Assessment Schedule – 2006

Human Biology: Describe functioning of human circulatory, respiratory and excretory systems (90178)

Evidence Statement

Question	Achievement	Achievement with Merit	Achievement with Excellence
ONE (a)	*Position of all FOUR valves correctly circled on heart diagram.*		
(b)	*Describes a function of heart valves eg **ONE** of:* • stops the backflow of blood • ensures blood flows in one direction.		
(c)	*Drawing shows* a vena cava entering the right auricle **AND** a pulmonary vein entering the left auricle. ***PLUS** both vessels correctly labelled.*		
(d)	*Describes **one structural** difference between the pulmonary artery and the pulmonary vein, eg* • PA has a valve; PV does not • PA has thick walls; PV has thin[ner] walls • PA has elastic walls; PV has inelastic walls • PA has smaller lumen than PV. *Answer must clearly identify the **difference** between the two vessels.*	*Gives reason for the structural difference, eg **ONE** of:* • PA valve stops back flow of blood (due to gravity), whereas blood in PV flows easily from lungs to heart • PA thicker wall to cope with higher blood pressure as heart pumps blood to lungs, whereas PV thin walled as blood flows with less pressure as it returns to heart (similar for PA elastic walls etc).	
(e)	*Describes the function of the coronary arteries in supplying the heart with essential materials, eg **ONE** of* • Supplies nutrients / glucose to the heart / tissue / cells • Provides oxygen to the heart • Removes carbon dioxide / metabolic wastes from heart.		
(f)(i)	*Identifies any **TWO** <u>lifestyle</u> factors that lead to CHD, eg* • Stress • Excess alcohol intake • Excess fat in diet • Excess salts in diet • Overeating • Physical inactivity.		

(f)(ii)	*Describes what lifestyle factor does, eg ONE of* • high fat increases cholesterol • high fat / salt causes hardening of arteries • excess alcohol / overeating increases blood pressure • stress in lifestyle • lack of exercise.	*Describes how the change affects the heart, eg described factor **leads to*** (cholesterol) – plaque build-up on wall(s), narrowing of CA, restricts blood flow / increases blood pressure **OR** narrowing of CA, walls less elastic, blood pressure increased / plaque builds up on CA wall(s) **OR** High blood pressure puts strain on heart muscles / weakens muscles.	
(g)	*Answer describes the role of **EACH** of the heart, plasma, red blood cells, eg what it does* • Heart pumps blood • RBC carry / transport oxygen • Plasma carries / transports substances. **AND** names <u>at least TWO of:</u> oxygen, glucose, carbon dioxide, amino acids, minerals, salts, hormones, antibodies, platelets, white blood cells, urea.	*Answer explains the role of TWO of the heart, plasma, red blood cells, ie how (H) or why (W).* • heart pumping causes blood flow around body under high pressure (H) • to distribute substances to all the body cells (W) • RBC carry oxygen **to** cells / tissues / muscles as oxyhaemoglobin (H) • for **respiration** / energy release(W) • plasma is **liquid / watery** so can transport substances in solution (H) • to supply / remove substances to / from cells (W). **Two substances** required.	*Answer discusses the role of TWO of the heart, plasma, red blood cells ie how and why* (Refer to merit answers) • Heart pumping causes blood flow around body under high pressure (H), to distribute substances to all the body cells (W). • RBC carry oxygen **to** cells / tissues / muscles as oxyhaemoglobin (H) for **respiration** / energy release(W). • Plasma is **liquid / watery** so can transport substances in solution (H) to supply / remove substances to / from cells (W). • Names at least four substances transported.
TWO (a)	*Describes **ONE** correctly of:* *Diaphragm* • Contracts and moves down / flattens (not pushes). • Lowers air pressure. *Intercostal muscles* • Contract and move ribs / ribcage up / out.		
(b)	*Describes any **ONE** of:* • air is not warmed • air is not filtered / cleaned • air is not moistened • more bacteria can enter • mucus cannot trap pathogens / dust / debris • cilia do not move mucus / debris out.		

(c)	*Describes any **ONE** of:* • support the trachea / bronchi / tubes • keep trachea / bronchi open.		
(d)	*Describes breathing, eg **ONE** of* *Breathing is a mechanical process that* • moves air / oxygen into lungs / alveoli **OR** • moves carbon dioxide out of lungs / alveoli.	*Explains **how** breathing keeps the body alive, eg* Breathing in / inhaling takes in air rich in oxygen for respiration **AND** Breathing out / exhaling expels / removes carbon dioxide / waste product **OR** provides oxygen and removes carbon dioxide.	
(e)	*Describes respiration eg* *Is a chemical reaction that* • releases / produces energy • uses glucose to release / produce energy • uses oxygen to release / produce energy.	*Release of energy **linked to** "why body needs energy", eg:* • to produce energy to carry out other body processes – to grow / move / reproduce. **OR** • to produce energy to use for metabolic processes.	
(f)	*Describes a **difference between inhaled and exhaled air** for **3 out of 4 gases,** eg* **Oxygen**: inhaled air has more oxygen than exhaled air [**OR** exhaled air has less oxygen than inhaled air] **Carbon dioxide**: exhaled air has more carbon dioxide than inhaled air [or visa versa] **Nitrogen** is the same for inhaled and exhaled air / there is no difference **Water vapour**: exhaled air has more water vapour than inhaled air [or visa versa].	*Explains why there is a difference between inhaled and exhaled air for 3 out of 4 gases, eg* Oxygen diffuses into **the blood and is taken in by the body** (and used during respiration to make energy). Carbon dioxide is produced by the body (as a waste product of respiration) and removed from the body into the alveoli **PLUS ONE OF:** • **amount of nitrogen stays the same** as body cannot absorb it in a gas form / it is not used or produced by the body. • **Exhaled air has more water vapour** because it is produced as a waste product of respiration. Excess water vapour is excreted / expelled / removed **OR** Because water is needed for gas exchange to occur.	*Discuss factor(s) that cause the differences between inhaled and exhaled air for each gas, eg* **Less oxygen exhaled because it has diffused** through the walls of the alveoli into **blood to be transported to cells** for use during respiration. The energy produced is needed by the body for other body processes. **AND** **More carbon dioxide** exhaled because it is produced as a **waste product** (of respiration**)**. It diffuses out of blood into the **alveoli to be excreted.** **AND** Nitrogen as explained in Merit **AND** Water vapour as explained in Merit

