

SUGGESTED ANSWER**Question 1**

	SUGGESTED ANSWER	MARKS	
1(a)(i)	Epithelium cell / Epithelial	1	1
1(a)(ii)	To secrete mucous into small intestine / ileum // to secrete intestinal juice containing enzymes Reject : to form a protective barrier against infections, mechanical injuries and dehydration (skin)	1	1
1(a)(iii)	<ul style="list-style-type: none"> • Organ R is stomach • It is formed when two or more different tissues combine together • To perform specific /same /particular function / to perform digestion <p style="text-align: right;">Any 2</p>	1 1 1	2
(b)(i)	Ribosome // Rough endoplamic reticulum/ rough ER // golgi apparatus *Reject RER	1	1
(b)(ii)	<p>*depends on answer in (b)(i)</p> <ul style="list-style-type: none"> • No / less synthesis of protein occur • Protein cannot be sent/less transport to the Golgi apparatus <p style="text-align: right;">Any 2</p> <p>Or</p> <ul style="list-style-type: none"> • Protein cannot be modified / processes • Protein cannot be package • No / less extracellular enzyme can be synthesis <p style="text-align: right;">Any 2</p>	1 1 1 1 1	2
(b)(iii)	Maltase / sucrase / erepsin / peptidase / lactase	1	1
(c)(i)	<ul style="list-style-type: none"> • lipid / fat • glycerols / fatty acid 	1 1	2
(c)(ii)	<ul style="list-style-type: none"> • Enzyme reaction is highly specific reaction • Enzymes are not destroyed by the reactions (which they catalysed) // Enzymes are reusable • Enzyme has active / specific site • One enzyme catalyse one substrate <p style="text-align: right;">Any 2</p>	1 1 1 1	2
	Total		12

Question 2

	SUGGESTED ANSWER	MARKS	
2(a)(i)	X: Metaphase I Y: Anaphase	1 1	2
(b)(i)	<ul style="list-style-type: none"> • Homologous chromosomes / bivalent are arranged / lined up (randomly) • At the metaphase plate / equatorial plane / middle of the cell / cell equator 	1 1	2
(b)(ii)	<ul style="list-style-type: none"> • It cause variation • Gamete carries different genetic content /materials <p style="text-align: right;">Any 1</p>	1 1	1
(c)(i)	Zon M : Cell division zone	1	1
(c)(ii)	<ul style="list-style-type: none"> • Cells in zone M / meristem actively divide • By mitosis • Form similar new cells /same • Increase the number of cells / enter into cell elongation zone <p style="text-align: right;">Any 2</p>	1 1 1 1	2
(c)(iii)	<ul style="list-style-type: none"> • Cytokinesis • vesicle fused together to form cell plate • Cell plate grows outward / fused to form cell wall (and plasma membrane) • Separate cell / cytoplasm into two (daughter cells) <p style="text-align: right;">Any 2</p>	1 1 1 1	2
d)(i)	Cancerous /cancer cell / Tumor / Malignant	1	1
d)(ii)	Ultraviolet light // x-ray // gamma rays / nuclear radiation * *reject food colouring	1	1

Question 3

		SUGGESTED ANSWER		MARK	
3(a)(i)	Able to name plant at Zone K and Zone L Zone K : <i>Avicennia</i> sp. Zone L : <i>Sonneratia</i> sp.	1 1			2
(ii)	<ul style="list-style-type: none"> • Have (long) underground cable roots • protect from strong coastal winds / for support • Pneumatophore roots • vertical breathing roots for respiration / get oxygen during high tides • the leaves covered by a thick layer of cuticle • reduce transpiration or water lost • the leaves are thick and succulent • able to store more water • roots cell has a higher osmotic pressure than the soil • to ensure that the roots do not lose water by osmosis • viviparity seeds // seed germinate while still attach on mother plant • increase the mangrove's chances to of survival // prevent seed from sinking/washed away <p style="text-align: center;">Any 2 adaptation & corresponding explanation</p>	1 1 1 1 1 1 1 1 1 1 1 1 1			4
(b)	<ul style="list-style-type: none"> • Source of food • nesting and nursery sites for many animals / breeding site • Rich source of timber and fuel • As a ecotourism / recreational area • Main sources of income for shoreline fishermen communities / fisherfolk <p style="text-align: right;">Any 2</p>	1 1 1 1			2
(c)	<ul style="list-style-type: none"> • Snake • Owl • Small bird <p style="text-align: right;">Any 2</p>	1 1 1			2
(c)(ii)	<p>10% x 1500 kJ = 150 kJ (receive by small bird)</p> <p>10% x 150 kJ =15 kJ (receive by owl)</p>	1 1			2
Total					12

