**6093 Biology Yearly TYS 2016**

| No | Paper 1 | Explanation |
|---|---|---|
| 1 | D | |
| 2 | A | |
| 3 | D | Active transport requires a cell membrane |
| 4 | D | |
| 5 | A | Reducing sugar, proteins, fats; sucrose is not a reducing sugar; |
| 6 | B | |
| 7 | B | HPV carries blood from SI to liver |
| 8 | B | |
| 9 | C | Light intensity is no longer the limiting factor |
| 10 | D | Cells in the epidermis has no chloroplasts. |
| 11 | A | Transpiration cannot take place if stomata is closed |
| 12 | B | |
| 13 | C | |
| 14 | C | |
| 15 | C | |
| 16 | B | |
| 17 | B | |
| 18 | B | Decrease in pressure is caused by increased in volume in lungs |
| 19 | B | |
| 20 | C | |
| 21 | D | |
| 22 | D | |
| 23 | C | |
| 24 | D | Perception of pain is always by brain |
| 25 | C | |
| 26 | B | |
| 27 | B | |
| 28 | D | |
| 29 | C | |
| 30 | B | |
| 31 | C | |
| 32 | C | |
| 33 | D | |
| 34 | A | |
| 35 | A | |
| 36 | C | |
| 37 | A | |
| 38 | C | |
| 39 | C | |
| 40 | B | |
| | Total | 40 |

| | Paper 2 Section A | | |
|---|---|---|---|
| **No** | **Answers** | **Marks** | **Remarks** |
| 1a | A: fibrin thread<br>B: red blood cell | 1<br>1 | |
| 1b | Damaged tissues and platelets + produce/release enzyme thrombokinase;<br><br>Thrombokinase, in the presence of calcium ions, catalyses the conversion of inactive prothrombin into active thrombin;<br><br>Thrombin catalyses conversion of short, soluble fibrinogen into long, insoluble fibrin threads + RBCs and platelets entangle/traps in fibrin threads forming blood clot to prevent entry of foreign particles into the bloodstream; | 1<br><br>1<br><br>1 | |
| 1c | capillaries are blocked + stopped/ restrict blood flow;<br><br>less/ no oxygen and glucose supply to brain cells resulting in a stroke + lose ability to control body organs;<br><br>brain cells may eventually die if there is continuously no supply of oxygen and glucose; | 1<br><br>1<br><br>1 | |
| | Total | 8 | |
| 2a | Salivary amylase<br>Polypeptides<br>Intestinal glands/pancreas | 1<br>1<br>1 | |
| 2b | Mouth: B;<br>Optimum pH is pH 7 + salivary amylase works best in neutral pH at which rate of enzyme reaction is the highest;<br><br>Stomach: A;<br>Optimum pH is pH 2 + pepsin works best in acidic pH at which rate of enzyme reaction is the highest; | 1<br><br>1<br><br>1<br><br>1 | |
| | Total | 7 | |

<table>
<tr><th>No</th><th>Answers</th><th>Marks</th><th>Remarks</th></tr>
<tr><td>3a</td><td>Mutation is a <u>sudden random change</u> in the <u>structure</u> or in the <u>chromosome number</u> of a gene during replication + error is not repaired + gene is modified/ chromosome is altered;</td><td>1</td><td></td></tr>
<tr><td>3bi</td><td>
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<tr><td></td><td>D</td><td>d</td></tr>
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1: dd (homozygous recessive)<br><br>
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2: Dd (heterozygous)
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3: Pp (heterozygous)<br><br>
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4: pp (homozygous recessive)
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50%
</td><td>1</td><td></td></tr>
<tr><td></td><td>Total</td><td>6</td><td></td></tr>
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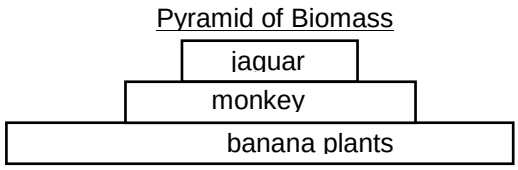
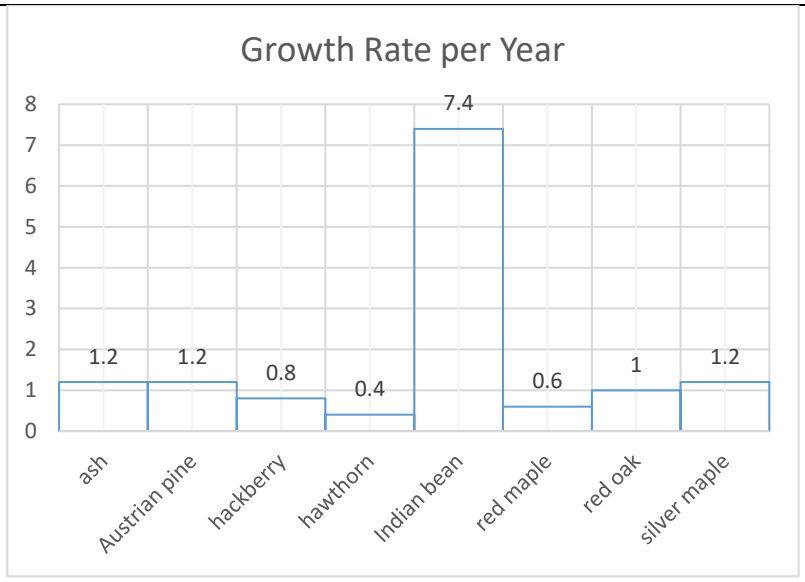
| No | Answers | Marks | Remarks |
|---|---|---|---|
| 4ai | Root hair cells | 1 | |
| 4aii | Absorption of water by osmosis and dissolved mineral salts by diffusion;<br><br>Uptake of ions by active transport; | 1<br><br>1 | |
| 4aiii | Long and narrow + increase surface area to volume ratio so as to increases the rate of absorption of water and dissolved mineral salts;<br><br>Cell surface membrane prevents cell sap from leaking out + cell saps contain sugars, amino acids and salts creating a lower water potential than the solution in the soil + steep water potential gradient for high rate of water absorption by osmosis;<br><br>Contains mitochondria where aerobic respiration takes place to release energy for active transport of ions into the cells; | any 2 | structure + function |
| 4b | Xylem tissue;<br><br>Transports water and dissolved mineral salts to mesophyll cells of the leaves from the roots by transpiration pull; | 1<br><br>1 | |
| | Total | 7 | |
| 5ai | A: mitochondrion<br>B: smooth endoplasmic reticulum | 1<br>1 | R: plural |
| 5aii | site where aerobic respiration takes place +<br>Glucose oxidised to release energy for the cell | 1 | R: produce energy |
| 5b | Plant cell has cellulose cell wall that provides support for the cell, while animal cell does not have a cell wall;<br><br>Plant cell has chloroplast that enable it to carry out photosynthesis, while an animal cell does not have chloroplasts;<br><br>Plant cell has a large central vacuole that contains cell sap, while animal cell have many smaller vacuoles. | 1<br><br>1<br><br>1 | Contrasting statements<br><br>R: no comparative word such as *while, but* |
| | Total | 6 | |

