BIOLOGY 1

MARKING GUIDE

1. a) i. Microtubule……***02 MARKS***

ii) Functions of microtubules

• They determine the shape of the cell

• They form the framework along which the plant cell wall is laid

• In cilia and flagella, they help in beating of rhythmic movements

• They bring about movement of chromosomes during anaphase in nuclear divisions

• Since they are tubular, they transport materials from one part of the cytoplasm to another

• They involve in the movement of other cellular organelles like Golgi vesicles, lysosomes, mitochondria etc……. ***any 5, @ 01 mark =5marks***

b) Starch has alpha glucose units linked by 1,4 and 1,6 glycosidic alpha linkages and has a branched structures WHILE Cellulose is made of beta glucose units in 1,4 beta linkages and has a rigid, elongated structure ……..03 marks

2. a) 0xygen is the final hydrogen acceptor in the respiratory chain……***02 marks***

b) Leaving

• Carbon dioxide

• Oxidized hydrogen carrier

• ATP

• Water

Entering

• Pyruvate

• Oxygen

• Reduced NAD (NADH2)

• ADP

• Phosphate (iP)

@ 01 mark, = 08 marks

3. a) Significance of scientific names

• Scientific name simplify communication worldwide, will be easy for them to know what is exactly ordered

• This helps to avoid confusion and ambiguity

• It is not influenced by any language barrier ……...***any 2, @ 2marks=04 marks***

b) Identification

SPECIMEN	**SERIES OF STEPS FOLLOWED**	**NAME/ IDENTIFICATION**
Bird W	1a), 2a)	*Geospiza*
Bird X	1b), 2b), 3b	*Platyspiza*
Bird Y	1 a)	*Certhidea*
Bird Z	1b), 2b), 3a	*Camarhynchus*

4. a) Evaluation of the number of chromosomes.

Radicle is a diploid cell=2n

2n=16

n=8

i. Pollen tube nucleus is haploid, n=**8 chromosomes**

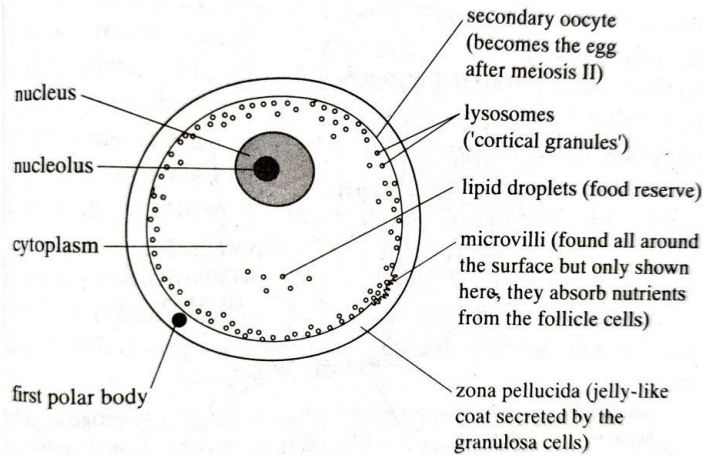
ii. Endosperm is triploid, 3n=**24 chromosomes**

iii. Antipodal cell is haploid, n=**8 chromosomes**

iv. Microspore mother cell is diploid, 2n=**16 chromosomes**

@ 01 mark, = 04 marks

b) secondary oocyte



Diagram=01 mark

Caption=01 mark

Labels= any 8, @ 0.5

5. a) Light dependent reactions of photosynthesis

• Photolysis of water: This is the splitting of water molecule under the influence of sunlight to produce hydrogen(proton), oxygen and electrons.

$2H_2O \rightarrow 4H^+ + 4e^- + O_2$

• Photophosphorylation: Photophosphorylation is the process of utilizing light energy from photosynthesis to convert ADP to ATP. It is the process of synthesizing energy-rich ATP molecules by transferring the phosphate group into ADP molecule in the presence of light

ADP + P → A**TP**

• Reduction of hydrogen carrier (NADP)

$NADP^+ + 2H^+ + 2e^- \rightarrow NADPH_2$

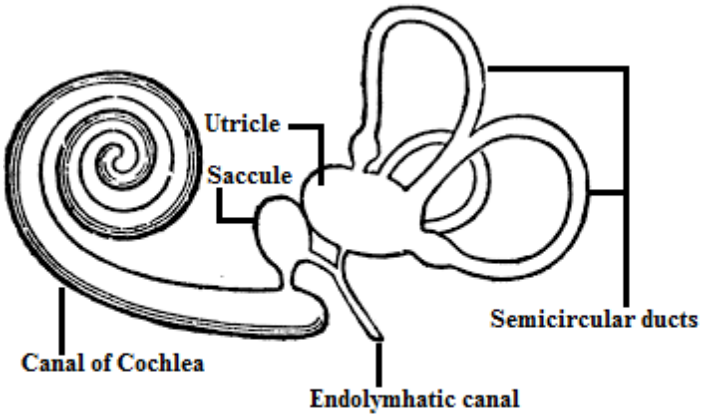
@ 2.5 Marks, =07.5 marks total

b) Even after removal of the entire stomach, it means that the oesophagus is connected directly to the intestine, via the duodenum. This still enables the pancreatic and bile ducts to continue to drain directly into the duodenum, breaking down foods so that the nutrients can continue to be absorbed, enabling the individual to survive.

