CATHOLIC DIOCESE OF KAKAMEGA EVALUATION TEST
JULY/AUGUST EXAM 2023
231/2 BIOLOGY PAPER 2 MARKING SCHEME

1. a). Each enzyme work best at specific /optimum PH

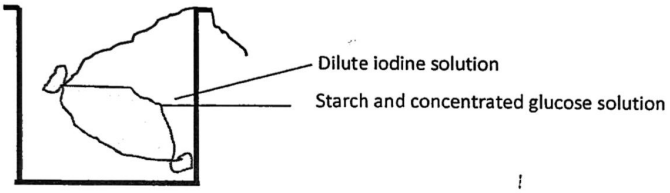
bPepsin 2
Trypsin 8 (2x1= 2mks)

c). Papain; because its activity is not affected by change in PH (2x1= 1mk)

d)(i) Pepsin – Stomach
Trypsin – Duodenum (2x1 = 2mks)

ii)Digest proteins into peptides (1x1 = 1mk)

2. The experimental set up was designed by form four students to investigate various physiological process. A mixture of starch and concentrated glucose solution was put in the visking tubing then placed in a glass beaker containing dilute iodine solution as shown below. Study the set up and answer the questions that follow.



i). Diffussion
Osmosis (1x2 = 2mks)

ii). White visking tubing content/starch solution turned blue-black;
- Visking tubing became full and more turgid;
- Volume of dilute iodine reduced in the beaker;
- The brown iodine solution colour in the beaker remained the same; (1x2 = 2mks)

iii **Diffusion**
- The high concentration of the small iodine molecules in the beaker than in the visking tubing content caused concentration gradient to develop; iodine molecules passed through the visking tubing membrane into the inner part by diffusion; iodine solution reacted with starch making the solution to turn blue / black in colour;

Osmosis
- The high concentration of water molecules in the dilute Iodine solution than in the starch and concentrated glucose solution; in the visking tubing led to a concetration gradient; water molecules moved from where they were in high concentration (in the beaker) to low concentration (in the visking tubing) by osmosis; because water molecules are small and can pass through the pores of the visking tubing; increasing the visking tubing content.

iv) Semi-permeable
- Sensitive to changes in temperature
- Sensitive to change in P^H
- Cell membrane is polarized (1x2 = 2mks)

3. a). parental genotype XX x XY^b

Allele / Allele	X	Y^b
X	XX	XY^b
X	XX	XY^b

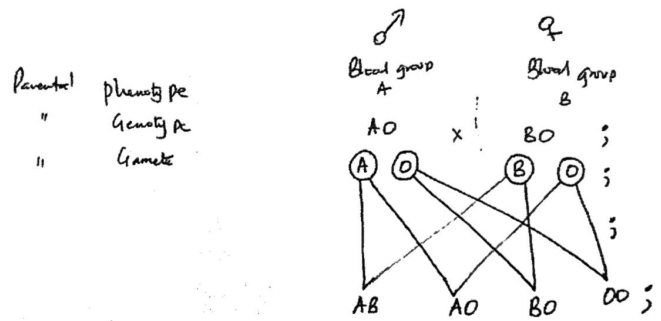
All boys were premature balded

b)

- Advice; - It is possible that blood group A and B couple can give rise to a baby with blood group O;
- Because a person blood A can be either genotype AA or AO;
- Aperson blood B can either have genotype BB or BO; since the gene O is recessive to both genes A and B;

OR

- A man blood group A genotype AO; marrying a woman blood group B genotype BO; can give rise to a baby blood group O;



- Genotype of offspring (OO) results to blood group O

4. a). To investigate fermentation / Anaerobic respiration in plants;

Tube A

- Bubbles of air / gas
- Rise in temperature/ Thermometer reading

Tube B

White precipitate form. Rej-Terms, milky/cloudy (1x1= 1mk)

c). Tube A

Enzyme in the yeast / Zymase breaks down glucose producing carbon(iv)oxide gas; and heat energy; (hence rise in temperature)