Question 4

	SUGGESTED ANSWER		MARK	
4(a)(i)	Organism P: Double closed (complete) circulatory system Organism Q: Single closed circulatory system		1 1	2
(a)(ii)	Correct arrow from lung to heart and heart to blood capillaries		1	1
(b)(i)		Organism P	Organism Q	1 1 1 Any 1
	PI	Heart has 4 chambers	Heart has 2 chambers	
	P2	has two atria and two ventricles // has right atrium, left atrium, right ventricle and left ventricle	has one ventricle and one atrium // has ventricle and an atrium	
	P3	heart receives both oxygenated blood and deoxygenated (separately)	heart receives deoxygenated blood	
(b)(ii)	<ul style="list-style-type: none"> contraction of ventricle / heart produce pressure (to) propel / force/ pump the blood flow from the heart / ventricle to vessel X <p style="text-align: right;">Any 2</p> <p>*reject -vessel Y receive blood from the lung -which do not generate any pressure</p>		1 1	2
(c)(i)	Cell P: Erythrocyte Cell Q: Lymphocyte		1 1	2
(c)(ii)	<ul style="list-style-type: none"> P has biconcave shape, but Q has irregular shape P has large surface area to increase the transport / bind / diffusion of oxygen Enable Q to squeeze through wall of blood capillaries // change shape to undergo phagocytosis P has no nucleus, but Q has nucleus to place more haemoglobin to transport more oxygen P has haemoglobin but Q has no haemoglobin haemoglobin combine with oxygen to form oxyhaemoglobin P can transport oxygen (in form of oxyhaemoglobin) but Q cannot. <p style="text-align: right;">Any pair Fact + Explanation</p>		1 1 1 1 1	2

(d)	<ul style="list-style-type: none"> • Dengue fever infected blood has low / less level of platelets // number of platelets is lower *reject 'no' • Less thrombokinase / thromboplastin released • Cause blood clotting cannot be /difficult to occurs / slower • (External / Internal) bleeding cannot be stop / bleeding complication • Excessive loss of blood / haemorrhaging • Can cause death <p style="text-align: right;">Any 2</p>	<p>1 1 1 1 1 1 1</p>	<p>2</p>
	Total		12

Question 5

5(a)	Purple flower			1	1
(b)		(R)	r	All 6 2 4-5 1 2-3 0	2
	R	RR	Rr		
	(r)	Rr	rr		
(c)(i)	25% OR $\frac{1}{4}$ OR 0.25			1	1
(c)(ii)	<ul style="list-style-type: none"> Phenotypic ratio (in F2 generation) are 3 purple flower and 1 white flower It is Mendel's First law/The Law of segregation Each trait control by a pair of alleles during formation of gamete / meiosis The (pair of alleles) segregate/separated Only one allele can be carried in a single gamete 			1 1 1 1 1 1	2
	Any 2				
(d)(i)	Hair / skin / blood / semen / saliva			1	1
(d)(ii)	<ul style="list-style-type: none"> male Q the child's DNA must be a combination of the mother's DNA and the Father's DNA the bands from the child's DNA that does not match with the mother's band but match exactly with the male Q band. some bands that do not match the mother's is absent in P and R 			1 1 1 1 1	3
	Fact + any 2 Explanation				
(e)	<ul style="list-style-type: none"> better diagnosis of disease/ early detection of gene that causes disease/ able to identify the name and the location of the disease (in chromosomes) Gene therapy / using gene to treat disease help to identify and delete/eliminate / change the gene of the disease replace with normal gene to correct disease disorder Increase quality of life Lengthen life span. discover genetic mutation which causes certain genetic disease 			1 1 1 1 1 1 1 1 1 1	2
	Any 2				
TOTAL MARKS				12M	

