## YTSS 2024 Biology Prelim

## Paper 1 Answers

1	А	11	А	21	В	31	С
2	С	12	А	22	С	32	С
3	В	13	С	23	В	33	В
4	А	14	С	24	В	34	А
5	С	15	В	25	D	35	А
6	В	16	А	26	А	36	D
7	В	17	С	27	В	37	С
8	В	18	В	28	D	38	С
9	D	19	С	29	В	39	А
10	В	20	В	30	D	40	В

## Paper 2 Answers

Qn	Answer Key		Remarks
	Section A		
1a	<ul> <li>irregular shape of cell (membrane) / cell loses its circular/biconcave shape / affects the shape of RBC</li> </ul>	1	
	Cell Swells / cell IS larger / cell expands	1	
16	(any 2)	1	
ai	<ul> <li>Decrease in surface area to volume ratio</li> <li>Slower rate of diffusion of oxygen into and out of RBC</li> </ul>	1	
	Less oxygen can bind to haemoglobin	1	
	Not able to transport oxygen in the body efficiently	1	
	(any 2)		
1c	Platelets	2	
	(Blood) plasma		
	White blood cells / lymphocytes / phagocytes		
	(max 2 marks, minus 1 mark for each missing word / mistake)		
	(max 2 marks, minus 1 mark for each missing word / mistake)		
2a	Water	2	
	Amino acids		
	Sucrose		
	(max 2 marks, minus 1 mark for each missing word / mistake)		
2b	Cell type A: sieve tube cell	1	
	Cell type B: companion cell	1	
2c	<ul> <li>companion cell / cell type B have (many mitochondria)</li> </ul>		
	<ul> <li>to provide energy to help sieve tube cells / cell type A</li> </ul>	1	
	transport food by active transport / translocation	1	
	OR	4	
	<ul> <li>companion cell / cell type B, provides nutrients and carries out matchalia processor</li> </ul>	1	
	<ul> <li>to keep sieve tube cell / cell type A alive</li> </ul>	1	
3a	Phenotype of parents: purple purple	1	
	Genotype of parents: Aa Aa	1/	
		/2	
	Gametes: A a A a	1⁄2	
	Genotype of F <sub>1</sub> generation: AA Aa Aa aa	1⁄2	
	Phenotype of F <sub>1</sub> generation: purple purple purple red	1⁄2	
	Ratio of F <sub>1</sub> generation: 3 purple : 1 red	1	

Qn	Answer Key		Remarks
			1/2 mark if no mention
			of purple/red
3bi	3 purple : 2 red	1	
3bii	small sample size	1	
	<ul> <li>random fertilisation of gametes</li> </ul>	1	
	OR random nature of fertilisation		
	mutation of gene for colour		
	(any 2)		
3c	1 AA : 2 Aa	1	
	$2/3 \times 660 = 440$	1	
3d	colours / shades / categories / phenotypes, not distinct / not	1	
	discrete / overlap / form a (gradual) range / include		
		1	
	<ul> <li>&gt;1 / 4 / several / many, genes</li> </ul>	1	
	environment affects, colour / pnenotype	1	
	(max 2 marks, any 2)		
4a	Light intensity / temperature / humidity / wind speed / volume of	2	
	water		
41-	(any 2)		
40	(as climate changes) increase in carbon dioxide concentration	1	
	stomata to be loss open		
	<ul> <li>less water (vanour) will be lost / evanorated / diffused out /</li> </ul>	1	Minus ½ if never
	transpired (though stomata) + this allows survival in low water	-	specify benefit of
	availability / dry conditions / this helps to conserve water		water
4ci	(3.10 – 1.55) / 15	1	Minus 1/2 for no/wrong
	= 0.10 au / °C	1	units
	OR (2.10 1.50) / 15	4	Minua 1 for wrong do
	(3.10 - 1.50)/15	1	winus i for wrong ap.
4cii	optimum temperature	1/2	
	<ul> <li>ranges from 20/21 °C to 28/29/30 °C</li> </ul>	1/2	
	fastest rate of, enzyme activity / enzyme-substrate complex	1/2	
	formation / effective collisions / product formation	1/	
	• atter 28 °C,	/2 1/	
	enzymes start to denature	/2 1/2	
	loss of (shape of) active site	1/2	
	<ul> <li>slower rate of, enzyme activity / enzyme-substrate complex</li> <li>formation / offective collicions / and dust formation</li> </ul>	, 2	
	iormation / enective collisions / product formation	1/2	
	(max 3 marks)		

