



**Annual Examinations for Secondary Schools 2014**

**FORM 5**

**BIOLOGY**

**MARKING SCHEME**

**Section A**

- 1a. A= 47 B = 45 1 mark  
Do NOT award the mark if comparison is incomplete.
- b. Chromosome mutation 1 mark
- c. Nucleus 1 mark
- d. In a normal human male the sex chromosomes are XY while in a human female the sex chromosomes are XX. 1 mark  
Do NOT award the mark if comparison is incomplete.
- e. 47 chromosomes 1 mark
- Total: 5 marks**
- 2a. In animal cells vacuoles are small and temporary while in plant cells there are large permanent vacuoles. 1 mark
- b. i. Hydrochloric acid 1 mark
- ii. X: Oesophagus Y: Duodenum 1 mark each – 2 marks
- iii. The A band slows and limits the amount of food that can be consumed at one time. 1 mark
- c. Bile 1 mark
- Total: 6 marks**
- 3a. Testes/testicles 1 mark
- b. 35°C or 36°C 1 mark
- c. Infertility 1 mark
- d. Smoking is addictive; Smoking causes a strong addiction – do not start it; Smoking blocks arteries and causes heart attack; Smoking causes lung cancer/emphysema; Smoking during pregnancy harms the unborn child; Smoking can slow blood flow and cause impotence; Smoking causes facial aging/aging of the skin; Smoking causes heart disease; Smoking is dangerous for your health; Smokers die young; Protect children from inhaling cigarette smoke; Smoking severely harms you and the people around you; Smoking is lethal; Smoking kills. 1 mark

Any ONE

- e. i. Irregular cycles in which ovulation does not occur. 1 mark  
Accept infertility.
- ii. Dried fruits: high source of dietary fibre; a good source of vitamin and minerals; dried fruit have no added sugar. 1 mark  
Any ONE  
Cheese: adequate source of protein and fat; supplies specific minerals such as calcium and phosphorus. 1 mark  
Any ONE

**Total: 7 marks**

- 4a. i. D      ii. A      iii. B      1 mark each – 3 marks
- b. Skull; cerebro spinal fluid; meninges. 1 mark  
Any ONE
- c. Block the arteries to the brain and limit/hinder the transport of oxygen/nutrient to brain cells. 2 marks
- d. Breathlessness; shortness of breath; wheezing. 1 mark  
Any ONE  
Accept: weak pulse; rapid or irregular heartbeat; bluish coloured skin; cough producing blood
- e. i. Surface area available; distance the gas molecules must diffuse across; the concentration gradient. 1 mark each – 2 marks  
Any TWO
- ii. In respiration oxygen enters cells while carbon dioxide is removed while in photosynthesis carbon dioxide enters plant cells and oxygen is released. 2 marks

**Total: 11 marks**

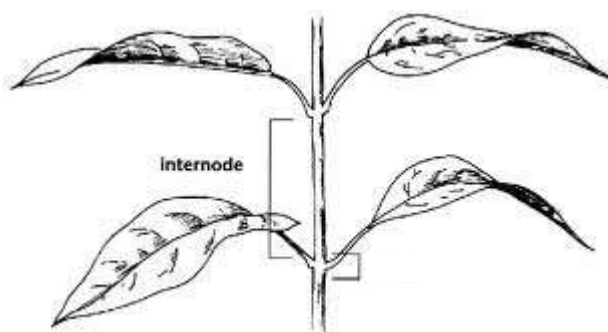
- 5a. i. Epidermis 1 mark
- ii. Touch; cold; pain; heat; pressure receptor 1 mark  
Any ONE
- b. i. Clare:  $X^H X^h$  1 mark
- ii. Steve:  $X^h Y$  1 mark
- c. Ruth:  $X^H X^H$  1 mark
- d.
- |           |                     |                 |         |
|-----------|---------------------|-----------------|---------|
|           | Noel                | Emily           |         |
|           | $X^H Y$             | $X^H X^h$       | 2 marks |
| Gametes:  | $X^H$ Y             | $X^H$ $X^h$     | 1 mark  |
| Offspring | $X^H X^H$ $X^H X^h$ | $X^H Y$ $X^h Y$ | 1 mark  |
- 25% chance of having affected son.  
Accept correct Punnet Square

