

TANZANIA HEADS OF ISLAMIC SCHOOL COUNCIL
FORM SIX INTER ISLAMIC MOCK EXAM

133/2

BIOLOGY I

MARKING SCHEME — 2024.

MARKING SCHEME

SECTION A (70 MARKS)

1 (a)

CHALLENGES OF CELL THEORIES:-

- (i) Cell theory doesnot explain clearly the origin of Pre existing cell
- (ii) Cell theory suggest that all living organism are Made up of cell but didnot consider VIRUSES which dont have cellular organisation and carry it life process.
Eg RBC
- (iii) Some cell dont have nuclei hence no genetic materials while cell theory suggest that all cell have simial chemical composition
- (iv) Some organelles like mito chondria contain genetic material (DNA) but their not a cell.
- (v) They didnt explain why virus reproduce while their not a cell.

(b)

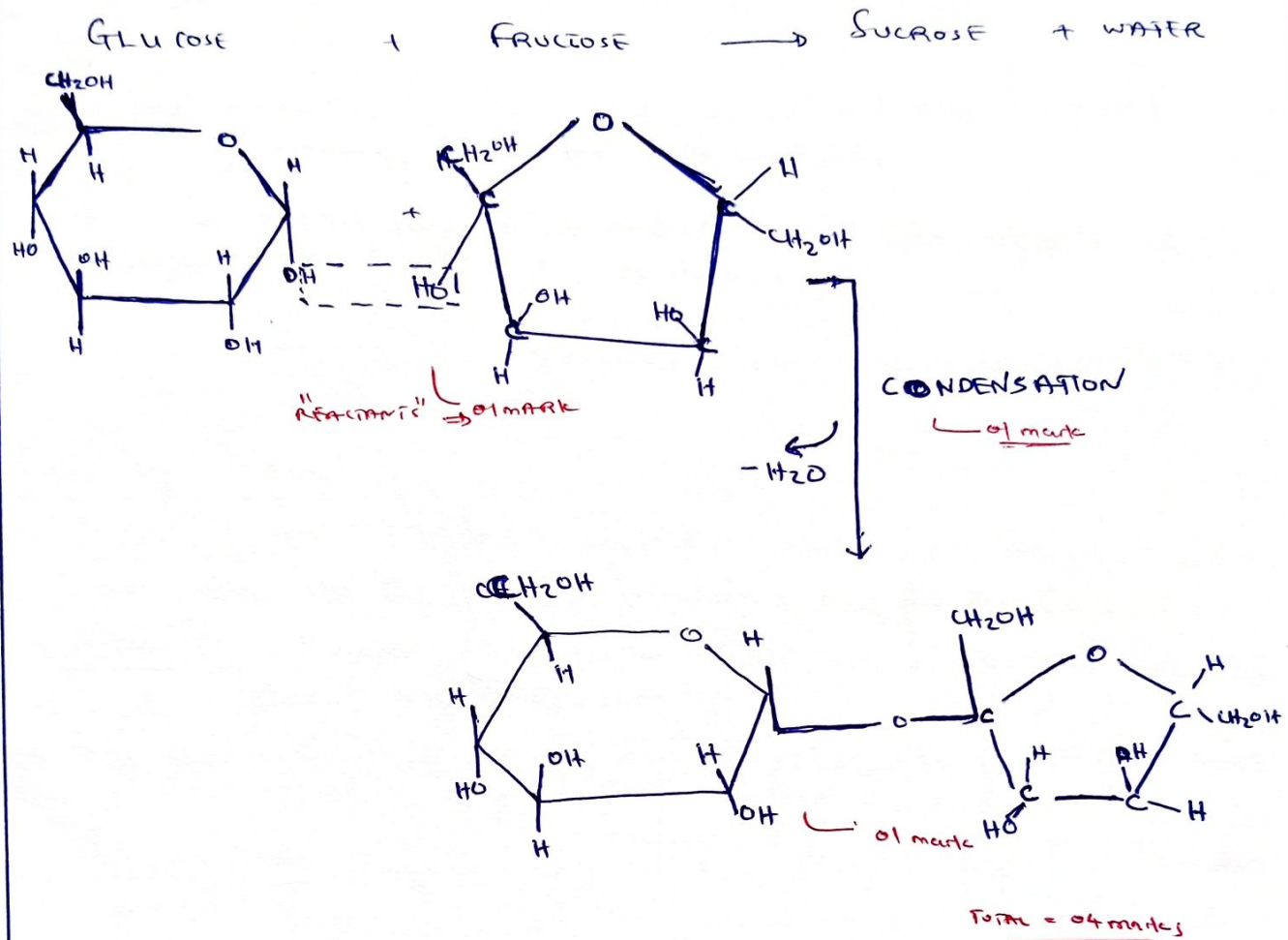
SYMBIOTIC NATURE of mitochondria:

