SMJK PEREMPUAN CHINA PULAU PINANG
TRIAL EXAMINATION 2015
LOWER SIX BIOLOGY 964/1 TERM 1
TIME: 1 HOUR 30 MINUTES

Part A: Objective Section
Instructions: This section contains fifteen compulsory multiple choice questions. Answer **all**.

1. X and Y in Diagram 1 are the structures of two hexose sugars.

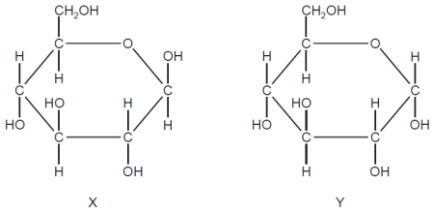


Diagram 1

Which statement is accurate?
   A. X is found in amylopectin.
   B. X is found in amylose.
   C. Y is found in cellulose.
   D. Y is found in glycogen.

2. Which statement is inaccurate about meristematic cells?
   A. Small-sized cells with large central nuclei and dense cytoplasm.
   B. Cells which retain their ability to divide by meiosis.
   C. Cells which are yet to become specialised.
   D. Examples of meristematic cells include vascular cambium and cork cambium.

3. Why may fish living in ponds survive temperatures below 0 °C in winter?
   A. Fish body tissues produce an enzyme which prevents blood from freezing.
   B. The ice on the pond surface insulates the water in the pond.
   C. The plants in the pond help to keep the water temperature above 0°C.
   D. The rocks in the pond warm up during the day and heat the water.

4. During endocytosis, what change will most likely occur in the plasma membrane of a cell?
   A. It will form two phospholipid monolayers.
   B. It will become electrically charged.
   C. It will partially dissolve.
   D. It will form vesicles.

5. Which of the following cells provide the best opportunity to study lysosomes?
   A. Skeletal muscle cells
   B. Neutrophils
   C. Pancreatic cells
   D. Osteocytes

6. The specific type of cell that comprises most diffusion membranes is a _____.
   A. Squamous epithelial cell
   B. Cuboidal epithelial cell
   C. Columnar epithelial cell
   D. Exocrine cell

7. Which of the following statements regarding cell fractionation technique is false?
   A. Cell fractionation requires the use of intact cells during the process of centrifugation.
   B. Cell fractionation separates components based on size.
   C. Cell fractionation separates components based on density.
   D. Cell fractionation provides a way to biochemically characterize different organelles.

8. A cell lacking oligosaccharides on the external surface of its plasma membrane would likely be inefficient in _____.

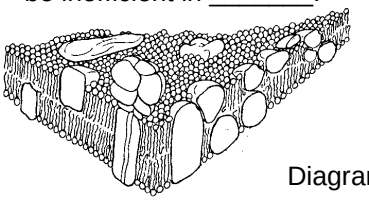


Diagram 2

   A. cell recognition.
   B. transporting ions against an electrochemical gradient.
   C. establishing a diffusion barrier to charged molecules.
   D. maintaining fluidity of the phospholipid bilayer.

9. The diagram shows the water potential of three root cells.

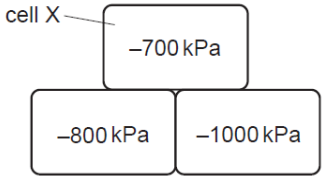
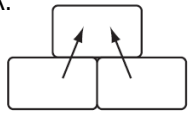


Diagram 3

In which directions will there be net movement of water by osmosis to or from cell X?

A.


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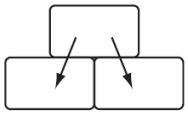

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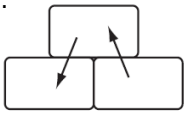

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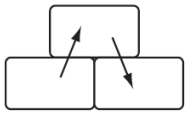


10. Which class of enzyme catalyses this reaction in the diagram on the right?

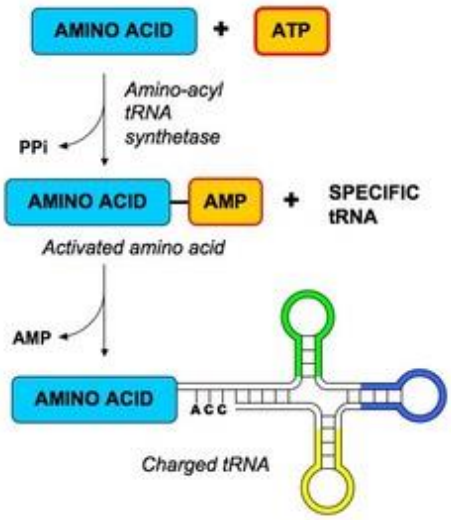


Diagram 4

   A. Lyase
   B. Transferase
   C. Ligase
   D. Phosphorylase

11. In the following graph, each of the curves, P, Q and R represents an enzyme-controlled reaction in one of the following situations:

