

Biology Paper 2

QUESTION 1

No	Criteria	Marks	
(a)	Able to name tissue W and tissue X. Answer: <ul style="list-style-type: none"> ▪ W : Upper epidermis (cells / tissue) ▪ X : Palisade mesophyll (cells / tissue) 	1 1	2
(b)	Able to state the function of cells W and Y in a leaf. Sample answer: <ul style="list-style-type: none"> ▪ W : Protect the inner tissues. // Allows light to penetrate. ▪ Y : Controls the size of stoma / transpiration / gaseous exchange // Allows gaseous exchange through the stoma. 	1 1	2
(c) (i)	Able to explain the differentiation of cells A to form the xylem tissue. Sample answer: <ul style="list-style-type: none"> ▪ Cells A join end to end, / the wall of cells A at the joints dissolved, ▪ to form a hollow tube / continuous tube (from root to leaves). ▪ The wall of xylem vessel is thickened by lignin. (Any 2) 	1 1 1	2
(ii)	Able to explain the effect on the function of the leaf when the plant unable to synthesise lignin during the formation of the xylem tissue. Sample answer: <ul style="list-style-type: none"> ▪ Xylem cannot be strengthened / cannot uphold leaf. ▪ Less sunlight received / absorbed. ▪ Slow down the rate of photosynthesis / less glucose produced Or (Any 2) <ul style="list-style-type: none"> ▪ Xylem vessels collapsed. ▪ Less water supplied to leaves. ▪ Slow down the rate of photosynthesis / less glucose produced (Any 2) 	1 1 1 1 1 1	2
(d)	Able to state the meaning of cell specialisation. Sample answer: <ul style="list-style-type: none"> ▪ Cells grow, change shape / differentiate. ▪ To carry out / perform specific function. 	1 1	2
(e)	Able to explain the adaptation of palisade mesophyll tissue to enable the leaf to carry out its function. Sample answer: <ul style="list-style-type: none"> ▪ Upright and closely packed. ▪ Contains large number of chloroplast. ▪ All cells receive maximum amount of sunlight. // Absorb maximum amount of sunlight // energy. 	1 1 1	2
TOTAL			12

QUESTION 2

No	Criteria	Marks	
(a)	Able to name the phase W. Sample answer: W : Interphase	1	1
(b)	Able to describe the processes at sub phases X, Y and Z during phase W. Sample answer : X : Cell synthesises protein / new organelles formed Y : DNA is synthesized / is replicated / 2 sister chromatids formed Z : Cell accumulates energy / synthesise energy / prepare for cell division	1 1 1	3
(c)	Able to draw a daughter cell based on the following criteria: <ul style="list-style-type: none"> • No. of chromosomes are haploid / 3 chromosomes • Types of chromosomes/ non homologous • New genetic combination 	1 1 1 Any 2	2
(d)	Able to explain how radiotherapy can treat cancer. Sample answer : F : Radiotherapy uses radiation / high energy rays E1 : destroy the nucleus of cancerous cells E2 : cancerous cells die / cannot divide mitotically E3 : cell cycle stops	1 1 1 1	2
(e)(i)	Able to name the method and explain the advantages of the method in increasing crop yield. Sample answer : T : Tissue culture / Cloning E1 : Large numbers of clones can be produced E2 : Within a short period of time / any time E3 : Clones inherited good characteristics/ resistance to diseases / fast growth rate / large fruit / good genetic traits	1 1 1 1 T=1m Any 2E	3
(e)(ii)	Able to state one problem : -Clones can be destroyed completely if they do not have the resistance to new diseases / pest.// -No variation	Any 1	1
		TOTAL	12

