

SAMIA SUB-COUNTY JOINT EXAMS-2021

BIOLOGY PAPER 2, MARKING SCHEME.

1 (a) Diffusion; (1 mark)

(b) (i) Brown colour (of iodine solution) seen;

Arm B

- Blue black colour seen; (2 marks)

(ii) Iodine particles/molecules move from arm A where they are in high concentration by diffusion; across pores on semi-permeable membrane into arm B. Iodine-starch reaction results to formation of blue black colour;

(c) (i) (2 marks)

- Absorption of nutrients in alimentary canal
- Reabsorption of useful substances in the nephron / kidney / kidney tubules.
- Gaseous exchange in alveoli / lungs. (2 marks)

(ii) - Surface area to volume ratio;

- Thickness of the membrane;
- Concentration gradient;
- Size of molecules;
- Temperature; (1 mark)

(Mark the 1st one).

2. (a)

(i) Blood cells / (Red blood cells, white blood cells and platelets);

- Blood proteins / Globulin and fibrinogen;

(2 marks)

(ii) Are too big to pass through

(b) (i) Less water would be reabsorbed and a lot of dilute urine is produced;

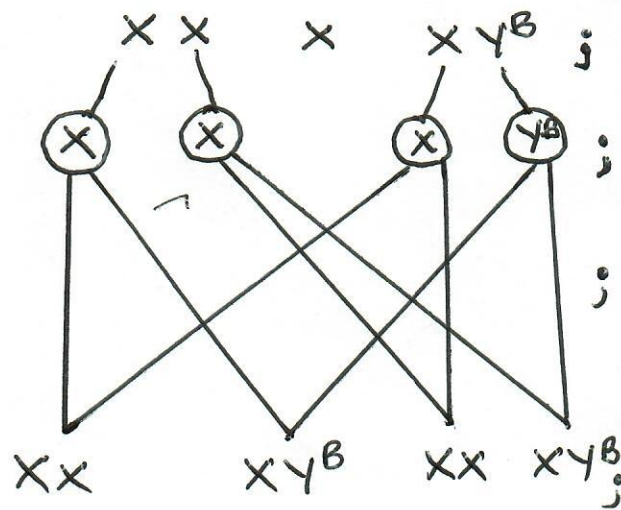
(ii) Diabetes insipidus (2 marks)

(c) Excess amino acids are deaminated by removal of amino group; the amino group is converted to ammonia; which combines with carbon (iv) oxide to form urea; that is excreted by the kidney. (3 marks)

3. (a) (i)

Woman

Bald headed Man



(ii) $\frac{0}{2} = 0\%$ / Nil / None

Reject $\frac{0}{4} = 0$

(iii) The gene for bald head / premature baldness is on the Y-chromosome, which girls do not inherit from their father; (0/0/0/0)

(b) (i)

U	C	A	U	A	G	C
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 ;

(1 mark)

(ii) - Resistance to diseases/
Pests/adverse weather
conditions ;

- Increased yield ;

- Early maturity ;

(1 mark)

(Mark the 1st point).

4. (a) 1 - Folate / vitamin B

2 - Dietary fibre

Accept water

(2 marks)

(b) - Breast milk Substitute;

Explanation:

- Has least amount of
Calcium and vitamin D
necessary for healthy bone
and teeth formation ;

(2 marks).

(c) - Breast milk Substitute;

Explanation:

- Has highest level/amount
of sugar which is the
main respiratory substrate ;

(2 marks)

(d) Contains antibodies, (and
other elements) that
protect baby from illness/
chronic diseases/allow
mother to pass immunity
to her baby ;

(2 marks)

5. Darwinian

(a) Evolution occurs through adaptation
by living organisms to their
environment. Environment can
select against or for a particular
organism (Natural Selection) ;

Lamarckian

Development of body parts is
directly proportional to their
utilization and acquired
characteristics are inherited ;
(use and disuse)

(0/1/1/1)

(2 marks)

(b) (i) Structures that have a common
basic plan and a common
embryonic origin, but modified
to perform different functions ;
(1 mark)

Examples

Beaks of birds / Mouth parts of insects
/ penta dactyl limbs ; (1 mark)

