



**MODUL PINTAS 2
TINGKATAN 5**

4551/2

**BIOLOGY
Kertas 2**

$2\frac{1}{2}$ jam

Dua jam tiga puluh minit

**PERATURAN PEMARKAHAN
BIOLOGY K2
4551/2**

BIOLOGI KERTAS 2

ANSWER SCHEME/SKEMA JAWAPAN

QUESTION 1/SOALAN 1

Question/ Soalan	Marking Criteria / Kriteria Pemarkahan	Marks/ Markah	
(a)(i)	P : mesophyll palisade cell Q : spongy palisade cell S : Chloroplast	1 1 1	3
(a)(ii)	P1 : The mesophyll palisade cell are arranged vertically and tightly P2 : near the top surface of the leaf P3 : packed with chloroplasts <i>And</i> P4 : To catch maximum light	1 1 1 1	2
(a)(iii)	P1 : A light reaction occurs in the grana,R P2 : Light reaction requires light P3 : as a reaction to light, chlorophyll captures light P4 : excite / activate chlorophyll electrons @ chlorophyll electrons leave behind chlorophyll molecules P5 : Activated chlorophyll molecules attract electrons from water molecules to regain stability P6 : causes water molecules to break down into hydrogen (H ⁺) and hydroxyl (OH ⁻) ions P7 : This reaction is sprayed with water photolysis	1 1 1 1 1 1 1	Max 2
(b)(i)	P: xylem vessel is a long hollow continuous tube/ dead cell/ no protoplasm P2 : to form continuous water column P3: cell wall are thickened by lignin P4: give waterproof properties P5: to give mechanical support P6: to prevent collapsing	1 1 1 1 1 1	

	Any 2		Max 2
(b)(ii)	<p>P1: (in temperature region) the growth rate of plant is different throughout water column</p> <p>P2: During spring/ summer,</p> <p>P3: Light intensity is high/ the growth rate is high/ rate of photosynthesis is higher</p> <p>P4: the xylem cells formed are large/ seen as light ring (in the stem)</p> <p>P5: during autumn/ winter</p> <p>P6: the growth rate is slow/ light intensity is low/ rate of photosynthesis is lower</p> <p>P7: Xylem cell formed are small/ seen as dark ring (in the stem)</p> <p style="text-align: right;">Any 3</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	Max 3
	Total / Jumlah		12 marks

QUESTION 2/SOALAN 2

Question/ Soalan	Marking Criteria/Kriteria Pemarkahan	Marks/ Markah	
(a)(i)	R- Primary structure S- Secondary structure	1 1	2
(a)(ii)	The linear sequence of amino acids. in a polypeptide chain.	1 1	2
(b)	Hydrolysis takes place. peptides bond is broken down. to form dipeptides.	1 1 1	Max 2
(c)	Contain all the essential amino acids.	1	1
(d)(i)	Silk is a protein Protein denatured. Structure of protein change/damage/broken. Shape of protein (3 dimensional) change//configuration of protein change.	1 1 1 1	Max 3
(d)(ii)	Wash in cold water/warm water//do not wash in water of high temperature. Do not dry silk under direct sunlight/do not use hot iron. Use dry cleaning.	1 1 1	Max 2
	Total / Jumlah		12 marks

QUESTION 3/ SOALAN 3

Question/ Soalan	Marking Criteria/ Kriteria Pemarkahan	Marks/ Markah	
(a)(i)	Tissue J : (Skeletal) Muscle tissue Cell K : Yeast	1 1	2
(a)(ii)	Process P : Anaerobic respiration Process Q : Aerobic respiration Word equation process Q : Glucose + Oxygen \longrightarrow Carbon dioxide +water+energy (38 ATP)	1 1 1	3
(b)(i)	F1 : Cell K undergoes anaerobic respiration E1 : Glucose breakdown (partially/incompletely) E2 ; to produce ethanol and carbon dioxide E3 : Less ATP / 2 ATP is produced	1 1 1 1	Max 2
(b)(ii)	F1 : Carbon dioxide released E1 : traps in the dough E2: causes the dough to rise	1 1 1	3
(c)	-Oxygen debt (Reject : Anaerobic respiration is a process, not a condition) AND E1 : because of oxygen deficiency // lack of oxygen E2 : to get more oxygen immediately E3 : to oxidise lactic acid Any 1	1 1 1 1	2
	Total / Jumlah		12 marks