QUESTION 3

No	Criteria	Marks	
3 (a)(i)	<p>Able to name gas X and Y correctly</p> <p><u>Answer</u> X : Oxygen Y : Carbon dioxide</p>	1 1	2
(ii)	<p>Able to explain how alveolus is structured to increase the efficiency of gaseous exchange</p> <p><u>Sample answer</u> F1 : Alveolus has thin wall (one cell thick) E1 : Gaseous can diffuse in and out through the wall more efficiently F2 : The (inner) surface of the alveolus is moist E2: Allowing oxygen to dissolve first before diffusing out F3 : The (outer surface) of the alveolus is covered by a network of blood capillaries E3 : Increase the surface area for rapid diffusion of gaseous</p>	1 1 1 1 1 1 Any 2	2
(b)	<p>Able to explain the difference between the concentration of gas X and Y in blood vessel Q.</p> <p><u>Sample answer:</u> F1 : The concentration of gas X in blood vessel Q is lower than gas Y E1 : Oxygen has been used by the body cells /cellular respiration E2 : (Cellular respiration) produces gas Y E3 : to be sent to the lung (to be excreted)</p>	1 1 1 1 Any 2	2
(c)	<p>Able to explain why the concentration of gas X of a cigarette smoker is lower than the one in a healthy person</p> <p><u>Sample answer:</u> F1 : Cigarette smoke contains carbon monoxide E1 : (Carbon monoxide) has higher affinity to bind with hemoglobin compared to oxygen E2 : forms carbaminohaemoglobin E3 : Therefore, less oxygen will bind with hemoglobin to be transported in blood vessel P</p>	1 1 1 1 Any 2	2
(d)	<p>Able to explain changes in the percentage of carbon dioxide</p> <p><u>Sample answer:</u> E1 : The high concentration of carbon dioxide E2 : decreases the blood pH E3 : Detected by central chemoreceptor and/ peripheral chemoreceptor E4 : Impulses are sent to the respiratory centre E5 : (Impulses are sent to) the cardiac and respiratory muscles E6 : Increase the heart beat and breathing rate E7 : To remove excess carbon dioxide (so that the percentage of carbon dioxide is returned to normal)</p>	1 1 1 1 1 1 1 1	4
<p>http://windyportal.blogspot.com/</p>		TOTAL	12

QUESTION 4

No	Criteria	Marks	
(a)	Able to state the substances injected into the blood of individual P and individual Q. <u>Sample answer:</u> P : Dead or weakened bacteria / viruses / antigens// vaccine Q : Serum containing antibodies // antiserum	1 1	2
(b)	Able to state the type of immunity obtained by individual P and individual Q. <u>Sample answer :</u> P : Artificial active immunity Q : Artificial passive immunity	1 1	2
(c)	Able to describe how could save that boy. <u>Sample answer :</u> F1: Snake venom / toxin acts as antigen to our body F2: Injection of serum which contains instant antibodies/ antiserum / anti-toxin must be given to the patient F3: Antibody-antigen action occurred very fast F4: Antitoxin/ antibody reacts with toxin / snake venom/ antigen and neutralize it / he is saved.	1 1 1 1	4
(d)(i)	Able to state the types of pathogen which cause the diseases <u>Answer:</u> Virus / bacteria	1	1
(ii)	Able to explain why there is a need for second and third doses for the immunisation <u>Sample answer :</u> F1: Immunisation is given to prevent infection from pathogens that caused diseases like Tuberculosis, Hepatitis B, Polio, diphtheria, whooping cough, tetanus. German measles (<i>state at least 2 example</i>) F2: New born are injected with vaccines to get Artificially Active Immunity F3: First dose are given to induce baby lymphocytes to produce antibodies which are specific against the antigens / bacteria / virus F4: 2 nd and 3 rd dose are booster dose to increase the production of antibodies at a faster rate. F5: Achieved immunity level // antibodies remained in the blood for a long time and provide permanent immunity / protect them from the next infection. Any 3	1 1 1 1 1	3
TOTAL			12

