

**500/3**  
**GENERAL**  
**SCIENCE**  
**Paper 3**  
**2024**



**UGANDA NATIONAL EXAMINATIONS BOARD**

**Uganda Certificate of Education**

**GENERAL SCIENCE**

**Paper 3**  
**Biology**

***SCORING GUIDE***

## SECTION A

1. a) Farming on a hilly area increased chances of soil erosion, which swept away soil into the river. This exposed the plant roots, and led to the destruction of soil living organisms, loss of soil, vegetation and other organisms.

Charcoal burning led to destruction / loss of vegetation cover in form of trees. This exposed the soil to agents of erosion like running water. It also increased chances of global warming. This activity affected natural resources like wild animals by destroying their habitats and vegetation itself.

Air pollution as a result of charcoal burning can lead to respiratory diseases which can affect humans and other animals as natural resources.

The silting of swamps and rivers as a result of soil deposition can lead to flooding. This affects / blocks aquatic habitats and can lead to death of water living organisms.

- b) *Advice to Mr. Bagonza*

- Practice better farming methods such as terracing, contour ploughing on the hills to reduce chances of soil erosion.
- Plant trees on the hill to hold the soil particles together so as to avoid soil erosion.
- Should also adopt better / alternative sources of fuel other than using charcoal.
- Should plant more cover crops in the swamp to overcome silting, and ensure firm holding of soils in the swamp.
- Desilting the rivers / swamps.

- c)

- The vegetation when conserved can facilitate the process of rain formation, curb global warming and act as habitats for wild life.
- Desilting of rivers restores the aquatic ecosystem which provides better habitats for aquatic life forms like fish, frogs etc.
- Preserving soil maintains its good properties for production of food for human consumption.

- 2 a) *plant structures affected*

- Leaves
- Stems
- Roots

- b) *the* hailstorms broke off and destroyed the leaves for both sugarcane and beans. This affected the sites for photosynthesis. Therefore, the plants could not manufacture food to support life processes.

Stems were destroyed; which are useful in transporting raw materials and products of photosynthesis. This affected the normal plant functioning.

The roots of beans were also affected and these could not absorb water required for the survival of the plants.

- c) Sugarcane stems have buds, which grow new shoots and these emerge as new sugarcane plants.

The sugarcane as well have stored food in the stems in form of sugars, which are used to support the process of growth of new structures like the shoots and buds.

Through the process of photosynthesis, the sugarcane manufacture and store food in form of sugars in the stems which are used to support the process of regeneration / regrowth.

## SECTION B

3. Peter's brothers breathed in inhaled the smoke from peter's smoking of cigarette.

During breathing in, the external intercostal muscles contract, while the internal intercostal muscles relax. The diaphragm muscles also contract, hence the diaphragm flattens. This increases the volume of the thoracic cavity and the lungs, while the pressure decreases below the atmospheric pressure.

Air including smoke from peter rushes into the lungs through the trachea. This smoke proceeds to the alveoli, where it is exchanged and causes the side effects like coughing after blocking the air passages.

*Possible health challenges faced by the brothers*

- Suffocation due to poor ventilation.
- Irritations / itching in the trachea due to smoke.
- Chest pain as a result of over coughing.
- Over coughing due to blocked air passages / air sacs.
- Lung cancer in the long run.
- Bronchitis.

Advice on *how* to live a healthy lifestyle

- Improve on the ventilation of the room.
- Brothers should go for treatment for cough and chest pain.

- They should go for cancer screening / testing.
- Improve on diet to contain especially fruits.
- Peter should go for medical counselling.
- Replace smoking with a more healthy lifestyle habit.

#### 4. *Sex determination*

Sex is determined by two chromosomes X and Y. the mother has only X while the father has both X and Y. During fertilization, the male sperm / gamete containing either X or Y fuse with the female gamete / egg / ovum with X chromosome.

If the X sperm fuses with the egg, a baby girl is formed. If the Y sperm fuses with the egg, a boy is formed. Therefore, the baby's sex is determined by the chance of a given type of sperm cell fertilising the egg.

##### *Effects of Kirabo's behaviour*

- Increased risk of miscarriage.
- Increased risk of premature birth and still birth.
- Babies born with low birth weights.
- Risk of developing pregnancy complications when she misses antenatal visits.
- Liver and digestive diseases/ complications as a result of alcohol consumption.

##### *Advice to overcome the challenges*

- Should stop drinking alcohol.
- Should go for regular antenatal visits.
- Seek marital counselling to discuss about her challenges.
- Practice good nutrition and diet.