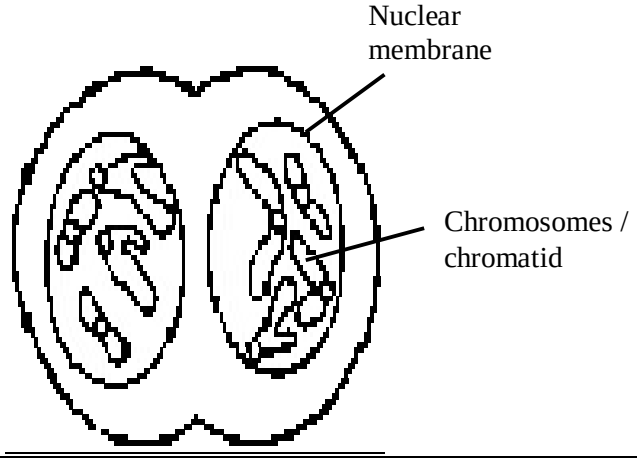
No	Mark Scheme	Sub mark	Total Mark
1(a)(i)	Able to name cell P and cell R. Answer : P : White blood cell / monocycte /leucocyte R : Phloem	1 + 1	2
(ii)	Able to state **one** function of cell P and cell R. Sample answer P : to fight infections / engulf / digest bacteria / defence mechanism // carry out phagocytosis R : to transport organic food / sugar / sucrose / glucose from leaves to all parts of plant / example	1 + 1	2
(b)(i)	Able to name the system which consists of cell S. Answer Nervous system	1	1
(ii)	Able to explain **one** role of cell S in the system. Sample answer F : control / coordinate activities of the body E1 : detect stimuli E2 : transmit electrical signals / nerve impulse E3 : to muscle / gland / effector Any two	2	2
(c)	Able to explain one characteristic of cell Q/root hair to facilitate water absorption from soil. Sample answer F1 : have large number E1 : to provide large surface area F2: (cells in tissue Q is) one-cell thick E2 : to increase diffusion / osmosis rate. E2: have a higher concentration of solutes than the water in surrounding soil Any two	2	2
(d)	Able to explain how herbicide is capable to stop the transportation of some mineral into a plant through Sample answer F : Herbicide contains active respiratory poison / toxic E1: denatures the respiratory enzymes E2. which stops cellular respiration E3 : no production of ATP. E4 . Active transport of the ions cannot take place in the absence of ATP Any three	3	3
	TOTAL		**12**

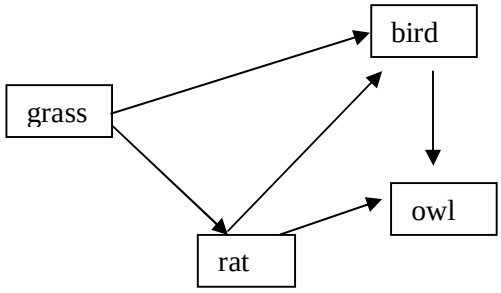
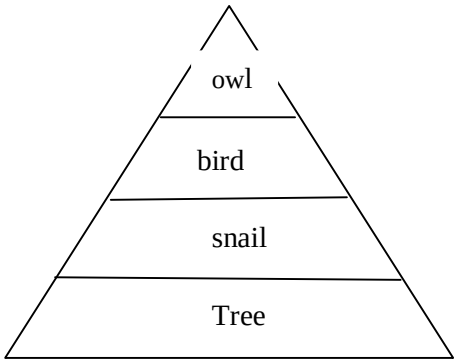
QUESTION 2

No	Mark Scheme	Sub mark	Total Mark
2(a)(i)	Able to state the type of cell division involved in the cell cycle. Answer Mitosis	1	1
(a)(ii)	Able to state **one** reason for the answer in (a)(i). Sample answer Because the cell cycle mitosis occur in skin cell /somatic cell	1	1
(b)(i)	Able to explain the chromosomal behavior in stage N. Sample answer F : N is metaphase E1 : Chromosome align at metaphase plate E2: spindle fibres (fully) formed E3 : attach to centromere of the chromosome Any two	1+1	2
(ii)	Able to state the importance of the chromosomal behavior in mentioned in (b)(i). Sample answer P1. To ensure new cells produced are identical in chromosomal number. P2. to ensure the sister chromatid can separate / move to opposite poles Any one	1	1
(c)	Able to draw a diagram showing the chromosomal behavior after stage M. • Chromosomal number = 1 mark • Chromosomal behavior = 1 mark • Label (at least 2) = 1 Sample answer  	1+1+1	3

