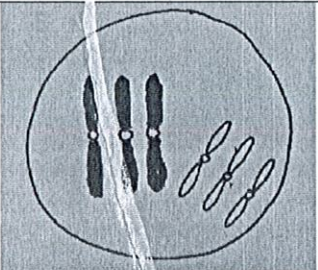


QUESTION 1			
BIL	SUGGESTED ANSWER	MARK	
(a)(i)	X: Animal cell	1	1
(ii)	<ul style="list-style-type: none"> Contain the green pigment / chlorophyll To trap energy from sunlight for photosynthesis 	1 1	2
(iii)	<ul style="list-style-type: none"> Site for cellular respiration Generate/ produce/ release/ provide/ more energy in the form of ATP// require more energy for muscle contraction (to fly) 	1 1	2
(iv)	<p>Similarity:</p> <ul style="list-style-type: none"> Both cell X and Y have cytoplasm/ plasma membrane / nucleus / Golgi apparatus / smooth endoplasmic reticulum / rough endoplasmic reticulum / ribosome / mitochondria <p style="text-align: right;">Any 1 similarities</p> <p>Difference:</p> <ul style="list-style-type: none"> Cell X has no cell wall while cell Y has cell wall Cell X does not contain chloroplast while Cell Y has chloroplast Cell X does not have fixed shape while cell Y have fixed shape Cell X has centriole while cell Y does not have centriole Cell X does not have vacuole //small vacuole while cell Y has large vacuole <p style="text-align: right;">Any 1P</p>	1 1 1 1 1 1	1 1 2
(b)(i)	L : Golgi apparatus M: Ribosome	1 1	2
(ii)	<ul style="list-style-type: none"> Extracellular enzyme is a protein Ribosome synthesis protein Ribosome use the information carried by the chromosome/ DNA (to make these protein) The information/ genetic code/ protein code is copied/ translated by RNA. <p style="text-align: right;">Any 3P</p>	1 1 1 1	3
		TOTAL	12

QUESTION 2			
BIL	SUGGESTED ANSWER	MARK	
(a)(i)	Phase P: Prophase	1	1
(ii)	<ul style="list-style-type: none"> Chromosomes condense (and tightly coiled) Shorter and thicker/ visible under light microscope Consists a pair of sister chromatid (jointed together at the centromere) 	1 1 1	2
Any 2P			

(iii)	 <p>Correct size of chromosome : 1m Correct number of chromosome : 1m</p>	1 1	2
(b)(i)	- Tissue culture	1	1
(ii)	<ul style="list-style-type: none"> • explant/ tissue/ aggregate cells is taken from the mother / parent plant • cells divide repeatedly • by mitosis • in differentiated mass of tissue <p>Any 2P</p>	1 1 1 1	2
(iii)	<ul style="list-style-type: none"> • Easy and faster (technique) • Increase the production/ number of banana plants in short time • Continuous supply of young plants throughout the year • Can choose only the good genetics/ high quality (of parent plants) • Produce genetically identical to parent plant <p>Any 2P</p>	1 1 1 1 1	2
(iv)	<ul style="list-style-type: none"> • clones will have same characteristic/ genetically identical as its parent cell • same level of resistance to diseases • because same DNA/genetic as its parent cell <p>Any 2P</p>	1 1 1	2
TOTAL			12

QUESTION 3			
BIL	SUGGESTED ANSWER	MARK	
(a) (i)	Capture, mark, release and recapture technique	1	1
(ii)	$\frac{62 \times 78}{37} = 130.7$ <p><u>Population size = 131</u></p> <p>Calculation – 1mark Answer – 1 mark</p>	1 1	2
(iii)	<ul style="list-style-type: none"> • Mice are dispersed evenly within the restricted area • Mice are captured randomly • Marking is non-toxic / harmless / permanent / do not limit the movement the mice • Mice that been released able to mix freely with other unmarked mice • Population is stable// rate of birth and rate of death is same <p>Any 1P</p>	1 1 1 1 1	1
(iv)	Prediction: The population size of mice increase		2