QUESTION 5

No	Criteria	Marks							
(a) (i)	Able to name the type of fingerprints of students X and Y <u>Answer:</u> X - Loop ; Y- Composite	2	2						
(ii)	Able to state one factor that causes variation in the fingerprints of students X and Y. <u>Answer:</u> Genetic factor	1	1						
(iii)	Able to state how the factor in (a) (ii) causes variation <u>Answer:</u> Genetic recombination during crossing over results in the formation of different	1	1						
(b) (i)	Able to state the type of variation <u>Answer:</u> Continuous variation	1	1						
(ii)	Able to state two traits, other than fingerprint, which show the same type of variation as in (b)(i) <u>Answer:</u> The ability to roll tongue Types of hair	1 1	2						
(c)	Able to explain the differences between the type of variation shown by fingerprints and height. <u>Sample answer:</u> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; border-bottom: 1px solid black; text-align: center;"><u>Height</u></td> <td style="width: 50%; border-bottom: 1px solid black; text-align: center;"><u>Types of fingerprint</u></td> </tr> <tr> <td>- Shows normal distribution</td> <td>Shows discrete distribution</td> </tr> <tr> <td>- Affected by environmental Factors</td> <td>Not affected by environmental factor</td> </tr> </table>	<u>Height</u>	<u>Types of fingerprint</u>	- Shows normal distribution	Shows discrete distribution	- Affected by environmental Factors	Not affected by environmental factor	1 1	2
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- Shows normal distribution	Shows discrete distribution								
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(d)	Able to explain how variation can ensure the survival of a species <u>Sample answer:</u> - Can differentiate from one individual to another / no one is the same - Able to adapt to a new environment - Able to camouflage to run away from any predators	1 1 1	3						
http://windyportal.blogspot.com/		TOTAL	12						


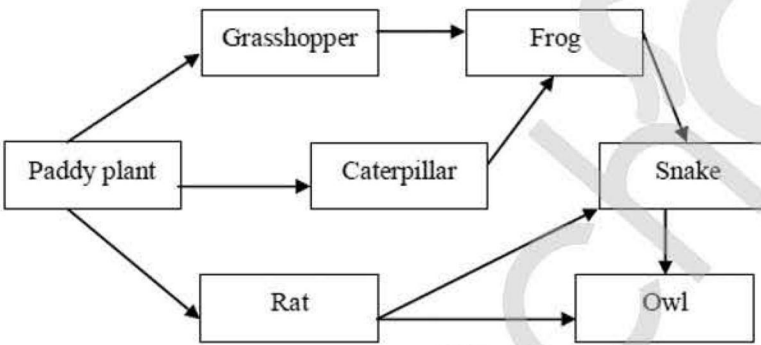
	SECTION B	Mark	
6(ai)	<ul style="list-style-type: none"> • The process shown in diagram 6.1 is simple diffusion. • At the beginning of the experiment the base of the beaker has a high concentration of potassium permanganate(VII) whereas in the distilled water, the concentration of potassium permanganate(VII) is low. • There is concentration gradient between the potassium permanganate(VII) at the base of the beaker with the distilled water at the top. • The diffusion of potassium permanganate(VII) molecules will occur from the region of high concentration to low concentration, which is in accordance to the concentration gradient to achieve equilibrium of concentration. • Hence, at the end of the experiment, the purple colour of Potassium permanganate(VII) can be seen throughout the water in the beaker because the potassium permanganate molecules have moved by simple diffusion to a region of low concentration of potassium permanganate(VII). 	1 1 1 1 1	Max 4m
(ii)	<p>Fresh milk</p> <ul style="list-style-type: none"> • Pasteurisation is a method of preservation of milk. • Fresh milk is heated to 63°C for 30 minutes and then cooled instantly. • Or milk is heated to 72°C for 15 seconds and then cooled instantly. • The method of preservation will destroy the microorganisms but will not change the nutrient value and colour of milk. <p>Fish</p> <ul style="list-style-type: none"> • The process of dehydration is a method of preserving fish. • The fish is dried with the use of fire, smoke or is left in the hot sun. • Food that is dried will have very low content of water and also is covered with carbon. • The water content which is low will cause the micro-organisms which are present to be destroyed or change into spores which are not active. 	1 1 1 1 1 1 1	Max 6m
(b)	<ul style="list-style-type: none"> • When the plant cell is put into 5% of sucrose solution, the solution is isotonic to the plant cell sap. • Hence, there is no concentration gradient between the osmotic pressure of the cell sap of the plants with the environment. • So the rate of water molecules moving into the plant cell is equal with the rate of water moving out from the cell to the surrounding. • Hence, there is no change in the structure or the size of the vacuole observed. • Then, the cell is put into 30% of sucrose solution which is a hypertonic solution compared to the cell sap of the plants. • There is an osmotic concentration gradient between the cell sap of the plants with the surroundings. • The water molecules will move out of the vacuole in the plant cytoplasm to the surrounding to achieve an osmotic equilibrium. • This will cause the volume of water in the vacuole in the cytoplasm to decrease, hence the cell membrane will be detached from the cell wall and the vacuole will contract. • The cell undergoes plasmolysis. 	1 1 1 1 1 1 1 1 1	

