SAMPEL PERCUMA

Skema Trial STPM 2020 Biologi Semester 1 (964/1)

Set penuh: Kertas Percubaan STPM

Sem 1 · Biologi

Sampel ini: 7 muka surat. Set penuh ada:

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- Semester 1: kertas percubaan (trial) negeri, subjek yang dipilih + skema
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Sampel bermula di muka surat sebelah

Nombor kad pengenalan……..Nombor pusat/angka giliran…….

964/1 **TRIAL STPM 2020**

BIOLOGY (BIOLOGI)

PAPER 1 (KERTAS 1)

One and a half hours(1 jam 30 minit)

SIJIL TINGGI PERSEKOLAHAN MALAYSIA

(MALAYSIA HIGHER SCHOOL CERTIFICATE)

Instructions to candidates:

DO NOT OPEN THIS QUESTION PAPER UNTIL YOU ARE ALLOWED TO DO SO

Answer all questions in Section A.

Answer all questions in Section B.

Answer two questions only in Section C.

All working should be shown. For numerical answers, unit should be quoted wherever appropriate.

Answer may be written in English or Malay.

For Examiner usage	
Section A	
15 questions	
Section B	
16	
17	
Section C	
Total	

This question paper consists of 8 printed pages.

Section A [15 *marks*]
Answer **all** questions in this section.

1. Which are **true** about peptide bond?
   A The tertiary structure of a protein is determined by its peptide bond
   B The peptide bond is formed between two amino acids with the same characteristics
   C The formation of a peptide bond releases one water molecule
   D The characteristic of a protein molecule is determined by its peptide bond

2. The difference between saturated fatty acids and unsaturated fatty acids is
   A. the branching or linear shape of the fatty acid
   B. the physical condition of the fatty acid at room temperature
   C. the number of oxygen atoms in the fatty acid
   D. the presence of double covalent bond in the fatty acid

3. Which are true about DNA and RNA?
   I. Both contain ribulose sugar
   II. Their monomers are nucleosides
   III. Their nitrogenous bases are purines and pyrimidines
   IV. Their sugar phosphate backbones are maintained by covalent bonds

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

4. Which of the following is a characteristic of a prokaryotic cell ?
   A Cellulose cell wall
   B A circular DNA
   C Mitochondrion
   D 80S ribosome

5. Which is not true of parenchyma cells?
   A Most fleshy tissue of fruits is composed mostly of parenchyma cells
   B Parenchyma cells have thicker primary walls than that of collenchyma cells
   C Photosynthesis occurs within the chloroplast of parenchyma cells of the leaf
   D Most parenchyma cells retain the ability to divide and differentiate into other types of plant cells

MARKING SCHEME

Section A:

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

Section B:

16.

a) Cell membrane/ plasma membrane (1 mark)

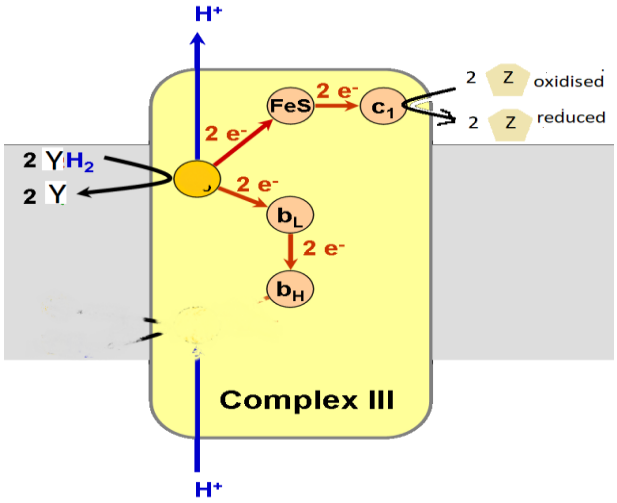
b) - Cell at point of incipient plasmolysis/ cell plasmolysed/ membrane just in contact with wall
- Because cell left in solution for one hour
- Equilibrium reached/ no net movement of water
- Solute potential inside equal to outside
- Outside is ginen as -600kPa (3 marks)

c) - K is cell wall which is inelastic/ wont stretch
- As protoplast/cell content expand/swell
- As water passes into cell
- Pushes against expanding protoplast/ cytoplast/ cell content
- Pressure potential is generated by resistance of cell wall (3 marks)

17 (a) Y: Coenzyme Q **2m**

Z: Cytochrome c

17 The diagram below shows complex III of the electron transport chain in the mitochondrion.



(a) State molecules Y and Z. [2 *marks*]

Y ……

Z:……

(b) Energy is released from the redox reaction in Complex III. What is this energy directly used for? [1 *mark*]

……

……

(c) Explain the difference in the number of ATP that can be produced from the energy in one $FADH_2$ compare to one $NADH + H^+$? [2 *marks*]

……

……

……

……

……

(a) Pump/transport protons from matrix (of mitochondrion) to the intermembrane space

1m

(b) $FADH_2$ produces only 2 ATP because its high energy electrons is only transport through two complexes/ III and IV only where as the high energy electrons of NADH are transported through complex I, III and IV of the electron transport chain.

