CHRISTIAN SOCIAL SERVICES COMMISSION
An Ecumenical Body of Tanzania Episcopal Conference and Christian Council of Tanzania
P.O. Box 9433, Dar es Salaam, Tanzania

CSSC-SOUTHERN ZONE FORM FOUR JOINT EXAMINATION

033/1 **BIOLOGY 1** **AUGUST 2024**

MARKING SCHEME

1. Question 1

I	Ii	Iii	iv	V	vi	Vii	Viii	ix	X
C	E	E	D	D	D	B	A	C	A

2. Question 2

i.	ii.	iii.	iv.	v.	vi.
J	G	B	K	H	E

3. (a) fields related to biology
   - ❖ Relationship between biology and medicine; the study of biology has helped in finding the causes, and ways of preventing diseases.
   - ❖ Relationship between biology and pharmacy; the pharmacist get all knowledge by studying biology and they dispense drugs to patients in hospitals, health centers and in pharmacies
   - ❖ Relationship between biology and agriculture; biological findings on crops and livestock have led to improved agricultural productions.
   - ❖ Relationship between biology and forestry; forestry as a science of planting and taking care of trees and forests. Therefore in biology we learn to develop trees that mature fast and tolerant to harsh environment.
   - ❖ Relationship between biology and nutrition; this means the nutritionist and dieticians can use their knowledge to advice people about their diet.

   (Any 4 points @ 01 marks, = 04 marks)

(b) Importance of study Biology

- ➢ It enables us to know our selves better.
- ➢ It enables one to get jobs like Biology teacher, Nurses, Doctor etc.
- ➢ It encourage international cooperation
- ➢ It enable us gain knowledge about our environment and how to improve it.
- ➢ Helps to acquire research skills.

(**Any 5 points each 01mark, = 05marks**)

4. (a).Theories of origin of life
   - ➢ **Special Creation**
     The earth and all organisms living on it were created in their present form by God
   - ➢ **Spontaneous generation theory**
     Living things arose from non-living materials on number of distinct occasions
   - ➢ **Cosmozoic theory**

Life on the earth was brought from outer space in the form of spores which grew and evolved into different organism.

- **Steady state theory**

  The earth has no origin it has always been able to support life and it has undergone very small change since then

- **Biochemical theory of origin of the life**

  Life arose on earth because of physical and chemical reactions of naturally occurring elements and molecules these molecules gradually accumulated in the oceans and formed a hot primordial soup. During the cooling of the earth it favored reaction of carbon, nitrogen, oxygen, ammonia, water vapour and methane to form the simple organ compounds like amino acid, nucleic acid and sugars. The nucleotides and nucleic acid that are main component of all living cells

any mention 4 points with explanation@ I.5 marks 6 marks

(b). Explanation of the terms

- **Homologous structures**

These are the structures that perform different function though they have similar ancestral origin

Example Beak structure in birds

Limbs structures in vertebrates

- Natural selection

Is an environmental force which usually favors organisms with favorable adaptive characteristics and eliminate that organism with unsuited characteristics

Example Long and short neck giraffe

Peppered month (Bistonbetularia) occurred in speckle white and melanic form

- Vestigial structures

These are the structure that has ceased to function in course of time

Example Appendix in man, coccyx in man, mammary gland in man, and wings of flightless birds

any mention 3 points with explanation and one example @ 1marks 3 marks

5. (a) Similarities between two types of cell division
   - Both occurs in the cell nuclei
   - Both involves four (4) stages of nuclei division
   - Both involves DNA replication
   - Both brings about formation of new daughter cells
   - Both involve the division of nucleus and cytoplasm

   any 4 points @ 1.5 marks 6 marks

   (b). Application of meiosis in real life situation

   - Formation of haploid gametes which is crucial for sexually reproducing organism
   - Insure the constant of chromosome in each sex cell
   - Sources of genetic variation due to crossing over of parental chromosomes

   any 3 point @ 1 marks 03 marks

6.

Species	Kingdom	Division	Class
Leguminous plant	Plantae	Angiospermophyta	Dicotyledoneae
Cereal plants	Plantae	Angiospermopyta	Monocotyledoneae

@ 001/2marks = 03 marks

(b)

CLASS DICOTYLEDONEAE	CLASS MONOCOTYLEDONEAE
i. Have tap root system	- Have fibrous root system
ii. Have leave which are net like venation	- Have parallel leaf venation
iii. Vascular bundles in stem appears in ring form	- Vascular bundles in stem are scattered.
iv. Flower parts appears in multiple of four or five	- Flower parts are in multiple of three.
v. Have short and broader leaves	- Have long and thin leaves.

