SAMPEL PERCUMA

# Modul Pentaksiran PdPC STPM 2021 Biologi Semester 1 Pahang

## Set penuh: Kertas Percubaan STPM

Sem 1 · Biologi

**Sampel ini: 8 muka surat. Set penuh ada:**

- 3 fail PDF
- Semester 1: kertas percubaan (trial) negeri, subjek yang dipilih + skema
- Blueprint 30 hari Semester 1 (setiap subjek)
- Semester 3: percubaan 2024, 10 subjek, banyak negeri, soalan + skema dalam satu fail

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MODUL PENTAKSIRAN PDPC SEMESTER1 MODUL PENTAKSIRAN PDPC SEMESTER 1

**964/1** **STPM 2021**

# BIOLOGY [BIOLOGI]

## PAPER 1 (KERTAS 1)

**One and a half hours (Satu jam setengah)**

# MODUL PENTAKSIRAN PDPC SEMESTER 1

# NEGERI PAHANG

**Instructions to candidates:**

**DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO.**

*There are* **fifteen** *questions in Section A. For each question, four choices of answers are given. Choose* **one** *correct answer. Answer* **all** *questions. Marks will not be deducted for wrong answers.*

*Answer* **all** *questions in Section B. Write your answers in the spaces provided.*

*Answer any* **two** *questions in Section C. All working should be shown. For numerical answers, units should be quoted wherever appropriate. Begin each answer on a fresh sheet of paper and arrange your answers in numerical order.*

*Answers may be written either in English or Bahasa Malaysia.*

| For examiner's use | |
|---|---|
| Section A | |
| **1-15** | |
| Section B | |
| **16** | |
| **17** | |
| Section C | |
| | |
| | |
| **Total** | |

This question paper consists of 13 printed pages and 0 blank pages

**Section A** [15 *marks*]

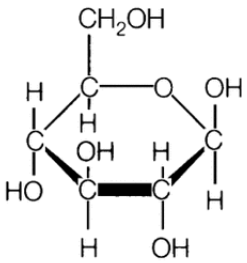
*Answer* **all** *questions in this section.*

1. Which of these properties of water can be attributed to hydrogen bonding between water molecules?

   I. Ice floats on liquid water.
   II. Water molecules are cohesive.
   III. Water is a solvent for ionic and polar molecules.
   IV. Water stabilizes temperature inside and outside of the cell.

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

2. The diagram below shows the structure of a molecule.




   The molecules will undergo condensation reaction to produce the polymer of

   A. Starch
   B. Amylose
   C. Cellulose
   D. Glycogen

3. What is the function of a condenser in a transmission electron microscope?

   A. To record the image of the specimen.
   B. To focus and magnify the image produced.
   C. To produce a high-speed beam of electrons.
   D. To focus the electron beam onto the specimen.

4. Which of the following statements is/are true about protein and amino acid?

   I. Most enzymes are globular protein
   II. The formation of peptide bond occurs by condensation
   III. All amino acids that are needed are synthesized in the body
   IV. All amino acids that are found in the protein have a different R group
   V. The non-protein component attached to the protein is called prosthetic group

