MID TERM EXAMS 2023

TERM 1

BIOLOGY

FORM 4

TIME 2HRS

INSTRUCTIONS: Answer all the questions in the spaces provided after the question.

1. A set of triplets, two of whom were identical were separated at birth and brought up by different families.when they were 19 years old, the data below were recorded.

	Susan	Jane	Amanda
Height	188 cm	188 cm	180 cm
Weight	62 kg	57kg	77 kg
Blood type	0	AB	0
Measure of intelligence	138	142	125

a) Name two girls who were identical twins (2mks)

Susan, Amanda; have the same blood group

b) State two reasons why these two girls were different from each other in any of the three ways shown in the table (2mks)

- **Weight differences due to difference in nutrition.**
- **Level of intelligence due to type of school each attends.**

2. outline the stages of metamorphosis in (2mks)

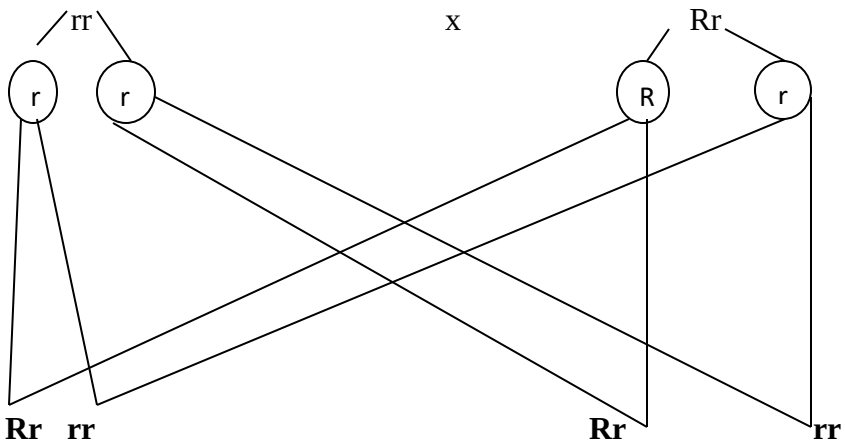
i. **A cockroach; egg ⟶ nymph ⟶ adult:**

ii. **b) A housefly; egg ⟶ larva(maggot) ⟶ pupa ⟶ adult**

3. differentiate epigeal and hypogeal type of germinations (2mks)
Epigeal germination; a type of germination where cotyledons are brought above the soil surface.
Hypogeal: a type of germination cotyledons remains underground.

4. a)Giving one example in each case, distinguish between continuous and discontinuous variations.(2mks)**continuous variation: a type of variation that exhibits a wide range of differences for the same characteristics e.g. height,weight,skin colour among others.**
Discontinuous: a type of variation with definite distinct groups e.g. sex,blood group, tongue rolling.

5. if a woman cannot roll her tongue marries a man who is a tongue roller but is the son of a non-roller father, what would be the chances of them producing a non-roller child(ability to roll the tongue is dominant to non-rolling.(5mks)



50% chance

6. State any three types of placentation exhibited by ovules in an ovary (3mks)
Marginal; basal; parietal; axile, free central

7. Study the figure below which represents a mature breed mould

i) Name structures A, B and C (3mks)

A-Spore; B-sporangium; C-Rhizoid

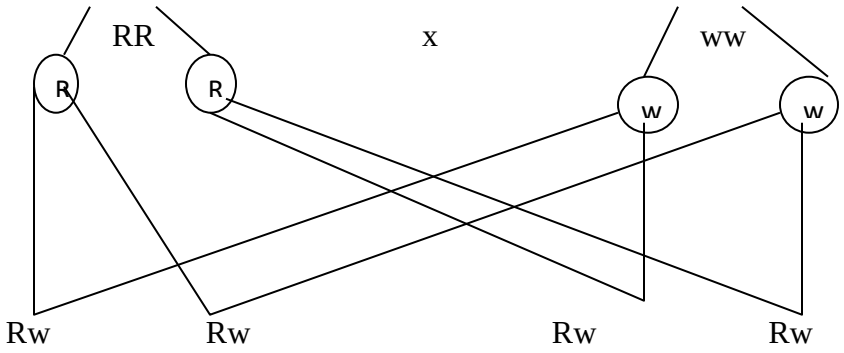
8. In a certain species of plants, the gene for red flowers is co-dominant to the gene of white flowers. In one experiment of such plants, all F1 plants had pink flowers.

