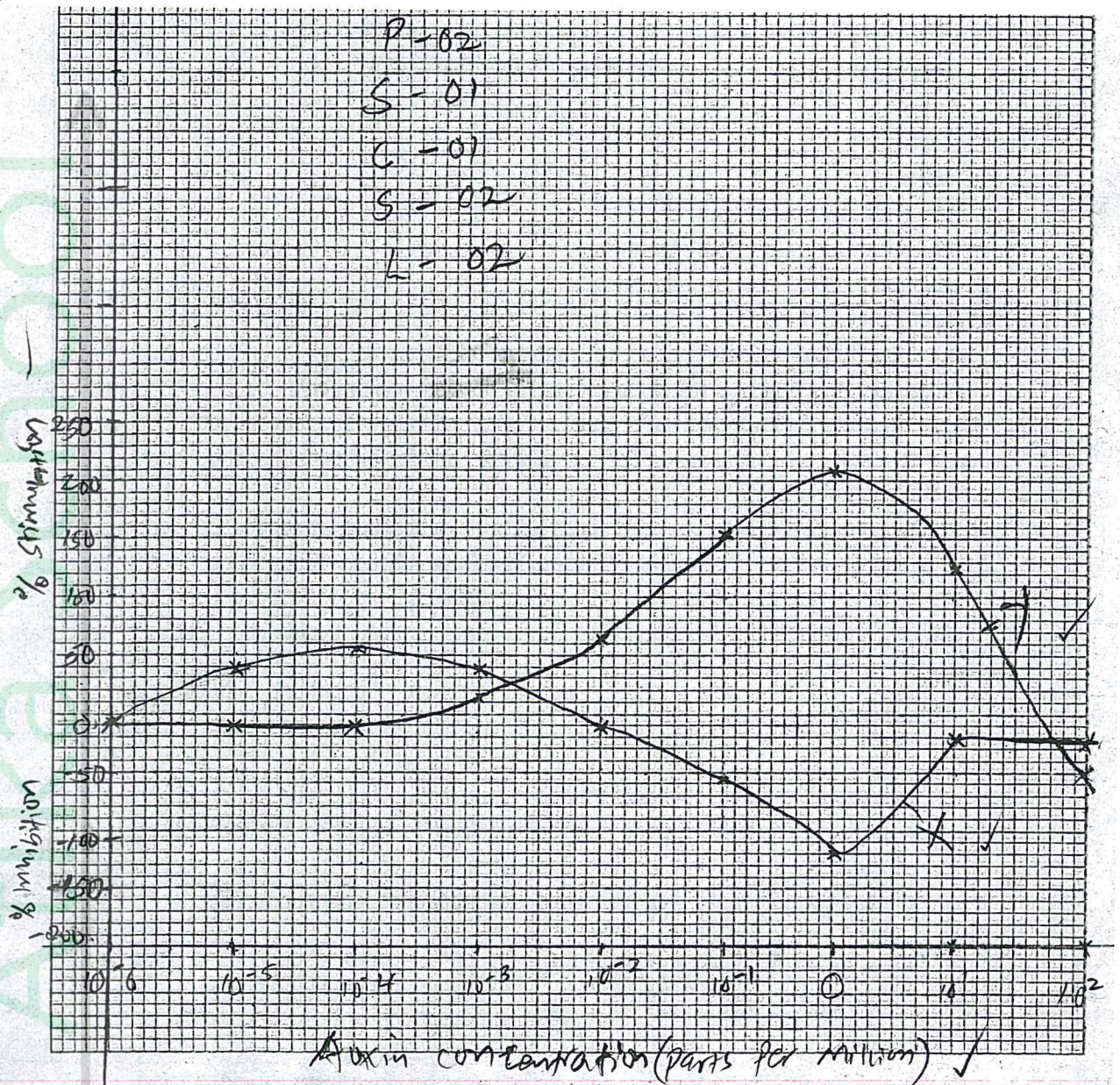


4.5.2 Biology Paper 2 (231/2)

1. (a)	E – Glomerulus; F – Interlobular artery/branch of renal artery;	(1 mark) (1 mark)
(b)	Region G At the (glomerulus), the afferent arteriole which brings blood to the glomerulus is wider than the efferent arteriole; this creates high pressure; leading to ultrafiltration; At the proximal convoluted tubule /distal convoluted tubule, substances required by the body/amino acid substances required by the body (amino acids/glucose/vitamins/ some water; are selectively re-absorbed (into the blood stream); hence selective reabsorption; Region H At the descending arm of/limb of the Loop of Henle, water is selectively reabsorbed; At the ascending arm/limb of the Loop of Henle, sodium ions/salts are actively/selectively reabsorbed; At the collecting duct, water is (selectively) reabsorbed:	(3 marks) (3 marks)
2. a)	Normal distribution curve;	(1 mark)
b)	i. Continuous (variation); ii. Independent assortment; Crossing over; iii. Organisms/individuals with advantageous traits/variations are favoured/selected by nature; and survive to reproduce/pass on/propagate the advantageous/favourable traits to their off-spring; Or Variation ensures propagation of desirable/favourable traits; to the future generations/off-spring, ensuring improved/quality population;	(1 mark) (2 marks) (2 marks)
c)	– Provides information/advice to individuals/families/communities about genetic disorders; – Helps identify/test/advice families/communities on possible risks of genetic disorders; – Provides supportive services/serves as patient advocates/refer individuals/families to relevant health professionals;	 (2 marks)
3. a)	i. During strenuous exercises, the heart beat/pulse rate is increased (more contraction/relaxation of cardiac muscles); while the rate of contraction and relaxation of skeletal muscles is increased; hence more blood flows to supply more oxygen/nutrients; and for removal of metabolic waste products (carbon (IV) oxide/urea);	(4 marks)