(i) with the uninhibited enzyme
(ii) with a non-competitive inhibitor added to the enzyme
(iii) with a competitive inhibitor added to the enzyme

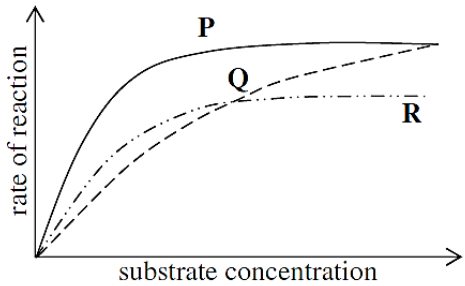


Diagram 5

Which curve represents each situation?

	Uninhibited enzyme	Non-competitive inhibitor added	Competitive inhibitor added
A.	P	Q	R
B.	Q	R	P
C.	R	P	Q
D.	P	R	Q

12. Which of the following could be a function of a plasma membrane protein?
A. ATP synthesis
B. Enzymatic activity
C. Oxygen uptake
D. Thermal insulation

13. If a viral toxin punches holes in mitochondrial membranes, the toxin will harm human cells because it will inhibit _____.
A. glycolysis
B. Krebs cycle
C. substrate level phosphorylation
D. oxidative phosphorylation

14. Both cyclic and non-cyclic photophosphorylation processes occur during the light reaction stage of photosynthesis. Which of the following are true regarding the differences between the two processes?

	Cyclic	Non-cyclic
I	ATP is produced	No ATP is produced
II	No NADPH is produced	NADPH is produced
III	Oxygen is produced	No oxygen is produced
IV	Excited electron is returned to chlorophyll	Excited electron is not returned to chlorophyll

A. I and III B. II and IV C. I, II and III D. II, III and IV

15. Aerobic respiration involves the following pathways and reactions:

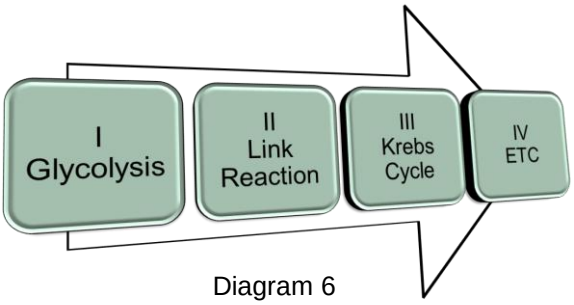


Diagram 6

How many molecules of ATP and reduced coenzymes are produced when one molecule of glucose is oxidised in the muscle cell?

	I	II	III	IV
A.	2 ATP 2 NADH	2 NADH	2 ATP 6 NADH 2 $FADH_2$	34 ATP
B.	2 ATP 2 NADH	1 NADH	1 ATP 3 NADH 1 $FADH_2$	36 ATP
C.	2 ATP 2 NADH	2 NADH	2 ATP 6 NADH 2 $FADH_2$	32 ATP
D.	2 ATP 2 NADH	2 NADH	2 ATP 6 NADH 2 $FADH_2$	38 ATP

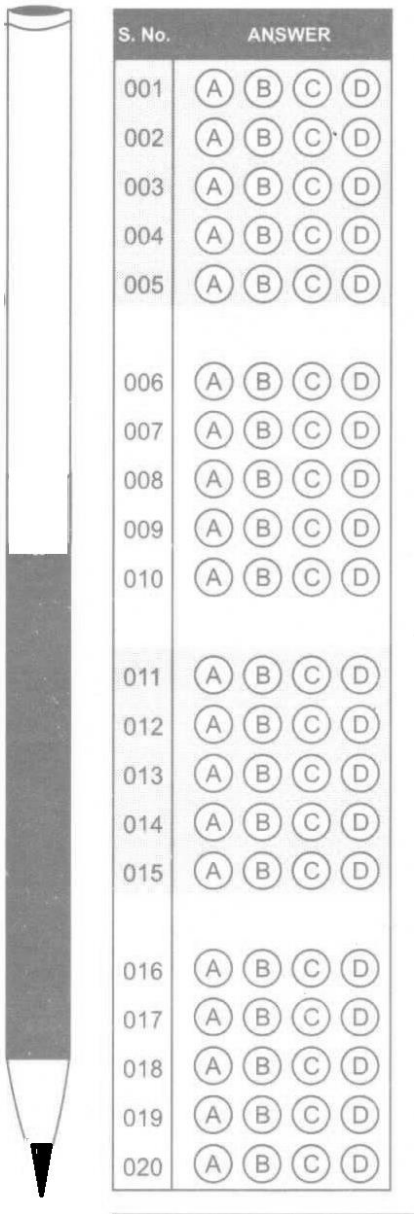
Prepared by Yeap Chee Beng

Checked by Confirmed by

Answer Sheet for Part A

Name: …….. L6S….

