Name: ……. ( ) U6S……..

SMJK PEREMPUAN CHINA PULAU PINANG

964 School Level Test

BIOLOGY

Question Paper

2 hours & 30 minutes

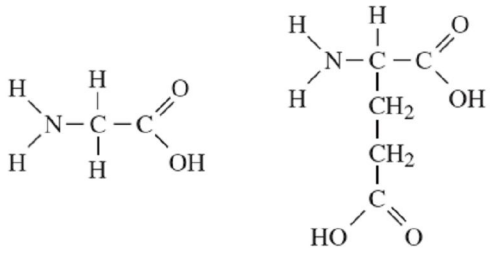
Answer all the structure and multiple choice questions in the answer spaces provided.

Part A Structure Questions 40 MARKS

Write the answers or correct solutions in the answering space after each question.

Question 1: *[10 MARKS]*

(a) The diagram shows the structure of two amino acid molecules.



Draw a box around the parts of the two amino acid molecules that would be removed when these amino acids are joined by a condensation reaction. [1 mark]

(b) (i) Many athletes eat food high in carbohydrate for three to four days before a race. This is known as 'glycogen loading' and improves performance. Suggest and explain **one** advantage of 'glycogen loading'. [2 marks]

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(ii) During vigorous exercise muscles respire anaerobically. This leads to muscle fatigue. Explain how. [2 marks]

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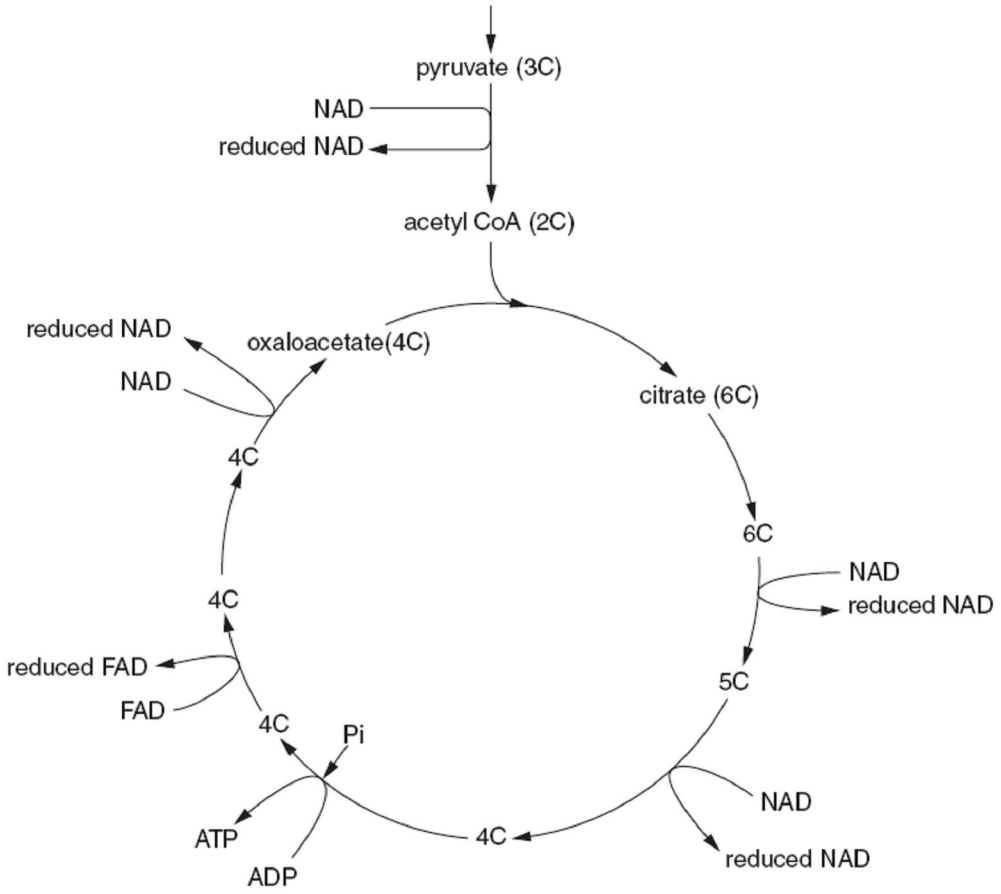
(c) Diagram below shows the Krebs cycle and the reactions preceding it.



