2017

Biology Paper 2
FORM 3

MARKING SCHEME

1. (a) i) plantae
   (ii)
   - Has chloroplast
   - Has cell wall
   - Has large central vacuole
   - Has regular shape.

   (b)
   A – Chloroplasts
   B – Nucleolus
   (c) stores water and mineral salts/ maintains cell shape/supports the cell
   (d) Cellulose
   (e) it uses a beam of electrons to magnify objects.
2. (a) Monocotyledonae;
   - Has a pith at the centre
   - Xylem and phloem arranged alternately in a ring round
   - Cylindrical xylem (not star shaped)

   (b)

   A – Epidermis

   B – Cortex

   C – Endodermis

   D – Pericycle

   (c)
   B – Packaging tissue/storage of food/active transport of minerals/support
   C – Storage of starch/regulate passage of substances
   D – Conducts water and dissolved mineral salts.
3. (a) 35^0C +1
   (b) Digestion takes long because the enzymes are denatured by the high temperatures.
   (c) Pepsinogen – prevent digestion of cells that produce it.
   (d)
   - PH
   - Presence or absence of enzyme inhibitors.
   - Enzyme concentration.
   - Presence of co-factors.
4. (a)
   X – Carbon(IV)Oxide
   Y – Oxygen

(b) Blood at M has a lower partial pressure of oxygen and a higher partial pressure of carbon(IV)oxide than in the alveolar air; oxygen then diffuses from the alveolar air into the blood and carbon(IV)oxide diffuses out of the blood into the alveolar space; blood at Q has a higher partial of oxygen and lower partial pressure of carbon(iv)oxide than at M.

(c) Some parts of the alveolus are poorly ventilated.

5. (a) Cigarette smoke inhibits action of cilia in the respiratory tract. This results in the accumulation of dust particles, micro-organisms and mucus. Bacteria invade the cells of the mucus membrane causing various respiratory diseases which cause lung cancer.

(b)

- ✓ They both have a large surface area for efficient diffusion of respiratory gases.
- ✓ They are both moistened all the time for respiratory gases to dissolve.
- ✓ They are both well supplied with numerous blood capillaries.
- ✓ They both have thin membrane for rapid diffusion of gases.

(c) Breathing roots/pneumatophores/lenticels

SECTION B (40 MARKS)

6. (a) photosynthesis

(b) Carnivorous

(c)

- ✓ Aquatic habitat – small fish/zooplanktons
- ✓ Terrestrial habitat – green plants

(d)

Algae → zooplanktons → bird J → large bird

Green Plants → Snails → Bird M → Large Bird

Green plants → Snails → Bird N → Large Bird

(e)

- ✓ Increase in population of snails.
- ✓ Green plants will reduce.
- ✓ Bird N will increase.

(f) Energy will be lost through excretion, egestion, incomplete predation and defecation.

(g) i)

- ✓ Fungi
- ✓ Bacteria

ii) Decomposition

(h) i)

- ✓ Hunting, poaching and trapping of birds.
- ✓ Farming and overgrazing.
- ✓ Mining leading to killing of organisms/pollution/sewage drainage.

ii)

- ✓ Farming/sewage drainage causes eutrophication and kills organisms.
- ✓ Pollution/raw sewage kills the organisms/reduces the number of organisms.

7. Abiotic Factors Affecting Plants and Animals

(i) Wind – in winding conditions the rate of transpiration increases; wind disperses seeds, fruits and spores which is an agent of pollination.

(ii) Temperature – increase in temperature increases the rate of transpiration.

(iii) Light – Plants need light for photosynthesis; some plants use light for flowering. Some seeds like lettuce require light for germination.

(iv) Humidity – low humidity increases the rate of transpiration while high humidity decreases rate of transpiration.

(v) PH – Each plant require a specific PH to grow well.

(vi) Salinity – Plants with self-tolerant tissues like mangroves survive in saline areas; plants in estuaries adjust to salt fluctuations.

(vii) Topography – in southern Hemisphere north facing slopes in temperate land have more plants than south facing slopes; plants in windward side have normal growth while plants on leeward side normally have stunted growth.

(viii) Rainfall/ Water – There are fewer plants in deserts where rainfall/water is less; water is used for germination; water is a raw material for photosynthesis.

(ix) Atmospheric pressure – variation in atmospheric pressure affects carbon(IV) oxide availability which affects photosynthesis.

(x) Mineral salts – plants thrive best where there is enough mineral salts; some plants grow in soils deficient of a particular elements.

8. Adaptation of the Human Skin
   - ✓ It has a conified layer made up of dead cells to protect the skin from mechanical damage, bacterial infections and water loss.
   - ✓ Has a granular layer made up of living cells that divide to form the conified layer.
   - ✓ It has malpighian layer which is made up of actively dividing cells that give rise to a new granular layer.
   - ✓ It contains pigment granules of melanin to protect the skin against ultra violet rays.
   - ✓ It has sebaceous glands which produce an oily secretion/sebum to make the skin supple and water proof to prevent drying or desiccation. Sebum is also an antiseptic.
   - ✓ It has blood vessels that dilate during hot weather. This increases blood flow near the skin enhancing loss of water to the atmosphere. Blood vessels constrict during cold weather. This decreases blood flow to the skin surface, thus minimizing heat loss from blood to the atmosphere.
   - ✓ It has a sensory nerve endings and receptors that enable human beings to detect changes in the external environment.
   - ✓ It has sweat glands that produce sweat to control body temperature.
   - ✓ Has hair to regulate body temperature.
   - ✓ It has subcutaneous fats in the dermis for insulation.