ANY 5 points @ 01 mark = 05 MARKS

- Mitochondria has own ~~Circular~~ DNA ~~for~~ self replication
- Mitochondria has own Ribosome for protein synthesis
- Mitochondria has own Enzyme system for carry out metabolic processes. Eg Krebs cycle
- Mitochondria has own Membrane system, control movement of material (Allow mitochondria to communicate with its surrounding)
- Mitochondria has own cytoplasm like material "MATRIX" which is the site of chemical reaction.

ANY 5 points @ 01 marks = 05 MARKS

2. (a) (i) Equation to show Sugar formula that found in Sugarcane
 — SUCROSE — 01 MARKS



2. (a) (ii) Features of Polysaccharide to make it to be good storage molecule:
- They have Large size molecule so when hydrolysed can yield many monosaccharide at a time (Es. Glycogen ~~have~~ made up of many glucose)
 - They are less or Insoluble in water Example starch so can be stored in cytoplasm of a cell.
 - They unreactive, don't affect pH of a cell, osmotic behaviour of a cell cytoplasm
 - They are easily hydrolysed or converted to ^{simple} sugar at convenient time when they are required to do so.

any 3 point @ 01 mark = 03 MARKS

2(b) CLASSES OF LIPID BASED ON CHEMICAL COMPOSITION

- Simple lipid (Homolipid)

- * Are lipid (ester) Made up of fatty acids and Alcohol

Example Fat, oil, wax.

Compound Lipid (Heterolipid)

- * Are lipid Made up of fatty acid, Alcohol and other compound

Example Glycolipid, Lipoprotein, Phospholipid.

Derived Lipid

Are lipid derived from simple and compound lipid after hydrolysis

Example - steroids, terpenes, carotenoids

* any point x 3 @ 0.5/2.

= 0.5/2 marks

* any explanation or example x 3 points @ 0.5/2 or 1/2 marks

3(a) Types of Neuroglia:

- * Microglial are smallest neuroglia which are Macrophage cells that makes up the primary immune system for the CNS.
- * Astrocytes These are found in the CNS, helps to provide metabolic and structural support of neurone.
- * Oligodendrocyte These are found in CNS, helps to form Myelin sheath on the axon which speed up rate of transmission of impulse
- * Schwann cell These are cell found in PNS, helps to form Myelin sheath.
- * Satellite cell
These cells are found in PNS, they provide structural and metabolic support to the other nerve cell.

any 3 point @ 0.2 marks = 0.6 marks

3.(b) Roles of synapse

① Unidirectionality

- synapse ensure impulse flow in one direction only.
- Because always the neurotransmitter are released from presynaptic neurone and receptor are found on post synaptic neurone.
- Increase efficiency of impulse transmission

② Transmit Impulse between two neurone (Act as a junction)

Example a Neuro muscular junction, Allow impulse from motor to the muscle

③ Adaptation and Fatigue

Adaptation is the steadily fall off response of neurone due to constant stimulation and

Fatigue - It occur when the amount of neurotransmitter in vesicle get exhausted hence synapse can no longer conduct impulse.