	Explanation: More food/ more birth rate/ more mice emigrate	1 1													
b)(i)	<ul style="list-style-type: none">• Level I: Species• Level III: Family	1 1	2												
b)(ii)	P1- Monera P2 - Protista P3 - Fungi P4 – Animalia P5 – Plantae Any 2P	1 1 1 1 1	2												
(c)(i)	Genus	1	1												
(ii)	Marking guide: <ul style="list-style-type: none">• Name is in Latin• each organisms has two names• the first name which begins with a capital letters(of O / Oryza), second name begins with the small letter (of s/ sativa)• The genus and species are written in italics//under line separately• First name refers to genus, second name refers to species Any 1P	1 1 1 1 1	1												
TOTAL		12													
QUESTION 4															
BIL	SUGGESTED ANSWER	MARK													
(a) (i)	Phase S: Rapid Growth Phase// exponential phase	1	1												
(ii)	<ul style="list-style-type: none">• Decrease in mass• due to respiration / depletion of stored food/ breakdown of stored food• Provide energy for formation of radicle & plumule• Stage R is germination (of seed) Any 2P	1 1 1 1	2												
(iii)	<table><tr><td>Diagram 4.1</td><td>Diagram 4.2</td></tr><tr><td>S shape / sigmoid curve</td><td>Staircase shape</td></tr><tr><td>Do not has intermittent growth/ has continuous growth</td><td>Has intermittent growth/ not continuous growth/ discontinuous</td></tr><tr><td>Not undergoes series of ecdysis</td><td>Undergoes series of ecdysis/ moulting process</td></tr><tr><td>Not have instar stage</td><td>Have instar stage</td></tr><tr><td>Slow growth continuously</td><td>Periodically growth</td></tr></table> Any 2P	Diagram 4.1	Diagram 4.2	S shape / sigmoid curve	Staircase shape	Do not has intermittent growth/ has continuous growth	Has intermittent growth/ not continuous growth/ discontinuous	Not undergoes series of ecdysis	Undergoes series of ecdysis/ moulting process	Not have instar stage	Have instar stage	Slow growth continuously	Periodically growth	1 1 1 1 1	2
Diagram 4.1	Diagram 4.2														
S shape / sigmoid curve	Staircase shape														
Do not has intermittent growth/ has continuous growth	Has intermittent growth/ not continuous growth/ discontinuous														
Not undergoes series of ecdysis	Undergoes series of ecdysis/ moulting process														
Not have instar stage	Have instar stage														
Slow growth continuously	Periodically growth														
(iv)	<ul style="list-style-type: none">• Q is Instar (phase)• Indicates a zero growth of grasshopper• caused by/ limited by hard exoskeleton• Unable to expand the body	1 1 1 1													

	Any 2P	1	2
(b)(i)	Vascular cambium/ Cambium/ Lateral meristem		1
(ii)	<ul style="list-style-type: none"> • Cambium develop into complete cylinder / ring • Cells of cambium divide actively • by mitosis Any 2P	1 1 1	2
(iii)	<ul style="list-style-type: none"> • No secondary xylem • No secondary phloem • Diameter of stem smaller / decrease • no secondary growth occur • Stem become weaker • cannot give support to plants • No complete cambium ring Any 2P	1 1 1 1 1 1 1	2
	TOTAL	12	

QUESTION 5											
BIL	SUGGESTED ANSWER	MARK									
(a)(i)	Discontinuous variation	1	1								
(ii)	<ul style="list-style-type: none">• Controlled by one gene• Crossing over (during Prophase I)• Independent Assortment (during Metaphase I in meiosis)• Random fertilisation of gametes <p>Reject: Mutation Any 2P</p>	1 1 1 1	2								
(iii)	<ul style="list-style-type: none">• because it is determining by genetic factor• not influenced by environment• permanent characteristic• determine by one allele <p>1st P + Another 2P</p>	1 1 1 1	3								
(b)(i)	<ul style="list-style-type: none">• chameleon can change the skin colour same with the environmental factors (and genetic factors)• enables to adapt better to changes in environment• called as camouflage• able to protect itself from predators• population become increase <p>Any 3P</p>	1 1 1 1 1	3								
(ii)	Similarities: <ul style="list-style-type: none">• Both create varieties in the population of the same species• Caused by environmental factors or genetic factors or both Differences: <table><tr><th>Discontinuous (Diagram 5.1)</th><th>Continuous (Diagram 5.2)</th></tr><tr><td>Distinctive</td><td>Not distinctive</td></tr><tr><td>No intermediate characteristics</td><td>Has intermediate characteristics</td></tr><tr><td>Qualitative</td><td>Quantitative</td></tr></table>	Discontinuous (Diagram 5.1)	Continuous (Diagram 5.2)	Distinctive	Not distinctive	No intermediate characteristics	Has intermediate characteristics	Qualitative	Quantitative	1 1 1 1 1 1	
Discontinuous (Diagram 5.1)	Continuous (Diagram 5.2)										
Distinctive	Not distinctive										
No intermediate characteristics	Has intermediate characteristics										
Qualitative	Quantitative										