THREE (a)	***Describes a function of renal artery, eg one of:*** • Brings blood to the kidney to be cleaned. • Carries blood high in urea / salts / water / wastes to kidney. • Carries oxygen (oxygenated blood) to kidney. (Provides blood to the kidney NOT sufficient)		
(b)	***Describes a function of kidney, eg one of:*** • regulates pH • filters waste products eg urea from blood • removes unwanted wastes from blood / body eg urea • removes excess water / salts / minerals from body / blood • helps control / regulate water / salt in the body / blood • produce hormones.		
(c)	***Describes idea of filtering blood (what is happening), eg:*** **Substances** (glucose / urea / water, salts) move / pass **from** blood / glomerulus / capillaries **into** Bowman's capsule / nephron **OR** Small substances (eg glucose / urea / water, salts) move / pass into Bowman's capsule / nephron while large substances (eg proteins / blood cells) remain in blood. **OR** Separation of plasma / tissue fluid from blood cells.	***Explains how blood is filtered / separated, eg:*** Blood in glomerulus / capillaries at **high pressure** forces / pushes / causes (smaller) substances eg glucose / urea / salts / water to move **into** Bowman's capsule / nephron while other (larger) substances eg proteins / blood cells **remain** in blood. (Identifies one substance)	
(d)	***Describes an effect of drinking more water on kidney,* eg** • kidney is washed out / rinsed with extra water • kidney produces more urine • solids don't get a chance to stick to walls of kidney • stone is washed out • solution is less concentrated • large amounts of water can dissolve stone.	***Explains how drinking extra water prevents another kidney stone eg*** More water intake causes more water to be **filtered** by the kidney. **Linked to** • Kidney is washed out with extra water so solids cannot stick to kidney wall again. • If solutions is less concentrated, there is less chance that a solid will form.	

(e)	***Describes an outcome, eg ONE of:*** • Scarring of kidney (due to retention of urine) • pain in abdomen / lower back / kidney • ureter blocked • urine cannot pass from kidney to bladder • may be passed out with urine.		
(f)	***Describes a difference, eg*** One of: • Urea made in liver (metabolic waste from protein / amino acids), urine made in kidney. • Urea filtered from blood into kidney but leaves kidney in urine. • Urea is a pure substance; urine is urea mixed with water, salts. • Urea is not made in the kidney.		

(g)	***Describes one similarity AND one difference*** ***OR describes two similarities*** ***OR describes two differences.*** **Similarities** • Both bloods have same amount of protein • ***Both bloods have same amount of blood cells*** • Both bloods have the same amount of glucose **Differences** • Glomerulus blood high in urea **AND** blood in capillary network less urea • Glomerulus blood high in water **AND** blood in capillary network less water • Glomerulus blood high in salts **AND** blood in capillary network less salts • Glomerulus blood more oxygen **AND** blood in capillary network less oxygen • Glomerulus blood oxygen / carbon dioxide **AND** blood in capillary network more carbon dioxide.	***Explains the reasons for: the similarity or difference / or two similarities / or two differences, eg:*** • proteins / blood cells stay inside the blood vessels / capillaries because they are too **large** to be filtered out of blood at the glomerulus • glucose filtered out by high pressure at glomerulus but all reabsorbed into capillary network because body needs glucose for respiration • blood from body high in urea / unwanted substances <u>filtered out at glomerulus</u>. Urea, a waste product is filtered from body / blood. Urine not needed, is not reabsorbed. • water filtered at glomerulus. Excess water is not reabsorbed to make up urine. Needed water is reabsorbed. • Excess salts go into urine. Any salts needed by body are absorbed. • Kidney cells use oxygen for respiration. Carbon dioxide is produced so blood in capillary network is higher in carbon dioxide.	***Discusses two similarities AND two differences, eg:*** Explains with reasons **why** there are similarities **and** differences with reference to two similarities and two differences. ***OR*** ***Discusses one similarity and three differences.***

Judgement Statement

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Achievement	Achievement with Merit	Achievement with Excellence
Minimum of TEN questions answered correctly, including at least TWO achieved from each organ system.	Minimum of TEN questions answered correctly, including at least TWO at Merit from one organ system plus at least TWO at Achievement from each of the other organ systems.	Minimum of TEN questions answered correctly, including at least ONE at Excellence and ONE at Merit from ONE organ system, plus at least TWO at Achievement from each of the other organ systems.