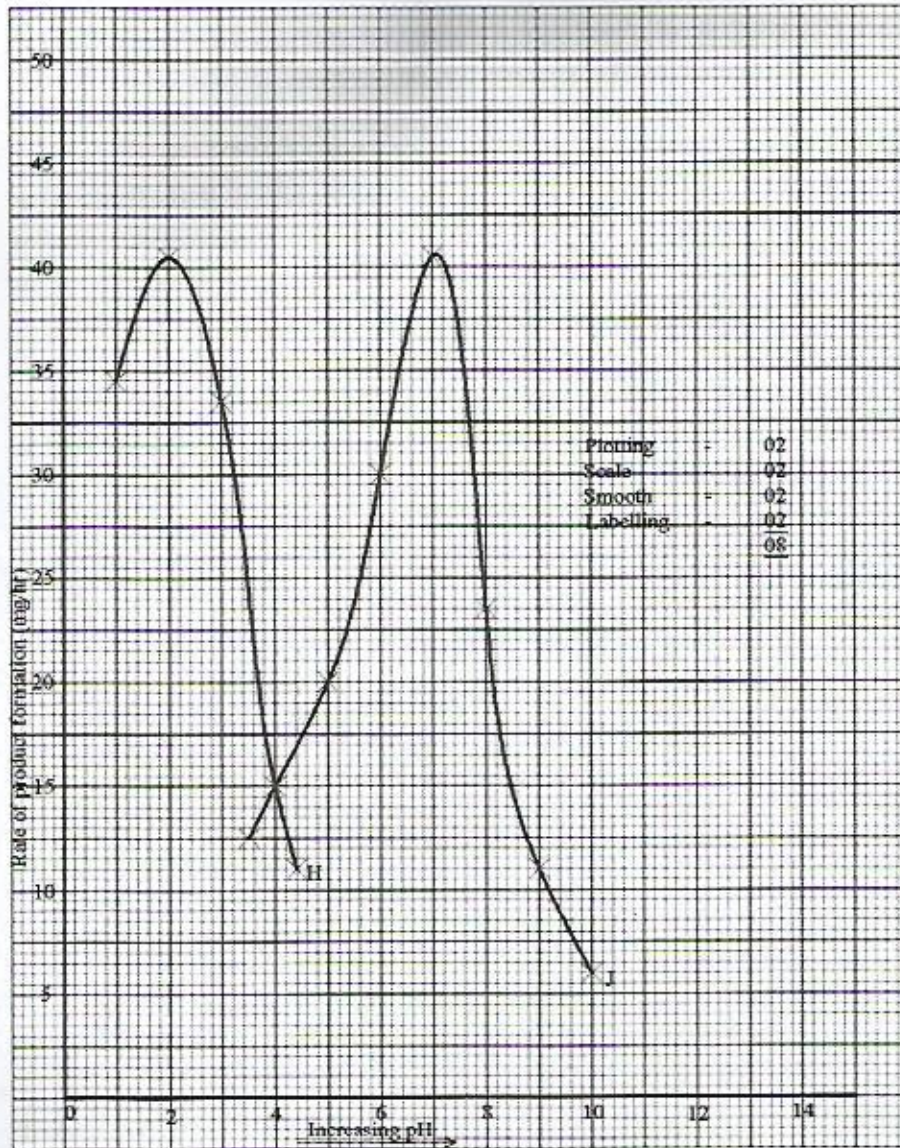


5.3.2 Biology Paper 2 (231/2)

1. (a)	Increased sodium chloride concentration/having more sodium and chloride ions solutes decreases osmotic potential/makes water potential more negative outside the seed/seedling in the surrounding solution/the surrounding solution to be hypertonic to the cell sap in the seedling/seed cells; seeds take in less water by osmosis/are dehydrated/lose water molecules to the surrounding solution; reducing the (growth) enzyme activity, hence reduced growth rate; OWTTE	(3 marks)
(b)	-Thread; -Marker pen; -Dye;	(2 marks)
(c)	(Rate of growth/increase in length of) the shoot tip/apex; It is a region of (active) cell division/growth;	(2 marks)
(d)	The seedling will be dehydrated, hence wither/die;	(1 mark)
2. a)	(i) The number of red blood cells count increase with the increase in altitude; to increase the oxygen carrying capacity (by the hemoglobin molecules in blood); since oxygen concentration is lower at higher altitudes; OWTTE	(3 marks)
	(ii) White blood cells serve to protect the body against harmful micro-organisms/parthogens; the quantities of parthogens or vulnerability of the body to microbial attack is not dependent on the altitude (to be countered by the white blood cells); hence the number of white blood cells' count is constant at whatever altitude; OWTTE	(3 marks)
b)	Atmospheric pressure decreases with the increase in altitude; the imbalance between the (outer) atmospheric pressure at high altitude and the internal blood pressure (generated by the heart) results in one nose bleeding at higher altitudes/internal blood pressure is higher than the (outer) atmospheric pressure; OWTTE	(2 marks)
3. a)	- Enables living organisms to avoid dangerous/harmful/harsh climatic/environmental conditions; OR - Enables living organisms obtain/access favourable environmental conditions (light, water, oxygen); any one	(1 mark)
b)	(i) Positive phototropism/tip bends towards light; light causes migration of auxins (produced at the tip); to darker side of the shoot, resulting in faster division of cells/elongation on the darker/opposite side of the shoot, hence bending towards light;	(3 marks)
	(ii) Both seedlings remain upright; seedling II does not have the tip while in III the tip has been covered by an opaque material preventing light from causing unequal distribution of auxins; OWTTE	(2 marks)
	(iii) Fitting an agar block treated with auxins at the decapitated end of seedling II ; removing the opaque material covering the tip of seedling III /replacing the opaque cap with a transparent one;	(2 marks)

6.