(d)(i)	Able to suggest a suitable method to be used which involved the cell cycle in mitosis. Sample answer Cloning / tissue culture	1	1
(ii)	Able to explain how the cloning / culture tissue can increased the crop yield. Sample answer F : large numbers of clones can be produced E1: within a short period of time / any time E2 : clones inherited good characteristic E3 : example on good characteristic /resistance to diseases/ fast growth rate / large fruit / Any three	Max 3	3
	TOTAL		12

QUESTION 3

No	Mark Scheme	Sub mark	Total Mark
3(a)(i)	Able to state the definition of ecosystem Sample answer An ecosystem is a community of organisms / biotic components which interact with their non-living environment/abiosis components.	1	1
(ii)	Able to state an example of niche Criteria : • Organism • Activity • place Sample answer Squirrel eat fruits from the tree // big bird eat mouse in the garden.	1	1
(b)(i)	Able to construct a food web showing the interaction of **four** organisms. Criteria : C1 : producer C2 : correct arrows C3 : At least 2 food chains C4 : 4 organisms correctly	1+1	

	Sample answer  All C`s correct = 2marks At least 3 C = 1 mark . Without C1 = no marks		2
(ii)	Able to construct a pyramid of numbers showing the interaction of **four** organisms. criteria C1 : 4 trophic levels C2 : sequence and position of organism in pyramid is correct. Sample answer  	1 1	2
(c) (i)	Able to calculate the total energy transferred to the organisms in the third trophic level. Sample answer C1 : 10% × 1500 kJ C2 : = 150 kJ	1 1	2
(c)(ii)	Able to state **two** ways in which energy may be lost in the food web. Sample answer P1 lost to atmosphere as heat energy P2 used to decompose dead matter (by decomposer) P3 used to carry out metabolism reaction in cells P4 respiration	1+1	

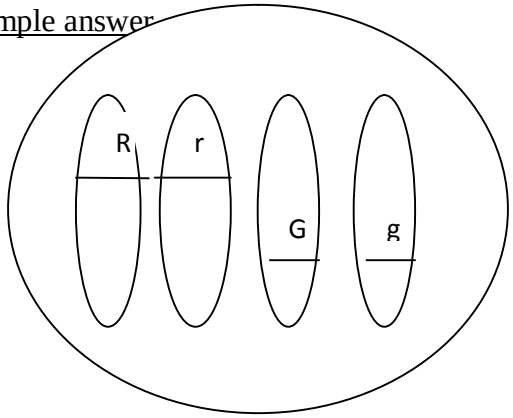
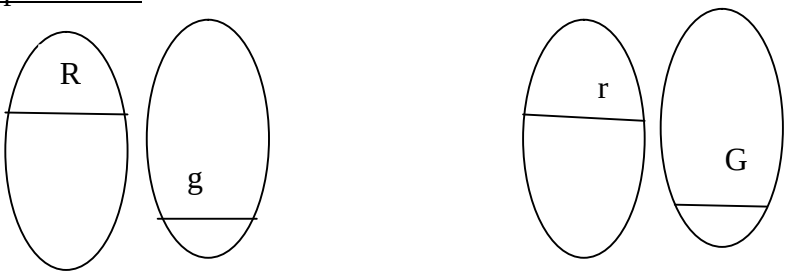
	P5 excretion P6 defaecation Any two		2
(d)	Able to explain **one** bad effect of human activities on the ecosystem. Sample answer F : deforestation / logging / open burning E1 : extinction / destroy of flora / fauna E2 : loss of biodiversity E3 : disruption of food chain/web E4 : Land slides / soil erosion / water pollution / flash flood Any two	1+1	2
	TOTAL		12

QUESTION 4

No	Mark Scheme	Sub mark	Total Mark
4(a)	Able state the importance of fluid S. Sample answer P1 : protect the foetus by absorbing shock P2 : protects foetus from physical damage P3 : allow movement of the foetus Any one	1	1
(b)(i)	Able to name both blood vessels. Answer 1. Umbilical artery 2. umbilical vein.	1+1	2
(b)(ii)	Able to tate the function of each blood vessels named in (b)(i) Sample answer Umbilical artery : carry waste product / deoxygenated blood from the foetus to the placenta. Umbilical vein : carry oxygenated blood from placenta to the Foetus	1+1	2
(c)	Able to explain why the foetus is aborted . Sample answer F : Q secrete progesterone to stimulate / induce the thickening endometrium E1 : infection caused Q does not secrete progesterone E 2 : endometrium are no longer thicken // endometrium break down	1+1	