(i) **Label** on the same diagram **all the stages** where
decarboxylation reactions occur with a letter **X**. [1 mark]

dehydrogenation reactions occur with a letter **H**. [1 mark]

(ii) Explain how NAD is regenerated. [1 mark]

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(iii) State how the formation of ATP in the Krebs cycle differs from the formation of ATP in oxidative phosphorylation. [2 marks]

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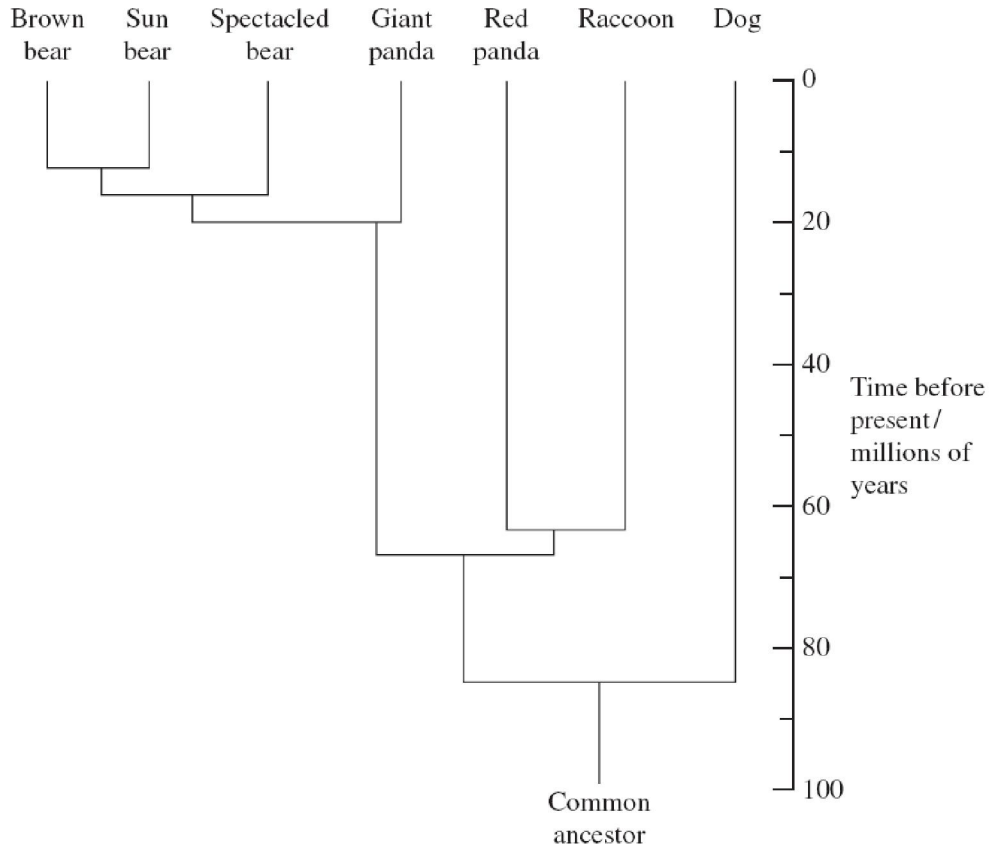
Question 2: *[10 MARKS]*

(a) The diagram shows the taxonomic relationships between some mammals.



(i) Which **two** species are most closely related? [1 mark]

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(ii) Suggest evidences that could have been used to construct this diagram. [3 marks]

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(iii) The red panda is a member of the kingdom **X**. Give **three** features that distinguish all members of this kingdom from all members of the **plant** kingdom. [3 marks]

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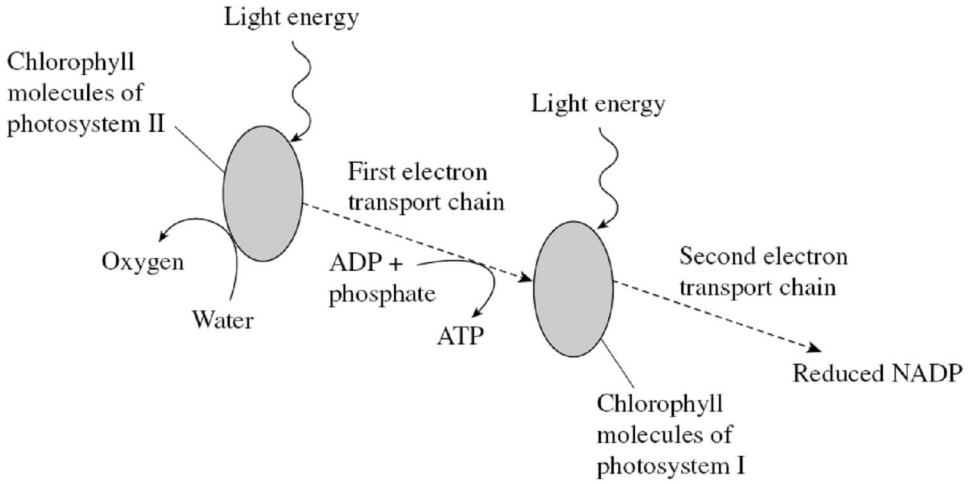
(b) Complete the table to show the classification of the red panda, *Ailurus fulgens*. [3 marks]

Kingdom	
Phylum	Chordata
	Mammalia
	Carnivora
Family	Ailuridae
Genus	

Question 3: *[10 MARKS]*

(a) The diagram shows the light-dependent reaction of photosynthesis.