Using appropriate letter symbols, work out the genotypes of the F1 offspring's (4mks)

Let R be gene for red and W gene for white

Parental phenotype: Red flowers White flowers

Parental genotypes: RR X WW

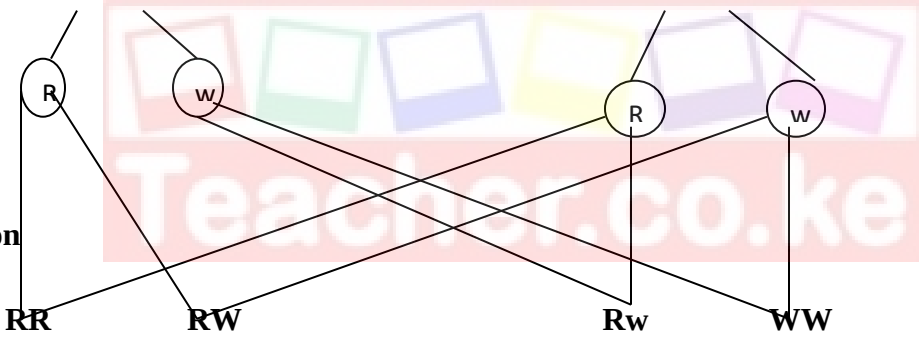


b) If one of the F1 offsprings who crossed with a white parent, what would be the phenotypic ratio of their offspring? (4mks)

Parental phenotype: pink white

Parental genotype: RW X RW

Rw x Rw



fertilization

RR RW Rw WW

F 1 phenotypic ratio: 1 red: 2 pink ; 1 white

c) What type of the cross is shown by the set up in (b) (4mks?)

Back cross

9. State four biotic inter-relationships in an ecosystem (4mks)

- **Competition**
- **symbiosis**
- **Predation**
- **. saprophtism**
- **parasitism**

10. The following living organisms have been observed in an isolated island; rats, insects, tortoise, snakes, grasses and birds. Construct four possible food chains each consisting of four organisms (4mks)

i. **Grasses rats snakes birds**
ii. **Grasses insects birds snakes**
iii. **Grasses insects lizards snakes**
iv. **Grasses lizards snakes birds**

11 a).Name the cell division that produces the gametes (1mk)

Meiosis

b) From the cell division you have named above in (a) above, State the chromosome constitution of the gametes (1mk)

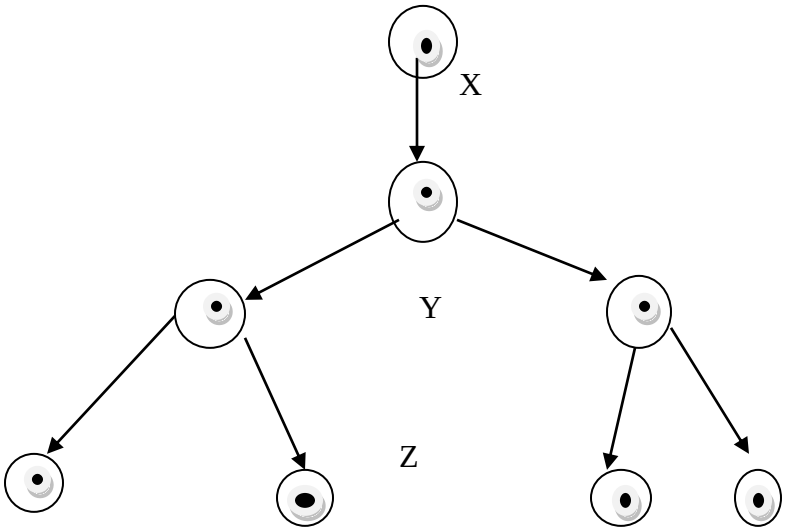
Haploid (n)

12. State the main classes of phylum chordate (5mks)

- **Pisces**
- **Amphibia**
- **Reptilia**
- **Aves**
- **Mammalia**

NB: Ref: if starts with small letter
Wrong spelling

13. The chart below shows the number of chromosomes before and after cell division and fertilization in an animal.



a) What type of cell division takes place at Y and Z (2mks)

Y-meiosis I, Z-meiosis II

b) Where in the body of the female does Z occur? (1mk)
Ovaries

14. Name three types of chromosomal mutations (3mks)

Deletion; translocation; duplication; inversion; polyploidy;non-disjunction

15. a) What is the role of the vascular bundles in plant nutrition? (2mks)

Xylem vessels: transport water and mineral salts from the roots to the leaves.