	(so, foetus is aborted). Any two		2
(d)	Able to explain why the foetus has a separate blood circulatory system from his mother. Sample answer F : Prevents the mixing of blood groups of the mother and the foetus which may be incompatible. E1 : If incompatible bloods mix, they clot / agglutinate E2 : and cause blockage in important organs / death Any Two **OR** F : Protect the foetus from the high blood pressure of the mother. E1 : Foetus has fine and delicate blood vessel. E2 : High pressure of mother's blood will cause the foetal blood vessels burst and damage. Any two **OR** F : Prevent the action of maternal hormones / chemicals / harmful bacteria E1 : from crossing the foetal blood E2 : which could harm the development of the foetus. Any two	1+1	2
(d)	Able to explain how HCG injections enable the process of pregnancy Sample answer P1: (the function of HCG is similar to that of LH so) HCG stimulates Ovulation. P2 : ovum / secondary oocyte is released from the ovary to fallopian tube. P3: ovum fuses with sperm in fallopian tube forming a zygote . P4: corpus luteum secretes progesterone. P5 : progesterone maintains the thickness of the uterine wall / endometrium P6: the thickness of the uterine wall enables implantation to occur. Any three	1+1+1	3
	TOTAL		**12**

QUESTION 5

No	Mark Scheme	Sub mark	Total Mark
5(a)(i)	Able to label the alleles for F1 genotype. Sample answer  All correct	1	1
(a)(ii)	Able to state the phenotype for F1 generation Answer Round , yellow (colour)	1	1
(b)	Able name the process that occurred during meiosis which produced different gametes in second possibilities. Answer Crossing-over // cross-over	1	1
(c)	Able to draw gametes J and gamete Kwhich are produced in second possibility. Sample answer  Gamete J / K	1+1	2
(d)(i)	Able to state which possibilities will cause more variation to the offsprings Answer Second possibility	1	1
(ii)	Able to explain **one** reason for your answer in (d)(i).	1+1+1	

<table>
<tr><td></td><td>Sample answer

F : crossing over occurred between (chromatids from a pair of) homologous chromosomes
E1 : in prophase 1 /meiosis 1 / meosis
E2 : (the exchange of parts between chromatids) results in new genetic Combinations // a different genetic composition.
E3 : (four) different gametes produced.
E4 : (thus, each time) gametes from two individuals fertilize randomly, it produced large number of variations between offspring
Any three</td><td></td><td>3</td></tr>
<tr><td>(e)</td><td>Able to Complete Digram 5.3 by filling in F1 generation gametes drawn in (c), genotype of F2 generation and phenotypeof F2 generation which will be produced.

Criteria :
• All Gametes from F1 generation correct = 1mark
• All Genotype of F2 generation = 1 mark
• All Phenotype of F2 generation = 1mark

Sample answer

<table><tr><th>Gametes from F1 generation.</th><th>Gametes from parent</th><th>Genotype of F2 generation</th><th>Phenotype of F2 generation</th></tr><tr><td>Rg</td><td></td><td>Rrgg</td><td>Round, Green</td></tr><tr><td>rG</td><td></td><td>rrGg</td><td>Wrinkle, Yellow</td></tr></table></td><td>1+1+1</td><td>3</td></tr>
<tr><td></td><td>TOTAL</td><td></td><td>12</td></tr>
</table>

QUESTION 6

No	Mark Scheme	Sub mark	Total Mark
6(a)(i)	Able to explain the adaptation of vertebrae P and vertebrae Q to function efficiently. Sample answer F1 : P is thoracic vertebrae E1 : Have long spinous processes E2 : and directed downwards E3 : for muscle / ligament attachment E4 : articulate with ribs to make up the side of the thoracic cavity.		

