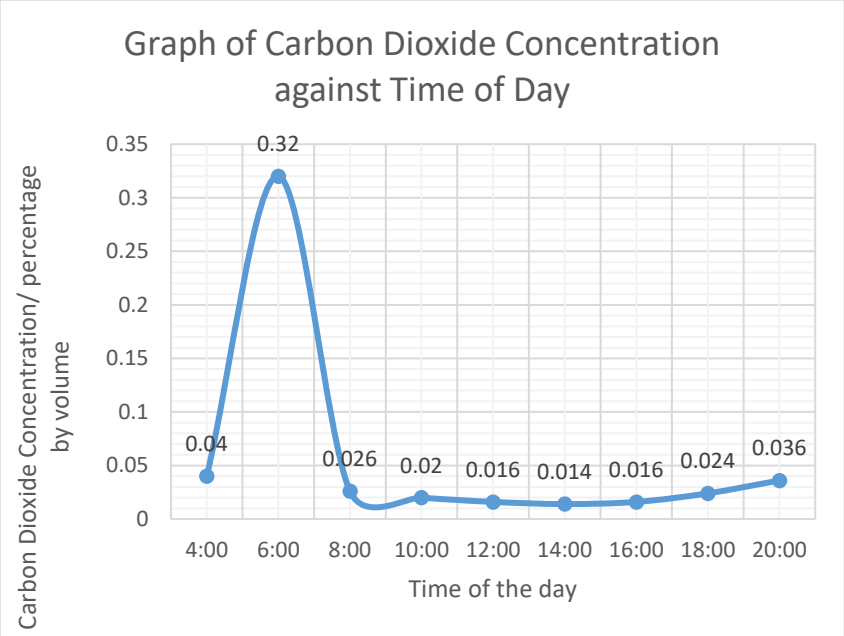
6093 Biology Yearly TYS 2015

No	Paper 1	Explanation
1	B	Cytoplasm present in RBC
2	C	Oxygen is used up in mitochondria during aerobic respiration
3	B	Against concentration gradient across a membrane
4	B	Starch is storage form of glucose in plants
5	B	
6	B	
7	D	
8	B	Enzymes are secreted into the small intestine from the pancreas or intestinal glands. Liver only produce bile that is stored in the gall bladder.
9	D	
10	A	
11	B	
12	C	Rate of p/s exceeds rate of aerobic r/p
13	C	
14	B	
15	B	
16	B	
17	D	
18	C	
19	C	
20	C	High hydrostatic pressure
21	B	
22	D	
23	B	
24	A	
25	D	
26	A	Sensory neurone is damaged
27	C	
28	B	
29	A	Male gamete has x and y chromosome
30	D	
31	C	Gene loci are at the same position
32	B	
33	B	
34	A	
35	A	
36	D	
37	A	
38	A	
39	A	
40	B	
	Total	40

	Paper 2 Section A		
No	**Answers**	**Marks**	**Remarks**
1a	A: starch B: maltose C: salivary amylase	3	
1bi	Temperature in the alimentary canal	1	
1bii	pH in the alimentary canal	1	
1c	Bile cannot be released from the gall bladder into the small intestines; Fats will not be emulsified into smaller fat droplets + surface area to volume ratio is not increased; Slower rate of digestion of fats by lipase;	1 1 1	
	Total	8	
2a	Sexual reproduction involves a process of fusion of nuclei of male and female haploid gametes to form a diploid zygote; Produces genetically dissimilar offspring; Gametes are produced by meiosis;	1 1 1	
2b	Rough surfaces + cling onto hairy body of insects; Insect follows nectar guide into flower to collect nectar + transfer pollen grains from anther of another flower to sticky stigma;	1 1	Structure + function Explain
2ci	A is the pollen tube	1	
2cii	Pollen tube grows down the style into the ovary + pollen tube secretes enzymes to digest surrounding tissues of the stigma and style; Pollen tube enters the ovule through micropyle + within the ovule, the tip of the pollen tube absorbs sap and bursts + releasing two male gametes; Nucleus of one male gamete fuses with the nucleus of the ovum to form a zygote + nucleus of the other male gamete fuses with the definitive nucleus to form the endosperm nucleus;	1 1 1	Describe + explain
	Total	9	