↓ continue

3(b) Continue (Role of synapse)

- Amplification - Some synapse has a tendency of release the ^{low amount} neurotransmitter that excite the post synaptic membrane
- This synapse increase sensitivity even if there is presence of weak stimulus.
- Filtration of Impulse
Some synapse may filter low level stimuli
- Facilitation

any four points ^{role of synapse} @ 0.5/2 marks = 02 marks
any 04 explanation @ 0.5/2 marks = 02 marks

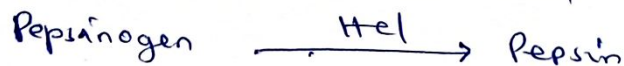
4.(a) Differences between Mesophyll and Bundle sheath chloroplast

MESOPHYLL CHLOROPLAST	BUNDLE SHEATH CHLOROPLAST
- Large gran - Light dependent stage favoured - Plenty of ATP, NADH₂ and oxygen generated - No RuBP Carboxylase so no CO₂ fixation - Little starch grains	- No gran (very few and small) - Light dependent stage occur at very slow rate - Little NADH₂ ATP and O₂ generated - High concentration of RuBP Carboxylase - Abundant starch grains

any 05 points (Difference) @ 0.1 mark = 05 marks

(b) - Roles of HCl produced by OXYNTIC CELL.

- It kills bacteria which are associated with swallowed food.
- It provide Optimum pH of 2.5 which enable stomach enzyme (Pepsin) to work best
- It help to convert the pepsinogen to pepsin



- Help to stop reaction/activities of salivary amylase
- Help to initiate the digestion of complex sugar (sucrose)

any 5 points @ 0.1 marks = 05 marks

5(a) Biological key - Refers to set of observable characteristics that leads to the identification of unknown organism

OR

- Refers to schedule of characteristics data which can be matched or correlated with observable characteristics of organism so as to identify it.

any definition = 01 mark

(b) Number key Six Coupled Leads

1. (a) Sex female - - - - - go to 2
(b) Sex male - - - - - go to 5.
2. (a) Hair colour red - - - - - Susan
(b) Hair colour blond - - - - - go to 3.
3. (a) Hair colour blond - - - - - Jane
(b) Hair colour brown - - - - - go to 4.
4. (a) Glasses worn - - - - - Donna
(b) Glasses are not worn - - - - - Linda
5. (a) Pants Jeans - - - - - Caleb
(b) Pants slacks - - - - - go to 6.
6. (a) Hair colour black - - - - - James
(b) Hair colour brown - - - - - Zach

any 6 coupled lead @ 0 1/2 marks = 3 marks.

6(a) Five (5). — 01 mark

Illustration

- 1st. Into Epithelial Cell lining of Alveolus
- 2nd. out of the cytoplasm of Epithelial cell
- 3rd. Into Endothelial of Blood Capillaries
- 4th. Out of the Endothelial of Blood Capillaries
- 5th. Into cytoplasm of Red blood cell.

