MARKING SCHEME OF BIOLOGY 01 syndicate 2025

1. (a)Features of Chloplast, mitochondria and bacteria in common are:

   (i) Circular DNA
   (ii) 70's ribosome
   (iii) Double membrane structure
   (iv) They are small in size
   (v) They divide by binary fission **(Any five points- 05 marks)**

   (b)Modification of mitochondria to perform like chloroplast

   (i) It must possess thylakoid membranes and grana, the site of LDR.

   (ii) The grana must contain chlorophyll for absorbing light

   (iii) It must contain cytoplasmic fluid part called stroma, site of Calvin cycle enzymes (Dark reaction).

   (iv). It must possess starch granules/grain to store starch.

   (vi) It must possess protein complexes to form photosystems I and II.**(Any five points- 05 marks)**

2. (a) Polymolecules of protein-very large molecules composed of many peptides bonded amino acids, the most common one contain more than 100 amino acids.

   Amino acid are bonded by peptide bonds, disulfide bridges, Vander Waals interactions and ionic bonds (**04 marks).**

   (b)(i) Structural and metabolic significant of protein

   -Form phospholipid bilayer-enclosing cell

   -Form hormone and coordination

   -Form enzymes for digestion

   -Keratin, collagen and elastic protein provide structure and rigidity to cell and tissue. Help for supporting structure like bones, cartilage, hair and muscle

   -Fluid acid-base balance

   -Transportation of oxygen like hemoglobin **(Any 06 points 1@=07 marks)**

3. (a) RUBISCO carry more carboxylation because fixation of carbon dioxide occur in chloroplast of the bundle sheath cells, the part with no photorespiration ($\mathbf{02\frac{1}{2}}$**marks)**

   (b)(i)Significance of $2H_2O \rightarrow 2H^+ + O2 + 4e^-$ reaction is

   - Provide electron that replace electron lost from photosystem II.

   - Provide hydrogen ion which reduces NADP to NADPH2, an important molecule in the light independent reaction for sugar synthesis ($\mathbf{01\frac{1}{2} = 03\ marks}$**)**

   (ii)- Have P.E.P carboxylase which is stable even in low partial pressure of CO2

   - CO_2 fixation occur away from where photorespiration occur.

   -Have stable carbon fixing molecules i.e. P.E.P ($\mathbf{02\ marks\ each. = 06marks}$)

4. (a)Features of mountain climbers and divers are:

   -Have large number of RBCs

   -Have large number of myoglobin in muscle

   -Their cell are tolerant to anaerobic respiration

   -Synthesize large amount of enthropoetin

   -Have high breathing rate **(Any five points = 05 marks)**

   (b)(i)Advantages of anaerobic respiration -It supply energy very fast during vigorous exercise **(02 marks)**

   (ii)Athletes spend certain time after vigorous exercise because use this time to

   -Pay back creating phosphate in muscles

   -Pay back A.T.P

   -Pay back O_2 content in RBCs, myoglobin **(03 marks)**

5. (a)Classification system are

   i. Artificial-based on a few observation features.

   ii. Natural-based on how organisms occur in evolutionary, use many features.

iii. Phyletic-Based on Darwin's publication "The origin of species by natural selection" classify organisms from simple to complex.

iv. Phylogenic (cladistics)-based on evolution and genetic relationship among organisms.

v. Phenetics-Based on many characteristics and mathematics algorithms **(01@=05marks)**

(b) (i) The organisms to be identified must be collected and displayed for observation and identifiable features recorded into a notebook.

(ii) Formulating a table for listing the species into two columns and generally determine a pair of exclusion character.

(iii) The second group is subdivided further into two other groups based on their common features. The smaller groups are continuously subdivided into two groups based on contrasting pair of statements.

(iv) The constructed key is numbered, allocated the number of couplets to be considered next after each step for the last step in which the specimens is identified.

(v) Write down the couplet in a special pattern to get a desired framework for a particular. **(05 marks).**

6. (a)Important of myelin shealth

- Action potential occurs only at the Node of Ranvier,

-Insulating the axon to speed up nerve impulses by salutatory progation/conduction (Two points $\mathbf{01\frac{1}{2}@ = 03}\boldsymbol{marks}$**)**

(b)Event of synaptic transmission

i. Nerve impulse arrive at the pre-synaptic knob,

ii. Calcium ions diffuse through calcium gated channel into the pre-synaptic membrane and fuse with vesicles,

iii. Fusion of vesicles with the pre-synaptic membrane,

iv. Release of neurotransmitters to the synaptic cleft,

v. Binding of the neurotransmitters (acetylcholine) with the receptor protein on the post synaptic membrane,

vi. Influx of the sodium into the dendrite, and beginning of the action potential.