QUESTION 4 / SOALAN 4

Question/ Soalan	Marking criteria/ Kriteria pemarkahan	Marks/ Markah	
(a)(i)	Able to name phase P1 and Q2. Answer: P1: Metaphase Q2: Anaphase 1	1 1	2
(a)(ii)	Able to explain division of cell Q brings about variation in organism. Answer: P1 : crossing over occur in cell Q P2 : at Prophase 1 stage P3 : (where) exchange of genetic materials/information between non sister chromatids (happened).	1 1 1 (Any 2P)	2
(a)(iii)	Able to draw the number of chromosomes at the end of process cell P and cell Q.  <p style="text-align: center;">Cell P Cell Q</p>	1 1	2
(b)(i)	Able to give one example of factor K. Answer: P1: Radiation / Radioactive radiation / gamma ray / UV ray P2: Carcinogen / chemicals / preservatives /cigarette smoke / suitable example of carcinogen P3: Stress	1 1 1 (Any 1P)	1
(b)(ii)	Able to explain the formation of cell T. Answer: P1: Cell T is a cancer cell. P2: Mutation occurs (due to the exposure to factor U). P3: (Gene that controls) cell cycle disrupted / changed. P4: Mitosis cannot be controlled.	1 1 1 1	

	P5: More (daughter) cells produced (in a shorter time). P6: Forms lumps / abnormal growth.	1 1 (Any 3P)	3
(b)(iii)	P1: apply sunblock lotion // use umbrella during a hot day // wear long sleeves shirt / pants // limit / reduce outdoor activities during a hot day to prevent exposure to UV ray. P2: Go for vacation / holiday / recreational activities exercise / any suitable example to manage stress level // prevent stress. P3: Eat healthily / unprocessed food // consume organic food // limit / reduce fast food intake // eat more fruit and vegetables to prevent the intake of carcinogen / chemicals / preservatives / suitable example. P4: Do not smoking // avoid areas contain cigarette smoke to prevent from inhaling cigarette smoke/ carcinogen /chemicals.	1 1 1 1 (Any 2P)	2
	Total / Jumlah		12 marks

QUESTION 5 / SOALAN 5

Question/ Soalan	Marking Criteria/Kriteria Pemarkahan	Marks/ Markah	
(a)(i)	Human : Complete double Closed Circulatory System Frog : Incomplete double Closed Circulatory System	1 1	2
(a)(ii)	P1- The right part and the left part of human heart are separated by the septum/human heart have four chambers P2- oxygenated blood and deoxygenated blood are not mixed in the ventricle P3- high concentration of oxygen are transported blood to the cells	1 1 1	3
(b)(i)	P1- J and K generate wave of impulses P2- impulses spread to atria and ventricles P3- Bundle of His and Purkinje Fibers spread impulses P4- atria and ventricles contract	1 1 1 1	3
(b)(ii)	P1- increase the pressure in both atria and ventricles P2- cause the bicuspid and tricuspid valve to open P3- the blood flow from the atria to ventricles/from ventricles to aorta and pulmonary artery	1 1 1	2
(c)	P1- high intake of saturated fats/carbohydrate/salt P2- lack of exercise/sedentary life style P3- always stressed with work	1 1 1	2
	Total/Jumlah		12 marks

QUESTION 6/SOALAN 6

Question/ Soalan	Marking Criteria/Kriteria Pemarkahan	Marks/ Markah	
(a)	<ul style="list-style-type: none"> -The shaded part is at the normal body temperature of 37°C because it represents the core temperature of the body. -The heat generated by the liver and metabolic activities is used to keep the vital organs at constant temperature. -As blood carries heat to the other parts of the body, heat is lost from the body, causing body temperature to drop. -The ends of the feet and hands have a larger surface area and loses most heat. Therefore the temperature there is the lowest 	<p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p>	4
(b)	<ul style="list-style-type: none"> -As the person walks out into the hot sun, thermoreceptors (warm receptors) in the skin detects changes in the environmental temperature. -At the same time, the hypothalamus detects changes in the temperature of the blood flowing through it. -The thermoreceptors generates nerve impulses which are carried by the afferent neurone to the hypothalamus. -The hypothalamus responds by sending nerve impulses along the efferent neurone to the skin and the endocrine glands. -The nerve impulses cause vasodilation to take place -Sweat glands become active and there is an increase in sweating. -Adrenal / thyroid glands are not stimulated and the metabolic rate reduces or remains normal. -Less heat is produced. -As a result, body temperature returns to normal. 	<p style="text-align: center;">1</p>	Max 6
(c)	<ul style="list-style-type: none"> -The blood glucose level in Encik Shah's blood is higher than normal/ too high -This shows that Encik Shah has diabetes. -Where there is impairment of the pancreas and not enough insulins is produced. -Excess glucose cannot be converted to glycogen. -Or the insulin produced is impaired and cannot convert excess glucose to glycogen or lipids. 	<p style="text-align: center;">1</p>	