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

5. Which organelle would an erythrocyte has the most just before it reaches maturity and becomes anucleate?

   A. Lysosomes
   B. Ribosomes
   C. Golgi bodies
   D. Rough endoplasmic reticulum

6. Glucose molecules pass through a plasma membrane via

   A. endocytosis
   B. active transport
   C. simple diffusion
   D. facilitated diffusion

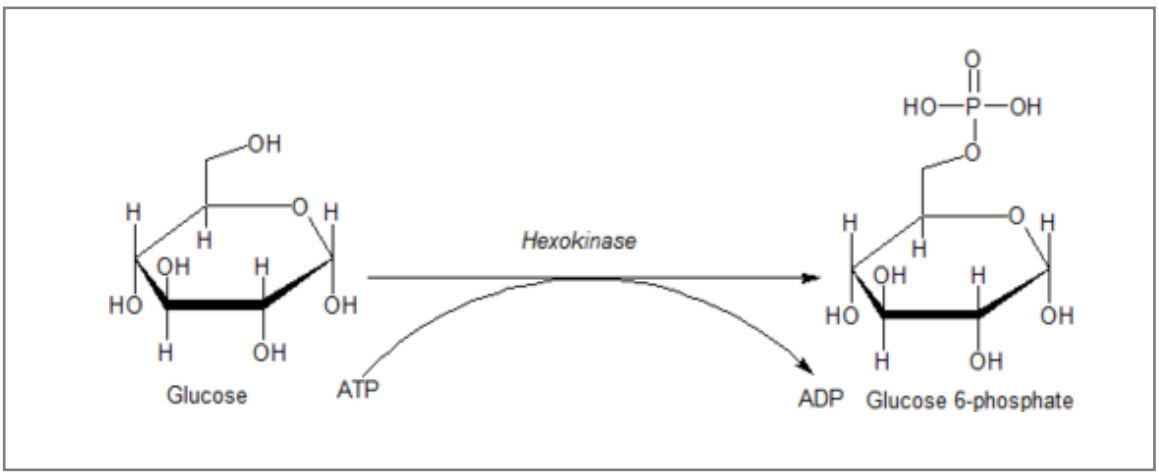
7. When substrate concentration is in excess, the rate of action at the beginning of an enzyme-catalyzed reaction ($V_o$) is at the highest rate because

   A. the highest affinity of the enzymes towards substrates is achieved.
   B. the rate of collision between the enzymes and substrates is the highest.
   C. the number of substrates binding to the enzymes is maximum at this point.
   D. the activation energy of the reaction is achieved at beginning of the reaction.

**Section B** [15 *marks*]

*Answer* **all** *questions in this section*.

16.




The equation above shows the phosphorylation of glucose in cellular respiration. This process will make glucose-6-phosphate become more chemically reactive and helps trap the sugar in the cell.

a) Name the class of hexokinase enzyme.

……

[1 mark]

b) How does hexokinase catalyse the phosphorylation of glucose?

……..…

……

[1 mark]

c) Name the stage of cellular respiration where the reaction above can occur.

……....

[1 mark]

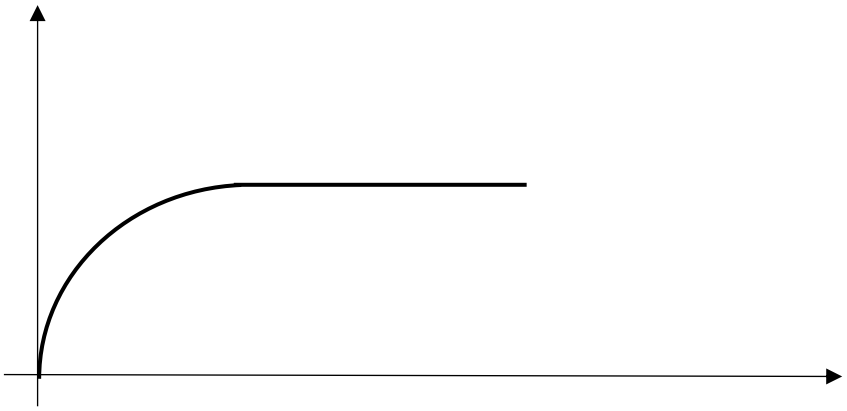
d) An experiment was conducted to study the phosphorylation of glucose in the brain cells. The maximum velocity, $V_{max}$ of the phosphorylation is 17 $\mu Mmin^{-1}g^{-1}$. The Michaelis constant, $K_m$ of the reaction is 1 x $10^{-5}$ M.

From the data given,

i. Calculate the initial velocity, $V_0$ of the phosphorylation.

[1 mark]

ii. On the sketched Michaelis Menten plot below, label the x-axis, y-axis, $V_{max}$, $V_0$ and $K_m$ based on the data given.



[2 marks]

iii. Hexokinase has broad substrate specificity; thus, hexokinase can phosphorylate other hexose sugar (6C sugar) for cellular respiration.
This means, if glucose is scarce in the cell, hexokinase can phosphorylate fructose for aerobic respiration.

Data below shows the $K_m$ of the phosphorylation reaction when the substrate used for sugar phosphorylation is glucose and fructose.

**Section C** [30 *marks*]

*Answer any* **two** *questions in this section.*

18.

a) Name a ground tissue that can be found abundantly in the durian flesh.
Then describe the structures related to the function of the named ground tissue. [5 marks]

b) Compare and contrast the cyclic photophosphorylation and noncyclic photophosphorylation. [7 marks]

c) Differentiate the C4 and CAM pathway in fixing carbon into Calvin cycle. [3 marks]

19.

a) Describe the process of oxidative decarboxylation that occur in
i. The formation of acetyl Co-A [4 marks]
ii. The Krebs cycle [7 marks]

b) Explain the process of bulk transport of specific substance in extracellular fluid. [4 marks]

20.

a) Diagram shows the structure of collagen.