(i) Using the diagram, explain the **role** played by water in the production of ATP during photosynthesis. [4 marks]

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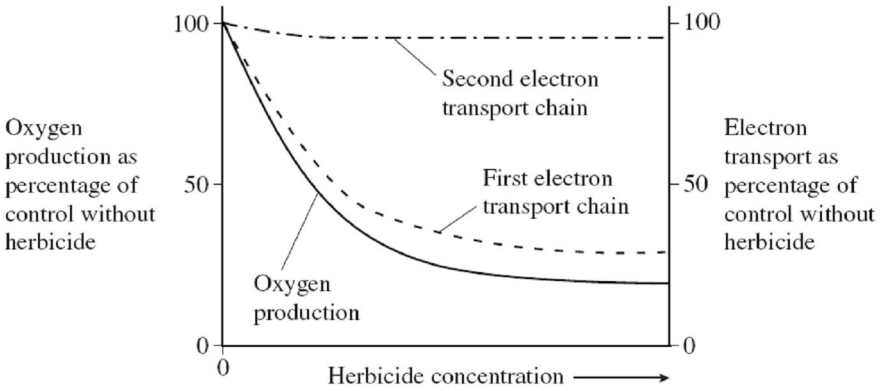
(b) Bee Gnoh and Cindy investigated the effect of a herbicide on the light-dependent reaction. They measured the effects of different concentrations of the herbicide on the production of oxygen and on both electron transport chains. The graph shows the results.



Using all of the information, suggest how the herbicide causes each of the following:
(i) the reduction in the production of oxygen [3 marks]

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(ii) the death of plants [3 marks]

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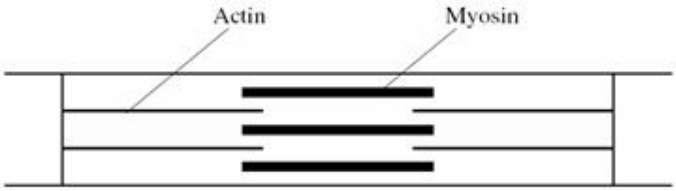
Question 4: *[10 MARKS]*
(a) Figure 4 shows a sarcomere in a relaxed muscle.



(i) Draw and label the appearance of this sarcomere in a contracted muscle. [2 mark]

(ii) Explain the role of each of the following in muscle contraction.

Tropomyosin: [2 marks]

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Myosin: [2 marks]