	-At the same time, the cells of his body cannot take in glucose.	1	
	-This is cause the cells to experience a deficiency of glucose which is needed for cellular respiration to produce energy.	1	
	-As a result, Encik Shah feels tired all the time.		
	-Because of the high concentration of glucose, the kidney cannot reabsorb all the glucose from the glomerular filtrate.	1	
	-The high glucose concentration increase the blood osmotic pressure.	1	
	-The body then tries to lower the osmotic pressure by stimulating the thirst centres of the brain, causing Encik Shah to feel thirsty	1	
		1	Max 10
	Total / Jumlah		20 marks

QUESTION 7 / SOALAN 7

Question/ Soalan	Marking Criteria/ Kriteria Pemarkahan	Marks/ Markah	
(a)	P1 : Organ X is gall bladder P2: Gall bladder stores bile P3: Bile emulsify lipid to tiny droplet P4: To increase the total surface area / TSA/V of the lipid P5 : Organ Y is pancreas P6: Pancrease secretes pancreatic juice containing lipase P7: Lipase hydrolyse /digested/breakdown lipid into fatty acid and glycerol	1 1 1 1 Max 2 1 1 1 Max 2	Max 4
(b)	P1: Protein is digested/break down into amino acid in digestion system P2: Amino acid absorbed by the the blood capillaries in the villus P3: From villus, amino acid is transported to the liver. P4:Then to the body cells via blood circulatory system P5: In body cell, amino acid is used to produce protoplasma/repair damaged tissue/synthesis enzymes/hormone P6: In liver , acid amino is used to synthesis protein plasma P7: Excess amino acid is convert to urea P8: Through deamination process P9 : urea is harmful to human body P10: Urea is transported to kidneys P11 To be excreted (through urethra) in the form of urine	1 1 1 1 1 1 1 1 1 1 1 1 1	Max 6
(c)	Able to explain the <u>effects of colorectal cancer</u> to the human health P1 a type of cancer that develops in the tissues of the colon P2 caused by carcinogens produced by colon bacteria P3 and eating a high fat/ low fibre diet P4 the symptoms is include blood in the stool/ a change in bowel movements P5 preventing adequate passage of stool or causing disruption in the absorption of nutrients and water P6 it may cause to eat less and lose weight P7 feeling tired P8 Haemorrhoids P9 a condition in which the vein around the anus or lower	1 1 1 1 1 1 1 1 1	10

	rectum are swollen and inflamed P10diarrhea or constipation	1	
	Total / Jumlah		20 marks

QUESTION 8 / SOALAN 8

Question / Soalan	Marking criteria/ Kriteria Pemarkahan	Mark																
8(a)	<table border="1"> <tr> <td>P1:</td> <td>The genotypes of the parents are homozygous tall, TT</td> </tr> <tr> <td>P2:</td> <td>(and) homozygous short, tt.</td> </tr> <tr> <td>P3:</td> <td>The genotype of the offspring is heterozygous, Tt.</td> </tr> <tr> <td>P4:</td> <td>(This is because of the) presence of one dominant gene for tallness in the genotype of the offspring, causing the offspring to be tall.</td> </tr> </table>	P1:	The genotypes of the parents are homozygous tall, TT	P2:	(and) homozygous short, tt.	P3:	The genotype of the offspring is heterozygous, Tt.	P4:	(This is because of the) presence of one dominant gene for tallness in the genotype of the offspring, causing the offspring to be tall.	1 1 1 1 4	4							
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8(b)	<p>P1 Parent's genotype $ttFF$ X $TTff$</p> <p>P2 Meiosis</p> <p>P3 Gamete genotype tF Tf</p> <p>P4 Fertilisation</p> <p>P5 F1 generation, genotype $TtFf$</p> <p>P6 F1 generation, phenotype Tenera</p> <p>Self-crossing</p> <p>Parent's F1 genotype $TtFf$ X $TtFf$</p> <p>Meiosis (award once)</p> <p>P7 Gamete, F1 genotype T Tf tF tf T Tf tF tf</p> <p>Diagram of Punnet square</p> <table border="1"> <thead> <tr> <th>Gane te</th> <th>TF</th> <th>Tf</th> <th>tF</th> <th>tf</th> </tr> </thead> <tbody> <tr> <th>TF</th> <td>TTFF</td> <td>TTFf</td> <td>TtFF</td> <td>TtFf</td> </tr> <tr> <td></td> <td>Thick husk, Thick flesh</td> <td>Thick husk, Thick flesh</td> <td>Thick husk, Thick flesh</td> <td>Thick husk, Thick flesh</td> </tr> </tbody> </table>	Gane te	TF	Tf	tF	tf	TF	TTFF	TTFf	TtFF	TtFf		Thick husk, Thick flesh	1 1 1 1 1 1 1	1			
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	<p>Note : P8 - F2 generation, genotype , P9 - F2 generation, phenotype</p>																					
	P10	Phenotypic ratio of generation F2 = 9:3:3:1																				
	P11	Recessive genes, h and f, (which are of poor quality) do not appear in the Tenera, but appear in the offspring of Tenera, the F2 generation.				1																
	P12	Not all the offspring produced have good quality like the Tenera which has thick flesh and thick husk. There are some offspring which are not of good quality.				1																
					1																	
					(Any 8P)																	
					8																	