No	Answers	Marks	Remarks
3a	40 – 16 = 24	1	
3b	The higher the air temperature, the higher the body temperature of insect; No thermoregulation mechanism in the body	1 1	Relationship
3c	Horizontal line from 20°C to 36°C of air temperature – constant human body temperature is 37°C	1	
3d	Temperature is higher than normal body temperature detected by thermo-receptors in the skin stimulates sweat glands to become more active; Increased production of sweat by sweat glands + more water in sweat evaporates into water vapour from surface of the skin; More latent heat of vaporisation lost from body + body temperature decreases/restored to normal level	1 1 1	stimulus + gland sweat production homeostasis
	Total	7	
4a	A: aorta/ aortic arch B: pulmonary vein	1 1	
4b	Prevent backflow of blood from pulmonary artery/lungs into the heart when P(RV) < P(pulmonary artery)	1	
4c	D: Deoxygenated blood from the rest of the body flows into RA + through vena cava; E: muscles of RA contracts + P(RA) is higher than P(RV) + tricuspid valves open + D: allow blood flow from RA to RV; E: muscles of RV contracts + P(RV) is higher than P(PA) + semilunar valves open + D: blood forced out of RV into PA + at high pressure + transported to lungs D: P(RV) is higher in P(RA) + triscuspid valves closes E: to prevent backflow of blood into RA/ P(PA) is higher in P(RV) + semilunar valves closes to prevent backflow of blood into RV	1 1 1 1	Entry of blood into heart Atrial contraction Ventricular systole Closure of valves R: atrium contract A: muscles of the atrium contracts
	Total	7	

No	Answers	Marks	Remarks
5a	Concentration of insulin decreased by 90 a.u.	1	
5b	Low concentration of blood glucose due to no intake of food; No excess glucose to convert to glycogen + pancreas is not stimulated to secrete insulin into the bloodstream;	1 1	
5c	increased contraction of muscles + increased rate of aerobic respiration + demand for glucose and oxygen increases in the muscles + BGC decreases; Stimulate the hypothalamus in the brain + nerve impulses transmitted to adrenal gland via spinal cord + adrenal gland secretes more adrenaline into bloodstream; Adrenaline • Stimulates liver to convert glycogen to glucose + more glucose available in the blood for muscle contraction • Stimulates increase metabolic rate • Stimulates increase rate of heartbeat + rise in BP so that oxygen and glucose are carried faster to the muscles • Stimulates constriction of arterioles to the gut + decrease digestive activities • Stimulates constricts of arterioles in skin + channel more blood to the muscles in the limbs	1 1 1	Stimulus Response Explain: 2 Effects
	Total	6	
6ai	Male Parent: I^AI^O	4	
6aii	Genotype Child 3: I^BI^O	1	
6aiii	Phenotype Child 2: AB Phenotype Child 4: O	1 1	
6b	I^A and I^B	1	
	Total	8	
7ai	organisms that are not able to make their own food + obtain energy and nutrients by feeding other organisms;	1	
7aii	feeding position of an organism in a food chain;	1	
7bi	plankton → small fish → large fish → fishermen/humans	1	
7bii	mercury is insoluble in water + plankton takes in mercury compound; mercury cannot be broken down by organisms and are not excreted + mercury is stored in the fatty tissues of the plankton; concentration increases in the body of small fishes as more plankton containing mercury are consumed + accumulation of chemicals in the bodies of organism is bioaccumulation;	1 1 1	R: no relation to context

No	Section B	Marks	Remarks
8a	 Axes labelled + all ticks labelled at equal intervals; Best fit curve + no shading + smooth curve; All points plotted accurately; Maximise the size of grid provided;	4	
8bi	0.320 – 0.014 = 0.306	1	
8bii	Between 0400 to 0600, % of CO_2 increases rapidly from 0.04 to 0.32 + no light for photosynthesis + only respiration is taking place + CO_2 accumulates; Between 0600 to 0800, % of CO_2 decreases rapidly from 0.32 to 0.014; light intensity increases + increasing rate of photosynthesis + CO_2 is used up; Between 0800 to 1400,% of CO_2 maintains at a fairly constant value of between 0.014 to 0.02 + maximum rate of photosynthesis is reached;	1 1 1 1	
8biii	Rate of photosynthesis exceeds rate of respiration + more oxygen is given out than taken in	1	
	Total	10	

