

NATIONAL BUSINESS AND TECHNICAL EXAMINATIONS BOARD
NATIONAL TECHNICAL CERTIFICATE EXAMINATION

BIOLOGY I ESSAY

PART I – INTRODUCTORY BIOLOGY

1. (a) *List the FOUR levels of organisation found in organisms.*
1. Cell 2. Tissue 3. Organ and 4. System
- (b) *State the level of organisation of each of the following:*
- Amoeba*
 - Hydra*
 - Onion bulb.*

Answer:

- Amoeba: cell level
 - Hydra: tissue level
 - Onion bulb: organ level
- (c) *Give TWO advantages of complex structural organisation in higher organisms.*
- specialization of body parts leading to division of labour
 - body parts work more efficiently.
 - all vital functions are carried out side by side one another without the stoppage of any one.
 - reproduction of new members without the disintegration of the old members.
 - ability to survive in different habitat.

PART II – FLOWERING PLANTS AND SOIL SCIENCE

2. (a) *State TWO modes of nutrition in plants.*
- photosynthetic
 - chemosynthetic
 - saprophytic
 - parasitic
 - symbiotic
- (b) *Explain what happens during light stage of photosynthesis.*
- Molecules of chlorophyll trap radiant energy of sunlight/chlorophyll absorbs sunlight rays.
 - Energy level of chlorophyll increases/chlorophyll becomes excited/chlorophyll energized.
 - ADP receives extra energy and become ATP/ATP is formed from ADP.
 - With the other extra energy, water molecules are split into hydrogen ions and hydroxyl ions/photolysis of water occurs.
 - Hydrogen ions are transferred.
 - NADP accepts hydrogen ions and becomes NADPH₂/NADP reduced.
 - Hydroxyl ions pass through series of chemical reactions to yield oxygen and water.
 - Oxygen and water are released as by-products.
- (ii) *Give the names of the TWO parts of the plants which aid photosynthesis.*
- Leaves
 - Stem
 - Roots
- (iii) *Name THREE storage structures in plants.*
- Leaf
 - Stem
 - Roots
 - Tuber/Rhizome/Corm
 - Fruit
 - Seed
3. (a) *List FOUR activities of man that can lead to soil losing its fertility.*
- Continuous cropping, over cropping, mixed cropping (without replenishing the soil)

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2. Deforestation, over grazing, using heavy machine.

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3. Bush/crop residue burning.
4. Exposing the soil, not planting cover crop or legumes.
5. Inability to control, reduce, manage and check erosion.

(b) *State FOUR characteristics of a fertile soil.*

1. Adequate mineral nutrients
2. active micro-organisms
3. well drained
4. sufficiently aerated
5. enough organic matter/humus
6. good structure and texture
7. presence of earthworms

(c) *Describe how erosion can be controlled in a village community.*

1. Dig gutters/channels for run off after rainfall.
2. Clear drains regularly
3. Plant grass to control run off from washing away topsoil.
4. Plant shade trees to serve as wind brakes
5. Avoid indiscriminate dumping of refuse.

PART III – ANIMAL BIOLOGY

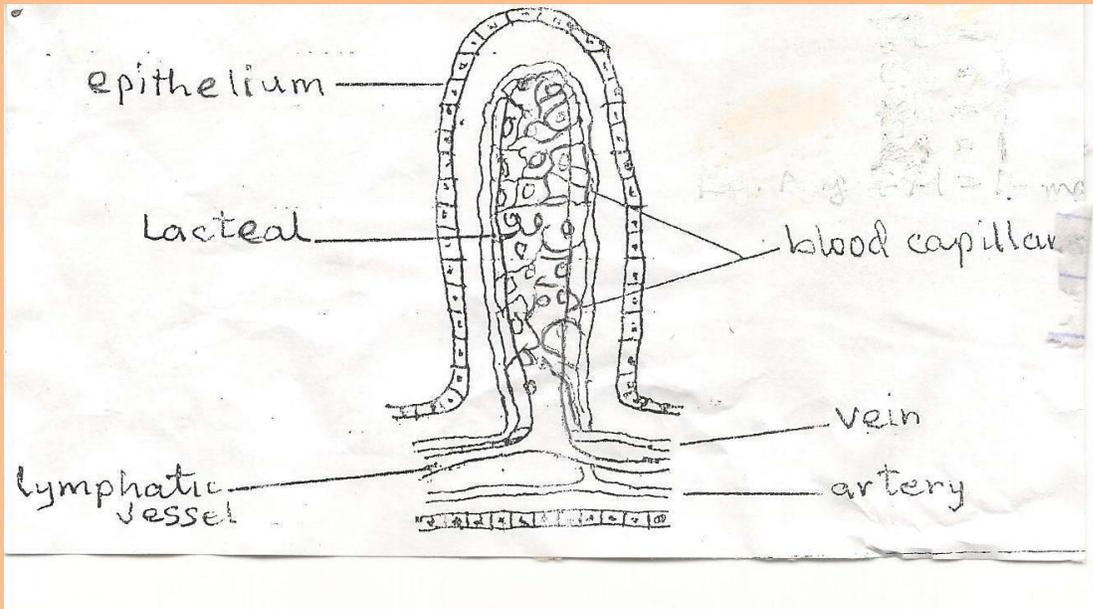
4 (a) *What is balanced diet?*

Balanced diet is that which contains sufficient quantities or amount or right proportion of proteins, carbohydrates, fats and oil, vitamins, mineral salts, water (six classes of food) to make healthy growth.