	Any three F2 : Q is lumbar vertebrae E1 : Largest / strongest vertebrae E3 : Their processes are short / thick E4 : Have large centrum which bear the weight of lower back E5 : To provide support to the (upper) body E6 : Are attach to many of the back muscles Any three	3 3	 6
(a)(ii)	Able to explain why human requires endoskeleton for efficient daily activities <u>Sample answer</u> P1 : Mechanical support P2 : Protection for internal organs P3 : A firm base the attachment of muscles P4 : Gives shape to the organism P5 :Helps in movement of the organism P6 :Site for production of blood cells P7 : Storage for phosphate and calcium Any four	Max 4	4
(b)	Able to explain why : • An athlete must do a warming up before the event • Elderly people experiences pain at their joint. <u>Sample answer</u> An athlete must do a warming up before the event F: to increase temperature of body / muscle E1 : enabling more efficient use of energy E2 : more efficient of glucose oxidation E3 : increase blood circulation / increase heartbeat/supply oxygen faster E4 : prevent injuries to muscle E5 : muscle can contract more efficiently E6 : prevent muscle cramp / allow muscle to be stretch more easily Any 5 <u>Sample answer</u> Elderly people experiences pain at their joint. F1 : small amount of synovial fluid produced (by the synovial membrane) E1 : thus increase friction between the end of the bones E2 : cartilage has become thinner E3 : thus cartilage is unable to cushions the joint / absorbs shock / further increases the friction between the end of bone E4 : ligaments become shorter / loss elasticity E5 : result in stiff / painful joint	5+5 Max 10	

	E6 : difficulty in movement Any 5		10
	TOTAL		20

QUESTION 7

No	Mark Scheme	Sub mark	Total Mark
7 (a)(i)	Able to explain the importance of plasma membrane for the survival of living organism. <u>Sample answer</u> F : living organism need nutrients / oxygen / glucose / mineral / any suitable example to continue their life`s processes E1 : ions inside cells must be kept at different concentration to outside the cells. E2 : to maintain a constant internal environment/ (homeostasis) E3 : The substances across the plasma membrane from the external environment E4 : cells produce waste products which exit through the plasma membrane E5 : The movement / types / amount of substances in and out of the cells is regulated by plasma membrane. E6 : the cells need to maintain suitable pH of the cells for enzyme activity E7 : so that cell can secretes useful substances / hormones / enzymes Any four	Max 4	4
(a)(ii)	Able to explain active transport and facilitated diffusion of substances through plasma membrane <u>Sample answer</u> Type 1 F1 : facilitated diffusion occur E1 : diffusion of small molecules / ions E2 : move from higher concentration to the higher concentration of solute E3 : through pore protein E4: does no need energy Any three Type 2 F : Active transport occur E1 : The molecules such as sodium ions / potassium ions / glucose / amino acid E2 : move against concentration gradient / from lower concentration to the higher concentration E3 : through carrier protein E4 : have active site with bind with particular molecule	3+3 3	

	E5 : need energy / ATP Any three	3	6
(b)	Able to explain what happen to the cell at point P, Q and R. <u>Sample answer</u> Isotonic to the sap cell : 0.27 moldm^{-3}/ 0.28 moldm^{-3} /0.29 moldm^{-3} **Point P** F1 : The mass of potato increase E1 : (This occur because) the solution concentration is hypotonic to the sap cell of the potato E2 : The water molecule diffuse out from lower concentration/ hypotonic region to the higher concentration/ hypertonic region E3 : by osmosis E4 : cell becomes turgid (so the mass increased) **Point Q** F2 : The potato does not lose or gain mass E1 : This occur because the concentration o the solution is isotonic to the cell sap E2 : Diffusion of water molecule is at equilibrium / equal rate E3 : no net gain or loss of water molecule (so the mass is matained) **Point R** F3 : The mass of potato decrease E1 : (This occur because) the solution is hypertonic to the cell sap E2 : The water molecule diffuse out from cells / from higher concentration to the lower concentration / solution at surrounding E3 : by osmosis E4 : cell becomes flaccid (so the mass decreased) Any 10	Max 10	10
	TOTAL		**20**