| No | Answers | Marks | Remarks |
|---|---|---|---|
| 6a | 1: fruit bats;<br>2: banana plants<br>one arrow from banana plant to monkeys;<br>one arrow from macaws to pythons; | 1<br>1<br>1<br>1 | |
| 6b | trophic level is a feeding position of an organism in a food chain;<br><br>TL1 is always made up of producers which are plants i.e. orchids, seeds, banana plants and bamboo plants /<br>TL2 is made up of primary consumers which are herbivores i.e. macaws, fruit bats and monkeys /<br>TL3 is made up of secondary consumers which are carnivores i.e. pythons and jaguars | 1<br><br>1 | definition<br><br>Any one reference |
| 6c | energy is lost as heat to the environment through respiration;<br>energy is lost in uneaten part or dead bodies, faeces and excretory products, trapped in the form of chemical energy; | 1<br><br>1 | |
| 6d |  | 1<br><br>1 | |
| | Total | 10 | |
| 7ai | Concentration of urine increases as concentration of ADH in blood plasma increases;<br><br>more ADH into blood plasma stimulates cells in the walls of the collecting ducts to become more permeable to water;<br><br>more water reabsorbed from the collecting duct into the blood capillaries + smaller volume of urine + urine produced is more concentrated; | 1<br><br>1<br><br>1 | Relationship<br><br>Effect of ADH<br><br>Effect of increase permeability |
| 7aii | Rate of flow of urine through the ureter decreases as the concentration of urine increases<br>/<br>Rate of flow of urine through the ureter decreases as the concentration of ADH in blood plasma increases | 1 | |
| 7b | Vigorous exercise + increase perspiration/ sweating to regulate body temperature + increase water excreted in sweat + decrease water potential below normal level in blood plasma;<br>stimulates hypothalamus in the brain to trigger pituitary gland to release/secrete more ADH into bloodstream; | 1<br><br>1 | |
| | Total | 6 | |

| | Section B | | |
|---|---|---|---|
| **No** | **Answers** | **Marks** | **Remarks** |
| 8a | 12.8 ÷ 16 = 0.8<br>1.0 × 16 = 16.0 | 1<br>1 | |
| 8b |  <br>All bars of equal width;<br>Axis labelled + equal intervals;<br>All bars plotted correctly;<br>Occupy the whole grid; | 4 | |
| 8c | Measure the height of the trees | 1 | |
| | Light is needed for p/s + <u>light energy</u> absorbed by <u>chlorophyll</u> needed to convert carbon dioxide and water into glucose and oxygen;<br><br><u>Glucose</u> serves as a source of food and energy for trees to grow + <u>higher light intensity</u> leads to more glucose being formed by p/s; | 1<br><br><br>1 | |
| 8e | temperature/<br>concentration of carbon dioxide/<br>volume of water/<br>water potential in soil solution/<br>concentration of mineral salts in soil/<br>soil pH | Any 2 | AW |
| | Total | 11 | |