(ii) Structures that have different
basic plan / embryonic origin
but modified to perform similar
functions ; (1 mark)

Examples

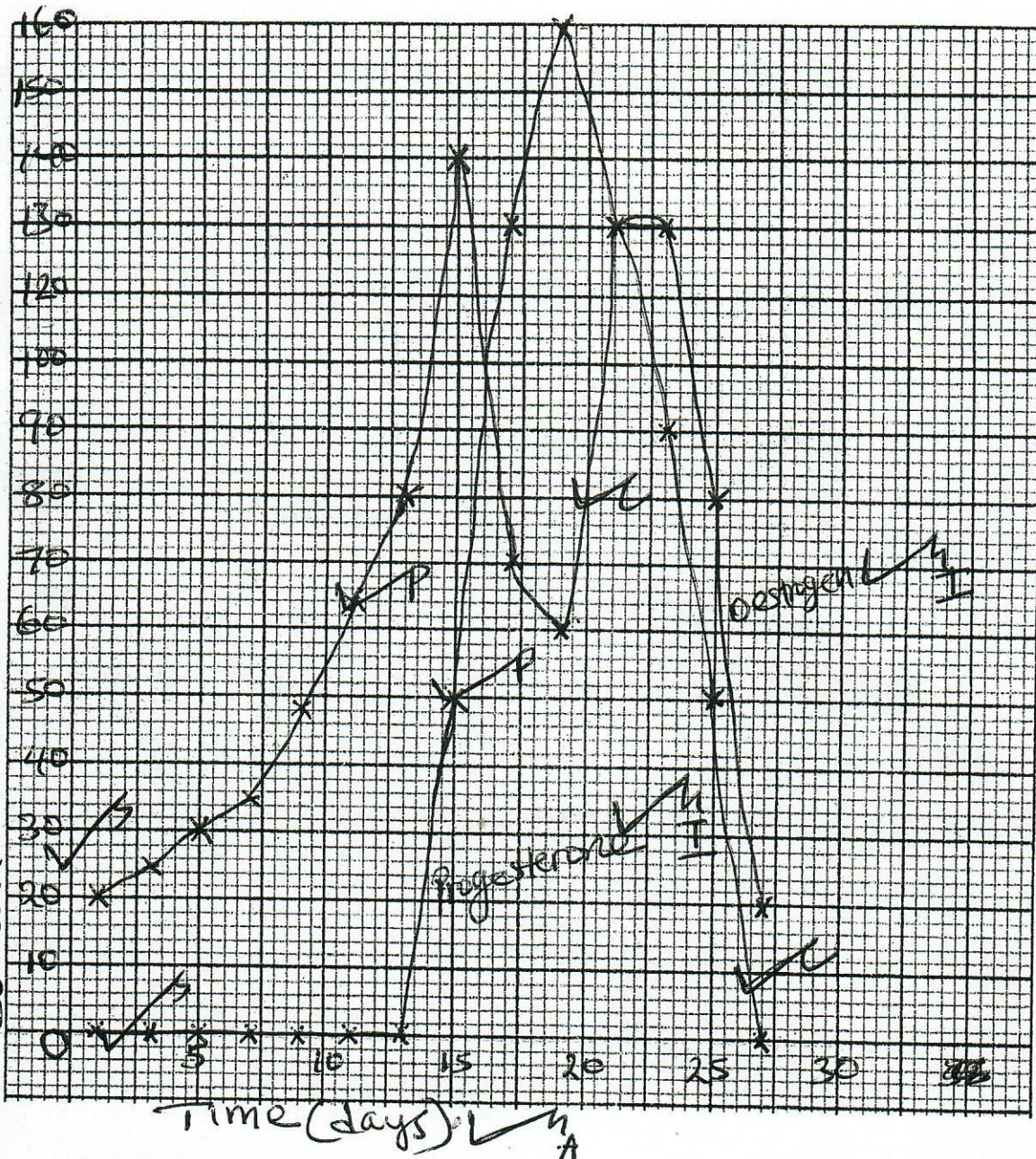
Wings of insects and wings of birds ;
(1 mark)

(iii) Structures that have ceased
to be functional over a long
period of time hence reduced
in size ; (1 mark)

