# *MARKING SCHEME BIOLOGY FORM 4*

## *TERM 2 2025*

1a)

| | |
|---|---|
| At start | Reducing sugars; absent |
| After 30 minutes | Reducing sugars; present |

b) i) diffusion;

ii) There is a high concentration of glucose molecules in the visking tubing than the beaker; glucose molecules are small enough to pass through the pores of the membrane; They move out into the beaker by diffusion;/ acc they diffuse out.

c) Cell physiology is the study of functions of the cell structures while specialisation is the structural modification/differentiation of cells to perform specific functions;

2 a) i) Chloroplast ; rej any other

ii) Oxygen

b) i) Provide the energy for photolysis / break down water into hydroxide ions and

hydrogen ions required in the dark reaction;

ii) To provide Hydrogen ions ; required on the process a medium of reaction

iii) Provide carbon required to combine with hydrogen and oxygen to form a

carbohydrate / glucose ;

c) ( respired oxidized) to produce cellular / cell energy / ATP;

used in synthesis of cellulose in cell wall :

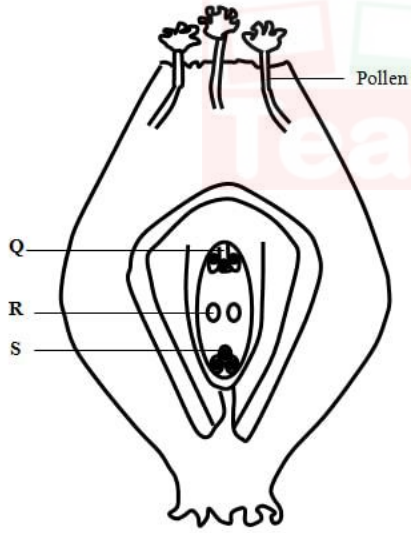
converted into starch and stored;

2.a) F. Oestrogen
G.Progesterone Progesterone
b) - Promotes healing (promotes repair (of the uterus)
-Causesthickening (of the uterine lining) vasculation
c) i) Leutinizing hormone rej LH
ii) - Causes ovulation
- Induces graafian follicle to become corpus luteurn
- Stimulates corpus luteum to release progesterone
d) $12^{th}$-$16^{th}$, 14+ 2

3 a.
i. **Protandry: condition in which stamen/anthers of a flower mature before the carpels/pistils/stigma;**

ii.**Self sterility; pollen grains from anthers of a flower fail to germinate on the stigma of the same flower**

b. The diagram below shows a stage during fertilization in a plant.

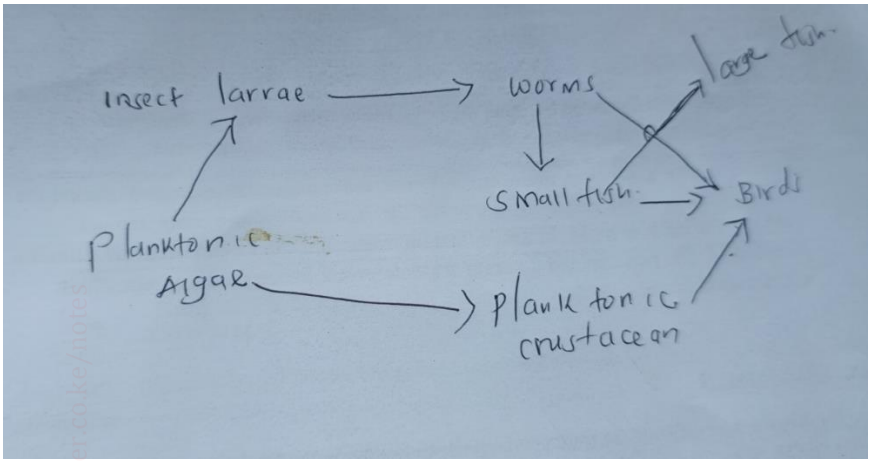



i. Name the parts labelled Q,R and S (3 marks)
**Q- Antipodal cells/embryo sac wall;**