Tube B

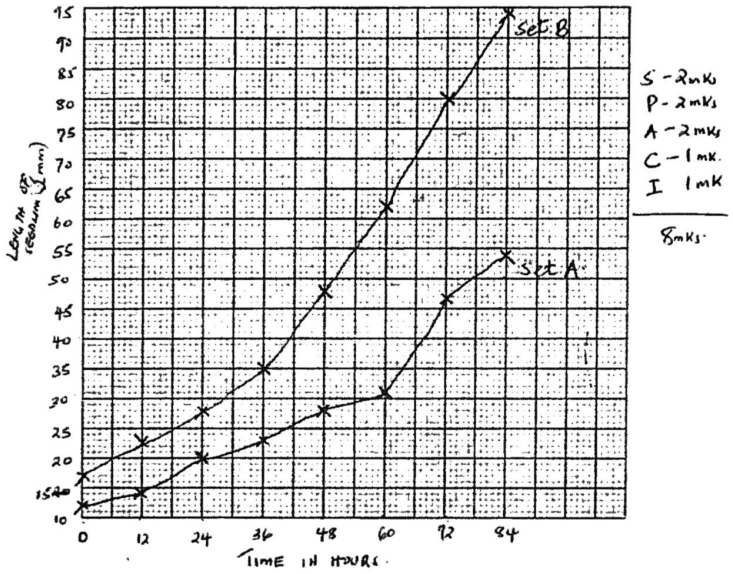
The Carbon (IV)oxide gas react with calcium hydroxide to form the white precipitate/calcium carbonate; (3x1 = 3mks)

d) To expel oxygen gas (1x1= 1mk)

e)Using the same setup, except that yeast is boiled. (1x1 = 1mk)

5.i) Phototropism
Geotropism
ii).They are sites where growth hormones are synthesized (Auxins);
iii).Within the stem, Auxins migrated from the lit side to the dark site; there occurred / was higher concentration of auxins in the darker side than the lit side; lit side with low auxin concentration had low cell elongation; Dark side had higher auxin concentration; The plant shoot therefore bend towards the light direction;
iv) Expose leaves in position to maximize light absorption for the process of photosynthesis;
(1x1 = 1m

6. a). Using suitable scale draw the graphs of the mean lengths in set A and B against time (8mks)



b) A 38mm
B 71mm } +-2

c).Set B stem/shoot length increased at a high rate; compared to shoot A; probably shoot B had been placed at/ in a darker place than shoot A; through phototropism shoot B responded with faster growth rate making the stem etiolated;

d).B would have continued at a faster rate; The stem would have become thin; and unable to support the plant upright; a phenomenon called etiolation; the stem would have turned white/yellow.

e). Temperature;
- ❖ Moisture content;
- ❖ Relative humidity;
- ❖ Growth medium nutrient status;

7 a). Describe how environmental factors increase the rate of transpiration in terrestrial plants (10mks)
How environmental factors increase the rate of transpiration in terrestrial plants.
- ➢ Temperature; High heat capacity increase evapotranspiration in terrestrial plants and vice versa.
- ➢ Light; - High light intensity prompts more opening of stomach, this predispose plants to high evapotranspiration and vice versa.
- ➢ Atmospheric pressure; It affects the amount of CO2 and O2 available for plants, this directly affects opening of stomata and consequently evapotranspiration.

- Relative humidity; The higher the RH the lower the rate of evaporation and vice
- Wind; This increases the rate of water loss from plants/Animals
- Salinity; Saline conditions outside the body of an organism/plant cause loss of water.

b). Describe five evidences of organic evolution (10mks)

- Fossil records; Remains of ancestral forms give direct evidences of organisms that existed at a certain geological age.
- Geographical distribution; Theory of continental drift explains how the one large ian mass existed with various organism, and when the mass broke various parts of it remained with different organisms which later evolved along different evolutionary lines leading to formation of new different species.
- Comparative embryology
  The evidence points out that embryos of different vertebrates groups have similar morphological features at early stages of development, this suggest common ancestry.
- Comparative Anatomy
  Organisms with similarities in basic structures suggest that such organisms have related or common ancestry.
- Cell biology
  Cells of higher organisms show basic similarities in structure and function, they also have some biological and chemical aspects in common, this suggest common or closely related ancestry.
- Comparative serology
  Analysis of blood proteins and antigens also reveal phylogenetic relationships,
  Closely related/phylogenetically similar species contains more similar blood proteins.

8.i). Seed dormancy:

- Temporary inhibition to germination where a seed is in resting condition ; with reduced metabolic reactions; (2 mks)

ii). Importance of seed dormancy.

- Enables the seed to withstand unfavourable conditions
- Allows time for dispersal of seeds; which ensures colonization of new habitats and reduce competition for resources.
- Allows time for the seeds to mature before germination; (4x1=4mks)

iii). Causes of seed dormancy.

- Immature embryo;
- Presence of hard seed coat (Testa);
- Presence of growth inhibitors e.g abscisic acid;
- Absence of growth promoters/ Hormones; e.g Gibberellins
- Lack of oxygen
- Lack of exposure of the seed to light for a certain duration of time/light of right wavelength;
- Lack of optimum temperature; (Max' of 7mks)

iv).Breaking seed dormancy.

- Allow seeds enough time to mature
- Removal of impermeable testa through scarification, pricking use of fires;
- Treatment with growth promoters;
- Drainage to increase soil air holding capacity
- Socking in water (to dilute inhibitors
- Exposure to long periods of heat (max of 7mks)