(Any 3 points @ 1mark = 3 marks)

(c) Uses of Leguminous plants and cereal plants

- Used as source of food
- Used for decorations
- Other Angiospermophytes are used as source of medicine.
- Used as raw materials in industries.
- Used to prevent soil erosion.

(Any 3 points each 1 mark = 3 marks)

7. (a) HIV destroy -T helper cells in the following ways
   - It reproduces inside the T-helper cell, then rupture the cell's membrane
   - It alters the T- helper cells so that when it responds to an infection it kills itself instead of dividing to form new cells
   - It marks T- helper cell as targets for destruction by other cells in the immune system
   - It causes the fusion of many T- helper cell to form a giant cell which cannot perform normal T-helper cell functions

   (1marks@= 4marks)

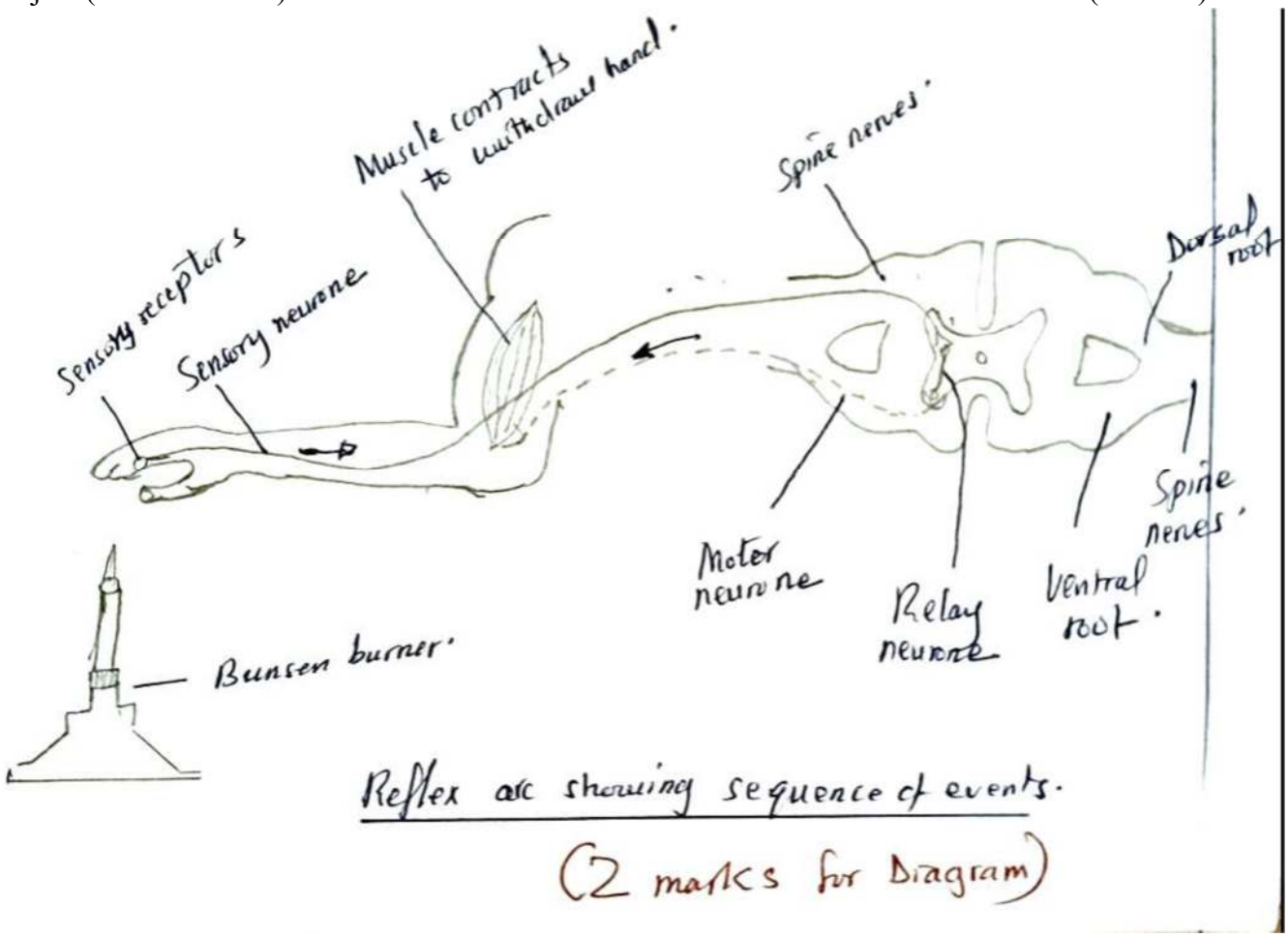
   (b) Different between xylem and phloem

Xylem	Phloem

i.	It transports water and dissolved minerals	-it transports food substances
ii.	It has tubular shaped structures called xylem vessels which is perforated	Phloem has elongated and tubular- shaped structures called sieve tubes with plates
iii.	Xylem fibres are narrow	Phloem fibres are wide
iv.	It composed of dead cells at maturity	It is composed of living cells.
v.	Occurs toward the inner part of the vascular bundle	Occurs on the outer side of the vascular bundle
vi.	Materials move in only one direction upward.	Materials move in two directions that are upward and downward directions.