(a)



- Plotting- all points (2 marks)
- (Smooth) curves $\frac{1}{2}$ mark each (1 mark)
- Appropriate scales- X and Y (2 marks)
- (Correct) labeling of axes (2 marks)
- Identity of curves (1 mark)

- b) (i) Rate of product formation increases with the increase in pH up to the optimum/then decreases; pH 2.0 is the optimum pH value for the activity of enzyme **H**; between pH 1 and 2, the enzyme molecules are activated;
- (ii) Rate of product formation (sharply) decreases with the increase in pH; enzyme **H** is not favoured by the increase in pH, hence is denatured; no product forms above/beyond pH 4.0 to 7.0 (all enzyme molecules will have been denatured);

(3 marks)

(3 marks)

c)	(i) pH 4.0; (ii) 15.0 mg/hour; (iii) pH 7.0;	(1 mark) (1 mark) (1 mark)
d)	- Temperature (increasing beyond 40°C or extremely lowering it); - (Varying) substrate concentration; - Enzyme concentration; 1×1=1 mark	(1 mark)
e)	Stomach; Acidic medium/low pH;	(2 marks)
7. a)	Predator-prey relationship A predator is an animal that hunts/kills another/other animals (prey) for food; example, a dog and a hare; preys devise survival mechanisms in their habitats not to be eaten/killed; to survive and reproduce/propagate their lineage; to this end, they run faster (strong hind leg muscles); camouflage with environments; mimic the predators; or strong sense of smell to detect the predator; some emit chemicals/smell that turn away from the predators; while others, like porcupines, use quills/spines/spikes to fight off predators; on the other hand, predators also evolve/device means to be able to survive in such an ecosystem, for instance, running faster/camouflaging with the environment/mimicking preys/sharp eyesight; some produce venom/poison; sharp/strong/long claws;	
b)	Symbiosis Is a close, (long-term) association between two organisms of different species where the two mutually benefit from each other; for example, the bacteria in the rumen/gut/colon of herbivores; which help the herbivores digest cellulose; as they are sheltered by the herbivores; the bacteria found in the human digestive system/gut; are also sheltered by humans as they ensure microbial balance; the nitrogen-fixing bacteria on the root nodules of leguminous plants; benefit from the shelter offered by the plants; as they facilitate conversion of free atmospheric nitrogen into forms that can be readily absorbed by the plants;	
c)	Parasitism Is a kind of (inter-specific) relationship/association where one member/organism, the parasite, benefits while the other, the host is harmed/loses; (also called antagonistic/antipathetic symbiosis) for example, a tick (parasite); sucking blood from a cow (host), making the cow to be anaemic/skin destroyed/malnourished; parasites can be external/ecto-parasite; or internal/endo-parasite; endo-parasites, for instance, liver fluke, suck blood/nutrients from the host and can cause death/bodily harm on the internal organs of the host, including blocking blood vessels; 20×1=20 marks	(20 marks)

8. (a)	<p>Heart Increased physical activity results in increased heart beat/rate/cardiac frequency/increased blood pressure; pumping more blood to the muscles/peripheral blood vessels at a faster rate; supplying oxygen; nutrients; for continued oxidation/respiration; to yield energy needed to sustain the (vigorous) contraction/relaxation of muscles (during the physical activity); carbon (IV) oxide/lactic acids/other nitrogenous/metabolic wastes produced during the process are also eliminated/transported to the relevant excretory organs for elimination; the wastes, if left to accumulate, can also poison cells/cause muscle cramp/fatigue/pain;</p>	
(b)	<p>Lungs The panting/increased breathing rate (during the physical activity) influences the lung volume/lungs expand/increase in volume, to take in more amount of air/oxygen retained (for the activity) or expelled (during the activity); they expand to take in more air/oxygen (into the body) and deflate to expel more carbon (IV); more oxygen is taken in (during exercise) to sustain the process of muscle respiration/to produce the required energy (for the constant muscle contraction and relaxation);</p>	
(c)	<p>Kidneys Kidneys also maintain the blood plasma pH, and osmotic balance; by eliminating excess hydrogen ions(H^+) that accumulate for instance, through the production of lactic acid/carbon (IV) oxide during exercise; to maintain the osmotic balance, the kidneys conserve sodium ions and reabsorb water (in the kidney tubules); leading to reduction in the volume of urine produced; during exercises, the kidneys tend to filter out more urea, releasing more in the urine;</p>	
(d)	<p>Skin Due to the increased muscle activity during physical exercises, one sweats (more); eliminating nitrogenous wastes/excess water (through the skin)/sweat pores; cooling the body; after water in the sweat evaporates; the increased internal body temperature also leads to the dilation of superficial blood vessels (vaso-dilation)/blood flowing to the skin; leading to loss of excess heat (to the atmosphere) by radiation/convection; the hair on the skin surface also lie flat to allow for loss of heat (to the environment) by radiation/convection;</p> <p>20×1=20 marks</p>	(20 marks)