**R- Polar nucleus/nuclei;**
**S- Egg call/ovum**
ii. State two functions of the pollen tube (2 marks)
**Secrete enzymes that digest the stigma/style/ovary tissue;**
**Offer passage for male nuclei to the ovum;**
iii. On the diagram label the microphyle. (1mark)

**Award if correctly shown in the diagram;**

4)From this record of observations construct a feed web (3 marks)




(b) From the food web you have constructed in (a) above isolate and write down a food chain that ends with

(i) Bird species as a secondary consumer (1 mark)

**Planktonic algae → Planktonic crustacean → Birds**

ii)Large fish as tertiary consumer (1 mark)

**Planktonic algae → Planktonic crustacean → Small fish → Large fish**

(c) The biomass of the producers in the lake was found to be greater than that of primary consumers. Give an explanation for this observation? (1 mark)

**Producers must always have a higher biomass than consumers because they support the consumers which are at higher trophic levels**

(d) Using either the observations recorded by the students or the food web you have constructed name

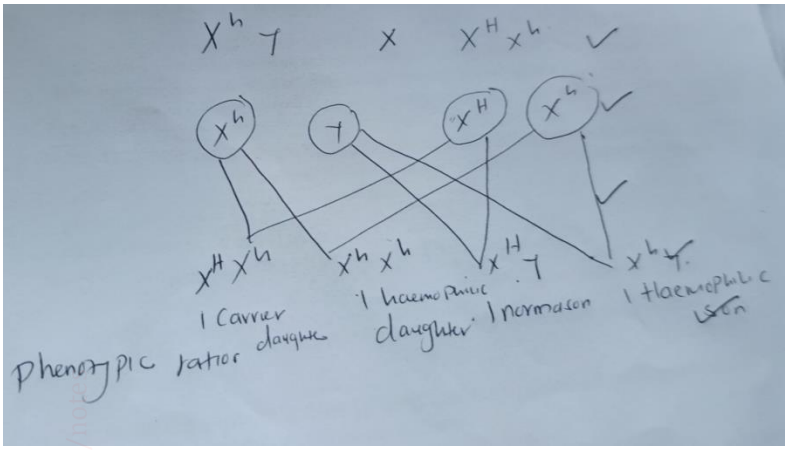
i)Two organisms that compete for food in the lake. (1 marks)

**large fish and birds**

(ii) The source of food the organisms in d (i) above compete for( 1 mark)

**5**a) $X^HX^h$

b)




c) Finger print in crime detection;

Settling parentage dispute;

Blood grouping;

***Mark any one correct.***

d) Chiasma/chiasmata (1 mark)