(1mark (a) 5 marks any five points)

8. (a) The action occurred is simple reflex action which is done trough reflex are. When she touches hot Bunsen burner the temperature and pain receptor in the skin stimulated sensory neuron and impulses generated are conducted to the spinal cord via dorsal root for interpretation the impulse travels from one nerve cell to another via a gap called synapse
Then motor neuron carries interpreted impulse from intermediate neuron via ventral root tho the effector organ(muscles) then the impulse stimulate muscle cell to contract and eventually pull the hand from the hot object (Bunsen burner). This is done when sufficient amount of muscle fibres contracts (5 marks)



Reflex arc showing sequence of events.

(2 marks for Diagram)

(b) Negative feedback mechanism is the mechanism

This is the mechanism which occurs when the response to stimulus reduces the activated environment. This usually leads to body to restore to the normal condition

While

Positive feedback mechanism this is a mechanism which occur when the response triggered by the control center to activate more stimulus. This usually leads to more stress to the body (2marks)

9. (a) Differences between two types of the sugar

DNA	RNA
i.Has deoyxriose sugar	Has ribose sugar
ii.Double helix strand	Single strand
iii.Found in nucleus, mitochondrion and chloroplast	Found in cytoplasm and nucleus
iv Has thymine as fourth organic base	Has Uracil as fourth organic base
v.Contain code for protein synthesis	Convey the message for protein synthesis

Any 4 point @ 1 marks 4 marks

(b) i. **Sex limited character**

Characters which are restricted to a particular sex only and cannot be found in other sex0.5 **marks**

Example hairy pinna, semen0.5 marks

ii. **Sex linked character**

Observable features in organism controlled by gene located on sex chromosome **0.5 marks**

Example Hemophilia and color blindness 0.5 marks

iii. Sex determination

Identification of sex of an organism whether to be a male or female by the gene located in the sex 1 marks

Chromosome Sex determination is controlled by the chromosome pair number 23

(c) i. Non Mendelian Inheritance (Incomplete dominance) 0.5 marks

No parent genes mask the expression of other genes both gene blend equally and produce

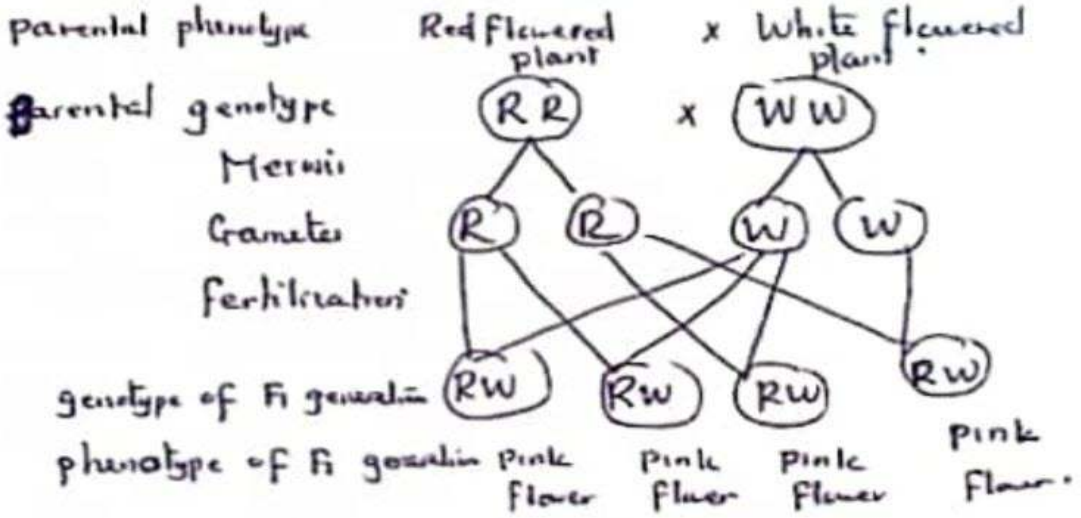
Intermediate form **1 marks**

ii.