Qn	Answer Key		Remarks
4ciii	similar shape but below sunny day curve	1	Minus 1/2 if the lines
			intersect
5ai	<ul> <li>a technique used to transfer genes from one organism to another</li> </ul>	1	
	another	1	
	<ul> <li>Individual genes may be cut on from the cells of one organism and inserted into the cells of another organism of the same or</li> </ul>		
	different species.		
	OR		
	<ul> <li>The transferred gene can express itself in the recipient</li> </ul>	1	
	organism.		
	OR		
	To form a transgenic organism		
5aii	• to, test / compare, effect(iveness) of, genes / proteins / plants /	1	
	• to see which (gene / plant / variety / of A and B) works better		
	/ best	1	
	To compare possible side effects		
	To increase genetic variation		
	(22)(1)	1	
52111	(any r)	1/2	
Jaiii	to show that non-GM potato plant is not able to kill any insects	1/2 1/2	
		/ _	
5b	A and B kill larvae	1	
	GM increases, yield of / food from (potatoes)	1	
	A, is best at killing insects / kills most insects / works fastest to     kill insects	1	
	A should be grown / will provide most food	1	
	• A, should be grown / will provide most rood		
	(max 3 marks, any 3 points)		
62	Fig. 6.1 - Pollen from the <b>anthers</b> sticks to / clings onto the	1	
Ua	(hairv) <b>bodv</b> of the bee	'	
	Fig. 6.2 - Pollen on the insect's (hairy) body is transferred to the	1	
	stigma		
6b	The anthers and stigma mature at different timings	1/2	
	In Fig 6.1, the anthers mature before the stigma	1/2	
	to ensure that pollen cannot be transferred to the mature stigma	1/2	
	In Fig. 6.2 the stigma mature only after the anthers have withered	1/2	
		12	
6c	(embryo in) seed develops from the <u>zygote</u>	1/2	
	<ul> <li>zygote is formed by <u>fusion of two gametes / fertilisation</u></li> </ul>	1/2	
	<ul> <li>both gametes are genetically, dissimilar / different / from two parameter</li> </ul>	1/2	
	parents male gamete / pollen, como from different plant	1/2	
	<ul> <li>fruit pod formed from tissue of parent / female plant / carpel /</li> </ul>	1/2	
	fruit (coat) genetically identical to female parent		

Qn	Answer Key		Remarks
	fruit pod is formed by mitosis	1⁄2	
	(max 2 marks, any 4)		
72	Correct scale	1	
74	• Correct order of trophic level (from bottom $A \rightarrow I \rightarrow S \rightarrow I$ ) +		
	label for trophic level		
7b	• mercury in the, river / water / invertebrate animals, may be,	1⁄2	
	consumed / ingested, by small fishes		
	mercury cannot be excreted	$\frac{1}{2}$	
	is stored in, fat/fatty/adipose, tissues	72 1/2	
	<ul> <li>Mercury, accumulates / increases in concentration, in the bodies of small fishes</li> </ul>	/2	
8a	A: x-axis: age of grapes and days	1	
	and		
	y-axis: percentage concentration of reducing sugars		
	<ul> <li>S: scale for x-axis (20 days for every 10 boxes)</li> </ul>	1	
	and		
	scale for y-axis (2.0% for every 10 boxes)	1	
	I : best fit CURVE	1	
8b	correct age estimated from graph	1	Minus 1/2 mark for
	≈ 64 days		missing units
8c	as grapes age, the concentration of amylase and reducing	1	
	sugar increase (only trend)		
	UK	2	
	<ul> <li>as grapes age from 0.10 to 0.30 au and reducing sugar</li> </ul>	2	
	increase from 1.1 to 11.3 % (trend + data)		
	• <b>amylase digests</b> / catalyse the digestion of + <b>starch</b> (in	1	Minus 1/2 for any
	grapes) + into maltose + which is a reducing sugar		missing part, no
1		1	