Question 6

	SUGGESTED ANSWER	MARK	
6 (a)	<ul style="list-style-type: none"> • Fluid X is amniotic fluid • Act as cushion/shock absorber that protects if mother falls/physical harm/outside pressure • Act as lubricant for foetus's body part such as fingers and toes from growing together//avoid webbing • Contain antibodies which protect the foetus against diseases • Allow the baby to float inside amniotic sac • Giving its freedom to move about • giving muscles and bones the opportunity to develop properly • Amniotic fluid consist of water from the mother's body and foetal urine • The fluid insulates the baby, keeping it warm/maintaining the regular temperature <p style="text-align: right;">Any 4</p>	<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> <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> <p style="text-align: center;">1</p>	4
(b)	<p><u>Smoking</u></p> <ul style="list-style-type: none"> • Cigarette smoke contain nicotine/carbon monoxide/carcinogenic • Can diffuse from maternal / mother's blood capillary to fetus capillary (through placenta). • Causing miscarriage/still birth/premature birth/ birth defect / baby with low birth weight/ any suitable answer. <p style="text-align: right;">Any 2</p> <p><u>Drugs</u></p> <ul style="list-style-type: none"> • Drugs such as cocaine/ecstasy/methamphetamine/ chemicals/ heroin/ any suitable example • Contain harmful chemicals • Increase the chance of birth defect// brain damage / Premature babies/ underweight babies/ stillborn baby <p style="text-align: right;">Any 2</p> <p><u>Alcohol</u></p> <ul style="list-style-type: none"> • Alcohol can pass from mother's blood to foetal blood • causing distinctive facial features • causing growth problems / birth defects / miscarriage / still born • causing FAS (Foetal Alcohol Syndrome) <p style="text-align: right;">Any 2</p>	<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> <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> <p style="text-align: center;">1</p>	6

	SUGGESTED ANSWER	MARK	
(c)	<u>Development of follicle</u> <ul style="list-style-type: none"> • Pituitary gland starts secreting FSH • (During day 1 to day 5), the level of FSH is increasing. • the level of FSH maximum on day 5 / day 13 • (FSH) stimulate primary follicle to develop into secondary Follicle • secondary follicle develop into Graafian follicle • the developing follicle secrete oestrogen <p style="text-align: right;">Any 3</p> <u>Ovulation</u> <ul style="list-style-type: none"> • During day 6 to day 14, level of oestrogen increase. • level of oestrogen peak / maximum on day 12 • stimulate pituitary gland to secrete LH • the level of LH peak/maximum/highest on day 13 • Graafian follicle ruptures • Secondary oocyte release from Graafian follicle • causes ovulation to occur on day 14 <p style="text-align: right;">Any 4</p> <u>Development of corpus luteum</u> <ul style="list-style-type: none"> • After day 15, the Graafian follicle change into corpus luteum • stimulated by LH • Corpus luteum secrets progesterone • Day 15 to day 28, level of progesterone increase. • if no fertilisation occurs, corpus luteum will degenerate. <p style="text-align: right;">Any 3</p>	 1	10 20
	TOTAL MARKS		

	MARKING CRITERIA	MARKS	
7(c)	<p>Able to name the health problem faced by Individual Y and explain why he needs injection of hormone M and drink solution L</p> <ul style="list-style-type: none"> • Individual Y suffered from diabetes (mellitus). 1 • Has high blood glucose level 1 • Pancreas unable to secrete insulin // secrete insufficient insulin 1 • Hormone M is insulin 1 • Insulin/hormone M stimulates the conversion of excess glucose(in blood) to glycogen. 1 • (Glycogen) are stored in liver/muscle cells 1 • Blood glucose level will be reduced/decreased/lowered back to normal 1 • (sweating and increase heart rate) shows symptom of hypoglycemia 1 • Glucose level in the blood is (too) low 1 • caused by high concentration of insulin in the blood (from the insulin injection) 1 • Pancreas unable to secrete enough glucagon 1 • Glycogen cannot be converted into glucose 1 • Solution K is sugar (solution)/ sugary drink 1 • The sugar diffused into blood stream 1 • The blood glucose level increase/raise back to normal range 1 <p style="text-align: right;">1 Fact with any 9 Explanation</p>		10
	TOTAL MARKS		20