**Total: 9 marks**

- 6a. Fish farming created an alternative source of freshwater/saltwater fish products to satisfy the increasing demand of the world for food due to the population explosion; fish farming replaces fish in quicker time than its natural habitat; fish farming saves some fish species from disappearing in the oceans/fish farming revives populations of endangered fish species; fish farming can combat overfishing. 1 mark  
Accept: fish farming can solve the problem of malnutrition by providing enough supply of fish which is an excellent source of protein and other nutrients such as iodine.
- b. Same temperature; same water source; same light intensity; use the same type of fish.  
Any ONE 1 mark
- c. Stir water to get 100% reading of oxygen in water at start of investigation; stop immediately if fish show signs of distress; use fresh water for each batch of fish. 1 mark  
Any ONE
- d. With an increased number of fish, the oxygen levels fall faster. 1 mark
- e. Aeration (mechanical or artificial); plants in water; recycle water (by using a pump); bubbling air/oxygen through water. 1 mark  
Any ONE
- f. i. Ectoparasite: A living organism living on another living organism. 1 mark  
ii. The bigger the number of fish in a tank the faster the spread of disease. 1 mark
- g. Accumulation of excretory products leads to eutrophication which in turn leads to biochemical oxygen demand/low concentration of oxygen in tank. 2 marks

**Total: 9 marks**

- 7a. Lack of chlorophyll. 1 mark
- b.



1 mark

- c. Etiolation response ensures that a seedling grows its shoot quickly and upwards so that it reaches the light before the seed's food stores run out. 2 marks
- d. i. A 1 mark  
More growth on side containing blob with auxin/lanolin. 1 mark
- ii. Lanolin with auxin mixture placed in a complete circle around the coleoptile. 1 mark
- e. As a control – to ensure that effect is due to auxin and not lanolin. 1 mark

**Total: 8 marks**

**Section B**

- 1a. i. Population: a group of organisms of the same species living in the same area. 1 mark
- ii. Predators; disease; availability of plants; competition; climate change. 2 marks  
Any TWO or equivalent.
- b. Persistent pesticides: do not break down and accumulate in the tissues of organisms while biodegradable pesticides break down. 2 marks
- c. i. Atmospheric nitrogen is converted to ammonia. 1 mark
- ii. Pesticides leach more in sandy soils compared to clay soil. 1 mark
- d. Decline in pollination that leads to a reduced crop yield. 2 marks
- e. Decreased ability to catch prey/ or difficulty to avoid and escape predators. 1 mark
- f. Decline in numbers of bald eagle population. 1 mark
- g. Become anaemic/pale/suffer from fatigue; easily bruised; bleed excessively. 2 marks  
Any TWO
- h. Pesticides are not specific; pesticides kill other beneficial organisms that are the predators of the pest/s. 2 marks

**Total: 15 marks**

2a.

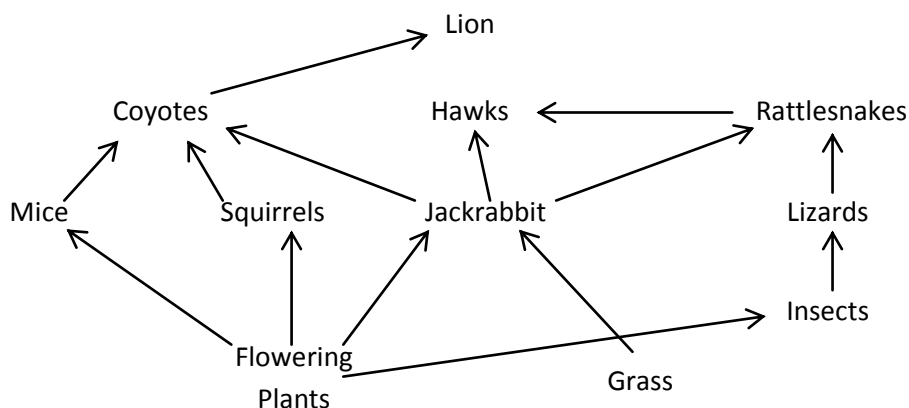
|                                 | <i>Monocots</i> | <i>Dicots</i>         |
|---------------------------------|-----------------|-----------------------|
| Number of parts of each flower  | in threes       | in fives or fours     |
| No. of cotyledons               | one             | two                   |
| Vascular bundles                | scattered       | in concentric circles |
| Roots                           | adventitious    | tap root              |
| Arrangement of major leaf veins | parallel        | network branching     |

Any TWO comparisons

1 mark for each correct comparison – 2 marks

- b. The large surface area of the ears help the rabbit to cool down by losing heat in hot weather. 2 marks

c.