8(c)	<u>DNA fingerprinting</u>			
	P1:	DNA fingerprinting can be used for identification purposes in solving criminal cases.	1	
	P2 :	For example, DNA samples from blood, skin, hair or semen left by a criminal at the scene of crime can be analysed.	1	
	P3:	To identify the parent of someone	1	
	P4:	To test potential organ donors for compatibility with a particular patient	1	
	P5:	To examine the relationship among human populations	1	
	P6:	To detect human genetic diseases and cancer	1	
	P7:	To confirm the genotypes of animals and plants in agriculture	1	
	<u>Human genome project</u>			
	P8:	A genome is the total genetic content of any cell in an organism consists of all the genes on all the chromosomes.	1	
	P9 :	Human genome project aims to map the position of genes on the chromosome and determine the sequence of bases in the DNA.	1	
	P10:	Identification of defective genes and hence the opportunity to offer early treatment.	1	
	P11:	Identification of genes which confer a susceptibility to certain diseases and so enable individuals to take preventive measures.	1	
	P12:	Prediction of proteins that the genes produce, giving an opportunity to design appropriate drugs to enhance or inhibit the activities of these protein.	1	
	P13:	Discovering the function of all the genes in the human genome will produce exciting new information,	1	
P14:	which help us understand more about how body works, and how to prevent and cure diseases.	1		
		(Any 8P)	Max 8	
		Total / Jumlah	20 mark	

QUESTION 9 / SOALAN 9

Question/ Soalan	Marking Criteria/Kriteria Pemarkahan	Marks/ Markah	
(a)(i)	P1 Employers in the build / industrial sector do not comply with the Noise Disclosure Regulations under the Occupational Safety and Health Act 1994 (Peraturan Pendedahan Bunyi Bising di bawah Akta Keselamatan dan Kesihatan Pekerjaan 1994)	1	
	P2 Employers do not know what steps to take in addressing noise pollution at work	1	

	P3 Awareness campaigns on noise pollution need to be expanded for all ages P4 The government may tighten the law to limit the noise levels that vehicles can produce. P5 The community should respect the neighbors by reducing / using the sound / sound produced by the speaker P6 Airports need to be built away from human settlements because low-flying airplanes produce noise P7 Obey the permitted sound limits	1 1 1 1 1	
(a)(ii)	P1 Causes humans to lose / lack hearing / deafness P2 Causes people to face health risks such as high blood pressure / cardiovascular disease / ulcer / depression / headache / stress P3 Disrupting peace and comfort / rest P4 Affects property value P5 Reduce productivity due to lack of focus in the workplace Any 10 for 9(a)(i) and (a)(ii)	1 1 1 1 1	10
(b)	P1 mengekalkan habitat semula jadi (bagi flora dan fauna) P2 supaya spesies (flora dan fauna) tidak pupus. P3 Mengekalkan rantai / siratan makanan P4 Bertindak sebagai tempat pembiakan haiwan akuatik P5 sebagai kawasan tadahan air hujan P6 Bertindak sebagai pemecah ombak/ elak hakisan pantai. P7 Menyerap gas CO2 // kurangkan kesan rumah hijau P8 Sumber bagi hasil kayu / arang P9 sebagai tempat aktiviti untuk rekreasi / ketenangan P10 sumber bahan bakar	1 1 1 1 1 1 1 1 1 1	10
	Total/Jumlah		20 marks

END OF MARKING SCHEME PERATURAN PEMARKAHAN TAMAT			
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