	ii. At rest, more blood flows through the alimentary canal/gut/gastral intestinal tract (since digestion is at optimum at rest); to transport digested/absorbed food materials/eliminate metabolic wastes;	(2 marks)
b)	Urea; Water; Salts;	(2 marks)
4. a)	i. H – Ball and socket (joint); M – Gliding/planar/plane (joint);	(2 marks)
	ii. Clavicle;	(1 mark)
b)	Scapula; -Has a spine to increase surface area for muscle attachment; -It is broad/flat to increase the surface area for muscle attachment; -Forms flexible attachment above the ribs that allows movement of the arms; -Has a glenoid cavity/depression for articulation with the humerus/forming the ball and socket joint; -Has acromion for articulation with clavicle/for muscle attachment; -Has coracoid process to increase surface area for muscle attachment;	(1 mark) (3 marks)
c)	Ligaments hold the bones together (at a joint) while tendons attach muscles to bones;	(1 mark)
5. a)	i. Bryophyta;	(1 mark)
	ii. <ul style="list-style-type: none"> – Has capsules (for enclosing spores); – Has (long) setae (for supporting the capsules/for effective propagation of spores); – (Developed) rhizoids (for anchorage/absorption of water/mineral salts); – Thalloid in nature/Thallus/undifferentiated; 	(3 marks)
b)	N – Capsule;	(1 mark)
	P – Seta;	(1 mark)
c)	Numerous/hair-like to increase the surface area for absorption;/to enhance rate of absorption of water/nutrients/dissolved mineral salts; Numerous/hair-like to hold firmly on the surface/not to be easily blown away/displaced/anchorage;	(2 marks)

6.a



b)	X - root;	(1 mark)
	Reason Low auxin concentration stimulates (rapid/faster) cell division and elongation/growth in roots; High concentration of auxins inhibits growth in roots;	(1 mark)
	Y - shoot;	(1 mark)
	Reason Low auxin concentration has little effect on the growth of shoots/shoots are stimulated to grow with high auxin concentration (up to a given optimum);	(1 mark)
c)	i. $33\% \pm 2$;	(1 mark)
	ii. 1.0 parts per million;	(1 mark)