5 marks

- d. Active during mornings and evenings (dawn and dusk); completely nocturnal; seasonal migration (such as moving to higher elevations); use of shade/burrows/dens during the heat of the day; dormancy during the heat/dry period. 2 marks

Any TWO

- e. Decrease respiratory water loss. 1 mark

- f. To waterproof body and to inhibit water evaporation. 1 mark

Any ONE

- g. Non desert animals need better insulation therefore have more fat. 2 marks

**Total: 15 marks**

- 3a. i. Mycelium: a mass of branching thread-like hyphae. 1 mark

- ii. Sporangium 1 mark

- b. Meiosis 1 mark

- c. The conversion of carbohydrates to alcohol and carbon dioxide using yeast under anaerobic conditions. 3 marks

- d. i. Pancreas 1 mark

- ii. When blood glucose levels increase more insulin is produced. Insulin changes excess glucose to glycogen. When blood glucose levels are low glucagon is released. Glucagon changes stored glycogen to glucose. 4 marks

- iii. Glucose is reabsorbed from the filtrate. 2 marks

- e. Death rate caused by diabetes in both males and females decreased from 2008 to 2010. Incidence of death rate caused by diabetes in males is higher than that in females over all the three years/ death rate caused by diabetes in females is lower than that in males over the three years 2008-2010. 2 marks

**Total: 15 marks**

- 4a. Both types of bacteria are involved in the cycling of nutrition. 1 mark  
Nitrifying bacteria enrich soil in nitrates by turning ammonia into nitrites and nitrates. Denitrifying bacteria lower the nitrate content of the soil by changing nitrates back to nitrites or ammonia. 2 marks

- b. Both trypsin and pepsin are enzymes involved in protein digestion by breaking proteins into polypeptides. 1 mark  
Pepsin is released in the stomach and works best in acidic conditions while trypsin is released in the small intestine and works best in alkaline conditions. 2 marks

- c. The stamen and the carpel are basic parts of the flower. 1 mark  
The stamen is the male part of the flower. Each stamen consists of a filament with an anther at the top. 1 mark  
The carpel is the female part of the flower. Each carpel consists of an ovary, a style and a stigma. 1 mark

- d. Both cells are specialised plant cells. 1 mark  
Do not award the mark if students do not mention that both cells are specialised cells.  
The root hair cell has a finger like projection that facilitates the absorption of water from soil. The palisade cell has numerous chloroplasts to absorb more light for photosynthesis. 2 marks  
Do not award marks if students mention that root hair cells are underground while palisade cells are in the leaves.  
Award 1 mark if students mention that palisade cells have numerous chloroplasts while root hair cells have none.

- e. Both the jellyfish and the garden snail are invertebrates. 1 mark  
The jellyfish is a coelenterate with simple body with tentacles and stinging cells while the garden snail is a mollusc with a soft unsegmented body covered by a shell. 2 marks  
Do not accept garden snail has a shell while jellyfish do not or jellyfish have tentacles and stinging cells while garden snails do not.

**Total: 15 marks**

- 5a. i. Micropropagation methods produce thousands of plantlets ( compared to conventional techniques that produce limited number of plantlets); the plants are genetically identical to retain the set/desired characteristics of the selected parent plant; it can be used to produce disease-free plants; it can be used to produce plants at any time of the year. 2 marks  
Any TWO
- ii. To reduce the chance of contamination (from microorganisms). 1 mark
- iii. Protection from wind/frost/harsh weather conditions; artificial lighting may be used to extend the day length such that plants can photosynthesise more; controlled climate conditions to improve crop growth; growing crops out of season. 2 marks  
Any TWO or equivalent
- b. i. Introduction of exotic/alien plant species; habitat destruction; deforestation; slash and burn agriculture. 2 marks  
Accept: global warming  
Any TWO
- ii. Nile crocodile hunted for its skin. 1 mark  
Accept habitat destruction if not mentioned in previous reply.
- iii. Very thin skin kept moist with slimy mucus; powerful rear legs; rear foot webbed for swimming; the eyes stand out from the head to give a wide field of vision. 2 marks  
Any TWO
- c. i. Seed leaves/cotyledons store food mainly starch for the rest of the embryo. 2 marks
- ii. Angiosperm seeds are produced in a hard or fleshy structure called the fruit that encloses the seeds. 1 mark
- iii. This helps to ensure that at least a few will end in a favourable place for growth. 1 mark
- d. Mutualism. 1 mark

**Total: 15 marks**