

ASSUMPTION ENGLISH SCHOOL
Sec 4 Biology 6093 Marking Scheme
Preliminary Examination 2019

Paper 1 (40 m)

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
D	C	B	A	B	C	D	C	A	B
Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20
B	B	C	D	B	C	A	D	C	A
Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28	Q29	Q30
A	C	D	C	B	B	B	C	C	B
Q31	Q32	Q33	Q34	Q35	Q36	Q37	Q38	Q39	Q40
C	B	C	B	B	B	A	D	C	D

Paper 2 Section A (50 m)

	a	P – protein/polypeptide Q- glycerol R – fat/lipid S – glucose/monosaccharide every 2 correct – 1 m	2
	b i	Benedict's test	1
	b ii	Add an equal volume of Benedict's solution into the sample; Shake the mixture and place the test tube into a boiling water bath for 3 minutes; If glucose is present, a brick-red precipitate will be formed; 3 points – 2 marks, 2 points – 1 mark, 0 to 1 point – no marks	2
2	a	phloem	1
	b	J and K; K is a leaf which takes in radioactive carbon dioxide for photosynthesis; The radioactive sugars formed in leaf K (through photosynthesis) can be translocated / transported up to J; Radioactive sugars cannot move down to the roots M or leaf L as the phloem at X is removed;	4
	c	All parts/ J, K, L and M; The phosphorus will be present in the roots M as water is absorbed by the root / plant roots absorbed radioactive phosphate ions; The radioactive phosphate ions can be transport up the xylem to the J, K and L as it remains intact;	3
3	a	O: phagocyte/white blood cell P: capillary	1 1

	b	M: the lymphocyte produces antibodies that causes the bacteria to clump together; N: The bacteria is being engulfed and ingested by phagocytes /phagocytosis of bacteria;	1 1				
	c	The platelets are activated; Causing soluble fibrinogen to be converted into insoluble fibrin ; The fibrin forms a mesh ; to trap red blood cells ; to form a clot ; 5 points – 2 marks, 3 to 4 points – 1 mark;	2				
	d i	lower for both	1				
	d ii	Glucose and oxygen diffused through the capillary into the skin cells; for the cells to perform aerobic respiration ;	1 1				
4	a i	pancreatic trypsin/amylase/lipase	1				
	a ii	small intestines / duodenum	1				
	b i	insulin	1				
	b ii	Insulin helps to decrease blood glucose concentration when it increases after absorption of glucose after a meal; Insulin helps to decrease blood glucose concentration by - increasing permeability of cell membrane to glucose, increasing rate of glucose uptake; - stimulating the liver to convert glucose into glycogen for storage; - increasing oxidation of glucose during tissue respiration; (any 2 of 3 points)	1 2				
5	a	<table><tr><th>Continuous Variation</th><th>Discontinuous variation</th></tr><tr><td>height weight</td><td>blood type</td></tr></table>	Continuous Variation	Discontinuous variation	height weight	blood type	1
Continuous Variation	Discontinuous variation						
height weight	blood type						
	b	Amy and Christie. They are the only ones with identical blood groups;	1				
	c	Couple 1.; They are the only ones with possibility of having allele I ^O . I ^O is a recessive allele and must be present in both the paternal and maternal genes in order for Amy and Christie to have blood group O.	1 1 1				
	d	100%	1				
6	a	insect: P, S, T wind: Q, R 5 correct – 2 marks, 3 or 4 correct – 1 mark	2				
	b	The stigma is feathery ; to provide a larger surface area ; to capture more ; pollen grains ; every 2 correct – 1 mark	2				
	c i	line + label L on stigma of P or R	1				
	c ii	After pollination ; the pollen grain germinates ; The pollen tube grows as it secretes enzymes to digest; the tissue of the stigma/style; Every 2 points – 1 mark	2				

	d	The nucleus in the pollen grain is haploid while the nucleus in a cell in structure S is diploid ; The nucleus in the pollen grain is formed by meiosis while that of structure S is formed by mitosis .	1 1
7	a	carbon compounds in animals	1
	b	C & E	1
	c i	Draw from air to plants	1
	c ii	Photosynthesis	1
	d	Oceans can absorb carbon dioxide when the carbon dioxide dissolves in the water; The dissolved carbon dioxide is used by phytoplankton and algae during photosynthesis ; Carbon compounds found in oceans can also be buried in the seabed and be converted into fossil fuels ;	1 1 1

Paper 2 Section B (30 marks)

1	a	It is the optimum pH for lipase action;	1
	b i	correct axis with units; appropriate scale; correct plots; best-fit curve; 4 points – 3 marks, 3 points – 2 marks, 2 points – 1 mark, 0 to 1 point – no marks	3
	b ii	mark based on student's graph	1
	c	The milk molecule is complementary to the active site of the lipase; The lipase catalyses the breakdown of the fat molecule into fatty acids and glycerol; The fatty acids lowers the pH of the mixture;	1 1 1
	d	The pH will decrease less rapidly ; The bile salts causes the emulsification of the fats; The surface area to volume ratio is increased when the fats are emulsified; Thus, allowing the lipase to digest the fats more rapidly ; every 2 points – 1 mark	2
2	a	Mutation is a spontaneous / sudden and random change; in the structure of the gene; or in chromosome number; 3 points – 2 marks, 2 points – 1 mark, 0 to 1 point – no marks	2
	b	Method; How results are interpreted; correct genetic diagrams;; Perform a test cross with a homozygous recessive salmon to determine if the orange-pink salmon is homozygous dominant or heterozygous; If the orange-pink salmon is homozygous, all the offspring will be orange-pink. If the salmon is heterozygous, only half the offspring will be orange-pink; Let P the the allele for orange-pink and p be the allele for white	1 1

		are reabsorbed through the tubule into the bloodstream by diffusion and active transport; Most of the mineral salts are reabsorbed as well (by diffusion and active transport) Water is also reabsorbed by osmosis along the nephron; Every 2 points – 1 mark (Composition) Excess water, excess salts and metabolic waste such as urea are passed on to the renal pelvis/bladder as urine;	1
	b	The water potential of blood increases; The hypothalamus is stimulated ; and the pituitary gland releases less anti-diuretic hormone (ADH) into bloodstream; Cells in walls of collecting duct become less permeable to water; Less water is reabsorbed from collecting ducts into blood capillaries; The body will release more water as urine, maintaining water potential of blood; 6 points – 4 marks, 4 to 5 points – 3 marks, 3 points – 2 marks, 1 to 2 points – 1 mark	4