Example

Caecum / Nictitating membrane/
Appendix / Coccyx bone/
Ear muscles / Body hair in human
being ; (1 mark)

Concentration of oestrogen and progesterone (mg/100cm³ blood)



$$\begin{array}{r}
 A=1 \\
 S=2 \\
 P=2 \\
 C=2 \\
 \hline
 T=1 \\
 \hline
 8
 \end{array}$$

100

- b) State the possible event taking place in the uterus during the first week. (1 mark)
 ...Healing and repair of the endometrium; ✓
- c) State the events taking place in the ovary between day 1 and day 13. (2 marks)

Development of the graafian follicle; ✓
 Production of oestrogen; ✓
 Maturation of graafian follicle/ovulation; ✓

3 max. 2

- (d) Ovulation (just) occurred; need to prepare endometrium for implantation / stimulate thickening of endometrium for implantation. (2 marks)
- (e) Due to increase in progesterone / activities leading to proliferation / thickening of endometrium; (1 mark)
- (f) Fertilization failed to take place, Corpus luteum degenerates; hence no more production of progesterone;
- (g) (i) (Site for) Spermatogenesis / sperm formation;
- (ii) Nourishes Spermatozoa / sperm cells;

- 7 (a) - Baking of bread;
- Brewing of beer / wine;
 - Formation of dairy products e.g. Cheese / yoghurt / sour milk
 - Formation of organic acids e.g. Oxalic acid / Citric acid / Vinegar (ethanoic acid).

(b) Inhalation

External intercostal muscles contract while internal intercostal muscles relax; raising the rib cage upwards and outwards; muscles of the diaphragm contract hence flatten; volume of thoracic cavity increases; and pressure decreases; (than atmospheric pressure) the higher air pressure in the atmosphere forces air into the lungs / the lungs inflate;

Oxygen in the inhaled air dissolves in moisture in the alveoli; and diffuses across alveolar wall through capillary wall into the blood; due to concentration gradient; CO_2 in the blood diffuses across capillary and through alveolar wall into the lungs; due to concentration gradient;

Exhalation.

External intercostal muscles relax; while internal intercostal muscles contract; causing rib cage to move downwards and inwards; muscles of the diaphragm relax and form a dome shape; making the volume of thoracic cavity to decrease; while pressure increases; than atmospheric pressure; higher pressure in the thoracic cavity forces air out of the lungs / deflates the lungs;

8 (a) Legumes form symbiotic relationship with rhizobia/nitrogen fixing bacteria; resulting in symbiosis leading to formation of root nodules; within which rhizobia convert atmospheric nitrogen; into ammonia; that is used by plants;

(5 marks)

(b) Wind; in windy conditions the rate of transpiration increases; disperses fruits/seeds; is an agent of pollination. Temperature; changes in temperature affects rate of photosynthesis and other biochemical reactions/metabolic reactions/enzymatic reactions; Increase in temperature increases rate of transpiration; Lower temperature/temperature below optimum inactivates enzymes hence lower rate of reactions; at optimum temperature enzymes work best hence maximum enzyme activity;

Light; Plant Avoul energy/correct light wavelength for photosynthesis; some plants need light for flowering/Photoperiodism; Seeds like lettuce require light of certain wavelength for germination; Humidity; when humidity is low rate of transpiration increases;

pH; Each plant requires a specific pH to grow well either acidic/alkalinity/neutral;

Salinity; Plants with salt tolerant tissues grow in saline area; plants in estuaries are able to adjust to salt fluctuations;

Topography; North facing slopes lands have more plants than south facing slope; plants on windward side have stunted/distorted growth;

Water; is needed for germination; it is a raw material for photosynthesis; dissolves mineral salts; provides turgidity hence support in plants;

Atmospheric pressure;
At low atmospheric pressure there is increased rate of transpiration; affect amount of oxygen for respiration;

Mineral Salts / trace elements;
Plants thrive well where there are mineral salts in the soil; plants living in the soil deficient in particular mineral element have special methods of obtaining it; (e.g. leguminous plants by nitrogen fixation, insectivorous plants by feeding on insects);

(34 Marks, Maximum 15 Marks).