	<ul style="list-style-type: none"> When the cell is put back into 0.1% of the sucrose solution, the solution is hypotonic to the plant cell sap. There exists an osmotic concentration gradient between the plant cell sap with the surrounding solution. This situation will cause a lot of water molecules from the surrounding move into the plant cell compared with water that moves out from the plant cell to the surrounding. The volume of the water in the cell increase, the vacuole enlarges, and the cytoplasm and the cell membrane will be pushed towards the cell wall. The cell becomes turgid. 	1 1 1 1 1	Max 10m
		Total	20

7ai)	<ul style="list-style-type: none"> Organism P shows autotrophic nutrition whereby it is able to synthesis complex organic substances, for example, carbohydrates from inorganic substances such as carbon dioxide and water. Organism Q shows heterotrophic nutrition, whereby it is unable to synthesis its own food and has to feed on food substances previously synthesised by other organisms. 	2 2	4
(ii)	<p>Similarity</p> <ul style="list-style-type: none"> Both have alimentary canals which are unable to secrete enzyme cellulose to digest cellulose. <p>Differences</p> <ul style="list-style-type: none"> R is a rodent with a one-chamber stomach whereas Q is a ruminant with a four- chamber stomach. R has a large caecum compared to Q. In R, food is digested twice through the alimentary canal whereas in Q, food is digested only once. In R, there is no regurgitation of food. In Q, the partially masticated food is regurgitated to the mouth for further mastication. Bacteria and protozoa in the caecum of organism R secrete cellulase to digest cellulose. Bacteria and protozoa in the rumen and reticulum of organism Q secrete cellulase to digest cellulose. 	2 1 1 1 1 1 1 1 1 1	Max 10m
(b)	<p>Obesity</p> <ul style="list-style-type: none"> Obesity is often caused by consumption of excess carbohydrates and fats and lack of exercise. People who are obese should reduce intake of fats and carbohydrates and carry out more exercise. <p>Anaemia</p> <ul style="list-style-type: none"> Anaemia may be due to insufficient red blood cells or the available red blood cells do not contain sufficient haemoglobin to transport oxygen. Anaemia often results from a deficiency of nutritional factors (e.g. iron, vitamin B12) required to synthesis haemoglobin or red blood cells. It may also be caused by excessive loss of blood or destruction of the cells by endoparasites. There should be an increase in the intake of iron and vitamin B12 if anaemia is caused by the deficiency of these factors. <p>Constipation</p> <ul style="list-style-type: none"> Constipation is the difficulty or infrequent elimination of faeces from the body. 	1 1 1 1 1	

	• Eating more food high in dietary fibres and drink more fluid to prevent constipation.	1	Max 6m
		Total	20

