



**Annual Examinations for Secondary Schools 2014**

**FORM 3**

**BIOLOGY**

**MARKING SCHEME**

**Section A**

- 1a. i. brine-shrimp (*Accept* shrimp) 1 mark  
ii. liver 1 mark  
*Accept* beak
- b. Protection from predators/avoiding predators; maximizing food intake; using scarce suitable nesting sites more efficiently. 1 mark  
Any ONE

c.

|               |                            |
|---------------|----------------------------|
| Kingdom       | Animalia                   |
| <b>Phylum</b> | Chordata                   |
| <b>Class</b>  | Birds                      |
| <b>Order</b>  | <i>Phoenicopteriformes</i> |
| <b>Family</b> | <i>Phoenicopteridae</i>    |
| Genus         | <i>Phoenicopterus</i>      |

0.5 mark for each correct taxonomic term – 2 marks

- d. Less exposure to snakes' own predators OR more efficient for snake since it cannot move faster than its prey. 1 mark

**Total: 6 marks**

- 2a. Name: Earthworm 1 mark  
Structural feature: presence of segments 1 mark
- b. Worms eat some soil and digest any plant remains in it. This is finely ground up inside them and when they deposit it back in the earth, it is good for the soil's texture. Some worms leave it on soil as worm casts and this helps to mix the different layers of soil. 1 mark
- c. Clay soil 1 mark
- d. Waterlogged soil is short of oxygen so roots and other organisms cannot carry out aerobic respiration. 2 marks
- e. Sporangia 1 mark  
*Accept* spores
- f. To aerate the soil OR easier for root growth. 1 mark  
*Accept:* to mix soil levels

- g. i. Fungi spread hyphae onto the dead/decaying matter, produce juices containing enzymes that dissolve/act on the decaying matter. 2 marks  
*Accept: external digestion of organic matter.*
- ii. Release of minerals in soil. 1 mark  
*Accept: breaking down of dead organisms/decomposition*  
*Do NOT accept formation of humus*

**Total: 11 marks**

- 3a. The shoot tip is the part that detects the stimulus. 1 mark
- b. The shoot tip placed on agar grows towards the light source while the shoot tip placed on the metal disc shows no growth. 2 marks
- c. Receives light more efficiently for photosynthesis. 1 mark
- d. Asexual reproduction 1 mark
- e. i. Movement of water from a high concentration of water to a lower concentration of water along a diffusion gradient. 2 marks
- ii. Contractile vacuole 1 mark
- iii. It bursts 1 mark

**Total: 9 marks**

- 4a. A: testa/seed coat                      D: radicle                      1 mark each – 2 marks
- b. C 1 mark
- c. This allows the germinating seed and young seedling more time to grow and become established before it begins manufacturing its own food. Therefore a better chance of survival. 2 marks
- d. X: Wind dispersal – Light fluffy parachute like structures 2 marks
- Y: Animal dispersal – Hooks attach fruit to animal's fur 2 marks

**Total: 9 marks**

- 5a. Herbivore – an animal that gets its energy from eating plants. 1 mark
- b. Enables louse to lie close to organism for attachment/feeding 1 mark
- c. Rod shaped bacterium 1 mark
- d. Presence of cell wall. 1 mark
- e. Statement is incorrect. 1 mark  
 Only bacteria can be observed using the light microscope. Viruses are much smaller than bacteria and are only visible with an electron microscope. 2 marks
- f. To digest the tough cellulose walls present in the grass they feed on. 1 mark

**Total: 8 marks**

- 6a. i. Y                      ii. X                      iii. X                      iv. Y                      (1, 1, 1, 1 mark)
- b. i. B                      ii. A                      (1, 1 mark)

**Total: 6 marks**

7. **A – Sensitivity** (*accept* – irritability/responding to stimuli)  
Organisms respond to stimuli such as heat, touch, light and sound. 2 marks
- B – Movement**  
Animals move arms and legs by means of muscles. 2 marks
- C – Growth**  
An animal or plant develops and it gets larger and heavier – in this growth process its volume and mass increase. 2 marks
- Total: 6 marks**