Part A: Objective Section



S. No.	ANSWER
001	A B C D
002	A B C D
003	A B C D
004	A B C D
005	A B C D
006	A B C D
007	A B C D
008	A B C D
009	A B C D
010	A B C D
011	A B C D
012	A B C D
013	A B C D
014	A B C D
015	A B C D
016	A B C D
017	A B C D
018	A B C D
019	A B C D
020	A B C D

Part B: Structure Section

Instruction: Answer two compulsory short structured questions below.

16. The effect of temperature on the rate of an enzyme-controlled reaction was investigated. The rate of reaction was determined when the enzyme was in solution and when it was immobilised. The results are shown in the table.

Temperature (^{o}C)	**Rate of reaction** (arbitrary units)	
	Enzyme in solution	**Immobilised enzyme**
0	1	1
10	7	3
20	12	7
30	18	16
40	24	24
50	14	24
60	2	20
70	0	10

Table 1

(a) Explain the difference between

(i) the rate of reaction at 70°C [3]

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(ii) the rate of reactions at 20°C [2]

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(b) Apart from cheaper operational cost, immobilised enzymes have other advantages in industrial processes. Give two of these advantages. [2]

1.....

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2.....

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17. Diagram 7 outlines some steps in glucose metabolism of the mammalian cells.

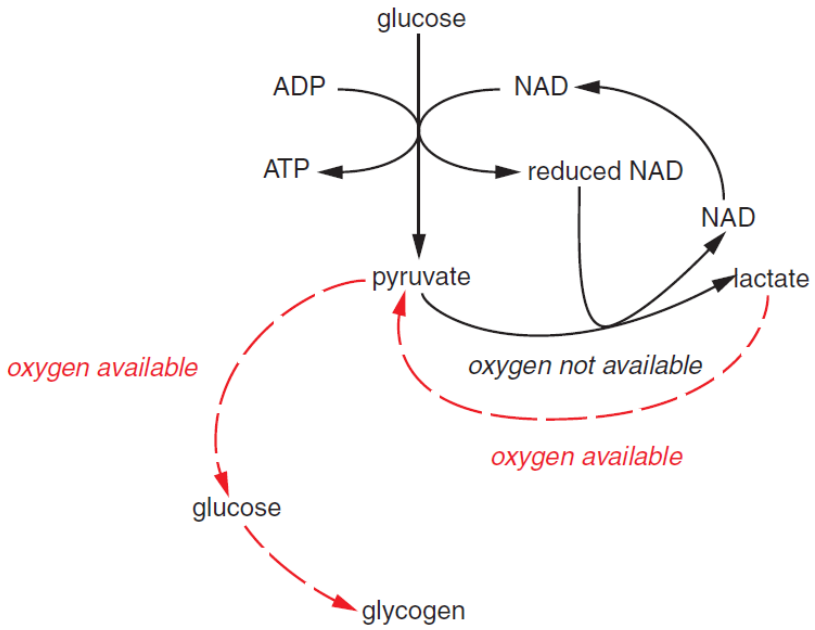

Diagram 7

(a) Name the part of the cell where glucose is converted to pyruvate. [1]

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(b) Explain **why**, in the absence of oxygen, pyruvate needs to be converted to lactate. [1]

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(c) Describe how anaerobic respiration in yeast cells differs from anaerobic respiration in mammalian cells. [3]

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(d) State the role of NAD^+ in respiration. [3]

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Part C: Essay Section
Instruction: Choose two out of three essay questions to be answered.

18. (a) How microscopes have contributed to our understanding of living organisms. [5]

    (b) Why do animals have epithelium? Explain its functions. [5]

    (c) Illustrate a labelled diagram of Golgi apparatus and outline its main functions. [5]

19. (a) Explain the significance of polar and non-polar amino acids in proteins. [8]

    (b) Discuss how disulphide bonds are affected by chemical relaxers in hair straightening. [7]

20. (a) Explain why the light-independent reactions of photosynthesis can only continue for a short time in darkness. [6]

    (b) Explain how photorespiration is a wasteful process in C3 plants. [9]

End of Paper