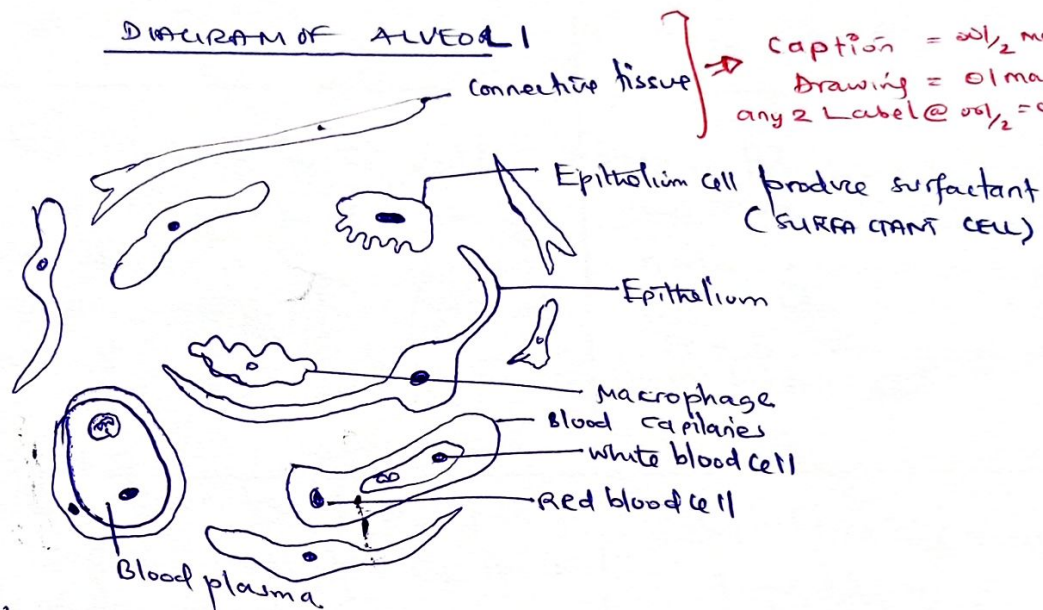
any 5 point @ 0.1/2 = 0.5 marks



(b)

Structure of Alveoli

DIAGRAM OF ALVEOLI



caption = 0.1/2 mark
Drawing = 01 mark
any 2 Label @ 0.1/2 = 01 mark

Description

- Alveoli structurally possess Connective tissue with elastic collagen fibre which enable it to expand and recoil during breathing
- Alveoli has Surfactant cell which secrete surfactant which enable lowering surface tension inside Alveoli also kill bacteria
- Alveoli has Macrophage (typical WBC) which kill bacteria by phagocytosis
- Alveoli has epithelial cell (squamous) one cell thick, which are permeable to increase surface area for gaseous exchange

any 4 explanation @ 01 mark = 04 marks

7(a)

Reason For Dioecious to be rare despite the advantage of Cross Pollination:-

- If plant is dioecious species, half (1/2) of its individual don't produce seed
- Also there is Large wastage of pollen which is disadvantage in term of Material and Energy resources.

any 2 points @ 01 mark = 02 marks

f. b) Difference on process of MEIOSIS in PLANTS and ANIMALS.

MEIOSIS IN PLANTS

MEIOSIS IN ANIMALS

(i) It produces Spores that develop into haploid gametophyte which later produces Male and female gamete that is two male nuclei and egg.

It produces male and female gametes (sperm & ovum)

(ii) The produced cells such as spore and Pollen grain are relatively large and conspicuous

Produced cell are relatively smaller and inconspicuous
Example Sperm.

(iii) - There is neither Telophase I, Cell wall formation nor Interphase in most of the plant species.
- The cells pass straight from Anaphase I to prophase II

- There is telophase I, where chromatids uncoil and nuclear membrane reappears after cleavage at each pole then nucleus passes to Interphase

(iv) cytokinesis occur by fusion of Golgi vesicle to form cell plate that extends to the periphery as the primary cell wall which separate the two cells

- cytokinesis occur by infolding of plasma membrane of the cell towards the spindle equator
- The furrow of cell membrane later fuses to separate cell

any 08 point @ 0.5 = 0.8 marks.

SECTION B (30 MARKS)

(Answer only 02 questions)

8(a) (i) Evidence to support the fact that Material are Conducted at Xylem:-

- Shoot cut and inserted into coloured solution when removed xylem of a shoot show presence of dye Example eosin. (This revealed that water are transported via xylem),
- Ringing of bark of tree not affect movement of water from soil. (since remove the bark of stem affect outer part that made up of phloem tissue)
- Blockage of xylem ^{vessel} by fats and Poison hinder the movement of water toward upper parts of plants.
- Metabolic Poison such as cyanide don't impede water flow via xylem. This proves that flow by passive processes in a dead cells of xylem vessel or tracheids

8(a)

(ii) CRITICISM OF MASS FLOW HYPOTHESIS:-

any 4 points @ 01 mark = 04 marks

- Hypothesis suggested that all Materials are transported in the same speed/rate, while experiment shows that amino acid and sugars are transported in different speed
- Hypothesis does not consider Bidirectional Movement of Manufactured food in plant from source to sink
- Hypothesis Neglects the roles of metabolism in translocation of manufactured food
- Hypothesis neglects the living nature of phloem it means (Does not account on why the sieve tube cell must be living & active),

any 4 points @ 01 mark = 04 marks

8(b)