.S**ECTION B (40 MARKS)**

6a) half mark for each correct entry

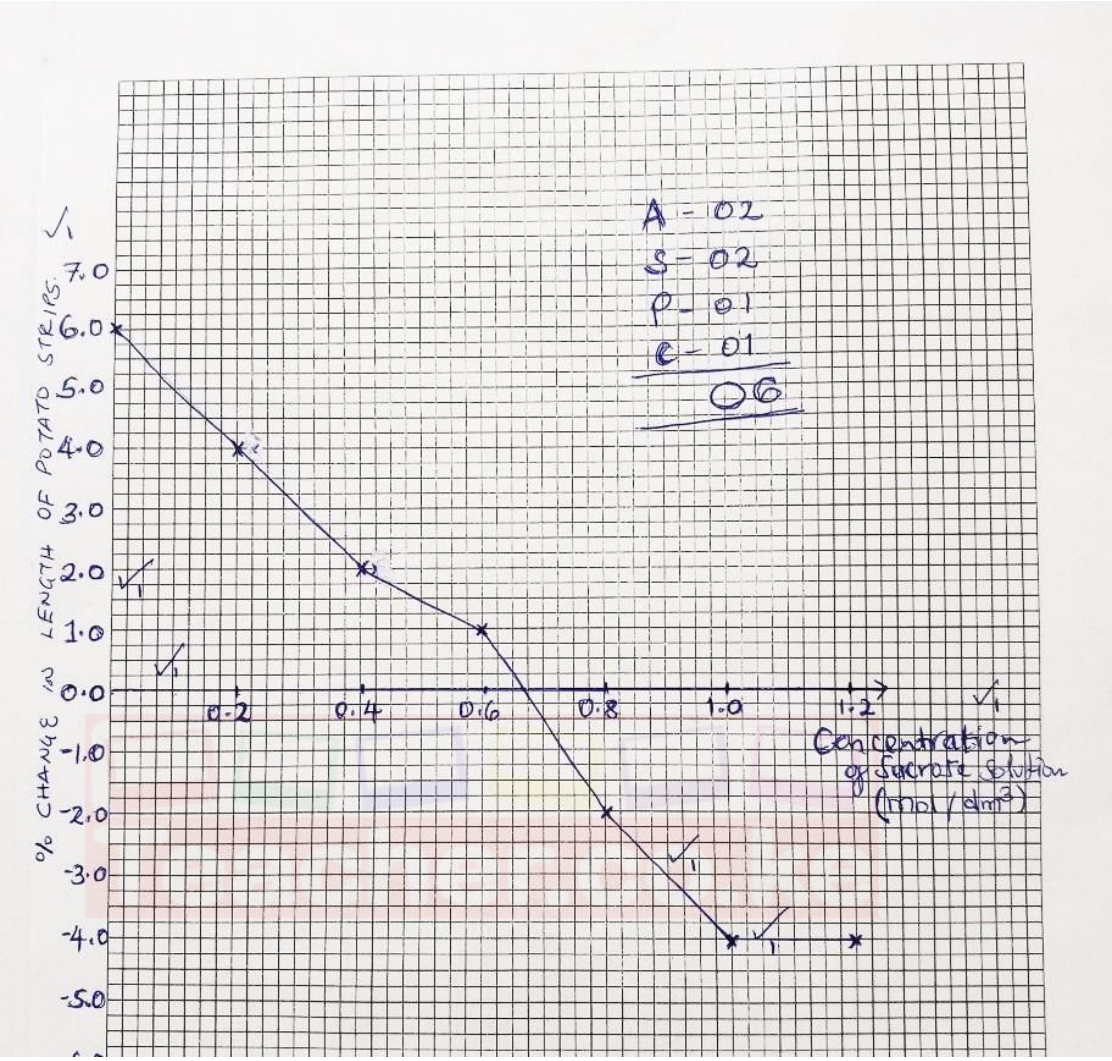
| Concentration of sucrose solution (mol/dm$^3$) | Initial length of potato strip (mm) | Final length of Potato strip (mm) | Change in length of potato strip (mm) | Percentage Change in length of Potato strip (%) |
|---|---|---|---|---|
| **0.0** | 50.0 | 53.0 | 3.0 | 6.0 |
| **0.2** | 50.0 | 52.0 | 2.0 | 4.0 |
| **0.4** | 50.0 | 51.0 | 1.0 | 2.0 |
| **0.6** | 50.0 | 50.5 | 0.5 | 1.0 |
| **0.8** | 50.0 | 49.0 | -1.0 | -2.0 |
| **1.0** | 50.0 | 48.0 | -2.0 | -4.0 |
| **1.2** | 50.0 | 48.0 | -2.0 | -4.0 |

b)i) Hypotonic/Low concentration; the potato cells gained water molecules by osmosis;

ii) Hypertonic/Higher concentration; potato cells lost water molecules by osmosis;

iii) No further osmosis; since the cells are fully plasmolysed;

c)




d) 0.675 mol/dm$^3$;

e) i)Placed in distilled water/Hypotonic solution;

ii) De-plasmolysis;

f) Absorption of water in the colon/gut; reabsorption of water molecules in kidney nephrons; Osmoregulation; Mark 1st 2

7a). Explain tropic responses in plants and their survival values. (10mks)

**Phototropism**

**This is a growth curvature in response to direction and intensity of light Shoots are positively phototropic while roots are negatively phototropic**

**Chemotropism**

**This is a growth curvature in response to a gradient of chemical concentration; developing pollen tubes grow towards chemicals secreted by the embryo sac;**

**Geotropism**

**This is a growth curvature in response to gravity; Shoots are negative geotropic while roots are positively geotropic;**

