## 6093 Biology Yearly TYS 2014

No	Paper 1	Marks	Remarks
1	A	1	
2	В	1	
3	С	1	
4	С	1	
5	D	1	
6	В	1	
7	В	1	
8	B (supposed to be breakdown of haemoglobin; not RBC)	1	
9	В	1	
10	С	1	
11	D	1	
12	С	1	
13	D	1	
14	С	1	
15	D	1	
16	С	1	
17	A	1	
18	С	1	
19	Ă	1	
20	С	1	
21	C	1	
22	C	1	
23	C	1	
24	D	1	
25	С	1	
26	D	1	
27	В	1	
28	A	1	
29	C	1	
30	A	1	
31	C	1	
32	D	1	
33	C	1	
34	C	1	
35	B	1	
36	A	1	
37	Α	1	
38	C	1	
39	Δ	1	
40	B	1	
	Total	40	

	Paper 2 Section A		
No	Answer	Marks	Remarks
1a	Process by which <u>metabolic waste products</u> and <u>toxic substances</u> are removed from the body of an organism;	1	
	Metabolism produces waste products + accumulation of waste/excretory products of metabolism can be <u>toxic</u> + harmful to the organism + must be <u>removed immediately</u> ;	1	
1bi	200 – 17 = 183	1	
1bii	Uric acid/ creatinine/ excess water	1	
1c	<u>Increase water potential above normal level</u> in blood plasma stimulates hypothalamus in the brain to trigger pituitary gland to release <u>less ADH</u> into bloodstream;	1	
	ADH stimulates cells in the walls of the collecting ducts to become <u>less permeable</u> to water + <u>less water reabsorbed</u> from the collecting duct into the blood capillaries;	1	
	Larger volume of urine + urine produced is more diluted/ lower concentration;	1	
	Total	7	
2a	Liver	1	
2bi	Volume of pure alcohol consumed		
	$= 3 \times 175 \times \frac{12}{100}$	1	
	$= 63 \ cm^2$		
	No of units of alcohol consumed		
	$= 63 \div 10$	1	
2hii	Amount of time		
2011	$= 6.3$ units $\div$ 1h		
	= 6.3h	1	
2c	Short-term:	2	TB pg.
	Reduced self-control + effect;		107-108
	hurred vision + effect		
	poor muscular co-ordination + effect:		
	unable to walk steadily + effect;		
	slurred speech + effect;		
	judgement deteriorates + effect;		
	lona-term <sup>.</sup>	2	
	liver cirrhosis + elaboration;	-	
	stomach/gastric ulcers + elaboration;		
	addiction/ alcoholic + elaboration;		
	Total	8	

3ai	Vein/ branch vein	1	
3aii	Xylem tissue; Forms a continuous lumen/hollow tube without any partition walls/ protoplasm + Transports water and dissolved mineral salts to mesophyll cells from the roots; / Phloem tissue; Sieve tube cells are joined end to end to form sieve plates + Conducts manufactured food (sucrose and amino acids) away from the leaf to the other parts of the plant;	1	Identify Structure + Function
3bi	Transpiration	1	
3bii	17 – 8 = 9 h	1	
3biii	6 <sup>th</sup> hour + 20 <sup>th</sup> hour	1	
3biv	Humidity of air/ Wind or air movement/ Light intensity	1	
	Total	7	
4a	A carbon sink is an area that <u>stores carbon compounds</u> for an <u>indefinite</u> period + stores more carbon than it <u>releases</u> ;	1	
	warming;	1	
4bi	Aerobic respiration	1	
4bii	Changing land use and agriculture <u>takes in more carbon dioxide than</u> <u>releases</u> carbon dioxide by <u>1 gigaton of carbon a year</u>	1	
4biii	Sum (Release – absorbed) = $(119 - 120) + (18 - 19) + (88 - 90) + 6$ = $-1 + (-1) + (-2_) + 6$ = 2 gigatops	1	
I			

