

YTSS 2024 Biology Prelim

Paper 1 Answers

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

Paper 2 Answers

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

Qn	Answer Key	
3bii	- small sample size - fertilisation is a random process / fusion of sex gametes are random - mutation of gene for colour (any 2)	1 1
3c	1 AA : 2 Aa $\frac{2}{3} \times 660 = 440$	1 1
3d	- colours / shades / categories / phenotypes, not distinct / not discrete / overlap / form a (gradual) range / include intermediates >1 / 4 / several / many, genes - environment affects, colour / phenotype (max 2 marks, any 2)	1 1 1
4a	Light intensity / temperature / humidity / wind speed / volume of water (any 2)	2
4b	(as climate changes) increase in carbon dioxide concentration causes + average width of stomatal aperture to decrease / stomata to be less open + QV - less water (vapour) will be, lost / evaporated / diffused out / transpired (though stomata) + this allows survival in, low water availability / dry conditions / this helps to conserve water	1 1
4ci	$(3.10 - 1.55) / 15$ $= 0.10 \text{ au} / ^\circ\text{C}$ OR $(3.10 - 1.50) / 15$ $= 0.11 \text{ au} / ^\circ\text{C}$	1 1 1 1
4cii	- at optimum temperature which ranges from 20/21 °C to 28/29/30 °C, rate of enzyme reaction is the fastest. - after 28 °C, enzymes start to denature, loss of (shape of) active site - slower rate of, enzyme activity / less / no enzyme-substrate complex formation	1 1 1
4ciii	similar shape but below sunny day curve	1
5ai	- a technique used to transfer genes from one organism to another OR - Individual genes may be cut off from the cells of one organism and inserted into the cells of another organism of the same or different species. - To form a transgenic organism	1 1 1
5aii	- to, test / compare, effect(iveness) of, genes / proteins / plants / varieties / A and B - to see which, (gene / plant / variety / of A and B), works, better / best - To compare possible side effects - To increase genetic variation (any 1)	1 1 1
5aiii	To act as a control to show that non-GM potato plant is not able to kill any insects	1

Qn	Answer Key	
5b	- A and B kill larvae , GM increases, yield of / food from (potatoes) + QV - A, is best at killing insects / kills most insects / works fastest to kill insects - A, should be grown / will provide most food	1 1 1
6a	Fig. 6.1 - Pollen from the anthers , sticks to / clings onto, the (hairy) body of the bee Fig. 6.2 - Pollen on the insect's (hairy) body is transferred to the stigma	1 1
6b	- In Fig 6.1, the anthers mature before the stigma, while in Fig. 6.2, the stigma mature only after the anthers have withered <u>to ensure that pollen cannot be transferred to the mature stigma of the same flower</u>	1 1
6c	(embryo in) seed develops from the <u>zygote</u> that is formed by <u>fusion of two gametes / fertilisation</u> - both gametes are genetically, dissimilar / different / from two parents	1 1
7a	- Correct scale - Correct order of trophic level (from bottom, A → I → S → L) + label for trophic level	1 1
7b	- mercury in the, river / water / invertebrate animals, may be, consumed / ingested, by small fishes - mercury cannot be excreted and is stored in, fat/fatty/adipose, tissues, increasing in concentration, in the bodies of small fishes	1 1
8a	- A: x-axis: age of grapes and days - y-axis: percentage concentration of reducing sugars - S: scale for x-axis (20 days for every 10 boxes) and scale for y-axis (2.0% for every 10 boxes) - P: correct plotting of all six points - L: best fit CURVE	1 1 1 1
8b	correct age estimated from graph ≈ 64 days	1
8c	- as grapes age, the concentration of amylase and reducing sugar increase (only trend) +QV amylase digests / catalyse the digestion of + starch (in grapes) + into maltose + which is a reducing sugar	1 1 1
8d	- Zero amount of / no reducing sugar, solution remains blue - Trace amount of reducing sugar, green ppt is observed - OR - Moderate amount of reducing sugar, orange ppt is observed - OR - Large amount of reducing sugar, brick red ppt is observed (max 2 marks, any 2)	1 1

Qn	Answer Key	
9a	L – placenta Function - • diffusion of oxygen and digested food substances / named (e.g. glucose, amino acid) from maternal blood to foetal blood • diffusion of metabolic waste/named from foetal blood into maternal blood • diffusion of antibodies from maternal blood into foetal blood • produces progesterone to maintain uterine lining • blood barrier that protects foetus from high pressure of maternal blood/harmful microorganisms/incompatible blood group (1 mark for labelling) (max 2 marks for function, any 2 points)	1 1 1 1 1 1
9b	M - urethra Function - transports urine from the urinary bladder to outside of the body	1 1
9ci	Sex: male, Due to presence of X and Y chromosome Health: Down syndrome / chromosomal mutation Due to trisomy at chromosome 21	1 1 1
cii	Sickle cell anemia • red blood cells becomes sickle-shaped due to the abnormal haemoglobin OR • red blood cells unable to absorb oxygen efficiently in the lungs OR Albinsim • body cells cannot produce pigment (1 mark for disease, 1 mark for any description)	1 1 1 1
10a	• (drinking of water causes) increase in blood water potential, detected by receptors hypothalamus • causes decrease in release of ADH into blood (in first hour) to be transported to the kidneys • cells in the walls of collecting duct becomes less permeable to water, less water is selectively reabsorbed into the blood • volume of urine produced will increase, (so) decrease in blood water potential / blood water potential returns to, set point / norm / normal, concentration of ADH increases back to norm at 9au from 1h to 3h	1 1 1 1
10b	• (osmoregulation) is the maintenance of a constant body water potential • by controlling the water potential and solute concentration in the blood.	1 1
10c	Similarities • Both involves a stimulus • Both bring about a response Differences • Nervous control involves nerve impulses while endocrine control involves hormones	1 1 1 1

Qn	Answer Key	
	- Nervous control are usually quick responses while endocrine control are usually slow responses - Nervous control requires transport by the neurones while endocrine control requires transport by the blood - Nervous control responses are short-lived while endocrine control responses may be short-lived or long-lived - Nervous control can be voluntary or involuntary while endocrine control is always involuntary - Nervous control is usually localised (involves only 1 effector) while endocrine control may affect more than one target organ (max 4 marks, any 4 points)	1 1 1 1
11ai	Acquired immune deficiency syndrome	1
aii	- there is a <u>decrease</u> in the percentage infections in, <u>most regions / regions A,C,E,F,G,H</u> (or named regions) +QV - there is an <u>increase</u> in the percentage infections in, <u>some regions / regions B, D</u> (or named regions) + QV - the biggest percentage decrease, in E (East and Southern Africa) + QV - the smallest percentage decrease, in G (Latin America) + QV - any 2 (1mark each)	1 1 1 1
B	- Vaccine contains, <u>an agent that resembles virus</u> OR <u>inactivated/weakened, virus/pathogen</u> - vaccination + is the process of taking a vaccine / being vaccinated, either orally or through an injection - receptors on, white blood cells/antibodies + complementary to the antigen + will bind - This <u>stimulates white blood cells</u> (to divide and) to produce more antibodies + to destroy/kill the agent/virus - Some <u>white blood cells remain in the blood stream</u> for a long time as <u>memory cells</u>. - In the future, when the <u>same pathogen</u> enters the body, <u>memory cells can recognise and quickly produce the antibodies</u> to destroy it.	1 1 1 1 1 1