

(a) Sexual reproduction in *Rhizopus* - By conjugation;

- It is usually between two strains of hyphae
- Known as + and - plus and minus/ opposite mating types
- The hyphae come in contact
- And produce small projections of their walls
- Which develop into progametangia with several nuclei
- The two progametangia enlarge
- Each progametangium develops a cross wall to divide into two parts; the gametangium and suspensor
- Subsequently the wall dissolves/breaks; and their contents/nuclei fuse to form a zygote
- The zygote develops a thick wall to form a resistant zygospore
- The zygospore germinates during favourable / damp / wet condition
- Into hyphae which bear sporangia.

(b) (i) Name of hormone Adrenalin /Adrenaline

(ii) Part where hormone is produced Adrenal gland/Medulla.

(iii) Changes that must have taken place as a result of the hormone

- Increase in heart beat
- Increase in rate of respiration
- Arterioles of skin and alimentary canal constrict
- Dilation of blood vessels that cause more blood to flow to the muscles/heart/lungs
- Increase in muscular tone/voluntary muscles become tensed
- Glycogen is converted to glucose/increase in blood sugar level
- To produce more energy
- Dilation of pupils of the eye

- Momentary freight/fear/anxiety/heavy breathing
- Spleen releases more Red Blood Cells from its reserve
- Increase in blood pressure

(c) (i) Differences between excretion in flowering plants and excretion in humans.

Flowering plants	Humans
No definite excretory organs	Definite excretory organs /presence of kidney/liver/skin
waste products include tannins/resins/alkaloids/gums etc	waste products include urine/urea/sweat/salts etc
Excretory products produced in small quantity	Excretory products produced in large quantities
Excretory products released at a slower rate	Excretory products released at a faster rate
most excretory products tannins/resins/alkaloids/gums are stored	most excretory products are completely removed
some excretory products/carbondioxide/oxygen/water vapour can be reused	some excretory products/urea/uric acid cannot be reused
Excretory products are derived from simple organic molecules	excretory products are derived from complex organic molecules.

(ii) Organelles in plant cells responsible for excretion of metabolic wastes.

Mitochondrion/ mitochondria; chloroplast/ chloroplasts.

(a) Adaptation of leaf for photosynthesis

1. Broad/flat leaf lamella, exposes large surface area for maximum absorption of light
2. Palisade mesophyll cells contain a lot of chloroplast chlorophyll; for maximum absorption of light
3. Position of leaf to stem; for optimum reception of light rays/sunlight
4. Thin lamella; allows light penetration into leaf tissue of mesophyll
5. Palisade cells are at right angle/perpendicular to the upper epidermis/chloroplasts are arranged in the periphery of the cells; all for easy activation of the chloroplasts for photosynthesis
6. Large vacuoles of the palisade cells; store photosynthetic products
7. Large intracellular air spaces in the spongy mesophyll; allow oxygen/carbondioxide to diffuse in/out of the chlorophyllus cells/ gaseous exchange
8. The epidermal cells have thin cell walls; for easy penetration of sunlight to the mesophyll
9. Guard cells have chloroplast; for the absorption of sunlight
10. The bean-shaped structure of the guard cell; is to allow for gaseous exchange
11. The stomata; open easily when it becomes turgid for diffusion of gases/carbon dioxide/oxygen
12. Xylem; conducts water into the leaves for photosynthesis
13. Phloem; transports manufactured food to other parts of the plant.

(b) Mode of feeding of tapeworm;

Parasitic mode of feeding; lives in the gut of man/pigs; has hooks/suckers; which enable it attach itself to the lining of the intestine of the host; has a flattened tape-like/ribbon-like body; provide large surface area for easy absorption of digested food; no alimentary/digestive system.