vii. Breaking of acetylcholine into acetyl and choline molecules which diffuse back into the pre synaptic knob. **(Any six points: 01@=07marks).**

7. (a)Basis of pregnancy test-measure of human chorionic gonadotropin(HCG) hormone in urine or blood of pregnancy women **03 marks**

(b) Solution

Number of chromosome in root (2n) =32, n=16 **01 marks**

Hence number of chromosome in

Endosperm (3n) =3×16=48 **01 mark**

Polar nuclei (2n) =2×16=32 **01 marks**

Egg nuclei (n) =16 **01 mark**

Polar tube nuclei (n) =16 **01 mark**

Embryo (2n) =2×16=32 **01 mark**

Mega sporangium (n) =16 **01 mark**

Total of 08 marks

SECTION B: (30Marks)

8. (a)**MUNCH'S MASS FLOW HYPOTHESIS**

Set of model /experiment to demonstrate physically how mass flow might brought about in sieve tube.

Description

-In the model there is an initial tendency for water to pass by osmosis into A, B and C but the tendency is greater in A because the solution in A is more concentrate than in C

-A water enter A, hydrostatic pressure build up in the closed system A- B - C, forming out forcing of water from C.

Mass flow of the solution occur through B along the pressure gradient generated. There is also osmotic gradient between A and C. Eventually the system the system come at equilibrium as water dilute the contents of A and solute accumulate at C **(03 marks)**

-The model applied to the living plants. The leaves are presented by A.

-They make sugar during photosynthesis, making the solute potential more negative (lower the water potential).

-water brought to the leaf from xylem (D) enter the leaves cell by osmosis, raising their pressure potential.

-At the same time sugar are used in sink C making the solute potential less negative (higher).

-The pressure gradient is thus generated from the source to the sinks resulting into mass flow. **(03 marks)**

(Diagram 03 marks)

(b)

Passive transport	**Active transport**
Do not use ATP	Use ATP
Deriving force is concentration difference	Possess protein channel for active pump of material
Movement of the material under concentration gradient	Materials moves against concentration in gradient
High selective	Partly non selective
Carrier protein are required	Carrier protein are not required
Are exocytosis, endocytosis, Na-K pump	Are osmosis, diffusion and facilitated diffusion

Any six (06) point=06marks

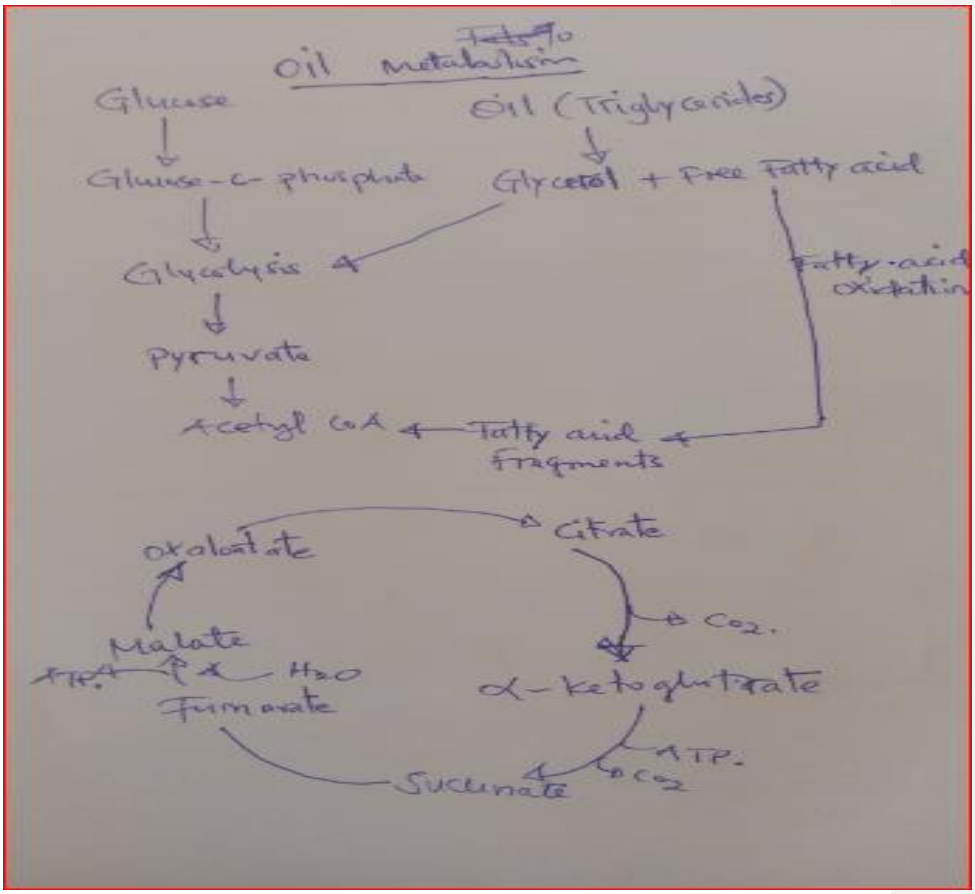
9. (a)Advantages of glucose over fat/oil metabolism