**Hydrotropism**

**This is a growth curvature in response to water/moisture; Roots are positively hydrotropic;**

**Thigmotropism**

**This is a growth curvature in response to contact with solid objects; shown by tendrils/climbing stems which twine around objects;**

**Survival values of tropic responses**

**-Thigmotropism enables the plants to obtain mechanical support, especially plants lacking woody stems**

**-Phototropism exposes the leaves in position to maximum light absorption thereby enhancing photosynthesis;**

**-Chemotropism enables pollen tubes to grow towards the embryo sac to facilitate fertilization;**

**-Geotropism enables plant roots to grow deep into the soil thus offering firm anchorage to the plant;**

**-Hydrotropism enables the roots of the plant to seek water;**

**;**

b). Explain how structures of the human ear are adapted to their functions. (10mks)

**The pinna;- is funnel shaped; cartilaginous structure that collects and directs sound waves into the ear;**

**The external auditory canal; - a tube that directs sound waves from the pinna to the eardrum lining the auditory canal; The canal contains wax-secreting cells; and hair which traps dust particles; and pathogenic bacteria hence prevent them from getting into the ear;**

**The eardrum; - has a thin tough membrane; that easily vibrates when hit by sound waves; transferring them into vibrations.**

**The ear ossiscles; - they act like a layer and they easily move forward and backward to amplify sound vibrations that hit them;**

**The suspensory ligaments; - suspends the ear ossicles and prevents excessive vibration that would otherwise damage the inner parts of the ear;**

**The eustachian tube - it connects the middle ear with the pharynx; and it equalizes air pressure between the middle and the outer ear so as to prevent distortion of the eardrum;**

**The oval window; - has thin membrane that transmits sound vibrations into the endolymph;**

**The cochlea; - highly coiled to occupy a small area but to accommodate a large number of sensory cells;**

**The perilymph and endolymph; - these are fluids that absorb mechanical shock; hence protect the delicate\parts in the inner ear; they also transmit vibrations to the inner parts of the ear;**

**The sensory cells; - when stimulated, they generate nerve impulses; which are transmitted by the auditory nerve to the brain;**

**The semi-circular canals; - these are tubular cavities that maintains body balance and posture; they contain special cells that are sensitive to changes in gravity;**

8a) External intercostal muscles relax;

internal intercostal muscles contract;
rib cage moves downwards and inwards;
diaphragm muscle relax;
diaphragm resumes its dome- shaped;
volume of thoracic cavity reduce; and pressure increases;
air is forced out of the lungs via trachea and nostril to the atmosphere
lungs deflate

b i) **SKIN: leads** increased internal body temperature, Thus, There is sweating; to eliminate nitrogenous wastes/urea/excess water; this also leads to cooling of the body; after water in the sweat evaporates; blood vessels also dilate; more blood flow close to skin surface; leading to loss of excess heat by radiation/convectional current; hair on the skin also lie on skin surface to allow heat loss by radiation/convection;

ii) **HEART:** There is increased heart beat; which increase blood pressure; thus more blood pumped to muscles/blood vessels; to increase supply of Oxygen; nutrients/glucose; for continued respiration; to supply more energy needed to sustain vigorous physical activity/muscle contraction; helps faster removal of Carbon (IV) Oxide/Nitrogenous wastes to excretory organs to be removed from the body; since if left to accumulate in the body, will poison/intoxicate the body tissues;

**DRUG ABUSE: May lead to** decreased appetite and poor feeding habits thus body gets emaciated; poor absorption of vital vitamin K and E leading to infertility/poor vision; poor performance of duty/sports due to poor body posture/balance; frequent coughs and lung infection due to irritation of lungs; may lead to lung/throat cancer; may cause stomach ulcers; damage to liver and heart tissues leading to heart attack and live cirrhossis; poor body temperature regulation thus excessive heat loss; damage to brain that may lead to insomnia/lack of sleep; hallucinatios; delirium; loss of memory/amnesia; pregnancy complications and poor foetal development in women; impaired judgement that predispose one to accidents and infections like HIV and AIDS; damage to critical organs may lead to death;