Roles of Blood:-

- Transport of soluble organic compound (digested food) from small intestine to the various body tissue where are assimilated or utilized or stored,
- Distribution of excess heat from the deeply seated organs. This helps in temperature regulation
- Transport of hormones from glands where are produced to the target site/organs for example Insulin from β -cell of langer han's in pancreas to Muscle / liver tissue
- Transportation of soluble excretory waste from production site to excretory organs example Urea from liver to kidney
- Transport of respiratory gases Example O_2 from lung to body tissue and CO_2 from tissue to lungs
- Defence against diseases example white blood cell kill bacteria by phagocytosis,
- Maintenance of constant solute potential (osmoregulation) and pH as a result of plasma protein activity (9-1)

9 (a) differences between inhalation and exhalation. (Inspiration and expiration)

	Inhalation	Exhalation
①	external intercostal muscles and the diaphragm contract. Internal intercostal muscles relax	external intercostal muscles and the diaphragm relax, internal intercostal muscles contract.
②	The volume of thoracic cavity increases and pressure decreases.	The volume of thoracic cavity decreases and pressure increases
③	Ribs move upward and outward	Ribs move inward and downward
④	The lung volume increases and due to decreased pressure air is pushed to the inside the body	The lung volume decreases and due to increased pressure air is forced out of the body.

4 points @ $0\frac{1}{2}$ = 2 marks

(b) Introduction - Meaning of electron transport chain.
Main body six points in a reasonable series.

- The electron transport system is the means by which the energy from the Krebs cycle in the form of hydrogen atoms is converted to ATP.
- The hydrogen atoms attached to the hydrogen carriers NAD and FAD are transferred to a chain of other carriers at progressively lower energy level.
- As hydrogen pass from one carrier to the next it split into their protons (H^+) and electrons.
- The carriers in the chain include NAD, FAD, Coenzyme Q and iron containing proteins called cytochromes. $\longrightarrow$

~~20110 Features of Polysaccharide~~

- Q9 (b) - Only electrons flow from reduced FAD to iron (Fe), copper (Cu) and oxygen, the energy released is harnessed to produce ATP.
- At the end of the chain the protons and electrons recombine, and the hydrogen atoms create links with oxygen to form water.

Six points @ 1 = 6

Illustration 2 marks

Total marks Q9 = 15

10. (GnRH) Gonadotrophin releasing hormone from Hypothalamus stimulate the anterior pituitary gland to secrete FSH (Follicle stimulating hormone).
- The FSH travel by blood to the target cell in the ovary
 - In the ovary FSH stimulate the follicle (several follicle cells) to develop, but only one of which will complete development
 - The granulosa cells of developing follicle cell start to produce female sex hormone (oestrogen)
 - The oestrogen released has two target cell, uterus and Anterior pituitary gland.
 - Oestrogen promote thickening of uterus wall and make it ready to receive pregnancy. (Prepare Endometrium for Implantation)
 - Oestrogen to the pituitary gland of anterior inhibit further secretion of FSH. This is example of negative feedback.
 - This prevent the possibility of further follicle being stimulated so that only one egg is produced at a time
 - At the midpoint of the cycle oestrogen level have built up to a high level which trigger the secretion of Luteinizing hormone (LH) from Anterior pituitary gland
 - LH and FSH are released in a surge, the target of LH is ovary where it causes OVULATION.
 - The remaining part of Graafian follicle stimulated by LH to form Corpus luteum.
 - Corpus luteum continue to secrete oestrogen, as well as another hormone progesterone.
 - Like oestrogen, Progesterone has two targets, uterus and anterior pituitary gland
 - It stimulate the uterus to maintain its thickening and also stimulate glandular activity
 - In pituitary gland it inhibit release of LH, a second example of negative feedback like oestrogen it also inhibit secretion of FSH
 - Release of Progesterone is associated with rise of in body temperature of the female just after ovulation
 - If fertilization does not occur, the Corpus luteum start to degenerate about 28 days into the cycle
 - Once it starts to degenerate the level of oestrogen and Progesterone decline, so inhibition of FSH is removed causing menstruation. This last for about 5 days into the next cycle
- Introduction - meaning - 0.2 marks
 (6) point @ 2 marks = 12 marks
 Conclusion - 0.1 mark (2-3) = 12 marks