4biv	Oceans are <u>largest carbon sinks</u> on Earth + one-third of the carbon dioxide releases by human activities is absorbed by oceans;	1	
	carbon dioxide that <u>dissolves</u> in the ocean's water is absorbed and used by phytoplankton and algae in p/s;	1	
	A portion of carbon compounds found in oceans is <u>buried in the</u> <u>seabed</u> + in the form of <u>fossil fuels</u> such as natural gas and oil;	1	
	Presence of <u>iron compounds</u> in the ocean <u>stimulates</u> the growth of phytoplankton;	1	
	increasing rate of photosynthetic activity + increasing rate of absorption of carbon dioxide by phytoplankton;	1	
	Total	11	
5a	<u>Carbon monoxide</u> in tobacco smoke <u>combines with haemoglobin</u> to form <u>carboxyhaemoglobin</u> ;	1	
	reducing the ability of haemoglobin to <u>bind with oxygen</u> + concentration of <u>oxygen</u> carried in RBC reduces + rate of aerobic respiration decreases + less energy released for cellular activities;	1	
	Increases rate of <u>fatty deposits</u> on the inner arterial wall;		
	causes narrowing of the <u>lumen of arteries</u> and leads to increase in BP + may increased risk of coronary heart disease;		
5bi	324 : 36 9 : 1	1 1	
5bii	Tobacco smoke <u>contains tar</u> that causes <u>uncontrolled cell division</u> + increasing risk of <u>cancer</u> in lungs;	1	
	Total	5	
6a	Asexual reproduction is the process resulting in the production of <u>genetically identical offspring</u> (clones) from <u>one parent</u> ;	1	
	Does not involve the fusion of gametes but involves mitosis;	1	
6b	A: prophase	4	
	B: telophase		
	D: metaphase		
	Total	6	



	Section B		
8a	Arteries have thick muscular walls with much elastic tissue but veins have thin muscular walls with little elastic tissue;	Any 2	Wall
	Arteries have <u>small lumen relative to diameter</u> but veins have <u>large</u> <u>lumen relative to diameter;</u>		Lumen
	valves are <u>absent</u> in arteries but <u>present</u> in veins;		Valves
8bi	Speed of blood <u>gradually decreases</u> at a steady rate from 48cm/s in the aorta ( <u>highest</u> speed) to 40cm/s in the arteries; Speed of blood <u>rapidly decreases</u> at a steady rate from 48 cm/s from the arteries through the <u>small arteries</u> until the <u>capillaries</u> at 4cm/s ( <u>lowest</u> speed); Speed of blood <u>gradually increases</u> from <u>capillaries</u> at 4cm/s to <u>small</u> <u>veins</u> at 9cm/s + <u>rapidly increases</u> at <u>veins</u> to 26cm/s + <u>slightly</u> <u>increase</u> at <u>vena cava</u> to 28cm/s ( <u>lower speed</u> than that in the artery);	1 1 1	R: no quotation of data R: did not specify lowest and highest speed
8bii	Graph of Mean Blood Pressure against Type of Blood Vessel	4	
8biii	Ventricular systole + contraction of the <u>muscles</u> of the ventricles;	1	
8biv	Pressure is force per unit area + with the same amount of force, pressure decreases as area increases/	1	Definition of pressure
	As the blood flows through the arteries, arterioles, capillaries, venules, veins towards the vena cava, the surface area in which blood flows increases + reducing the pressure;		Effect of area on pressure
	Total	11	