d)	<p>-Faster maturity of flowers/earlier flower formation/flowering; -Pruning/decapitating shoot tips to allow sprouting of lateral buds, hence more yield; -Keeping flowers fresh; -Stimulate formation/development of (adventitious) roots;</p>		(3 marks)
e)	<p>Simple reflex action</p> <ul style="list-style-type: none"> - Is not learned (over time)/is inborn - Primary stimulus involved - Impulse follows appropriate sensory and motor neurone/sensory and motor components are the same all the time; - Single stimulus brings about the desired response 	<p>Conditioned reflex action</p> <ul style="list-style-type: none"> - Is learned (over time); - Secondary stimulus involved; - Impulse follows inappropriate sensory but appropriate motor neurone; - Repeated stimulus needed to bring about a response; 	Any 3 (3 marks)
7. a)	<p>Rhizopus/mucor/mould; reproduce asexually; by sporulation; spores develop from a single cell forming sporangium; which bursts on maturity releasing spores; which are dispersed by air currents/wind germinating; to form new generation/ form a mycelium (if it lands on a suitable medium); Or Yeast/Saccharomyces/Schizosaccharomyces; reproduce asexually; by budding; parent cell forms an outgrowth/projection/bud; this is followed by division of the nucleus into two; one of the nuclei moves into the bud; which grows and develops into a new cell;</p>		(5 marks)
b)	<p>After/at the onset of menstruation, (the anterior lobe of) the pituitary gland; secretes follicle stimulating hormone (FSH); the FSH causes the Graafian follicle; to develop into the ovary; and stimulate the ovary tissues to secrete oestrogen hormone; Oestrogen brings about repair/healing of the endometrium/uterine wall; its concentration increases to a level which stimulates the (anterior) pituitary gland; to secrete lutenizing hormone (L.H.) and stops further secretion of FSH;</p> <p>The L.H. stimulates the maturation of the Graafian follicle; LH also stimulates the Graafian follicle to release an ovum into the (funnel of the) fallopian tube/causes ovulation; it also stimulates the remains of the Graafian follicle to form a yellow body/corpus luteum (in the ovary);</p> <p>The corpus luteum is stimulated by the L.H. to produce progesterone; Progesterone then stimulates the thickening of the endometrium/inner lining of the uterine wall; in readiness for implantation; as progesterone level increases, it inhibits (the pituitary gland) from secreting FSH; further increase in progesterone level inhibits the pituitary gland from secreting L.H. This causes the corpus Luteum to degenerate; this reduces the amount of progesterone; the sudden drop in secretion of progesterone causes the endometrium to slough off/menstruation occurs; and the cycle is repeated;</p>		(15 marks)

8.	<p>The meal is ingested through the mouth; (In the mouth), it is chewed/masticated (by teeth); to reduce/break it into smaller particles; mixed with saliva (from salivary gland);</p> <p>The food is then rolled (by the tongue) into boluses; and pushed down/ into the oesophagus/swallowed; The boluses move by peristalsis (into the stomach);</p> <p>Constant contractions/relaxations of the stomach walls mix the food, (giving rise to chime); Presence of food in the stomach further stimulates production of gastric juice; which contains pepsinogen; and rennin/chymosin; Pepsinogen is activated to pepsin; by hydrochloric acid; (contained in the gastric juice). Pepsin breaks down proteins to peptides;</p> <p>Rennin converts/coagulates the protein, caseinogen; in milk to casein; (which is abundant in young children). It is then pushed into the duodenum (through the pyloric sphincter); Pancreatic juice in the duodenum contains trypsin; which digests proteins into peptides; (secreted in an inactive form, trypsinogen)</p>	
	<p>In the ileum, intestinal juice/<i>Succus entericus</i> is secreted; It contains peptidase enzymes; which breaks down polypeptides into amino acids; It also contains polypeptidase enzyme; which breaks down peptides to amino acids, completing the process of digestion of the proteins;</p> <p>The amino acids are absorbed into the bloodstream/pass through the epithelia of the villi, and the capillary walls into the blood-stream; by active transport; The undigested/indigestible proteins/food substances pass through to the colon/large intestines; where water is absorbed; leaving a semi-solid waste material being passed on to the rectum; then out through the anus (as faeces);</p>	(20 marks)