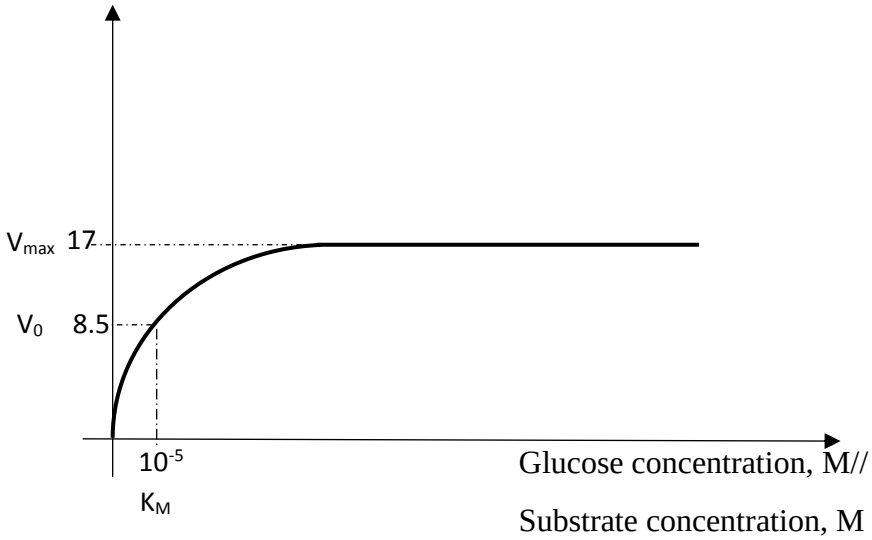



State **all** level of protein structures present in the collagen above.
Then, describe **all** levels of protein structure present in the collagen. [7 marks]

## Section A: Objective Questions Scheme

| | | | | |
|---|---|---|---|---|
| 1. D | 2. C | 3. D | 4. A | 5. A |
| 6. D | 7. C | 8. | 9. B | 10. C |
| 11. A | 12. D | 13. B | 14. D | 15. A |

## Section B: Structure Questions Scheme

| No | | Answer | Marks |
|---|---|---|---|
| 16 | a) | Transferase// EC2 | 1m |
| | b) | Hexokinase transfers a phosphate group from ATP to glucose | 1m |
| | c) | Glycolysis | 1m |
| | d) i) | $V_0 = ½ V_{max}$<br>$= ½ 17 \mu Mmin^{-1}g^{-1}$<br>$= 8.5 \mu Mmin^{-1}g^{-1}$ | 1m for answer **with** unit |
| | ii) | Velocity of reaction, $\mu Mmin^{-1}g^{-1}$<br><br> | 1 m: correct label with units on x and y-axis<br><br>1m: correct label of all $V_0$, $V_{max}$ and $K_m$ |

## Section C: Essay Scheme

| No | | Questions/ Scheme | Marks |
|---|---|---|---|
| 18 | a) | *Name a ground tissue that can be found abundantly in the durian flesh.*<br>*Then describe the structures related to the function of the named ground tissue.*<br>*[5 marks]* | |
| | | • Ground tissue in durian flesh is parenchyma tissue | Name of ground tissue: 1m |
| | | • Structure: has relatively thin and flexible primary walls and lack of secondary walls<br>• Function:<br>o Allow the elongation of cells//<br>o Remain alive at maturity//<br>o Retain the ability to divide and differentiate into other type of plant cells under special conditions<br>o Allow easy passage of sugars// water | Each structure related to the function: 1m + 1m<br><br>Max: 4 marks (2 structures and 2 functions) |
| | | • Structure: has large central vacuole<br>• Function: Synthesizing and storing pigments// organic products// starch// ions// soluble nutrients | |
| | | | |
| | b) | *Compare and contrast the cyclic photophosphorylation and noncyclic photophosphorylation.*<br>*[7 marks]* | |
| | | Similarities:<br>• Both reactions occur in the thylakoid membrane<br>• Both reactions use photosystem I (PS I), ferredoxin, cytochrome complex and plastocyanin<br>• Both reactions produce ATP<br>• Both reactions absorb light with 700nm wavelength | Any 3 points for 3 marks |

TAMAT SAMPEL

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