9a	In light-dependent stage, chlorophyll absorbs/traps <u>light energy</u> + convert into <u>chemical energy</u> ;	1	chlorophyll
	Light energy is used to <u>split water molecules into oxygen and</u> <u>hydrogen atoms</u> + photolysis of water;	1	photolysis
	In light-independent stage, hydrogen <u>reduce</u> carbon dioxide to glucose / carbon dioxide gains hydrogen to form glucose + using the chemical energy from the light dependent stage;	1	reduction
	Glucose is <u>used immediately</u> by plant cells + <u>excess glucose</u> are converted to <u>sucrose</u> and transported to <u>storage organs</u> + excess glucose stored as starch in starch granules;	1	storage
9b	<u>Conditions</u> can be <u>controlled</u> to the optimum to ensure rate of p/s is the maximum;	1	function of greenhouse
	Factors: light intensity, temperature, concentration of carbon dioxide, amount of water, concentration of mineral salts in soil, soil pH;	1	factors that can be controlled
	Use a computerised system/ technology to monitor the conditions so that rate of p/s is kept at an optimum;	1	technology
	Lamps/ light bulbs + to ensure high light intensity to ensure high rate of p/s takes place throughout the day /	2	2 ways to
	temperature sensor/ thermostat + ensure optimum temperature to prevent enzymes from being inactive or from being denatured, hence maintaining highest rate of p/s /		maximum growth
	more carbon dioxide can be supplied by introducing animals/ other organisms to release carbon dioxide + to maintain high rate of p/s;		
	Total	9	

E10a	muscles of diaphragm contract + diaphragm flattens;	1	
	external intercostal <u>muscles</u> contract while internal intercostal <u>muscles</u> relax;	1	
	moving the ribs <u>upwards and outwards</u> + sternum moves <u>up and</u> <u>forward;</u>	1	
	lungs expand + increasing thoracic volume;	1	
	lowering <u>air pressure in the lungs</u> + <u>atmospheric pressure</u> is higher than pressure in the lungs;	1	
	forces atmospheric air into lungs;	1	
E10b	Oxygen is inhaled into the <u>alveoli</u> +	1	
	diffuse through the walls of alveoli and walls of capillaries into the BBC in the bloodstream:		
	<u>itte in the bloodstream</u> ,	1	
	Oxygen binds to <u>haemoglobin</u> in <u>RBCs</u> to form <u>oxyhaemoglobin</u> :		
	RBC carries oxygen from <u>lungs</u> to <u>LA</u> of heart via <u>pulmonary vein</u> + to <u>LV to aorta</u> + to <u>coronary arteries;</u>	1	
	Oxyhaemoglobin is converted back to oxygen + oxygen diffuses from the RBC out to the tissue fluid through the walls of the arteries + diffuses into the muscles cells;	1	
	Total	10	

O10a	<u>biological catalysts</u> that is made up of <u>proteins</u> and can <u>break</u> <u>down</u> substances into simpler substances or <u>build up</u> complex molecules;	1	function
	catalyse/speed up chemical reactions in cells + lowers <u>activation</u> <u>energy</u> of a reaction;	1	lower activation energy
	<u>remain unchanged</u> at the end of a reaction + recycled/reused so required in <u>minute/small</u> amounts;	1	remain unchanged
	three-dimensional shape + substrates can <u>fit exactly</u> into the active sites / complementary to the active sites + active sites that bind to <u>specific</u> substrates;	1	active site
	rate of enzyme reaction is the highest at optimum temperature/pH + <u>inactive</u> at low temperatures <u>below optimum</u> resulting in low rate of enzyme reaction + <u>denatured</u> at high temperatures <u>beyond optimum</u> and at extreme pH;	1	effect of temperature/pH on enzyme activity
	when enzymes are denatured, active sites are <u>altered/changed</u> + enzyme-substrate complex cannot be formed + no/reduce enzyme reaction;	1	effect of denaturation on enzyme activity
O10b	Washing powders with enzymes can <u>breakdown/ digests food</u> <u>substance like fats and oils</u> but for washing powders without enzymes, food substances cannot be broken down;	1	Contrasting statements Function of enzymes
	Washing powders with enzymes works best using <u>room</u> <u>temperature water</u> + save energy but for washing powders without enzymes, hot water is needed;	1	Optimum temperature
	<u>Small amount</u> of enzymes needed for breaking down the food substances + recycled/ reused + lesser washing powder but large amount of washing powders without enzymes needed;	1	Amount of powder
	product of digestion of food substances by enzyme is <u>soluble in</u> <u>water</u> + <u>easy removal of stains</u> on clothes but stains may not be effectively removed using washing powders without enzymes;	1	Effect of enzymes
	Total	10	