Not influenced by environmental factors	Influenced by environmental factors (and genetic factor)	1	
A single gene control the trait of character	Two or more genes control the same character	1	
Phenotypes controlled by a pair of alleles	Phenotypes controlled by many alleles		
Any 1 + 2 or 2 + 1 (S & M)			3
TOTAL			12

QUESTION 6															
BIL.	SUGGESTED ANSWER	MARKS													
(a)	<p><u>Sample answer</u></p> <ul style="list-style-type: none">• Name: Red blood cell/ erythrocyte• Biconcave shape / No nucleus• TSA/V is higher• Carry / increase diffusion of oxygen to cell• To do cellular respiration• elastic membrane• Easy to squeeze and faster• Contain haemoglobin• To transport oxygen to cell in form of haemoglobin• Contain haem group/ iron (as site of oxygen binding) <p style="text-align: right;">Any 4E</p>	1 1 1 1 1 1 1 1 1 1	4												
(b)	<p><u>Sample answer</u></p> <p><u>SIMILARITIES</u></p> <ul style="list-style-type: none">• Both have closed circulatory system.• Both blood flows in blood vessels• Both has blood as the transport medium• Both have heart• Both heart have atrium & ventricle• Both heart do not have septum <p><u>DIFFERENCES</u></p> <table><tr><th>P</th><th>Q</th></tr><tr><td>Organism P is fish</td><td>Organism Q is frog/ amphibian</td></tr><tr><td>Heart of P has two chambers // one atrium and one ventricle</td><td>Heart of Q has three chambers // two atria and one ventricle</td></tr><tr><td>Single circulatory system</td><td>Double circulatory system</td></tr><tr><td>P has systemic circulation only</td><td>Q has systemic circulation and pulmonary circulation</td></tr><tr><td>Oxygenated blood flows from the gills</td><td>Oxygenated blood flows from the lungs</td></tr></table>	P	Q	Organism P is fish	Organism Q is frog/ amphibian	Heart of P has two chambers // one atrium and one ventricle	Heart of Q has three chambers // two atria and one ventricle	Single circulatory system	Double circulatory system	P has systemic circulation only	Q has systemic circulation and pulmonary circulation	Oxygenated blood flows from the gills	Oxygenated blood flows from the lungs	1 1 1 1 1 1 1 1 1 1	
P	Q														
Organism P is fish	Organism Q is frog/ amphibian														
Heart of P has two chambers // one atrium and one ventricle	Heart of Q has three chambers // two atria and one ventricle														
Single circulatory system	Double circulatory system														
P has systemic circulation only	Q has systemic circulation and pulmonary circulation														
Oxygenated blood flows from the gills	Oxygenated blood flows from the lungs														

	<table><tr><td>Blood flows through the heart once</td><td>Blood flows through the heart twice</td></tr><tr><td>Oxygenated blood is transported directly to the body</td><td>Oxygenated blood is transported to the heart first before to the body.</td></tr></table>	Blood flows through the heart once	Blood flows through the heart twice	Oxygenated blood is transported directly to the body	Oxygenated blood is transported to the heart first before to the body.	1	
Blood flows through the heart once	Blood flows through the heart twice						
Oxygenated blood is transported directly to the body	Oxygenated blood is transported to the heart first before to the body.						
		1					
	At least 2S, 2D		4				
(c)	<ul style="list-style-type: none">• The immune system decrease/ less• No/ less antibody to fight pathogen// low antibody concentration• Easy to get an infection / any disease• easy to transmit / spread disease to other person• died• no / less protection at a time when they are vulnerable• No immunity (at all to fight the disease)• Shorterhis lifetime	1 1 1 1 1 1 1 1					
	Any 3P		6				
TOTAL		20					