(c) Mineral elements necessary for the proper functioning of;

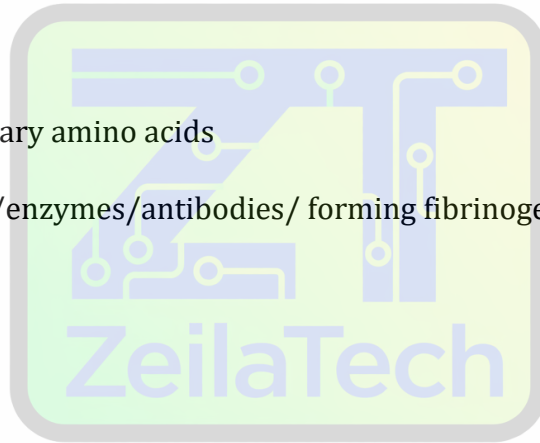
- (i) Bones - Calcium; phosphorus; fluorine
- (ii) Red blood cells - Iron; copper
- (iii) Thyroid gland - Iodine.

(d) (i) Benefits of including roughages in the diet of humans :

- Stimulates bowel movement/peristalsis
- Reduces blood cholesterol/bowel cancer/gall stones/appendicitis/ obesity / diabetes mellitus
- They do not contribute to weight gain/high blood sugar
- It releases glucose slowly
- It prevents constipation.

(ii) Importance of proteins to humans;

- For the repair of damaged tissues; replacement of worn-out tissues
- For body building
- For growth
- For the supply of the necessary amino acids
- For formation of hormones/enzymes/antibodies/ forming fibrinogen necessary for blood clotting.



3

Smart Learning Tools

(i) Sewage : Waste matter/ faeces, urine, waste water from animals/industrial/domestic sources; that is dissolved/ suspended in water.

(ii) Effects of releasing untreated sewage into a stagnant water body;

- Spread of water-borne diseases/correctly named diseases/microbes/pathogens
- May be toxic/poisonous to aquatic life/organisms
- Makes water unfit for consumption/use
- Increased decomposition
- Increased concentration of nutrients
- Rapid growth of algae/aquatic plants/algal bloom/eutrophication
- Depletion of oxygen

- Suffocation/death of aquatic animals
- Generates offensive odour/air pollution
- Nutrient/nitrate/phosphate enrichment/accumulation in a water body; as a result of breakdown by bacteria.

(b) Surface terracing as a soil conservation method :

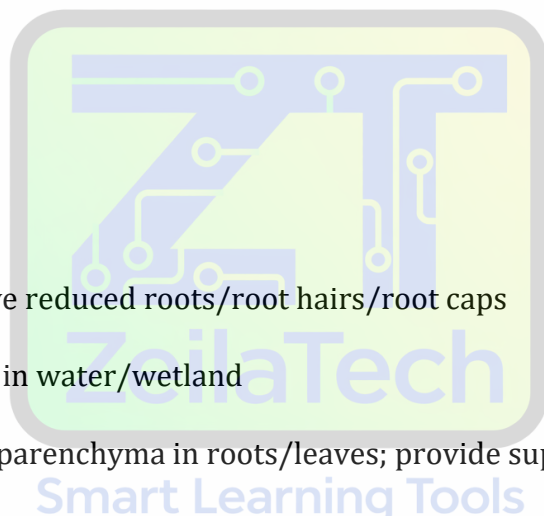
A method of controlling erosion on a gentle/steep slope of hill; flat horizontal areas are constructed on which crops are cultivated; following the contour; steps/walls are built along the contours; ploughing is also done along the contours; reduces the speed of water running down the slopes.

(c) **Adaptation** : Is the possession of the characteristic/trait/behaviour/structure/feature; that evolved over a period of time; enable an organism to survive and reproduce; in response to changes in the environment/habitat.

(d) Adaptation of;

(i) Hydrophytes

1. Some hydrophytes lack/have reduced roots/root hairs/root caps
2. do not need firm anchorage in water/wetland
3. presence of large air space parenchyma in roots/leaves; provide support for buoyancy
4. Presence of hairs on the leaves; to prevent blockage of the stomata
5. stomatal pores; occur only at the upper epidermis of the leaves to aid transpiration/loss of water
6. numerous adventitious roots and root hairs; aid the absorption of water/mineral salts
7. small size of the plant; for buoyancy/floating in water
8. waxy upper surface of the leaf; to prevent clogging of the leaf by water
9. long petiole/leaf stalk to support/ expose the broad lamina for photosynthesis
10. long flower stalk/pedice; to expose flower for pollination/ pollinating agents
11. presence of breathing roots/pneumatophores; for breathing/gaseous exchange.