8 (a)	<p>Able to explain why K and L circulatory system are not directly connected to each other.</p> <p>Sample answer:</p> <p>F1 both system separated E1 blood of both not mixing E2 permits exchange of gases/food E3 waste product E4 between the foetus and the mother</p> <p>F2 prevent the action of maternal hormone/other chemical E5 in mothers blood E6 which could harm the development of the foetus E7 but the protection is incomplete. E8 Harmful chemical/ alcohol /nicotine/morphine/bacteria/toxine/viruses E9 can enter the foetus from mothers blood E10 cause permanent damage</p> <p>F3 (protect foetus) from high blood pressure of maternal circulation.</p>	Any 10	10
(b)	<p>Able to discuss the moral issues related to application of Science and Technology in overcoming human reproduction's problems.</p> <p>Sample answer:</p> <p><u>Preventing pregnancy</u></p> <p>F1 Contraceptive method P1 stop ovum from being formed P2 stop the fertilize ovum from developing in the uterus. P3 stop sperm from reaching ovum. F2 Could harm the foetus when a women has the ability to bear a child. F3 Only use contraception for health P4 for health P5 financial reason F4 (Prevention of fertilize egg from developing) is an act of killing. F5 The use of spermicides kills life F6 Religious believe there is only accept natural method of contraception.</p> <p><u>Overcoming infertility</u></p> <p>F7 Infertility is the failure of the couple to have a baby P6 due to block fallopian tubes. P7 low sperm count F8 Sperm bank P8 not allowed (religion) if used sperm not from husband, F9 In-vitro fertilization IVF P9 it is wrong to destroy extra embryos P10 abuse the technique to select the sex /zygote P11 to produce perfect offspring F10 Surrogate mother P12 Life of surrogate mother is threatened.</p>	Any 10	10
	http://windyportal.blogspot.com/	Total	20

9a (i)	Paddy → grasshopper → frog → snake // Paddy → rat → snake → owl etc // any reasonable answer	2	2										
		2	2										
		2	2										
(ii)	<ul style="list-style-type: none"> • Use insecticide/ pesticide -Kill/ destroy the pests/ grasshopper and caterpillar -Accumulation of chemical substances in the other organisms of the food chain causes mutation/ death of organisms// accumulation of chemical substances in the surroundings -cause water/ air pollution/ effect of pollution. (Ex: ozone depletion) -The mutant pests develop resistance to the pesticide/ insecticide <ul style="list-style-type: none"> • Biological control method -Predator kills only the specific pests/ grasshopper and Caterpillar -Causing imbalanced population of other organisms in the community/ disruption of food change -Pests population decreases, producer/ paddy plants population increases 	1 1 1 1 1 1 1	Max 6										
(b)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Good effect</th> <th style="width: 50%;">Explanation</th> </tr> </thead> <tbody> <tr> <td>Provide job opportunity</td> <td>Improve economic status</td> </tr> <tr> <td>Provide infrastructures</td> <td>Build schools, clinics to upgrade quality/ better education</td> </tr> <tr> <td>Provide better living conditions</td> <td>Have good sanitation system/ hygienic water supply/ better electric supply</td> </tr> <tr> <td>Convenient transport system</td> <td>Faster transportation</td> </tr> </tbody> </table>	Good effect	Explanation	Provide job opportunity	Improve economic status	Provide infrastructures	Build schools, clinics to upgrade quality/ better education	Provide better living conditions	Have good sanitation system/ hygienic water supply/ better electric supply	Convenient transport system	Faster transportation	1 each	Max 4
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		Bad effect	Explanation		
		Paddy field exposed to weathering	During heavy rain, soil particles are washed away to the river/ water source leads to muddy flood/ leaching	1 each	Max 4
		Habitat for flora and fauna in paddy field destroyed	Extinction of flora/ fauna in the area// less agricultural productivity in the area		
		Air/water /thermal/ sound pollution	Due to the release of pollutants into the environments// causes diseases/ bronchitis/ asthmatic/ stress// leads to decrease in health quality		
		Increase population in the area	Leads to social problems		
				Total	20

END OF MARKING SCHEME