Question 8

	SUGGESTED ANSWER	MARK
8(a)(i)	<ul style="list-style-type: none"> • Level 2 is roughage/fiber • roughage/ fiber has high water holding capacity which provides bulk to intestinal contents • Aids in peristalsis // rhythmic contraction of muscles along the walls of alimentary canal • (Aids in bowel movement) which prevent the build-up of toxic substances in the rectum • Prevents constipation / undigested matter cannot move along in the large intestine. • Reduces the risk of haemorrhage/colon cancer <p style="text-align: right;">*Any suitable answer</p>	1 1 1 1 1 1
	<ul style="list-style-type: none"> • Level 2 is water • Transport medium (for nutrient and waste substances) • Maintain a water balance between the blood and interstitial fluid • Provide moisture for respiratory surfaces (alveoli) • Help to maintain body temperature (for optimum enzyme activity) • Medium for biochemical reaction <p style="text-align: right;">*Any suitable answer</p>	1 1 1 1 1 1
	<ul style="list-style-type: none"> • Mineral / Ion Calcium and phosphorus • Maintain good health • (Ion Calcium and phosphorus) to build strong bones and teeth / to prevent blood clot • (Sodium/potassium/chlorine) / Maintain osmotic balance • (Ion ferum//haemoglobin) / Formation of red blood cell <p style="text-align: right;">*Any suitable answer</p>	1 1 1 1 1
	<ul style="list-style-type: none"> • Vitamin / Vitamin B / Vitamin C / Vitamin D • Maintain good health • (Vitamin B) to prevent beri-beri Co-enzyme • (Vitamin C) to antioxidant Prevent scurvy • (Vitamin D) to prevent ricket Strong bone <p style="text-align: right;">*Any suitable answer</p> <p style="text-align: right;">Any 2 (Fact + Explanation) If no Fact max 2m</p>	1 1 1 1 1
		4

	SUGGESTED ANSWER	MARK	
(a) (ii)	<ul style="list-style-type: none"> • Level 4 is (high) lipid/salt/sugar • Food at level 4 is placed at the highest level of food pyramid • should be taken in smallest amount/sparingly • sweets / ice cream / cookies contain high sugar • Excessive sugar in blood lead to obesity/diabetes • ice cream / butter / cookies contain high lipid • Excessive lipid in the blood will form adipose tissue/obesity • increase cholesterol level//heart attack//cardiovascular diseases/stroke (any cardiovascular diseases) • butter contain high salt • increase the risk of high blood pressure / hypertension / kidney failure (any suitable diseases) <p style="text-align: right;">Any 6</p>	<p>1 1 1 1 1 1 1 1 1 1</p>	6
(b)	<ul style="list-style-type: none"> • practicing (a daily) balance diet • the diet comprises all food classes // carbohydrates, lipids, proteins, vitamins, mineral salts and fibers // foods from level 1, level 2, level 3 and level 4. • in the correct amount / appropriate ratio • should take more foods from level 1, 2 and 3 / containing carbohydrates, fruits and vegetables / proteins • for sustaining better general body growth / normal metabolism of the body • (the adolescent/teenager) requires more carbohydrates (as level 1) • for energy production / energy resources in the body • because teenager is more active • More proteins (as level 3) • for rapid muscular growth / replacement of dead tissues / cells /repairing damaged cells • growth rate is highest / fastest • and synthesis of functional proteins/ enzymes / antibody /hormones / insulin • vitamins / minerals serve as co-enzyme / co-factor for normal enzyme activities • Calcium / Phosphorus ion are important for growth of bones / teeth. • iodine for production of thyroxine • fibres helps peristalsis in the alimentary canal / avoiding constipation • should avoid from consuming excessive fats (as level 4) • which is the principal cause of cardiovascular problems / heart problem / hypertension / thromboses coronary / arterosclerosis / obesity <p style="text-align: right;">Any 10</p>	<p>1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</p>	10

	<ul style="list-style-type: none"> • damage the eggs of certain amphibians. • leaf cells and chlorophyll are damaged • rate of photosynthesis become low • reduce plant growth • reduces crop yields <p style="text-align: right;">Any 8</p>	<p style="text-align: center;">1 1 1 1 1 1</p>	<p style="text-align: center;">8</p>
	<p><u>Steps To Solve The Problem</u></p> <ul style="list-style-type: none"> • Reduce / stop using CFCs / air conditioner / aerosol / refrigerator • Replace CFCs with HCFCs. • Use wrapping papers instead of polystyrene boxes. • Patch up the holes in the ozone layer by firing frozen ozone balls into the atmosphere <p style="text-align: right;">Any 2</p>	<p style="text-align: center;">1 1 1 1</p>	<p style="text-align: center;">2</p>
TOTAL			20