No	Answers	Marks	Remarks
9a	Nicotine; makes blood clot easily, increase risk of blood clots blocking/narrowing the arteries + increase risk of coronary heart disease; addictive drug that causes the release of hormone adrenaline, increase heartbeat rate and blood pressure; Carbon monoxide; combines with haemoglobin to form carboxyhaemoglobin + reduces ability of blood to carry oxygen + oxygen supply to cells reduces + lowering rate of aerobic respiration; increases fatty deposits on the inner arterial wall leading to narrowing/blocking of the lumen of arteries caused increase in BP + increased risk of coronary heart disease,; Tar; Causes uncontrolled cell division, increases risk of cancer in lungs; paralyses cilia lining the air passages, increase risk of bronchitis and emphysema, breathing difficulty leads to lack of oxygen supplied to cells; irritants; paralyses cilia lining the air passages, increase risk of bronchitis and emphysema; breathing difficulty leads to lack of oxygen supplied to cells;	6	2 effects per component
9b	As blood alcohol concentration increases from 0 mg per 100 cm^3 to 70 mg per 100 cm^3, the reaction time of the person increases from 308 ms to 340 ms; High alcohol consumption causes reduced self-control, increased reaction time, slow reaction, blurred vision, poor muscular co-ordination; judgement deteriorates; more likely to cause accidents when driving;	1 1 1 1	R: no quotation of data Any two short-term effects
	Total	10	

No	Answers	Marks	Remarks
E10a	Both tissues are involved in transport of useful substances in plants; Both tissues are located in both stem and leaves to facilitate p/s; Xylem tissues transport water and dissolved mineral salts but phloem tissues conducts manufactured food (sucrose and amino acids); Xylem tissues transport substances from roots to leaves but phloem tissues transports substances from leaves to other parts of the plant; Xylem tissues transport water by transpiration pull, root pressure and capillary action but phloem tissues transports manufactured substances by active transport; Xylem tissues does not use energy to transport water but phloem tissues uses energy released by mitochondria in companion cells;	1 1 1 1 1 1	Similarity Similarity Diff 1: Type of substances Diff 2: Direction of transport Diff 3: Mode of transport Diff 4: Energy R: structural similarity and difference
E10b	Moving air blows away water vapour that accumulates outside the stomata + maintains steep water vapour concentration gradient between the leaf and the atmosphere + higher rate of transpiration; Increase humidity + high concentration of water vapour in the air surrounding the plant + Decreases the water vapour concentration gradient between leaf and atmosphere + Rate of transpiration decreases; Increase temperature of air + increase rate of evaporation of water from the thin film of moisture around mesophyll cells + Higher concentration of water vapour in the intercellular air spaces + Rate of transpiration increases; High light intensity causes the stomata to open and become wider + increase rate of diffusion of water vapour out of leaf + increase rate of transpiration;	1 1 1 1	
	Total	10	

No	Answers	Marks	Remarks
O10a	increase light intensity stimulates the photoreceptors in the retina producing nerve impulses; nerve impulses are transmitted to the sensory neurone in the optic nerve to the relay neurone in the brain + to the motor neurone and to the effector, circular and radial muscles of the iris; circular muscles of the iris contract + radial muscles of the iris relax; pupil constricts reducing the amount of light entering the eye + pupil reflex prevents excessive light from entering the eye and damaging the retina;	1 1 1 1	Describe Describe Explain Explain
O10b	Light refracted through cornea and aqueous humour onto lens; Lens further refract light rays + adjust its thickness depending on the distance of the object; e.g. for nearby object, ciliary muscles contract, relaxing the pull on the suspensory ligaments + suspensory ligaments slacken, relaxing their pull on the lens; lens becomes thicker and more convex, decreasing its focal length; lights rays sharply focused on the retina stimulates the rods and cones depending on the intensity of light; Clear image formed on the retina is inverted, laterally inverted and diminished;	1 1 1 1 1 1	cornea + AH lens example example retina image
	Total	10	