SAMPEL PERCUMA

Trial STPM 2023 Biologi Semester 1 Terengganu

Set penuh: Kertas Percubaan STPM

Sem 1 · Biologi

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KEMENTERIAN PENDIDIKAN
JABATAN PENDIDIKAN NEGERI TERENGGANU

STPM 2023

PEPERIKSAAN PERCUBAAN SEMESTER 1

BIOLOGY

964/1

Nama :.....

Kelas :.....

DIBIAYAI OLEH KERAJAAN NEGERI TERENGGANU

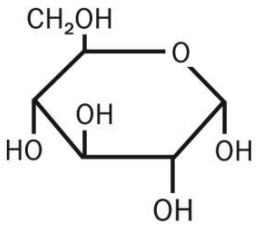
Tidak dibenarkan menyunting atau mencetak mana-mana bahagian dalam kertas soalan ini tanpa kebenaran Pengarah Pendidikan Negeri Terengganu

ANJAKAN MUAFAKAT NEKAD

Section A [15 marks]

Answer **all** questions in this section.

1 A molecular structure of a molecule is shown in the diagram below.



What will be produced if the molecule in the diagram above undergoes the polymerisation process?

A Maltose
B Collagen
C Cellulose
D Glycogen

2 The result of an analysis of the rat's DNA of the relative amount of four nitrogenous bases is shown in the table below.

Purine		*Pyrimidine*	
P	*Q*	*R*	*Thymine*
20.4%	30.5%	19.8%	29.3%

Which are *P,Q* and *R*?

	P	*Q*	*R*
A	Adenine	Guanine	Cytosine
B	Guanine	Adenine	Cytosine
C	Adenine	Cytosine	Guanine
D	Cytosine	Adenine	Guanine

3 Which protein subunits regarding cytoskeleton fibres are correct?

	Microtubules	**Microfilaments**	**Intermediate filaments**
A	Fibrous subunits	Tubulin dimer subunits	Actin subunits
B	Tubulin dimer subunits	Fibrous subunits	Actin subunits
C	Tubulin dimer subunits	Actin subunits	Fibrous subunits
D	Fibrous subunits	Actin subunits	Tubulin dimer subunits

8 Which is true of penicillin which blocks the formation of the bacterial wall by mimicking substrate for the enzyme transpeptidase?

A It forms a complex with the substrate
B It binds to the allosteric site of the enzyme
C It blocks the substrate from entering the active site.
D It destroys the three-dimensional configuration of the enzyme

9 A reaction in the formation of the enzyme-substrate complex and its products is shown follows.

$$E+S \rightleftharpoons [ES] \longrightarrow E+P$$

What is the rate of the reaction depend on?

I the maximum velocity, V_{max}
II the velocity at a specific time, *v*
III the substrate concentration, [S]
IV the Michaelis-Menten constant, K_m

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

10 Biochemical reactions normally have a temperature coefficient (Q_{10}) of 2, from 0^0 C to optimum temperature.

A At 38^0 C, the Q_{10} for a biochemical reaction is around 2.
B The temperature 40^0 C which promotes maximum activity
C The change in the rate of reaction for every 10^0 C rise in temperature
D The doubling in the rate of reactions for every 10^0 C rise in temperature

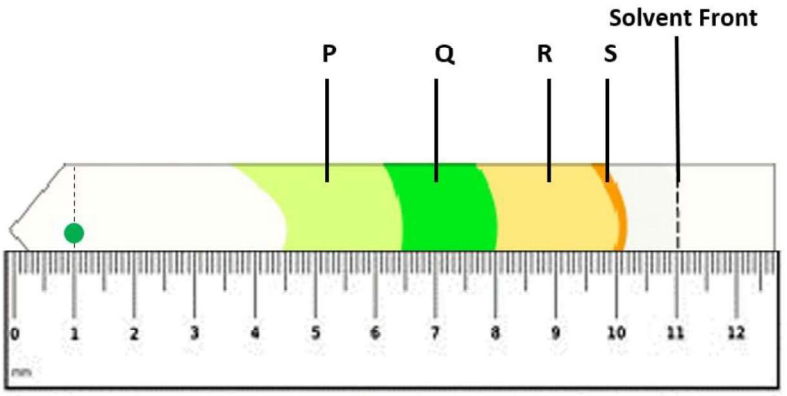
11 Which of the following metabolic reactions do not involve the release of carbon dioxide?

I Pyruvate + coenzyme A → Acetyl-Coenzyme A
II Malate → Oxaloacetate
III Pyruvate → Lactate
IV Acetyl-Coenzyme A + oxaloacetate → Citrate + coenzyme A
V Succinate → Fumarate

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

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

16 The result from paper chromatography of spinach leaf extract is shown in the diagram below. Pigments P,Q,R and S were separated from the experiment.



(a) (i) Complete the following table with the calculation of R_f values for the pigments
[2 mark]

Pigment	P	R
R_f		

(a) (ii) Explain the result obtained from the calculation in (a)(i)
[2 marks]

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.....

.....

(ii) Explain the result obtained from the calculation in (a)(i)
[2 marks]

.....

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* This question paper is CONFIDENTIAL until the examination is over. CONFIDENTIAL*

(b) What is meant by activation energy?

[1 mark]

.....

.....

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(c) Explain how does an enzyme work to reduce the required activation energy

[3 marks]

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(d) What happen after the transition state?

[1 mark]

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.....

SECTION C [*30 marks*]

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

18 (a) Describe the role of lipid components in cell membrane structure.

[9 marks]

(b) Explain the structure of lysozyme.

[6 marks]

19 (a) Describe the series of reactions involved in the production of high energy molecules within the Krebs cycle.

