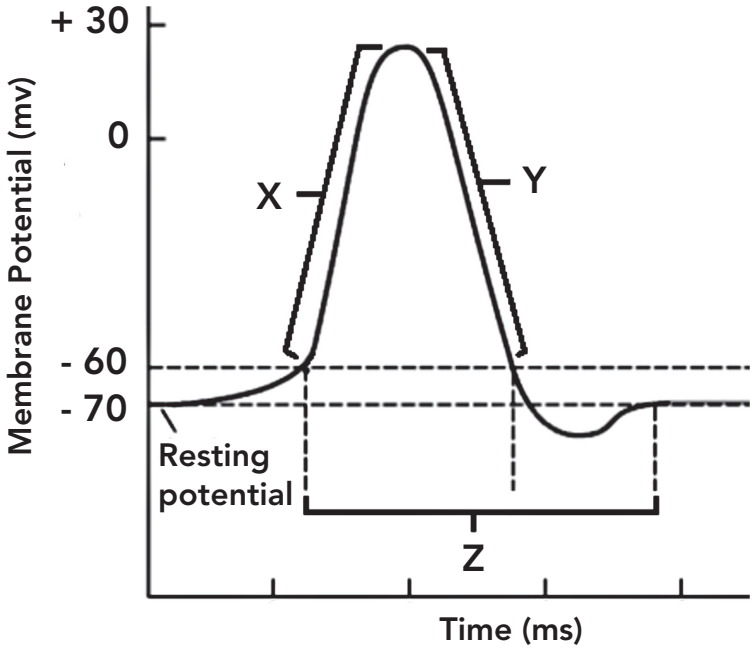
B: _____

c. Describe the role of the cells labeled (C) during the second invasion of the same antigen.

_____

_____

22) The graph below shows the changes in membrane potential of a neuron during the transmission of an impulse. (3 Marks)

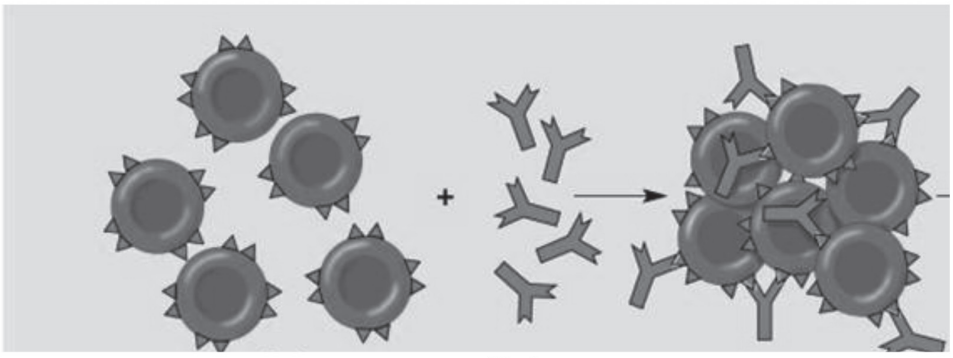


a. Explain in terms of ion movement the states of the axon membrane labeled (X) and (Y).

b. What is the importance of the period labeled (Z)?

Question 4 (14 marks)

23) The diagram below shows the result of the transfusion of incompatible blood. (2 marks)



a. Describe what happens in the step labeled (X).

_____

_____

b. State two effects of the result labeled (X) in the human body.

_____

_____

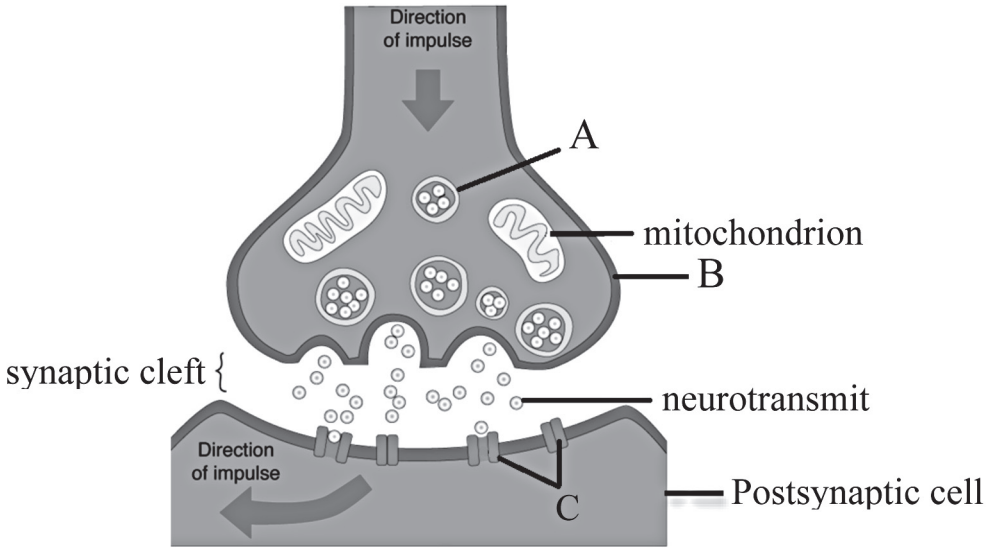
24) Complete the table below that shows different types of chemical defense in the human body. (4 marks)

Chemical	_____	Lactate	_____
Secretion	Saliva	_____	Gastric Juice
Mode of Action	_____	Slows bacterial growth	pH 2 kills bacteria

25) Compare between the two types of toxins produced by bacteria. (2 marks)

Endotoxins	Exotoxins

26) The diagram below shows synaptic transmission. (3 marks)



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

A: _____

B: _____

b. Describe the function of the part labeled (C).

_____

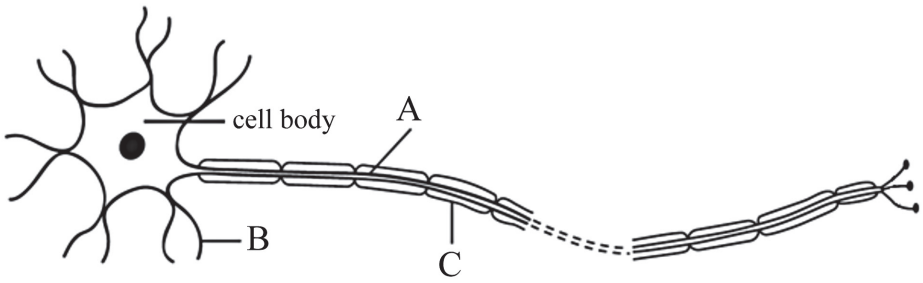
_____

c. One example of a neurotransmitter is acetylcholine.
How is acetylcholine removed from the synapse?

_____

_____

27) The diagram below shows the structure of a neuron. (3 marks)



a. Name the parts of the neuron labelled (A) and (B).

A: _____

B: _____

b. Explain why action potentials cannot occur in the part labeled (C).

_____

_____

END OF EXAMINATION

مُسَوَّدَة