



Annual Examinations for Secondary Schools 2014

FORM 4

BIOLOGY

MARKING SCHEME

Section A

- 1a. i. Protein
ii. Vitamin D
iii. Iron 1 mark each – 3 marks
- b. Balanced diet 1 mark
- c. A diet high in junk food contains high amounts of fats and carbohydrates that lead to obesity and heart disease. Therefore reducing junk food from the diet can help to reduce obesity and coronary heart disease. 2 marks
- d. A Mediterranean diet is high in fibre that serves to reduce constipation and bowel/colon cancer. 2 marks
- Total: 8 marks**
- 2a. Breathing rate increases to supply the muscles with the extra oxygen needed to supply the energy required for muscles to work using aerobic respiration. 2 marks
- b. i. B
ii. C (*Accept D*) 1 mark each – 2 marks
- c. Intercostal muscles contract during breathing in and relax during breathing out. 1 mark
Award the mark ONLY if comparison is correct.
- d. Oxygen (*Accept O₂*) 1 mark
- e. Heart beats more quickly (increase in heart beat) and more deeply (stronger). 2 marks
- Total: 8 marks**
- 3a. i. Oxygen-poor blood flows from the heart out of the body and back to the heart. 1 mark
ii. Oxygen-rich blood flows from the heart to the lungs and back to the heart. 1 mark
- b. i. Bicuspid valve 1 mark
ii. Increase in strength of the heart beat; leading to a thicker left ventricle muscle wall. 2 marks
- c. i. Blood flows back to atrium instead of being pumped to lungs. 1 mark
ii. Between right atrium and right ventricle. 1 mark
Do NOT accept in the right side of the heart.

- d. Large number of mitochondria enables continuous aerobic respiration and a good supply of blood provides nutrients and oxygen. 3 marks

Total: 10 marks

- 4a. i. Produced in the liver; excreted in the kidney/skin 2 marks
ii. Produced in the liver; stored in the gall bladder 2 marks
Do NOT accept stored in the bladder.
iii. Stored in the urinary bladder/bladder; carried to the outside via the urethra. 2 marks
- b. Protein and glucose. 2 marks
- c. Concentrated urine and very dry faeces. 2 marks

Total: 10 marks

- 5a. Sucrose 1 mark
- b. Glucose and Galactose 1 mark each - 2 marks
- c. To neutralise the potentially harmful acid entering the intestines from the stomach. (ACCEPT: to create optimum pH for intestine enzymes to work in.) 1 mark
- d. They can be used over again. 1 mark
- e. Specific enzymes 1 mark
- f. Mechanical digestion: Chewing (Accept: grinding and crushing)
Chemical digestion: saliva moistens food and the enzyme salivary amylase starts digestion of starch. 1 mark each – 2 marks
- g. To increase the surface area for absorption of nutrients. 2 marks

Total: 10 marks

- 6a. Leaf from Jar A stains brown while leaf from Jar B turns blue black/dark blue. 2 marks
- b. Same type of plant; same duration of time; same place/temperature 1 mark
Any ONE
- c. release of oxygen. 1 mark
- d. The coloured water travels up the xylem to the (peduncle of the) flower. The water is absorbed by the petals. 2 marks
- e. The palisade cells that contain chloroplasts are near the surface of the leaf on the side that receives most light. 3 marks

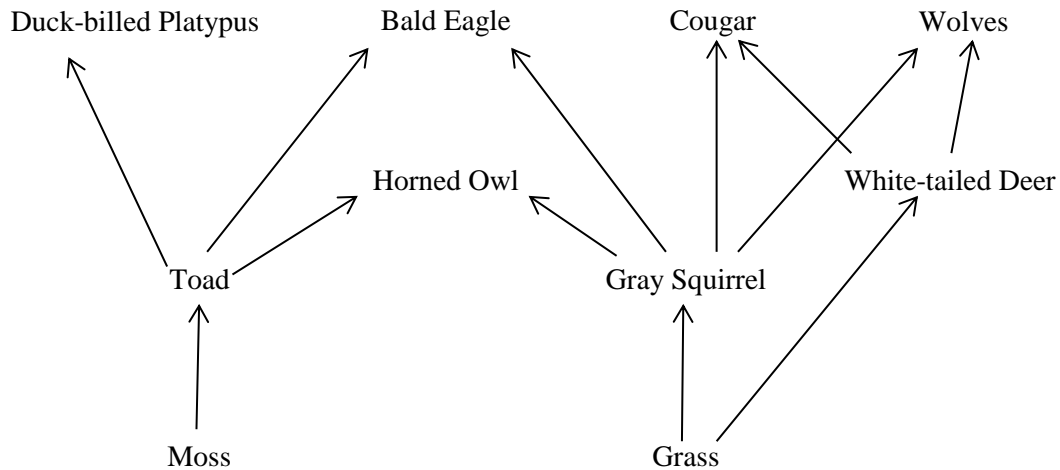
Total: 9 marks

Section B

- 1a. Near the backbone on either side of the heart; in thorax. 1 mark
Accept: On either side of the heart.
- b. Wheezing, coughing; problems exhaling; difficulty in breathing; shortness of breath; chest tightness. 2 marks
Any TWO

