



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

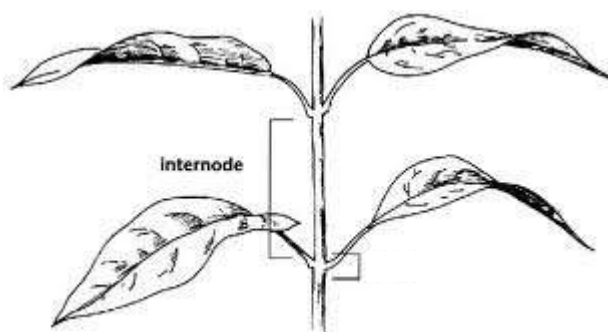
Total: 11 marks

- 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. Population: a group of organisms of the same species living in the same area. 2 marks
- b. i. Predators, disease, availability of plants, competition, climate change. 2 marks
Any ONE or equivalent
- ii. Using a biodegradable pesticide and using a natural predator/biological pest control method. 2 marks
- c. i. Leguminous plants/legumes 1 mark
Accept: peas; clover; soybeans; beans.
- ii. Nitrifying bacteria 1 mark
- iii. In wet conditions clay soil is sticky and in dry conditions it is hard. 2 marks
- d. Decline in pollination that leads to a reduced crop yield. 2 marks
- e. i. Excessive bleeding; easily bruised. 2 marks
Any ONE
- ii. Bone marrow 1 mark

Total: 15 marks

2a.

<i>Characteristic</i>	<i>Monocots</i>
Number of parts of each flower	in threes
No. of cotyledons	one
Vascular bundles	scattered
Roots	adventitious
Arrangement of major leaf veins	parallel

Any TWO

1 mark each – 2 marks

- b. Escape when captured from the tail by a predator. 1 mark
- c. No special structure develops to enclose the seeds. The seeds are found naked on the bracts of cones. 2 marks
- d. The jackrabbit. 1 mark
The large surface area of the ears help the rabbit to cool down by losing heat in hot weather. 2 marks
- e. i. Jackrabbit; mice; ground squirrels. 2 marks
Any TWO
- ii. Hawks; rattlesnakes; coyotes; lizards 2 marks
Any TWO
- iii. fourth trophic level 1 mark

- f. 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 ONE

Total: 15 marks

- 3a. i. Sporangium 1 mark
 ii. Gametes 1 mark
 iii. Mycelium 1 mark
- b. The conversion of carbohydrates to alcohol and carbon dioxide using yeast under anaerobic conditions. 3 marks
- c. i. Insulin and glucagon 2 marks
 ii. Glucose 1 mark
 iii. Renal artery 1 mark
- d. i. Incidence of death rate caused by diabetes in males from 2008 to 2010 decreased steadily. 1 mark

More balanced diets; regular training/exercise/effective health campaigns to inform public about diabetes symptoms; adequate monitoring of blood glucose. 2 marks

- ii. $(29.2 + 27.8 + 19.4)/3 = 25.46/25.5\%$ 2 marks

Total: 15 marks

- 4a. Both pancreatic amylase and salivary amylase are carbohydrases. 1 mark
 Salivary amylase produced by salivary glands in the mouth. This begins starch digestion.
 Pancreatic amylase produced by pancreas carries on the digestion of starch and changes all the starch to maltose. 2 marks
- b. Both the thyroid and adrenal glands are endocrine glands/ductless glands. 1 mark
 The thyroid gland which is located in the neck region secretes the hormone thyroxine. 1 mark
 The adrenal glands which are located one on top of each kidney secrete adrenaline. 1 mark
- c. Both the stigma and style are parts of the carpel (female part of the flower). 1 mark
 Stigma is the tip of the carpel where the pollen (male sex cells) are deposited. 1 mark
 Style is the slender stalk connecting the stigma to the ovary. 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 earthworm and the tapeworm are invertebrates. Body made of segments. 1 mark
 The tapeworm is a flatworm while the earthworm is an annelid. 2 marks
 Accept reference that the tapeworm is parasitic while the earthworm is 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). 2 marks
- 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 ONE
- ii. 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. 4 marks
Any TWO
- c. i. Seed leaves/cotyledons store food mainly starch for the rest of the embryo. 2 marks
- ii. This helps to ensure that at least a few will end in a favourable place for growth. 1 mark

Total: 15 marks