QUESTION 8

No	Mark Scheme	Sub mark	Total Mark
(a)	Able to describe how cellulose in the plant fibres are digested and how the products of digestion of cellulose are absorbed into the body of the herbivore. <u>Sample answer</u> P1 : This is the digestive system of a non ruminant example a rabbit. P2 : Mouth: Plant tissues are cut, crushed and grind by the teeth/ incisors/premolars/ molars . P3 : Plant cell walls are disrupted / cellulose exposed P4 : Stomach/ duodenum/ ileum – No enzyme cellulase secreted / No digestion of cellulose. P5 : Caecum (Enlarged)/ contains microorganisms/ bacteria / protozoa which secrete cellulase P6 : to digest the cellulose P7 : Appendix Enlarged / contains mi.croorganisms/ bacteria / protozoa which secrete cellulase P8 : to digest the cellulose. P9 : Cellulase hydrolyse cellulose to glucose in the caecum and appendix Able to describe absorption of glucose. <u>Sample answer:</u> P10 :Some glucose are absorbed by the caecum. P11 : No absorption of glucose in rectum P12 : Re-swallow the digested cellulose/glucose / pallet from the caecum after it has left the anus / coprophagy P13 : All the glucose is absorbed into the blood capillaries of the villus in the ileum **Any 10**	Max 10	10
(b)	Able to explain how a teenager may be able to plan his daily diet wisely to maintain his normal growth and good health. <u>Sample answer:</u> A good dietary habit for normal growth and good health of an adolescent: P1 : practicing a daily balance diet P2 : the diet comprises all food classes // carbohydrates, lipoids, proteins, vitamins, mineral salts and fibers // foods from level 1, level 2, level 3 and level 4. P3 : in the correct amount	Max 10	

	P4 : should take more foods from level 1, 2 and 3 / containing carbohydrates, fruits and vegetables / proteins P5 : for sustaining better general body growth / normal metabolism of the body. P6: the adolescent requires more carbohydrates (as level 1) P7 : for example energy production / energy resources in the body P8 : More proteins (as level 3) P9: for rapid muscular growth / replacement of dead tissues / cells / repairing damaged cells P10 : and synthesis of functional proteins/ enzymes / antibody /hormones / insulin P11 : vitamins / minerals serve as co-enzyme / co-factor for normal enzyme activities P12 : elements like Ca/ P / iodine are important for growth of bones / teeth / development of endocrine gland / thyroid P13 : fibers helps peristalsis in the alimentary canal / avoiding constipation P14 : should avoid from consuming excessive fats (as level 4) P15 : which is the principal cause of cardiovascular problems / heart problem / hypertension / thromboses coronary / arterosclerosis / obesity Any 10		10
	TOTAL		**20**

QUESTION 9

No	Mark Scheme	Sub mark	Total Mark
9(a)	Able to explain the mechanism of blood clotting <u>Sample answer:</u> P1 : Wall of blood vessel is broken / damage / injured / severed P2 : The connective tissue in the vessel wall is exposed to blood. P3 : Platelets stick to the collagen fibres in the connective tissue. P4 : Then aggregation of platelets forms platelet plug. P5 : The clumped platelet, damaged cells and clotting factors in the plasma P6 : forms activators known as thromboplastine. P7 : Thromboplastine, in the presence of Ca2+ and vitamin K P8 : convert prothrombin (inactive plasma protein) into thrombin (active plasma protein). P9 : Thrombin catalyses the conversion of soluble fibrinogen to insoluble fibrin. P10 : Fibrin threads form a network that mesh over the wound trapping red blood cells P11 : and sealing the wound. P13 : A blood clot is formed preventing further blood loss from the	Max 10	

	vessel. P14 : prevent bacteria / pathogen / microbe from entering the cell through wound Any 10		10
(b)	Able to explain how lymphatic system complement to the blood circulatory system. <u>Sample answer:</u> Statement 1 : P1 : In the small intestine, the products of lipid which are fatty acids and glycerol P2 : are first transport into the lacteals in the villi. P3 : The lacteals fuse to form larger lymphatic vessels P4 : and enter the lymphatic system. P5 : Lymphatic fluid carrying the products of lipid digestion eventually drains into the thoracic duct. P6 : The thoracic duct merges into the left subclavian vein which is a part of the blood circulatory system. P7 : Thus the lymphatic system complements the circulatory system in transporting the products of digestion. Statement 2 : P8 : (90% of) tissue fluid form at capillary network (interstitial fluid) must be return to the circulatory system. P9 : The remaining (10%) flows into blind-ended lymph capillaries P10 : which are found in capillary network. P11 : These lymph capillaries drain into larger lymph vessels P12 : which eventually drain back into the blood circulatory system P13 : via the thoracic duct and the right lymphatic duct. P14 : Thus, the lymphatic system complements the circulatory system in ensuring that the volume of blood in blood vessels is kept constant. Any 10	Max 10	10
	TOTAL		**20**

PERATURAN PEMARKAHAN TAMAT