### Section B

- 1a. Arthropod – mosquitoes; beetles 1 mark  
Amphibian – frog/s 1 mark
- b. Slender and streamlined body to offer minimum resistance to the water. 2 marks
- c. Maintaining adequate population numbers; outcompete other native fish; reach sexual maturity/reproductive stage earlier 1 mark  
*Any ONE*
- d. i. mammals 1 mark  
ii. internal fertilisation 1 mark
- e. Egg, Larva, Pupa, Adult 0.5 mark each – 2 marks
- f. i. Epithelium; connective tissue; skeletal tissue; nervous tissue, muscle tissue 2 marks  
*Any TWO or equivalent*  
ii. The skin is an intact barrier between the body and its environment; the skin makes a pigment to protect us from sun's rays; oil glands help with waterproofing and keeping germs out. 2 marks  
*Any TWO*
- g. Other harmless organisms will be affected (eg. insect larvae and other insects) by the pesticide. 2 marks
- Total: 15 marks**

- 2a. Round in cross section; long-thread like body. *Any ONE.* 1 mark
- b. i. Jointed legs/appendages 1 mark  
ii. Crustacean 1 mark
- c. i. Larger bodies have a smaller surface area to volume ratio and so lose heat slower than smaller bodies. 2 marks  
*Accept: Penguins have a thick layer of fat for insulation.*  
ii. Feathers trap a layer of air that acts as an insulator of heat. Feathers overlap to provide waterproofing. Dark coloured feathers absorb heat from the sun. 2 marks  
*Any TWO*  
iii. To increase surface area to lose more heat to the surroundings. 2 marks

- d. i. Hollow bones makes birds lighter for flying. 1 mark  
 ii. Solid bones in penguins makes them heavier and easier to dive underwater for food. 2 marks
- e. i. The transfer of pollen from stamen of the flower to the stigma of the same flower (or a different flower on the same plant). 2 marks  
 ii. Not being dependent on pollinating agents; helps to keep advantageous traits in the species; self pollination helps to propagate plants when number of flower is small. 1 mark  
*Any ONE*

**Total: 15 marks**

- 3a. Only birds and mammals are endothermic; amphibians, fish and reptiles are exothermic. 3 marks
- b. Insects shed their exoskeleton during moulting; grow during the moulting process and a new larger exoskeleton is formed. 3 marks
- c. Dicots have tap-root systems and broad net veined leaves but monocots tend to have a fibrous root system and long parallel veined leaves. 3 marks
- d. The Amoeba is a unicellular organism. Division of labour takes place in multicellular organisms. 2 marks
- e. Some cells like the red blood cell lack a cell nucleus (anucleate) 2 marks
- f. The tortoise is not a mollusc but a reptile. 2 marks

**Total: 15 marks**

- 4a. Phloem 1 mark
- b. i. Pollen contains the male gamete. Nectar is the sugary fluid produced in nectaries. 2 marks  
 ii. Angiosperms/flowering plants 1 mark  
 iii. Statement is incorrect because sepals are usually green. 2 marks
- c. i. Nitrogen fixing bacteria present in root nodules of leguminous plants. 2 marks  
 ii. Rapid spread of disease; rapid depletion of mineral ions 1 mark  
*Any ONE*  
 iii. Epigeal Germination. 1 mark
- d. Viruses are acellular/lack a cell structure. 1 mark
- e. Attach to a host cell; penetration; replication of virus/genetic material; release of virus. 4 marks

**Total: 15 marks**

- 5a. Storage of water gives succulent plants a more swollen appearance. 1 mark
- b. Stem 1 mark
- c. Reduces air movement near surface of plant therefore reduction in water loss therefore reduction in transpiration. 2 marks

- d. i. Mosses have thread like rhizoids to anchor them to their substrate. 1 mark  
ii. No waterproofing system to prevent water from evaporating. Lack of a vascular system to transport through plant. 2 marks
- e. i. Male cone 1 mark  
ii. Female cone 1 mark  
iii. Seeds are not enclosed in an ovary. 1 mark
- f. i. Absorption of sunlight / light energy 1 mark  
ii. Photosynthesis 1 mark  
iii. *Adequate diagram* with the following labels: Sporangium, spores 3 marks

**Total: 15 marks**