[9 marks]

(b) How can a person obtain energy during starvation?

[6 marks]

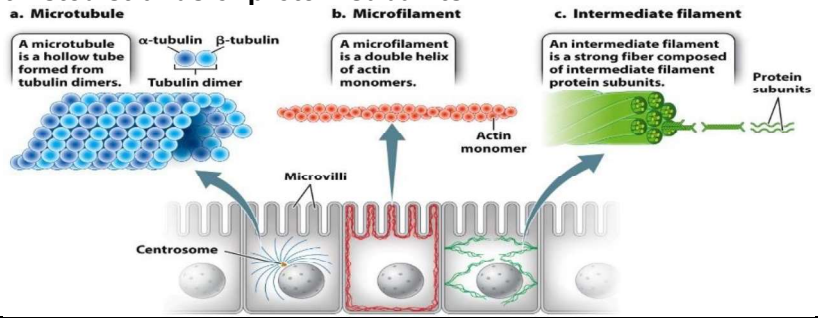
20 (a) Describe the structure of chloroplast that involved in light dependent reaction.

[3 marks]

(b) Explain the reaction involving photosystem II (PS II) in light dependent reaction of photosynthesis

[12 marks]

MARKING SCHEME TRIAL YEAR BIOLOGY PAPER 1 STPM 2023

SECTION : A		
No	**ANSWER**	
1	**D**	**The molecule is an α-glucose as it has the -OH group on the first carbon pointing downwards. Condensation of many α-glucose molecules will produce either glycogen in animals or starch in plants. Maltose is the condensation of only two glucose molecules. Cellulose is the condensation of many ß-glucose molecules.**
2	**B**	**Thymine is 29.3%, hence the nearest value is 30.5% (Q)** **Q is Adenine** **R is cytosine as cytosine is a pyrimidine together with thymine** **P is Guanine**
3	**C**	**Microtubules, microfilaments and intermediate filaments comprise the cytoskeleton. Microtubules are made up of dimers of alpha and beta tubulin; microfilaments being the smallest are made up of actin molecules; whereas intermediate filaments comprise of several twisted strands of protein subunits.** 
4	**C**	**Keratin is an intermediate filament, made up of fibrous proteins and is very stable. Keratin is the key structural component of hair and nails as well as the key structural material making up the outer layer of human skin. Keratin is one example of a double a-helix protein. Double helix refers to two polypeptide chains that are coiled together and held in position by disulphide bridges between the neighbouring chains.**
5	**C**	**The pressure potential of a plant cell is always positive as turgor pressure acts inwards to counteract the solute potential of the cell. This is so after the cell absorbs water by osmosis when immersed in water and becomes turgid.**
6	**A**	**The plasma membrane is made up of lipid and protein molecules which are arranged in an irregular pattern within the membrane bilayer. These molecules are constantly moving in two dimensions in a fluid manner. This allows the plasma membrane to be flexible and semi-permeable in nature.**
7	**D**	**An immobilised enzyme is an enzyme attached to an inert insoluble material. This causes the enzymes to be stable and have resistance to changes in pH and temperature. They promote the rate of reactions but are not themselves consumed in the reactions. They may be used repeatedly and the products need not be purified at the end of the reactions.**
8	**C**	**Penicillin produces its bacteriocidal effect by inhibiting the synthesis of bacterial cell walls. Penicillin is a competitive inhibitor that inhibits the enzyme, transpeptidase, by reacting with a serine residue in transpeptidase. Penicillin blocks the active 99 site of the enzyme that**

SECTION : C (30 MARKS)

No		Answers	Marks
18	(a)	***Describe the role of lipid components in cell membrane structure.***	**(9 marks)**
	P1	The basic structure of cell membrane are phospholipid bilayer and cholesterol (which are lipid component)	1m
	P2	The hydrophilic phosphate heads of phospholipids face outwards into the aqueous environment inside and outside the cell	1m
	P3	The hydrocarbon tails face inwards create a hydrophobic interior	1m
	P4	Phospholipid bilayer move laterally in their own layers	1m
	P5	This make the phospholipid bilayer more fluid/give fluidity of cell membrane	1m
	P6	Its hydrocarbon tails contains saturated and unsaturated fatty acids	1m
	P7	Double bonding of unsaturated fatty acids creates kink in the phospholipids tail	1m
	P8	keep the molecules from packing together	1m
	P9	High in unsaturated fatty acid the membrane remains fluid at lower temperature//low in unsaturated fatty acid the membrane solidifies at lower temperature	1m
	P10	The presence of cholesterol in between phospholipids	1m
	P11	regulate lateral movement of phospholipids tail//regulate packing	1m
	P12	At moderate temperature cholesterol reduces phospholipid movement	
	P13	At low temperature cholesterol hinders solidification	
		• **Any P1 – P9 and P10 – P13**	**9 marks**
		Total	**9 marks**
18	(b)	***Explain the structure of lysozyme.***	**6 marks**
	P1	It is a tertiary structure of protein	1m
	P2	A globular protein	1m
	P3	Consists of a polypeptide chains/single strand	1m
	P4	Made up of α helix and β pleated sheet that folding and coiling form a compact globular protein	1m
	P5	It is maintained by the interaction of hydrogen ,ionic and disulphide bonds as well as hydrophobic interaction	1m
	P6	This protein folds as to shield hydrophobic side groups from the aqueous surrounding and	1m
	P7	exposed hydrophilic side chains at the active site of enzyme	
	P8	which a substrate binds in it	
		Any 6P	6 marks
		Total	**6 marks**
		TOTAL	**15 MARKS**

TAMAT SAMPEL

Suka sampel ini?

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