2m

(c)
- Cyanide can bind to the haemcopper centre of complex IV
- Complex IV is then unable to accept electrons from cyt c
- Cyt c remain in reduced state
- Cyt c does not return to complex III
- All the other complexes and CoQ remain in the reduced state
- No pumping of proton occurs, therefore no ATP is synthesised

Max 3m

Section C:

18 (a) **High surface tension**
- at the surface of water body, water molecules are hydrogen bonded together and with water molecules below it, resulting in inwardly cohesive forces that produces high surface tension
- allow small organism like water skater to move on the surface of the water because their body weight is not enough to break the water surface

(1 mark + 1 mark)

Cohesion and adhesion
- because of its polarity, water molecules readily form hydrogen bonds with other water molecules which tend to stick together
- when water evaporates from leaves, the unbroken water column held by cohesive forces within the narrow xylem vessels are drawn upwards to the top of the tree
- adhesion of water to the xylem wall resist the downward pull of gravity

(1 mark + 1 mark)

Universal solvent
- water is a polar/bipolar/charged molecules
- solubilizes most biological molecules/ions and polar molecules/nutrient substances//medium for biological reaction

(1 mark + 1 mark)

High specific heat capacity
- a large amount of heat energy is required to raise the temperature of water because of its many extensive hydrogen bonds between neighboring water molecules
- important in stabilizing temperature//maintaining against temperature fluctuation
- provide thermally stable environment for aquatic organisms in the ocean, seas and lake

(1 mark + 1 mark)

Low viscosity

- because of the hydrogen bonds between water molecules continually broken and reform
- making them easy to slide over each other and able to flow with less friction
- as in narrow blood vessels
- act as lubricant
- to allow food to move easily down the alimentary canal

(1 mark + 1 mark)

Density

- water has maximum density at 4°C
- water expands as it freezes and is less dense than liquid water
- at 0°C and below, ice is formed and float on the surface
- forming insulating layer which prevent water from freezing in lower depths
- therefore aquatic organisms in ponds and lakes can survive in liquid water during winter

(1 mark + 1 mark)

High latent heat of vaporization

- mean vaporization of water need a lot of heat energy
- when sweating, a lot of heat energy must be absorbed from the body to evaporate the sweat which give the cooling effect to the body

(1 mark + 1 mark)

High latent heat of fusion

- mean much heat has to be removed before water can freeze
- ensure cell contents/aquatic habitat do not freeze quickly in cold water

(1 mark + 1 mark)

Max **10**

(b) - Ketones have the carbonyl group within a carbon chain whereas aldehydes have the carbonyl group at the end of carbon chain
- examples: **Ketones** = fructose/ribulose/ dihydroxyacetone *(any 2)*
Aldehydes = glucose/galactose/ribose/ glyceraldehyde *(any 2)*

Max 5

Total 15

20. (a)

- An enzyme inhibitor is a chemical substance that cause a reduction in the rate of an enzyme-catalysed reaction. **[1 mark]**
- There are two type of inhibitor, competitive inhibitor and non-competitive inhibitor. **[1 mark]**

Competitive inhibition

- Competitive inhibition involves an inhibitor that has a structure which resembles the substrate molecules.
- The inhibitor bind temporarily to the active site of the enzyme and prevents the substrate from binding to it.
- The inhibitor and substrate compete for the same active site.
- This inhibition can be reserved by increasing the substrate concentration.
- Examples: The inhibitor malonate competes with the substrate succinate for the active site of the enzyme succinate dehydrogenase.

Max = 3 marks

Non-competitive inhibition

- Non-competitive inhibition involves an inhibitor that does have a similar shape to the substrate.
- The inhibitor does not compete with the substrate for the active site of the enzyme.
- The inhibitor binds to another site on the enzyme called allosteric site.
- This binding causes a change in the confirmation of the enzyme unabling the substrate to bind to its active site.
- This inhibition cannot be overcome by increasing the substrate concentration.
- Examples : Heavy metal ions such as mercury (Hg^{2+}), silver (Ag^{2+}) and arsenic (As^{+}) which combine permanently with sulfhydryl groups in the active sites or other parts of the enzyme cause enzyme denaturation.

Max = 4 marks

(b) i) **Temperature**

- At low temperature, the rate of the enzyme catalysed reaction is low.
- The rate of the reaction approximately doubles for every $10^{o}C$ increase of the temperature until the optimal temperature for the enzyme is reached.
- At optimal temperature, highest rate of enzyme catalysed reaction occur.
- Increase of temperature above optimal temperature causes denaturation of enzymes as bonds that maintain the specific tertiary globular structure of enzymes are broken.
- The denatured enzymes cannot form the enzyme-substrate complex causing decrease in the rate of reaction.

TAMAT SAMPEL

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