(b) *State ONE role each of the following in digestion:*

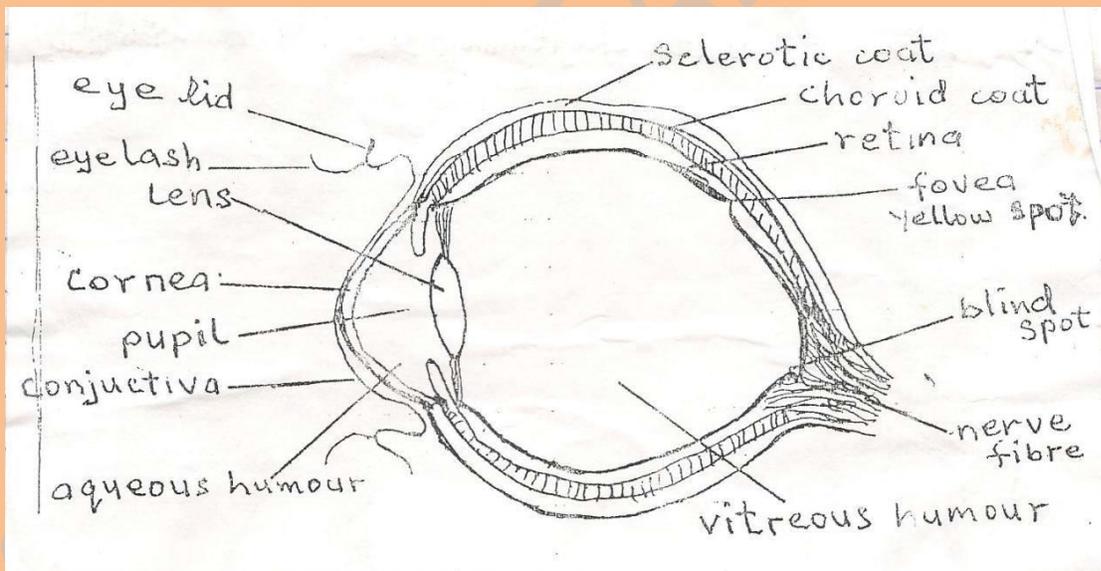
- i. **Teeth**
 - ii. **Tongue**
 - iii. **Saliva**
- i. **Teeth:** Used for tearing or cutting, cracking or crushing and grinding or chewing of food.
 - ii. **Tongue:** Used to turn/mix food; roll chewed food into a ball or bolus, press food against hard palate for swallowing and clean or clear food from the teeth and mouth.
 - iii. **Saliva:** moistens food, softens food, adds water to food. Contains enzyme (amylase/ptyalin); Digests carbohydrate/starch to maltase. The mucus in saliva lubricates the food for easy swallowing. Saliva starts the digestion of boiled/roasted/baked/fried carbohydrate foods.

(c) (i) Draw and label the longitudinal section of mammalian villus.



9

5. (a) (i) Draw a large labelled diagram of the vertical section of mammalian eye.



(ii) What parts of the eye are responsible for protection and vision?

Protection: Conjunctiva, eyelids, eye lash, sclerotic layer.

Vision: Conjunctiva, cornea, lens, retina, optic nerve.

(b) *Explain the function and effect of over and under secretion of thyroxin and insulin.*

Function: Thyroxin: It controls growth and regulates cells functions.

Effects of over secretion:

1. Cells become over active
2. Enlarge growth behind the eyes pushing them upward forward (exophthalmos)
3. Increased heart beat
4. Loss of weight

Effects of under secretion

1. over weight
2. Low rate of metabolism/hypothyroidism
3. Low mental development and performance
4. development of goitre
5. retarded/arrested growth in infants/cretinism

Insulin

Function

1. Makes the liver to remove excess glucose from blood.
2. stimulates the cell to utilize glucose.

Effects of over secretion:

1. No known effect of over secretion.

Effects of under secretion:

1. Water moves out of the body tissues by osmosis into the blood.
2. Increased urine production.
3. Frequent thirst.
4. Dehydration.
5. Lose of weight.

PART IV – GENETICS AND ECOLOGY

6. (a) List FOUR components of ecosystem

1. Water
2. Air
3. Soil
4. Plants
5. Animals
6. Micro-organisms
7. Mineral salts.

(b) Explain how to measure: i. Rainfall ii. Wind direction.

1. Rain fall:

- A rain gauge is put on a clear place in the premises. At the end of each rainfall, the cylinder is emptied into a measuring cylinder.
- The reading in millilitre is read and recorded.
- The cylinder is placed back into metal container.

2. Wind direction

- A wind vane is used in determining the direction of the wind.
- A wind vane is installed in a convenient place.
- It is observed anytime.
- The arrow head of the pointer is read at the east, west, south or north as the wind turns it.

(c) State THREE differences between parasitism and symbiosis.

Parasitism	Symbiosis
1. Only one member of association benefits while the other suffers	The two members of the association benefit from the association.
2. May result in the death or ill-health of the disadvantaged member	Does not lead to ill-health or death of any member.
3. Reproduction may be impaired in the host	Does not disturb reproduction in the members.