Xerophytes

1. possession of thick succulent leaves/stem; for storing water
2. reduction of leaves to spines; to reduce water loss/rate of transpiration
3. thick waxy cuticle on epidermis; to reduce water-loss/transpiration
4. possession of long tap root system; to obtain water from great depth of soil
5. presence of sunken stomata; to reduce water loss
6. reduced number of stomata; to prevent excessive water loss
7. possession of multiple epidermal layers; for water conservation/to reduce water loss.

4

a) **Test cross;** This is the crossing/mating of an organism of unknown genotype with a homozygous recessive/double recessive organism; to determine the genotype of an organism.

(ii) **monohybrid cross;** Is a genetic cross between parents that differ in the alleles they possess; for one particular gene

(b) Crosses

(i) R - Round seed, r - bean-shaped seed

Parental genotype (homozygous) RR

X

rr

Gametes

R

R

X

r

r

Correct crossing (CC)

F₁ generation (Genotype) Rr Rr

Rr

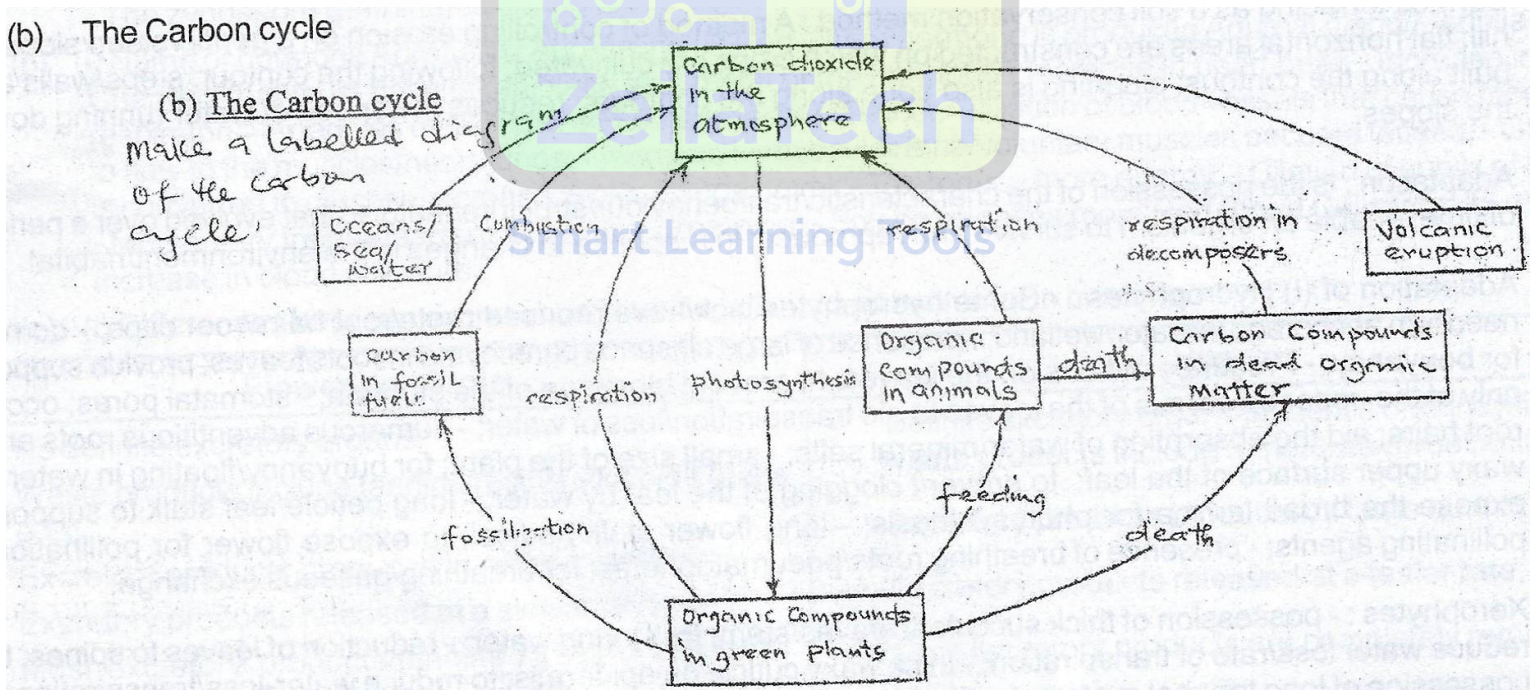
Rr

(b) (ii) Not scorable

(a) Kidney diseases

Diseases	One effect	One remedy
kidney stones	Abdominal pains; decreased frequency of urination, pains during urination; presence of blood in the urine; increased blood pressure.	Drink plenty of water kidney transplant; avoid foods rich in calcium/red meat/meat; consult a physician.
Nephritis	Oedema/swelling of feet and ankle; high blood pressure; blood in urine/dizziness/back pain/fatigue/general weakness; inflammation of the kidney tubules	consult a physician; kidney transplant; dialysis/all food items must be washed/cooked properly; drinking water boiled/filtered/sterilized
Diuresis	Thirst/dehydration occurs; high blood pressure may occur; loss of appetite; weakness; fatigue; nausea; loss of serum electrolyte.	Consult a physician; avoid fans/air conditions in cold weather, avoid excessive drinking of alcohol

(b) The Carbon cycle



(c) (i) Estuarine habitat; is the place point where a river enters to ocean/sea, into which the tides flow; fresh water mix with salt water; to form brackish water.

(ii) food chain typical of an estuarine; phytoplanktons - branacles => fish => bird **OR** Detritus => worm => molluse => bird **OR** Detritus => shrimp => fish => bird