QUESTION 7				
BIL	SUGGESTED ANSWER			MARK
a) (i)	Sample answer <ul style="list-style-type: none"> • M is biceps muscle, N is triceps muscle • Biceps/ M muscles contract (triceps/ N relaxes) • Both muscles act antagonistically • (Contraction of biceps muscles) produced pulling force • Tendon transmits pulling force to the radius (and ulna) • Ulna and radius/arm pulled upward • The forearm bend 			1 1 1 1 1 1 1
				Max: 4
(ii)	<u>Sample answer</u> <ul style="list-style-type: none"> • Receptor in the eye (retina) detects the shuttlecock / stimulus • (Receptor) trigger / produce nerves impulses • The nerve impulses transmit / pass from receptor to spinal cord/ CNS through afferent neurons. • Afferent neuron transmits impulse to interneuron • Brain interprets/ integrate/ analyse the impulse/ informations • Nerve impulses are transmitted through interneurons • Nerve impulse are transmitted through efferent neuron to effector/ arm muscles • Both (arm) muscle act antagonistic// triceps contracts while biceps relaxes • to straighten the forearm 			1 1 1 1 1 1 1 1 1
				Max 6
(b)(i)	Able to explain the graph at phase X and Y Phase X <ul style="list-style-type: none"> • Bone mass is increased from age of 0 to 30/ during phase X 			1

	<ul style="list-style-type: none"> • Bone undergoes growth • Oestrogen level is enough high to • stimulate absorption of calcium // sufficient calcium intake <p style="text-align: right;">Any 2P</p>	1 1 1	2
	<p>Phase Y</p> <ul style="list-style-type: none"> • Bone mass starts to decrease after age of 30/ during phase Y • Low oestrogen level • insufficient calcium intake • Bone more brittle / more porous / more fragile • Fracture of bones / vertebrae / wrists / hips • Stooped posture • Loss of height <p style="text-align: right;">Any 2P</p>	1 1 1 1 1 1 1	2
	<ul style="list-style-type: none"> • Adequate / enough / high intake of calcium / phosphorus • Increase the formation of bones cells and teeth / strengthen the bones • Adequate intake of Vitamin D • Aids absorption of calcium / phosphorus • Regular physical exercise • Delay bone fractures / reduce bone mineral loss / increase bone density • Take medication as prescribed by doctor • Slow down bone mineral loss <p style="text-align: right;">Any 3 (Facts + Exp)</p>	1 1 1 1 1 1	6
	Total		20

QUESTION 8			
BIL	SUGGESTED ANSWER	MARK	
(a)	<ul style="list-style-type: none"> • P is gastric gland • no/less gastric juice is produced • no/less enzymes pepsin produced • no hydrolysis of protein to polypeptide • no/less enzymes rennin produced • no conversion of caseinogen into casein • no/less hydrochloric acid produced • medium less acidic//less optimum reaction/less bacteria killed • less mucus is produced <p style="text-align: right;">Any 6P</p>	1 1 1 1 1 1 1 1 1	6
(b)	<p><u>PREGNANT WOMAN</u></p> <ul style="list-style-type: none"> • Need more proteins • for foetus growth /build new cells • Insufficient protein cause stunted growth in foetus 	1 1 1	

