MARKING SCHEME
END TERM 2 EXAMINATION
JULY/AUGUST 2025
BIOLOGY
PAPER 2
FORM 3

1. A biological washing powder contains an enzyme. The enzyme removes stain such as blood from clothes by digestion when the clothes are soaked in water with the powder.
   (a) What is an enzyme? (2mks)

- **An organic catalyst that is produced by a living cell and speeds up the rate of a chemical reaction without itself being changed or destroyed or consumed.**

   (b) Identify two possible enzymes that are found in the washing powder above. (2mks)

- **Proteases**
- **Lipases**

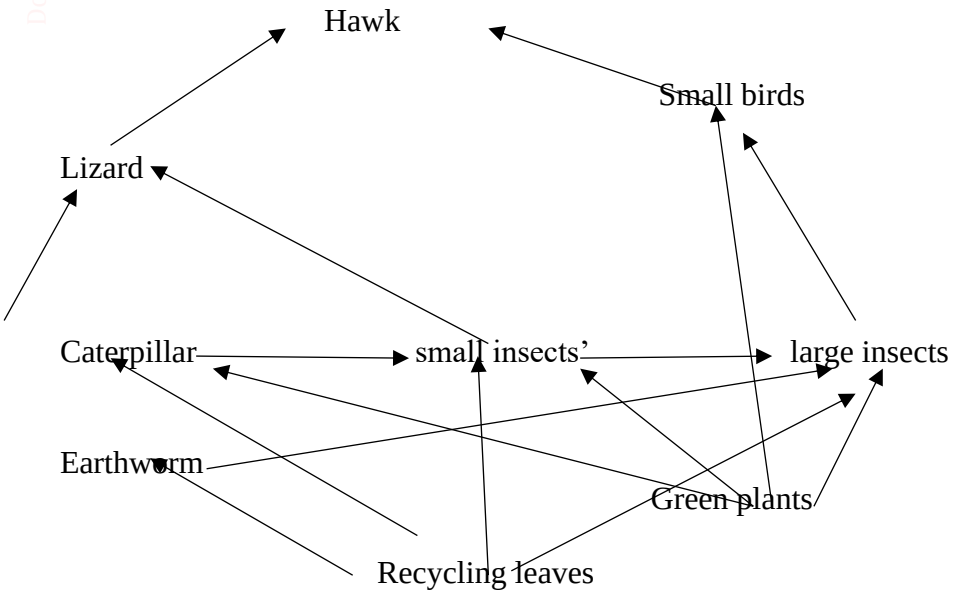
   (c) Would the stains be removed faster with the powder in water at 30^oC or 15^0C. (1mk)
   At 30^oC
   (d) Explain your answer in (c) above (2mks)

   Enzyme activity is at its optimum and enzymes quickly digest the protein that forms some of the blood stains

   (e) Why would boiling the clothes socked with the washing powder do not remove the stains? (2mks)

- **Boiling denatures enzymes making them ineffective at digesting the protein that cause the stains.**

3. Distinguish between pyramid of numbers and pyramid of biomass. (2mks)



b) From an ecological study, students formed the following food web.
Pyramid of number is a pictorial representation of organisms number at each trophic level in an ecosystem while pyramid of biomass is a pictorial representation of dry weight of organism species at each trophic level of an ecosystem.

From the food web, construct two food chains with lizard as a tertiary consumer. (2mks)

Green plants → caterpillar → small insects' → lizard

Decaying leaves → caterpillar → small insects' → lizard

c)(i) Which organism has the least biomass in the ecosystem. (1mks)

Hawk

(ii) Give reasons for your answer (3mks)

Some energy is lost through indigestible food through feeding
Some energy is lost during respiration in form of heat
Some energy is lost through defecation.