-Its only fuel that can produce ATP in the absence of oxygen, hence provide quick energy for cells hence, more energy is required than glucose. **(03 marks)**

(b)Lipid metabolism

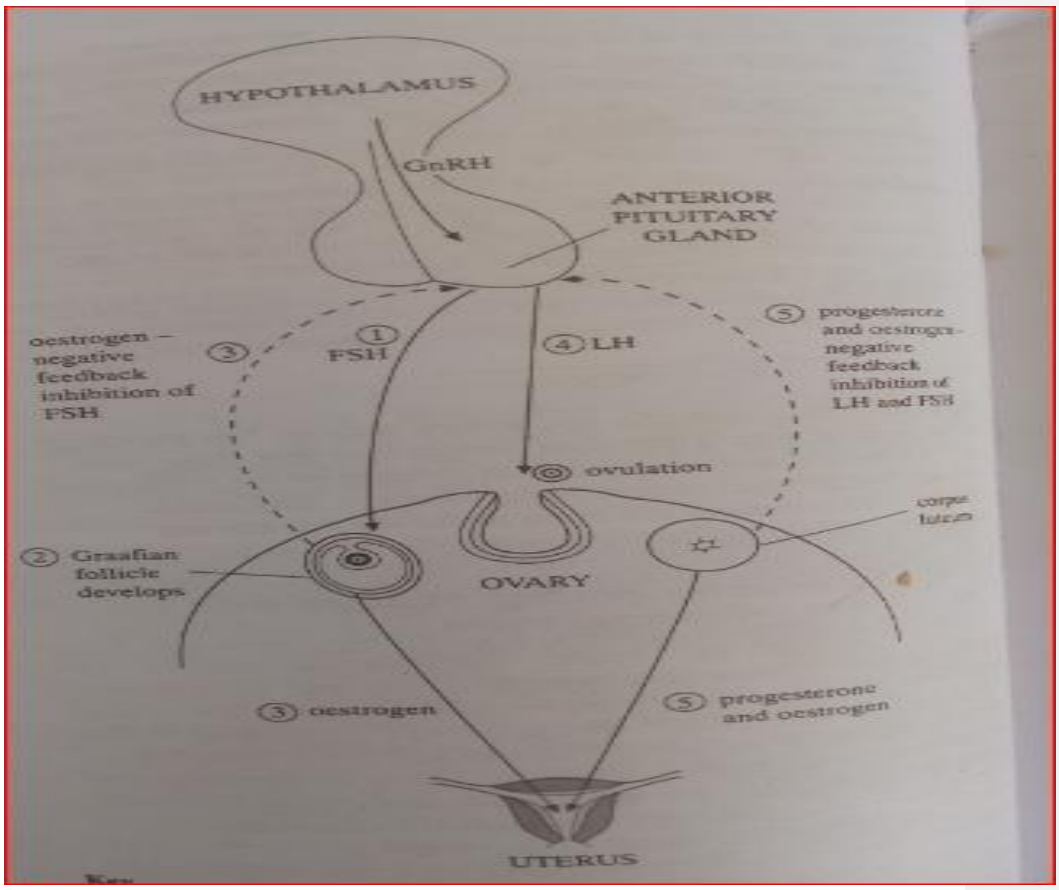
Commented [U1]:

Commented [U2]:



(12 marks)

10. (a)Feedback mechanism of hormone control in menstrual cycle.



8 marks

-FSH –stimulate development of follide cells, which start to secretes oestrogen; which become inhibitor for the inhibiting secretion of FSH

-Luteinizing cause evolution leaving corpus luteum which start to secrete progesterone which in turn inhibit the release of luteinizing hormone from pituitary gland.

(b)Events of double fertilization

-Pollen grain land on the stigma

-Pollen grain absorb water and sucrose secreted by stigma cells

-The pollen tube energy

-The pollen tube grow under control of pollen tube nuclei **(06marks)**

-The generative nuclei divide into two cells

-On reaching on the micropyle, the tip of the pollen burst, release two nuclei which one fuse with egg to zygote and the other fuse with polar nuclei to form endosperm.