Phloem vessels: transport manufactured food within the plant

b) To which class does an animal with two body parts and four pair of legs belongs? (1mk)

Arachnida

c) State 3 importance of osmosis in plants (3mks)

- **Absorption of water from the soil**
- **Support in herbaceous plants**
- **Opening and closing of stomach**
- **Feeding in insectivorous plants.**

d) Why is oxygen important in the process of active transport in cells? (1mk)

Oxygen is required for respiration that produces energy for active transport.

16. a) Give two reasons why accumulation of lactic acid during vigorous exercise leas to an increase in heart beat (2mks)

- **To enable faster removal of lactic acid.**
- **To increase oxygen supply in tissues.**

b) A person whose blood group is AB requires a bloodtranfusion .Name the blood groups of the donors (1mk)

- **A, B, AB and O (reject if one group misses.**

c)Adult elephants flap their ears twice as much as their calves in order to cool their bodies when it is hot, Explain (2mks)

- **The surface area to volume ratio in calves is higher than in adults, hence adults retain more heat than the young.**

d) Name the blood vessel that transports blood from; (2mks)

i) Small intestines to the river

Hepatic portal vein

ii) Lungs to the heart

Pulmonary vein

17. a) Name the bacteria found in root nodules of leguminous plants (1mk)

Rhizobium

b) What is the role of bacteria named in (a) above? (1mk)

Converts nitrogen into nitrates

c) Name the causative agent of typhoid (1mk)

Salmonella typhi

18. (a) Name two sex-linked-traits in human (2mks)

- **Hairy pinna**
- **Hemophilia**
- **Premature blindness**

b) How is aerenchyma tissue adapted to its function? (2mks)

- **Has air spaces which store gases for exchange and buoyancy.**

c) State the term referring to fruit formation without fertilization (1mk)

Parthenocapy

e) Other than Carbon (IV) oxide, name other product of anaerobic respiration (2mks)

- **Ethanol**
- **Lactic acid**
- **Energy/ATP/heat**

19. a) Name the class in the phylum Arthropoda which has the largest number of individuals (1mk)

- **insecta**

b) Give three factors that determine the amount of energy a human requires in a day (3mks)

- **occupation**
- **body size**
- **sex**
- **age**
- **basal metabolic rate**

c) Name three process in human body in which homeostasis is involved (3mks)

- **osmotic pressure regulation**
- **thermoregulation**
- **blood sugar regulation**
- **ionic balance**

d) State three factors that affect enzymatic activities (3mks)

- **temperature**
- **PH**
- **Enzyme concentration**
- **Substrate concentration**
- **Enzyme co-factors and co-enzymes**
- **Enzyme inhibitors**

20. a) State the functions of the following cell organelles

i) Ribosomes**; site for protein synthesis**

ii) Lysosomes**: contain lytic enzymes that destroy old and worn out organelles**

b) State the functions of the following parts of a light microscope

i) Objective lens: **magnify the specimen on the stage.**

ii) Diaphragm: **regulates amount of light entering onto the stage**

c) Pregnancy continues if the ovary of an expectant mother is removed after four months. Explain (2mnks)

- **After four months, ovary stops secreting progesterone hormone and placenta takes over.**

d) Other than using the quadrat give 3 other methods of estimating population of organisms (3mks)

- **Line transect**
- **Belt transect**
- **Total count**

21 a) Name two dental diseases (2mks)

- **Periodontal**
- **Dental carries**

b) State two functions of saliva (2mks)

- **Has mucus to lubricate food.**
- **Has enzyme salivary amylase**

c) State one economic importance of each of the following plant excretory products (3mks)

i) Tannin: **treating leather**

ii) Quinine: **anti-malaria drug**

iii)Caffeine: **used as beverage drink/stimulant.**