But people who have their stomach removed can only eat a small amount of food at a time. Because of this, they will need to eat more often ….. 2.5 Marks

6. a) **Membranous labyrinth**

This is simply the continuous system of ducts filled with endolymph, lined interconnected sacs and passages that is suspended within the bony labyrinth of the inner ear. It is comprised of the cochlea duct, saccule and the utricle.



Membranous Labyrinth

Description=02 marks

Diagram=01 mark

Caption=01 mark

Labels= any 4, @ 0.5

b) i) Ethene/Etylene

ii) Gibberelins

iii) Auxins

iv) Cytokinins ……*@01 Mark, = 04 Marks*

7. Advantages

• The plant is independent of water for sexual reproduction, thus better adapted for land environment

• The seed protects the embryo

• The seed contains food for embryo (Either in the cotyledons or endosperm)

• The seed may remain dormant and survive adverse conditions

• The seed is physiologically sensitive to favorable conditions

@ 01 Mark, =05 marks

Disadvantages

• Seeds are relatively large structures because of the extensive food reserves. This makes dispersal more difficult

• Seeds are often eaten by animals for their food reserves

• There is reliance on eternal agents such as wind and insects for pollination and fertilization, hence more dependent on chance.

• There is a large wastage of seeds because the chances of survival of a given seed is limited

• The food supply in a seed is limited

• Two individuals are required in dioecious species, making the process more dependent on chance.

Any five, @ 01 Mark, =05 marks

SECTIOB B

8. a) i. If a plant species is dioecious, half of its individuals do not produce seeds.

Also there is a large wastage of pollens which is a disadvantage in terms of

materials and energy resources**……*..02.5 Marks***

ii) Separate sex is more economical in animal than in plants because males and

females can move about, there is therefore less wastage of gametes**….*02.5 Marks***

b) Harmful substances

• Carbon monoxide and nicotine from cigarette smoking

• Alcohol

• Drugs (both pharmaceutical and illegal drugs)

• Viruses like German measles, Hepatitis B, HIV

• Rhesus factors

Any five, @ 02 Marks, =10 marks

9. a) The biological significance of the properties of water.

• **Water is a polar solvent.**

Water can ionize; A small amount of water spontaneously dissociated into hydrogen ion (H+) and hydroxyl ion (OH–) which depends on temperature. This is called ionization.

$H_2O \leftrightharpoons H^+ OH^-$

Water is regarded as the 'general solvent' or 'universal solvent' due to the polarity of its molecules.

• **It has high heat of vaporization**

This is significant in both minimizing water loss from the body and cooling the body

• **Water has high specific heat**

This property ensures slow heating of water; maintain constant temperature of living organisms and environment.

• **Water is liquid at room temperature/Water has high heat of fusion**

It provides suitable liquid environment within the cells, it prevents freezing and ice formation in the protoplasm even when exposed to very low temperature.

• **Water has low viscosity and high surface tension**

They work on the cohesion of cell substances.

It slows down water loss in plants' leaves through pores.

• **Water is incompressible**

It helps organisms to tolerate pressure and compression. Because of this in earthworm water acts as hydro skeleton. Loss or gain of water causes various plant movements like stomatal movement, seismonasty of Mimosa leaves etc.

Any five, @ 02 Marks, =10 marks (Property 01-mark, explanation of significance 01 mark)

b) Sources of variations

• Both pentoses and hexoses can be used to make polysaccharides

• 1,4 and 1,6 linkages are common between sugars, hence branching can occur

• Lengths of chains and branches and extent of branching can vary

• The alpha and beta forms of monosaccharides are significant and add value to the variations

• Sugars may be ketoses and aldoses

• Sugars have high reactivity

Any five, @ 01 Marks, =05 marks

10. a) Features of phloem translocation

• The amount of materials carried through the phloem may be very large

• There is high rate of flow of materials trough the phloem sieve tubes

• The distance through which the food substance travels may be long

• The size of phloem is small

• Sieve tube, which is very fine part of the phloem is concerned with the movement of materials

@ 01 Marks, =05 marks

b) Adaptations of cardiac muscles

• The muscle is made up of striated fibres which make it tough and strong to withstand the pumping activity

• The muscles are packed with numerous mitochondria for liberation of sufficient pumping energy

• The muscle is highly supplied with blood vessels for perfusion of nutrients and oxygen

• The muscles have ability to oxidize lactic acid from skeletal muscles for energy release

• Cardiac muscles contain many connective tissues that add up to its strength

• The inner surface of the muscle has a fluid which acta as a lubricant to protect it from tearing.

• The muscles contracts more slowly than the skeletal muscles and thus, does not as fatigue as easy as the skeletal muscles

• Presence of actin and myosin filaments making up the myofibrils adds sufficient pressure

• They have ability of self-stimulation without an assistance of a neurone (The muscle is myogenic)

Muscle fibres branch and cross connect each other to form a net-like arrangement for the transfer of action potentials.

Any five, @ 02 Marks, =10 marks