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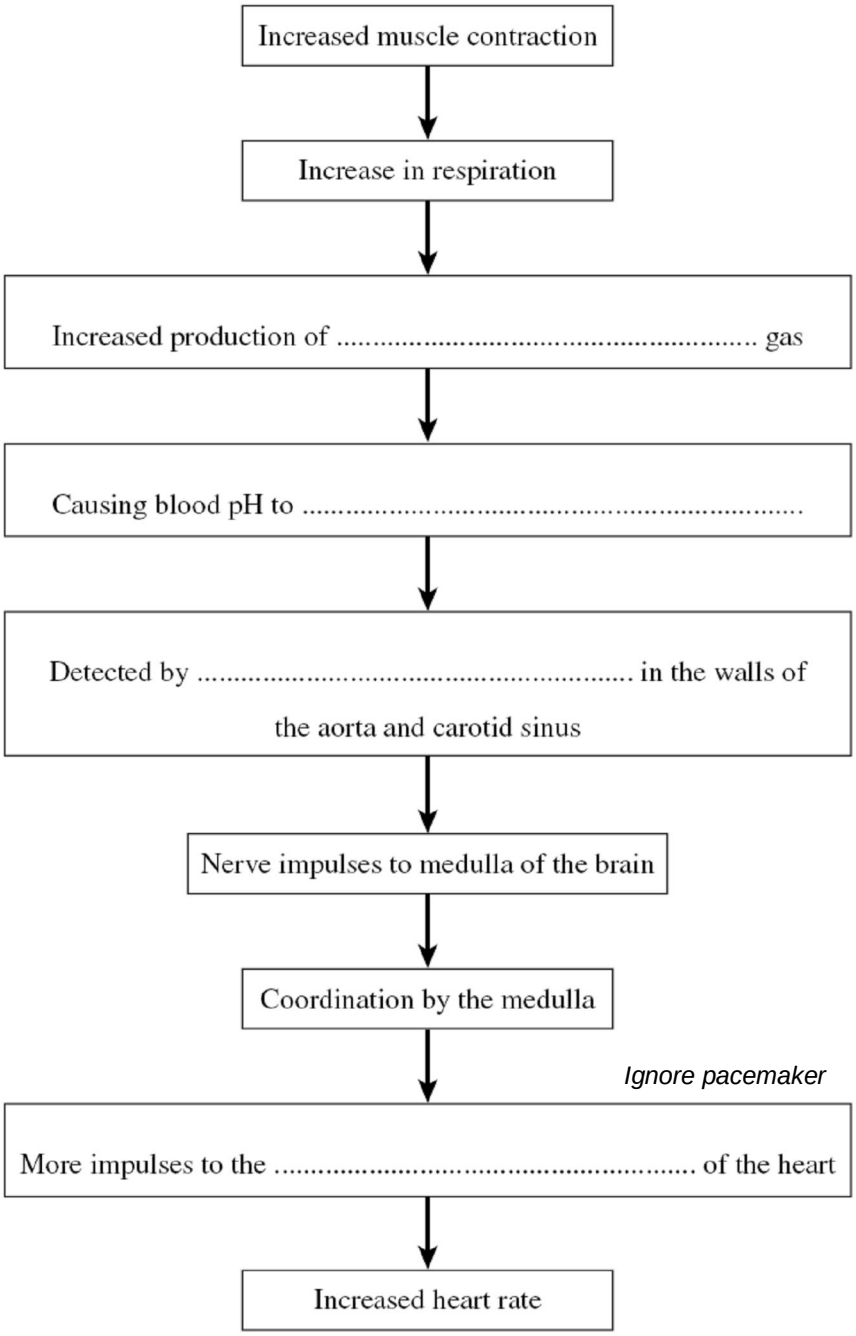
(b) During exercise, muscle contraction increases and so does heart rate. Complete the chart to show what causes this increase in heart rate. [4 marks]



Part B Essay Questions 60 MARKS

*Answer **four** of the six questions below. Arrange your answers in **numerical order** and tie the answer sheets for this section at the end of the examination.*

5. (a) The vampire bat is a small flying mammal that feeds on blood. The rapid intake of blood during a feed leads to a large increase in body mass of the bat. It also leads to the production and release of large amounts of dilute urine.
   (i) Explain the **advantage** of the **increased** rate of urine production during feeding. [2 marks]

   (ii) After a blood meal has been digested, the vampire bat produces concentrated urine. Explain how urine is concentrated in mammals. [7 marks]

   (b) Vampire bats are able to maintain a constant body temperature when the environmental temperature falls. Explain how. [6 marks]

6. (a) Describe and explain **four** ways in which the structure of a capillary adapts it for the exchange of substances between **blood** and the surrounding tissue. [4 marks]

   (b) Describe and explain how tissue fluid is formed and how it is returned to the **blood**. [6 marks]

   (c) Sucrose is moved through phloem by **mass flow**. Describe how. [5 marks]

7. (a) The rate of an enzyme-catalysed reaction is affected by temperature. Explain how. [6 marks]

   (b) Immobilised enzymes are frequently used in the food industry. Explain how these enzymes are used in the production of high fructose corn syrup. [9 marks]

8. (a) Explain what is meant by each of the following ecological terms. [2 marks]
   (i) Population (ii) Ecosystem

   (b) Explain what a transect is and describe when it is appropriate to study a habitat by using a transect. [2 marks]

   (c) (i) A farmer changed the use of his land from raising animals to growing cereal crops. This is more efficient in terms of total food production. Explain why. [2 marks]

   (ii) The farmer was paid to stop using one of his fields for farming. Over the next 20 years the species in the field changed. Describe a method that could be used to measure these changes. [7 marks]

   (d) (i) Suggest **two** biotic factors that might cause a rapid decline in population size. Explain how each factor might bring about this decline. [2 marks]

9. (a) Describe the process of oxidative phosphorylation in the mitochondrion. [9 marks]

   (b) The ornithine cycle is a series of reactions that converts ammonia formed by deamination of amino acids to urea that is less toxic. With the aid of a diagram, explain the process of the ornithine cycle. [6 marks]

10. (a) Describe the structure of a motor neurone. [5 marks]

   (b) Explain how an action potential is transmitted along a **motor neurone**. [10 marks]

Prepared By Mdm Yeap C B