(d)(i) Pests that can attack plant crops :

Stem borer

army worms

weevils

black tea-thrips

aphids

root mealybugs

variegated grasshopper

beetle; rodents

squirrel

locust

birds

mites

cotton stainer

any correctly named examples.

NOTE : Spelling must be correct to score.

(ii) Ways of controlling plant diseases

- Chemical control/ use of fungicides/ nematocides/ bactericides/ pesticides
- Biological control/ use of predators and parasites of insects/ pests to keep them in check
- Breeding resistant varieties of crop
- Planting genetically modified crops that can resist viruses/ bacteria transmitted by pests
- Destruction of infested crops by burying/ deep burial/pruning of affected parts
- Destruction of alternate host
- Adopt good management/ crop rotation.

(e). Functions of a public health authority

- ensures cleanliness of public places/markets/schools/playgrounds
- concerned with the proper disposal of refuse
- provides maternity clinics/health centres/nursing homes/family planning
- provides child welfare services

- provides medical inspection of schools
- registers birth/death
- prevents controls infectious diseases/ administers vaccination/ immunization/ inoculation
- informs World Health Organization of the outbreak of infectious diseases
- ensures adequate provision of clean water to the public
- provides ambulance services
- provides quarantine services for plants/ animals/ humans
- gives health certificate to travelers
- provides public health education/awareness of diseases
- inspects and certifies health of animals and cleanliness of slaughter house/ abattoir.

(f). Ways of maintaining food hygiene : -

1. proper harvesting/ storage methods must be ensured to prevent damage to food items
2. food items must be properly washed/ cleaned to prevent contamination
3. food items must be properly cooked at appropriate temperatures
4. kitchen/cooking areas must be kept clean always/free from germs
5. perishable food items must be properly preserved/ refrigerated
6. proper personal hygiene must be observed by those handling food
7. cooking utensils must be properly washed/ cleaned before and after use
8. cooked/prepared food must be covered at all time
9. proper disposal of unused/leftover food.