-Excess glucose is converted to glycogen and stored in the liver/ muscle cells.
-Excess glucose is oxidised to release energy
-Some glucose is converted into fats and stored in adipose tissue.
b) Pancreas and liver
c) To avoid fluctuation in osmotic pressure which disrupt metabolism;
Enough glucose is required for normal functioning of the cells.
d) Maintenance of constant internal osmotic pressure.
OR
Maintenance of water and ion concentration in an organism at a constant state.

i)(a) Cellulose

(b) - Store sugars, salt and food.
- Carry out osmoregulation by inducing osmotic.
- Gradient that brings about water movement.
- Maintain the shape of the cell.

(c) Cell wall

Chloroplast

(ii)(a) Contractile vacuole

(b) Lysosomes

(c) Cilia

2(a)(i) B - Seta / Stalk

D - Rhizoid; Rej Rhizoids

(ii) A - Production of spores / sporulation

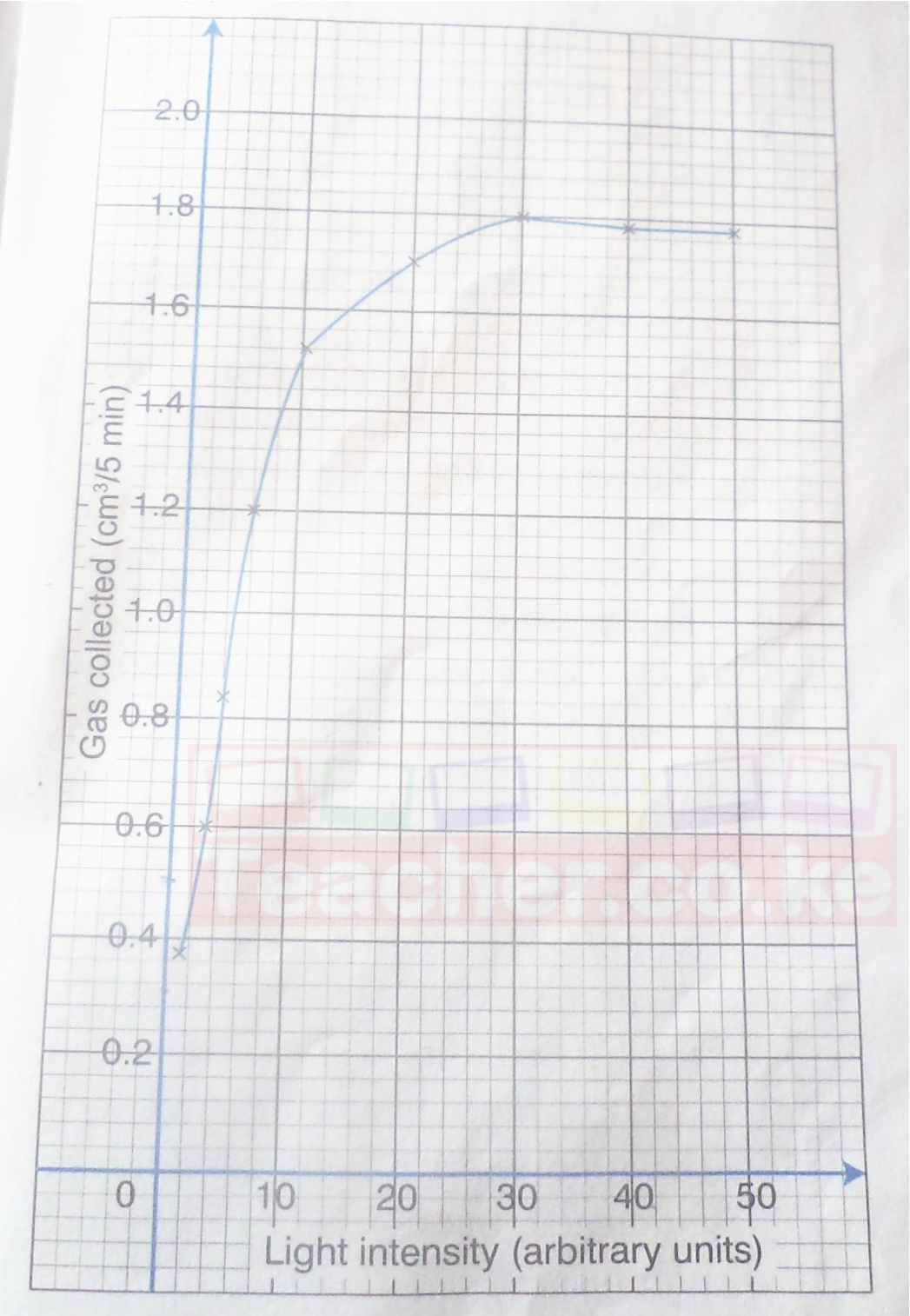
C - Photosynthesis; OWTTE

(b) (a) Phylum - Arthropod

Class - Insecta

(b) Jointed appendages

Segmented body



(b) (i) The rate of gas production increases due to the increase in light intensity. The light provided energy for photosynthesis which released the gas.

(ii) The rate of photosynthesis levels off / become constant. The optimum light intensity has been attained, so the gas production becomes constant due to other limiting factors.

(c) Carbon (iv) Oxide + water $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ glucose + oxygen

(d) ATP, hydrogen atoms, oxygen.

(e) Light energy split the water molecules to oxygen and atoms / photolysis.

(f)
- Availability of water
- Carbon (iv) oxide
- Presence of chlorophyll
- Temperature

7. a)

- Some bacteria causes disease in human beings such as vibrio used chlorine that causes cholera
- Bacteria are used to treat sewage.
- Bacteria cause dead plant and animals to decay this this realizing nutrients for us by plants.
- Bacteria cause food spoilage.
- Nitrogen fixing bacteria convert nitrogen to into nitrate which improves soil fertility.
- They are used to process cheese and yoghurt.
- Bacteria are used to produce organic acids alcohol, biogas and insulin.