- c. i. Children living in Floriana have a higher risk possibility of suffering from asthma than children living in Wardija. 1 mark
- ii. Fitting catalytic converters to cars/ Using new car technology e.g. hybrid cars; electric cars etc. (*ACCEPT*: more efficient engine consume less fuel) 1 mark
- d. Mucus aids in the protection of lungs by trapping foreign particles like dust and bacteria that enter it particularly through the nose during normal breathing. 1 mark
- e. During breathing in the lung volume increases while it decreases during breathing out. 2 marks
- f. Increased breathing; inadequate ventilation; inadequate oxygenation; shortness of breath.
Any ONE
Do NOT accept symptoms such as coughing. 1 mark
- g. In a smoker cilia are destroyed (non-functional) and so mucus accumulates in the respiratory tubes. Dust and microbes trapped in the mucus slide down towards lungs making the person cough. The coughing inflames the lining of bronchi causing bronchitis. 3 marks
- h. Tar – collects in the lungs as tobacco smoke (contains carcinogens; causes lung cancer)
Nicotine – increases heart rate and blood pressure; causes addiction; narrows blood vessels
Carbon Monoxide – combines with haemoglobin in red blood cells thus reducing the level of oxygen reaching cells. 1 mark each – 3 marks
- Total: 15 marks**
- 2a. Pancreatic juice contains the protease trypsin, however it also includes the carbohydrase enzyme amylase that breaks down starch into maltose, and lipase that breaks down into fatty acids and glycerol. 3 marks
- b. As the temperature increases the rate of photosynthesis keeps increasing up to about 40°C. Above this temperature photosynthesis stops because the enzymes that control the process are denatured. 2 marks
- c. Only herbivores have a gap called the diastema between the front and back teeth. 2 marks
- d. The liver receives blood from the heart via the hepatic artery, however it also receives blood loaded with nutrients from the digestive system via the hepatic portal vein. 3 marks
- e. The indigestible food is not absorbed and assimilated – indigestible food is egested through the anus. 2 marks
- f. Multicellular animals require specialised exchange organs while single-celled animals carry out gas exchange across the cell membrane. 3 marks
- Total: 15 marks**

3a.



Do NOT award marks if direction of arrows is incorrect

5 marks

- b. Pyramids of numbers 1 mark
- c. Energy flow along a food chain results in a great loss in mass – about 90% is lost. This is because a bulk of food consumed by consumers is lost in respiration and excretion, and never reaches the next level. 2 marks
- d. The population of white-tailed deer is drastically reduced because the cougar and wolves feed more on deer since the population of Gray squirrel is drastically reduced because of the viral disease. 2 marks
- e. Ruminants have a four chambered stomach while non-ruminants do not. 1 mark
Do NOT accept ruminants have four stomachs.
- f. Molars and premolars. 1 mark each – 2 marks
- g. In carnivores canines are used for stabbing the prey and keeping hold of it as it struggles to escape. 2 marks

Total: 15 marks

- 4a. Spiracles are the tiny holes in the cuticle of insects through which air enters the tracheal system. Trachea are a series of breathing tubes and branches through which oxygen passes to reach the tracheoles and finally to organs and tissues. 3 marks
- b. The pharynx belongs both to the respiratory and alimentary systems. Through the pharynx food passes from the mouth cavity into the gullet and air passes from the nasal cavity into the windpipe. The larynx is an air passage when air is forced through the voice box the vocal cords vibrate producing sounds. 4 marks
- c. Xylem vessels are long tubes made of the hollow remains of dead cells – they carry water and dissolved minerals up from the roots through the stem to leaves. Phloem vessels are living cells that carry dissolved food materials mainly sucrose and other soluble organic compounds from the leaves to other parts of the plant including the roots. 4 marks
- d. The wall of the left ventricle is thick and muscular since it must force blood through the arteries to all the tissues of the body. The wall of the right ventricle is less muscular since it needs only force blood along the pulmonary arteries to the lungs. 4 marks

Total: 15 marks

- 5a. Biogas typically refers to the gas/methane produced by the breakdown of organic matter eg. vegetable peelings (our waste) in the absence of oxygen – by means of anaerobic bacteria. 3 marks
- b. Emphysema is a lung disease characterised by a smaller surface area at the alveoli; thus reducing the rate of gas exchange resulting in wheezing and shortness of breath. 3 marks
- c. The leaves suffer from chlorosis/yellowing of the leaves due to lack of magnesium that is necessary for the formation of the green pigment chlorophyll. 3 marks
- d. The child suffers from night blindness that is caused by lack of adequate Vitamin A in the diet. Rich sources of vitamin A include carrots, dairy products, pumpkin, apricots. 2 marks
- e. Biological detergents are effective because they contain enzymes such as lipases, proteases and carbohydrases that act on different stains such as egg yolk (protein) and oil stains (lipids). Biological detergents are also effective because they work well in low temperatures thus reducing electric consumption. 4 marks

Total: 15 marks