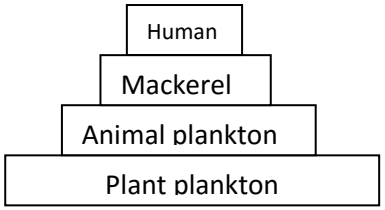
PAPER 2
SECTION A

QN NO.	SUGGESTED ANSWER SCHEME
1(a)	- Polypeptide: a straight/unfolded molecule made up of/with sequence of amino acids. - Protein is a folded form of polypeptide which performs a specific biological function.
1(b)	- Glycogen is a storage form of glucose/sugar in animals. - Glucagon is a hormone which breaks down glycogen to glucose during homeostasis. - Glycerol is a component of fats/with fatty acids.
2a	- Sketch of graph showing a lower rate of reaction but same trend as Fig. 2.1.
2b	- Enzymes involved in photosynthesis start to denature due to high temperature; - Less molecules/amount of enzyme-substrate complex/products can be formed peer unit time. Rate of reaction reduces.
2c	- More energy available to enzymes and substrate molecules; - Increased KE for the molecules; - Higher frequency of formation of enzyme-substrate complex thus higher rate of products formed.
3a	- Being small increases surface to volume ratio. - This increases rate of diffusion/therefore better absorption of gas by diffusion.
3b(i)	X = hydrogen carbonate ion/bicarbonate ion; Enzyme = carbonate anhydrase
3b(ii)	- Both A and B are one-celled thick/moist/ covered with a layer of moisture.
3b(iii)	(0.04 + 0.02 + 0.05)um = 0.11 um
3c	- Diaphragm relaxes and arches/bends upwards; - internal intercostal muscles contract; - causes the ribcage to swing downward and inward; - this increases the lung pressure/thoracic cavity pressure to force air out.
4a	- Cell Y produces antibodies to kill/agglutinate the germs/neutralise the effects of germs; - Cell X will carry out phagocytosis to engulf the germs.
4b	- Platelets and damaged cells causes thrombokinase to increase; - Thrombokinase causes fibrinogen to form fibrin to trap blood cells and germs which is the blood clot.

QN NO.	SUGGESTED ANSWER SCHEME
5a	- Fallopian tube/oviduct.
5b	- Fertilisation still takes place/there is still fusion of sperms and eggs/fusion of male and female gametes still occurs.
5c	- The embryos will form placenta in the uterus; - this allows for exchange of gases between mother and embryo; - placenta allows nutrients and waste products exchange at placenta; - amnion/amniotic sac can be formed to allows embryo to grow freely and protected from physical injuries/cushion the fetus against mechanical injuries.
6a	
6b	- Plankton population will increase; - Mackerel population will decrease.
6c	- Plant plankton will absorb the mercury and bioaccumulate in the tissues; - when animal planktons consume them, the mercury is passed to the animal planktons; - since the mercury is not removed, the concentration bioamplify. - When humans consume the mackerel the human may be poisoned.

QN NO.	SUGGESTED ANSWER SCHEME
7a	- The antibodies a, b from the donor will be diluted by the plasma of the recipient.
7b	- 6
7c	- Genetic diagram: Parental phenotype: A x B Parental genotype: I^AI^O x I^BI^O Gametes (circled): I^A I^O I^B I^O Random fertilization: Offspring genotype: I^AI^B I^AI^O I^BI^O I^OI^O Offspring phenotype: AB A B O
8a	- 6
8b	- it holds the sister chromatids together. - spindle fibre attaches to x to pull the chromatids apart during metaphase.
8c	- Correct pair of chromosomes (of same lengths) are shaded.
8d	- Three non-homologous chromosomes.
8e(i)	- The *R. imitator* has the similar body patterns as the *R. variabilis*. - The predators assume that they are also toxic so *R. imitators* are not preyed on.
8e(ii)	**Variation** produced patterns on body similar to *R. variabilis* these frogs survived during natural selection (not preyed on) breed / genes passed to next generation

PAPER 2
SECTION B

QN NO.	SUGGESTED ANSWER SCHEME
9a	- Chemical messenger - secreted by endocrine gland - directly into blood stream - effect changes in target organs
9b	Any one of: - Both A and B must empty their bladders at the start of the experiment to ensure that all urine collected is the result of drinking water or the solution during the experiment. /OR - Both A and B had same physical activities to ensure loss of fluid through sweating is about the same.
9c(i)	Curve Y
9c(ii)	- Consumption of salt causes decrease in water potential in blood - this stimulates the hypothalamus to send nerve impulses to pituitary gland - pituitary gland secretes more ADH (antidiuretic hormone) - The hormone increases permeability of the collecting duct of kidneys to increase reabsorption of water into blood
9d	- The skin
9e	- Excretion removes metabolic wastes or toxic substances out of the body - if these substances were to remain in the body the water potential/ pH in blood may be upset - blood cells may be damaged/enzymes may not work at optimum conditions - high concentration of toxic substances may kill the person.
10a	- It is a double-helical molecule/structure - Made up of nucleotides/polynucleotides - the two strands are bonded together by complementary base-paring - of nitrogenous bases: A-T (Adenine-Thymine); C-G (Cytosine-Guanine) - it contains genes
10b	- a gene for insulin is identified and cut using restriction endonuclease/restriction enzyme - a plasmid of an E coli/bacteria is cut using the same restriction enzyme - the two ends of the gene produce 'sticky'/complementary ends with the insulin gene - the insulin gene is joined with the plasmid using DNA ligase - bacteria are treated with heat/electric shock to cause the cell surface membrane to open up - recombinant plasmid is transferred into bacteria to form transgenic bacteria - Transgenic bacteria allowed to multiply to produce insulin in mass

11 EITHER (a)	- Some energy is lost when it is being transferred from one organism to another in a food chain/in ecosystem - the energy loss is can be in the form of heat energy lost to the environment - during respiration in organisms - energy locked in the egested or excreted products not passed to the organisms in next trophic level - some of the organic materials are not consumed by organisms and is not passed on in the food chain - these account for a decreasing in energy down the food chain and not restored/recycled completely in the ecosystem - having a shorter food chain allows more energy to be passed to the organisms in the next higher trophic level
(b)	- Glucose is oxidized during respiration to release energy in organism - water and carbon dioxide are the by-products of respiration - carbon dioxide is absorbed by green plants/producers during photosynthesis - carbon atoms are used to form glucose during the process - Glucose may be converted to protein or fats in plants which may be passed on to animals when being consumed
11 OR (a)	- Water and mineral salts/nitrates are being transported - by the xylem vessels from the roots up the stem - mainly by transpiration pull - These materials are transported upwards to the leaves - Glucose formed during photosynthesis is converted to sucrose and amino acids - sucrose and amino acids are translocated by phloem tissues from leaves to other parts of plant - energy and sucrose are loaded into sieve tube cells for translocation - energy is provide by companion cells
(b)(i)	- the guard cells will plasmolyse - they become flaccid resulting in decrease in stomatal pore
(b)(ii)	Advantage: - closure of stomata reduces transpiration/loss of water vapour from the leaves - water is conserved in the plant/prevents dehydration in plant Disadvantage: - less amount of carbon dioxide may be absorbed - rate of photosynthesis is reduced