<ul style="list-style-type: none"> • Need more carbohydrate • for more energy to mother • Insufficient carbohydrate cause tiredness to mother 	1 1 1 1	
<ul style="list-style-type: none"> • Need more vitamin D // vitamin C • aid in absorption of calcium // (vit C) maintains good health • insufficient in vitamin D cause stunted growth in baby // insufficient in vitamin C cause scurvy for mother 	1 1 1	
<p style="text-align: right;">*Reject : vitamin only *Accept : any vitamins with correct effect</p>		
<ul style="list-style-type: none"> • Need more calcium/phosphorus (mineral salts) • Need more iron • for formation of teeth and bone in foetus • Insufficient intake of calcium cause stunted growth of bone and teeth in baby • Iron for building red blood cells • Lack of iron leads to anemia 	1 1 1 1 1 1	
Any 2P + Correct 2Exp		4
<u>LABOUR WORKER</u>		
<ul style="list-style-type: none"> • Need more carbohydrate • for more energy • Insufficient carbohydrate cause tiredness 	1 1 1	
<ul style="list-style-type: none"> • Need more protein • to repair the damage tissue/ build muscle 	1 1	
<ul style="list-style-type: none"> • Need more vitamin D • for absorption of calcium. • insufficient vitamin D cause stunted growth of bone // insufficient vitamin C cause scurvy 	1 1 1	
<ul style="list-style-type: none"> • Need more calcium (mineral salts) • for strong bones • insufficient calcium cause bones to be more porous/ brittle. 	1 1 1	
Any 2P with correct 2Exp		4
<u>TODDLER/ CHILD</u>		
<ul style="list-style-type: none"> • Need more protein • for growth/ build new tissues • Insufficient protein will cause kwashiorkor disease 	1 1 1	
<ul style="list-style-type: none"> • Need more carbohydrate 	1 1	

	<ul style="list-style-type: none"> • for more energy • Insufficient carbohydrate cause marasmus disease 	1	
		1	
	<ul style="list-style-type: none"> • Need more vitamin D • for absorption of calcium • insufficient vitamin D cause stunted growth of bone // insufficient vitamin C cause scurvy 	1	
		1	
	<ul style="list-style-type: none"> • Need more calcium (mineral salts) • for strong bones • lack of calcium cause stunted growth of bone and teeth. 	1	
		1	
		1	
	Any 2P with correct 2Exp		4
		Max:	10
(c)	<ul style="list-style-type: none"> • Less / no growth of plant • (At compensation point) the rate of photosynthesis is equal to the rate of respiration • no net gain or loss of carbon dioxide// Absorption of CO₂ is equal to release of CO₂ • no net gain or loss in sugar produced/consumption • no excess sugar can be used for growth/reproduction/seeds production/living process • minimum/less production of crop yield 	1	
		1	
		1	
		1	
		1	
		1	
		1	
	Any 4P		4
	TOTAL		20

QUESTION 9			
BIL	SUGGESTED ANSWER	MARK	
(a)	<ul style="list-style-type: none"> • heavy metal/copper/mercury/zinc/chromium/lead • highly toxic • accumulate in the organism via food chains • oil/grease/suspended solids (high) • less oxygen dissolve in the water • rate of respiration low for aquatic organism • rate of photosynthesis aquatic plant decrease • light intensity less penetrate into the water • heat from hot water discharged into the river • increase water temperature • less oxygen dissolve • BOD value high • lead to aquatic organism died <p style="text-align: right;">Any 4P</p>	1 1 1 1 1 1 1 1 1 1 1 1 1	4
(b)	<ul style="list-style-type: none"> • Treat effluents (before they are discharged into water source) • to filter the river water • free from poisonous/ death of aquatic organism. • Take legal action/restrict the law (against illegal dumping of toxic wastes from factories) • to avoid the release of more pollutants to the river • Plants the tree at river bank • to prevent soil erosion to provide more oxygen to aquatic organism • Awareness campaign on clean environment by school/college/university/media/others • to sustain/maintain the river ecosystem <p style="text-align: right;">Accept any suitable answer</p>	1 1 1 1 1 1 1 1	Max: 6
(c)	<ul style="list-style-type: none"> • combustion of fossil fuels in power station / factories / domestic boilers • produce sulphur dioxide • and oxides of nitrogen Reject: nitogen dioxide • (gases) dissolved / combine with water vapour • form sulphuric acid / nitric acid • rainwater fall to the Earth with pH less than 5.0 // becomes more acidic • acid rain occurs <p style="text-align: right;">Any 6P</p>	1 1 1 1 1 1 1	6
(d)	<ul style="list-style-type: none"> • As cash crop//food • source of nutrition/income • providing timber • for building/construction/paper/furniture • medicine/herb • cure certain disease/raw material to make traditional medicine • water catchment 	1 1 1 1 1 1 1	

	• providing clean water for drinking/bathing/household needs	1	
	• for education	1	
	• area for academic research	1	
	• recreation	1	
	• for stress reliever/relaxation	1	
Any 4P			4
TOTAL			20