Solution

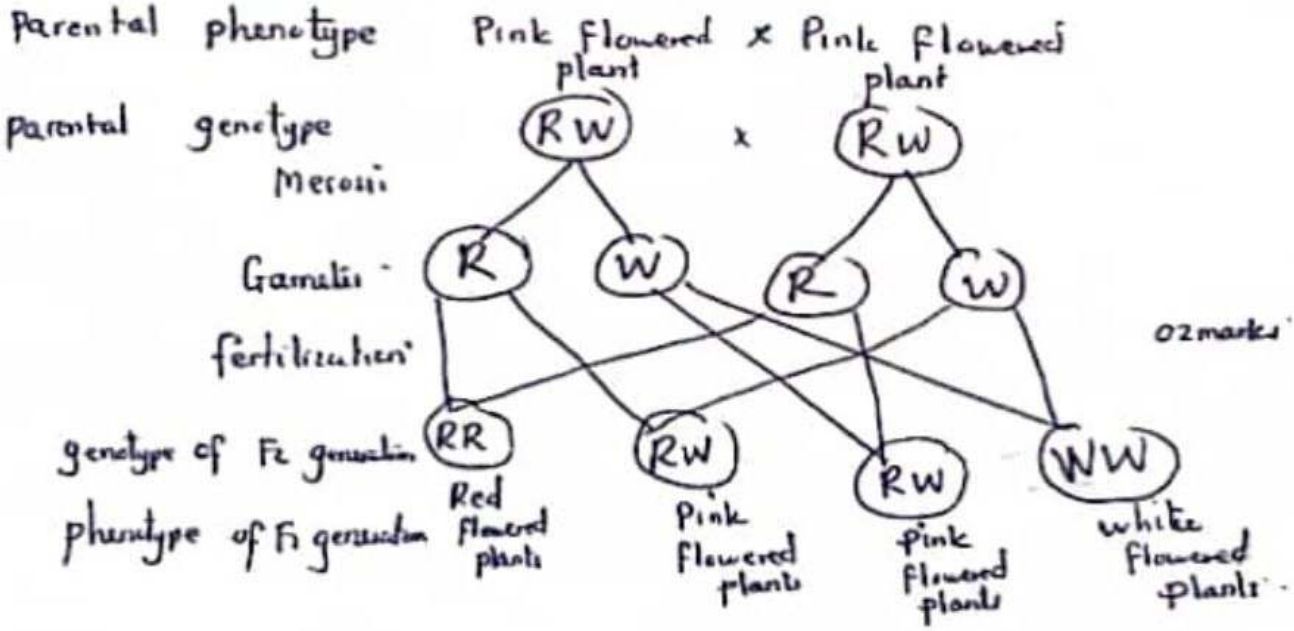
9 c(ii) Let R represent gene for red flowered plant. 0c1/2 mark
W represents gene for white flowered plant.

Result of F1 generation



02marks

To obtain F2 generation



02marks

F2 Phenotype ¼ Red rose flower, 2/4 Pink rose flower, ¼ white rose flower

F2 Phenotype ratio 1: 2: 1 **(1 marks)**

F2 Genotype ¼ homozygous red rose flower, 2/4 Pink rose flower, ¼ Homozygous white rose flower

F2 Genotypic ratio 1: 2: 1 **(1 marks)**

Red flowers were 1/4 x 1600= 400 **(0.5 marks)**

Pink flowers were 2/4 x 1600 = 800 **(0.5 marks)**

White flowers were 1/4 x 1600=400 **(0.5 marks)**

10. THE MECHANISM OF DOUBLE FERTILIZATION

- The pollen grain reaches to the stigma, after reaching to the stigma will germinate because of the sucrose solution secreted by the epidermal cells of the stigma.
- A pollen tube emerges from one of the pores in the wall of the pollen grain , the pollen tube grows down the style to the ovary
- During the growth of the pollen tube the generative nucleus of the pollen grain divides by mitosis to produce two male nuclei
- one male nucleus of the pollen grain fuses with the egg of the nucleus to form the zygote, and the other fuses with the two polar nuclei to form the endosperm(**15 marks)**

11. explanation about tuberculosis disease based on

- Disease Tuberculosis ---------- 1 marks
- Causes bacterium called Mycobacterium tuberculosis ----------2 marks
- Mode of transmission Droplets infection during coughing and sneezing ----------1 marks
- Effect of tuberculosis
  - Lung damage
  - Kidney damage
  - Bone infections
  - Damage of immune system
  - Hunchback.any 4 points @ 1 marks 4 marks
- Preventions
  - Avoid living in poorly ventilated room
  - Avoid over crowded area
  - Vaccination
  - Cover mouth and nose during coughing and sneezing
  - Isolation any 4 points @ 1 marks4 marks
- Treatment use the following medicine
  - Ethambutol
  - Isoniazid
  - Pyrazinamide
  - Rifampin any 2 @ I mark 2 marks

Conclusion 1 marks