Qn	Answer Key		Remarks
			marks for 2 or more
			missing part
8d	Zero amount of / no reducing sugar, solution remains blue	1	Missing precipitate
	Trace amount of reducing sugar, green ppt is observed	1	/solution -minus 1m.
	OR		
	Moderate amount of reducing sugar, orange ppt is observed		
	UR		
	• Large amount of reducing sugar, block red ppt is observed		
	(max 2 marks, any 2)		
9a	I – placenta	1	
ou	Function -	·	
	<ul> <li>diffusion of oxygen and digested food substances / named</li> </ul>	1	
	(e.g. glucose, amino acid) from maternal blood to foetal blood		
	diffusion of metabolic waste/named from foetal blood into	1	
	maternal blood		
	diffusion of antibodies from maternal blood into foetal blood	1	
	<ul> <li>produces progesterone to maintain uterine lining</li> </ul>	1	
	<ul> <li>blood barrier that protects foetus from high pressure of</li> </ul>	1	
	maternal blood/harmful microorganisms/incompatible blood		
	group		
	(1 mark for labelling)		
	(max 2 marks for function, any 2 points)		
Qh	M - urethra	1	
30	Function -	'	
	transports urine from the urinary bladder to outside of the body	1	
9ci	Sex: male	1/2	
	Due to presence of X and Y chromosome	1	
	Health: Down syndrome / chromosomal mutation	1/2	
	Due to trisomy at chromosome 21	1	
Cii	Sickle cell anemia	1	A: type 1 diabetes
	red blood cells becomes sickle-shaped due to the abnormal	1	(mellitus) $\rightarrow$ little or
	naemogiopin	1	ho insulin produce /
	red blood cells unable to absorb oxygen efficiently in the lungs     increases the changes of blood eletting in blood vessels	1	blood alucose
	Increases the chances of blood clotting in blood vessels	'	concentration
	(1 mark for disease, 1 mark for any description)		oonoonaaaon
10a	(drinking of water causes) increase in blood water potential	1/2	
	<ul> <li>detected by receptors hypothalamus</li> </ul>	1/2	
	<ul> <li>causes decrease in release of ADH into blood (in first hour)</li> </ul>	1/2	
	<ul> <li>cells in the walls of collecting duct</li> </ul>	1/2	
	becomes less permeable to water	1/2	
	less water is selectively reabsorbed	1⁄2	
	at collecting duct	1⁄2	
	volume of urine produced will increase	1/2	
		1/2	
1		1 /2	1

Qn	Answer Key		Remarks
4.01-	<ul> <li>(so) decrease in blood water potential / blood water potential returns to, set point / norm / normal</li> <li>Concentration of ADH increases back to norm at 9au from 1h to 3h</li> <li>(max 4 marks, any 4 points)</li> </ul>	1/2	
100	<ul> <li>(osmoregulation) is the maintenance of a constant body water potential</li> <li>by controlling the water potential and solute concentration in the blood.</li> </ul>	1	
10c	<ul> <li>Similarities</li> <li>Both involves a stimulus</li> <li>Both bring about a response</li> <li>Differences</li> <li>Nervous control involves nerve impulses while endocrine control involves hormones</li> <li>Nervous control are usually quick responses while endocrine control are usually slow responses</li> <li>Nervous control requires transport by the neurones while endocrine control requires transport by the blood</li> <li>Nervous control responses are short-lived while endocrine control responses may be short-lived or long-lived</li> <li>Nervous control can be voluntary or involuntary while endocrine control is always involuntary</li> <li>Nervous control is usually localised (involves only 1 effector) while endocrine control may affect more than one target organ</li> </ul>	1 1 1 1 1 1 1	
	(max 4 marks, any 4 points)		
11ai aii	<ul> <li>Acquired immune deficiency syndrome</li> <li>there is a <u>decrease</u> in the percentage infections in, <u>most</u> regions / regions A,C,E,F,G,H (or named regions)</li> <li>there is an <u>increase</u> in the percentage infections in, <u>some</u> regions / regions B, D (or named regions)</li> <li>the biggest percentage decrease, in E (East and Southern Africa)</li> <li>the smallest percentage decrease, in G (Latin America)</li> <li>any 2 (1mark each) + data quote to support described trend (max 3 marks)</li> </ul>	1 1 1 1 1	Must spell in full

Qn	Answer Key		Remarks
В	<ul> <li>Vaccine contains, <u>an agent that resembles virus</u></li> <li>OR inactivated/weakened_virus/pathogen</li> </ul>	1	
	<ul> <li>vaccination + is the process of taking a vaccine / being vaccinated</li> <li>either orally or through an injection</li> <li>receptors on, white blood cells/antibodies + complementary to the antigen + will bind OR antibodies are specific in action</li> <li>This <u>stimulates white blood cells</u> (to divide and)</li> <li>produce more antibodies + to destroy/kill the agent/virus</li> <li>Some <u>white blood cells</u> remain in the blood stream for a long time as <u>memory cells</u>.</li> <li>In the future, when the <u>same pathogen</u> enters the body, <u>memory cells can recognise</u></li> <li>and <u>quickly produce the antibodies</u> to destroy it.</li> </ul>	1 1 1 1 1 1 1	