- Bacteria cause diseases in plants and livestock lowering production.
- Used in bacteria and preserving tea and tobacco.
- Preparation of silage. 5x2=10mks

(b)

- Some fungi such as penicillium are used to make antibiotics.
- Some such as mushrooms are used as food.
- Yeast is used in the brewing and bread baking industries.
- Fungi cause decomposition of dead plants and animals releasing nutrients into the soil.
- Some causes diseased such as ring worms and athlete's foot in human beings.
- Dry rot fungi destroy timber.
- Some fungi such as bread mould cause food spoilage. 5x2= 10mks

- Wind;
  Windy conditions transpiration;
  Wind disperses fruits/seeds/spores; an agent of pollination;
- Temperature;
  Change in temperature affect rate of photosynthesis/other biochemical reactions/ metabolic/enzymatic reactions; rise in temperature rises transpiration.
- Light;
  (Green) plants need light for photosynthesis;
  Some plants need it for flowering;
  Some seeds (like lattice) require it for germination;
- Humidity
  When humidity is low, transpiration rate rises;
- PH
  Each plant requires specific PH to grow well;
  Acidic or alkalinity or neutral
- Salinity
  Plants with salt tolerant tissues (e.g. mangrove) grow in saline area; plants in estuaries adjust to salt fluctuations;
- Topography
  North falling slopes in temperate lands have more plants than south facing slopes;
  Windward side plants have stunted and distorted growth; leeward side plants are stunted/wind ward normal growth;
- Rainfall/water

Few plants in dry areas/where rainfall is less;
Water for germination;
Water as a raw material for photosynthesis;
Water as solvent for mineral salts;
Provides turgidity;
Water for dispersal;
A medium of transport of plant nutrients;

- Mineral salts
  Plants thrive (grow well in soils with mineral salts)
  Plants living in soil with deficiency of particular element have special methods of obtaining it. Legumes obtain nitrogen by nitrogen fixation /carnivorous plants/insectivorous plants, carnivorous trees obtain their nutrients from mycorrhizal association;