| No | Answers | Marks | Remarks |
|---|---|---|---|
| 9a | Excess amino acids are transported to the liver for deamination + amino groups are removed from amino acids;<br><br>Remains of amino acids are converted to carbon residue + which in turn is converted to glucose;<br><br>Glucose dissolves in blood plasma carried to other body cells for aerobic respiration + excess glucose will be converted into glycogen + stored in the liver or muscle cells;<br><br>Amino group is converted to ammonia + which in turn is converted to urea;<br><br>Urea dissolves in blood plasma + carried to the kidneys in the bloodstream + excreted in urine; | 1<br><br>1<br><br>1<br><br>1<br><br>1 | Deamination<br><br>Conversion to glucose<br><br>Transport of glucose<br><br>Formation of urea<br><br>Excretion of urea |
| 9b | Large amount of carbon dioxide produced from aerobic respiration + carbon dioxide diffuses from cells into the blood and enters RBCs;<br><br>Carbon dioxide reacts with water in RBCs to form carbonic acid + catalysed by enzyme carbonic anhydrase present in RBCs;<br><br>Carbonic acid is converted into hydrogencarbonate ions which diffuse out of the RBCs into the blood plasma + a small amount of carbon dioxide is also dissolved in the RBCs;<br><br>In the lungs, hydrogencarbonate ions diffuse back into RBCs + converted back into carbonic acid + converted into water and carbon dioxide + carbon dioxide diffuses out of blood capillaries into the alveoli + expelled when exhaled; | 1<br><br>1<br><br>1<br><br>1 | Aerobic respiration<br><br>In RBC<br><br>From RBC to plasma<br><br>lungs |
| | Total | 9 | |

| No | Answers | Marks | Remarks |
|---|---|---|---|
| E10a | Both aerobic and anaerobic respiration requires glucose as a reactant;<br><br>Both aerobic and anerobic respiration releases energy;<br><br>Aerobic respiration occurs in the presence of oxygen but anaerobic respiration occurs in the absence of oxygen;<br><br>Aerobic respiration releases a large amount of energy but anaerobic respiration releases a small amount of energy;<br><br>Aerobic respiration produces carbon dioxide and water but anaerobic respiration produces lactic acid in humans; | 1<br><br>1<br><br>1<br><br>1<br><br>1 | Similarity<br><br>Similarity<br><br>Difference<br><br>Difference<br><br>Difference |
| E10b | Anaerobic respiration occurs in the absence of oxygen + produces lactic acid in muscle cells;<br><br>During vigorous exercise, muscles incur an oxygen debt when oxygen supply cannot meet the demand of oxygen;<br><br>Muscles carry out anaerobic respiration causing accumulation of lactic acid in muscle cells + results in fatigue and muscular pains;<br><br>During rest, breathing rate continues to be high to provide sufficient oxygen to muscle cells + to repay oxygen debt + lactic acid is gradually removed from muscles + transported to liver;<br><br>Lactic acid oxidised in liver to release energy used to convert the remaining lactic acid into glucose + transported back to muscles; | 1<br><br>1<br><br>1<br><br>1<br><br>1 | Condition + Product<br><br>Oxygen Debt<br><br>Effect of OD<br><br>Repay OD<br><br>Fate of lactic acid |
| | Total | 10 | |

| No | Answers | Marks | Remarks |
|---|---|---|---|
| O10a | Ductless glands that secrete hormones directly into the blood + transported to a target organ;<br><br>Hormone production controlled by nervous system or regulated by certain chemical substances;<br><br>Pituitary gland + secretes ADH;<br>ADH stimulates walls of the collecting duct to be more permeable to water causing an increase water reabsorption;<br><br>Adrenal gland + secretes adrenaline;<br>stimulates various target organs including liver, muscles, arterioles;<br><br>Pancreas + secretes insulin and glucagon;<br>regulation of BGC + target organ is liver;<br><br>Ovaries + secretes oestrogen and progesterone;<br>Target organ is uterine lining + repair and thickening;<br><br>Testes + secretes testosterone;<br>Development of male reproductive organs; | 1<br><br>1<br><br>Any 2 e.g. | function<br><br>Mode of transmission<br><br>Name of gland + hormones<br><br>Effect + Target organ |
| O10b | BGC increases above normal level stimulates the islets of Langerhans in the pancreas to secrete insulin into the bloodstream;<br><br>Insulin stimulates the conversion of excess glucose into glycogen in the liver;<br><br>insulin stimulates increase of permeability of cell membranes to glucose, hence, increases uptake of glucose by cells;<br><br>increase supply of glucose, increase rate of aerobic respiration, increase cell metabolism + decreased BGC back to normal level;<br><br>BGC decreases below normal level stimulates the islets of Langerhans in the pancreas to secrete glucagon;<br><br>glucagon stimulates the conversion of glycogen back into glucose;<br>glucagon stimulates conversion of fats and amino acids into glucose +<br>causes the increase of BGC back to normal level; | 1<br><br>2<br><br>1<br><br>2 | BGC > normal (stimulus)<br><br>2 Effects of insulin<br><br>BGC < normal (stimulus)<br>Effect of glucagon |
| | Total | 10 | |