

MARKING SCHEME

NAME SCZ Salongo 0705-950374 STREAM



BEGINING OF TERM EXAMINATION 2019

SENIOR FOUR (4)

BIOLOGY 553/1

(THEORY)

Paper 1

Time: 2 hour : 30Min

Instructions:

- ❖ Answer all questions in section A and B. Put answers to section A in the answer grid provided. Answers to section B must be written in the spaces provided.

SECTION	MARKS
	L..FÖ
C/30	
TOTAL noo	

SECTION A: (30 rvnRKS) ANSWER GRID

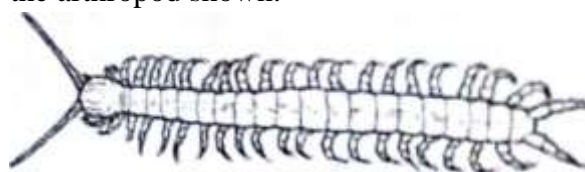
	C ✓	11	A ✓	21	
	A ✓	12	B ✓	22	C ✓
	B ✓	13	c ✓	23	B ✓
	C ✓	14	D ✓	24	B ✓
	C ✓	15	D ✓	25	B ✓
	A ✓	16	A ✓	26	B ✓
	B ✓	17	D ✓	27	B ✓
	B ✓	18	A ✓	28	C ✓
	C ✓	19	A ✓	29	D ✓
10	C ✓	20	C ✓		A ✓

SECTION A (30 MARKS)

Attempt all questions in this section, answers should be written in Answer graph paper.

1. Which of the following features differentiate a housefly from a spider?
 - A. Segmented body
 - B. Jointed limbs
 - C. Number of body parts
 - D. Possession of exoskeleton

2. Use the key to identify the arthropod shown.



- (a) Body divided into segments.....go to 2
- (b) Body not divided into segments.....go to 3
- (a) Body has one pair of legs per segment.....
- (b) Body has two pairs of legs per segment.....
- (a) One pair of antennae.....c
- (b) Two pairs of antennae.....t)

3. Which of the following relationships is an example of mutualism?

- A. Tape worm living in human gut.
- B. Bacteria living in gut of a cow.
- C. Ticks living on the skin of a dog.
- D. Plasmodium living in human blood.

4. Lactase is a human enzyme that catalyzes the breakdown of lactose in milk. At which temperature does lactase work fastest?

- A. 0 °C
- B 18 °c

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C 37 °c

D 100 °c

5. Which row shows the chambers of the heart, from those with the thickest walls to those with the thinnest walls?

	Thickest	—————→	thinnest	
	Atria		Left ventricle	Right ventricle
	Atria		Right ventricle	Left ventricle
C	Left ventricle		Right ventricle	Atria
D	Right ventricle		Left ventricle	Atria

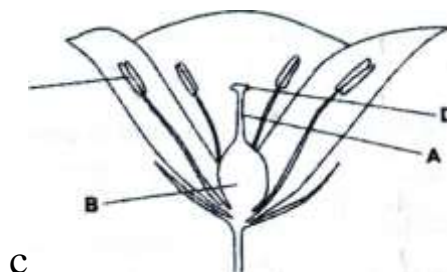
6. Why are arthropods the most successful group of organisms on land?

- A. They have a water proof exoskeleton.
- B. They can move very fast.
- C. They have jointed legs.
- D. They have segmented bodies.

7. 160cm^3 of water was added to 250cm^3 of dry soil. The volume of the mixture after stirring was 380cm^3 . What is the percentage of air in the soil sample?

- A. 7.9%
- B. 12%
- c. 25%
- D. 34%

8. The diagram shows a flower.



In which structure do seeds develop?

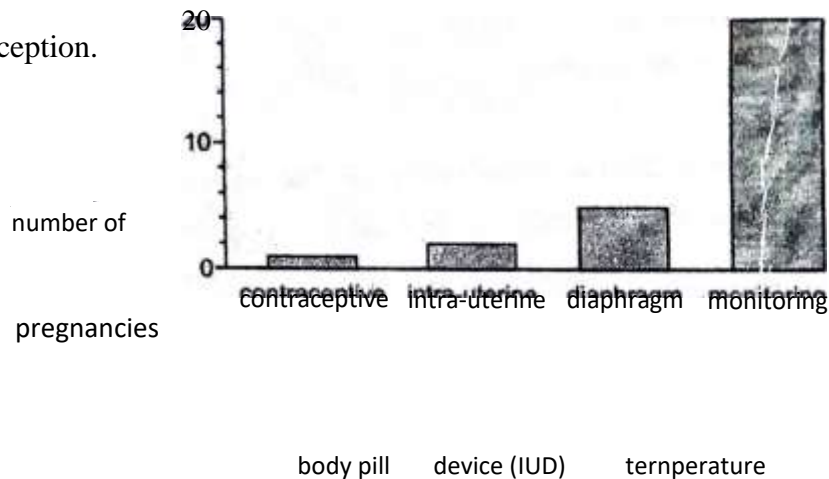
9. The following occur during mitosis in animal cell.

- (i) Chromosomes thicken and become more visible.
- (ii) Centromeres divide.
- (iii) Chromosomes line up at the equator of spindle.
- (iv) Daughter centromeres are pulled to the opposite pole of the spindle.

Which of the above occurs during Anaphase?

- A. (i) and (ii)
- B. (i) and (iii)
- C. (ii) and (iv)
- D. (iii) and (iv)

10. The graph shows the number of pregnancies in four groups of 100 women. Each group used a different method of contraception.



The method of contraception which is the least effective is?

- A. Barrier
- B. Chemical
- C. Natural
- D. Surgical.

11. Which of the following methods cannot be used to measure growth?

- A. Age of the organism.
- B. Length of the organism.
- C. Volume of the organism.
- D. Fresh and dry weight of the organism.

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12. Which of the following explains why the circulatory system of an embryo is never in direct connection with mother's blood vessels?

- A. It is connected to the uterus by the placenta.
- B. The mother's blood pressure would burst capillaries of the embryo.
- C. The mother's blood contains blood and respiratory gases.
- D. Many substances in the mother's blood are poisonous.

13. A person eats a large bowl of rice. What happens to the amount of insulin, Glycogen and glucagon in their body?

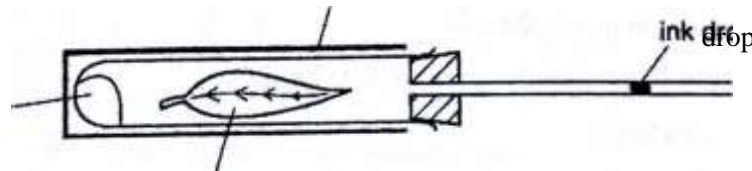
	Insulin	Glucagon	Glycogen
	Decreases	Decreases	Increases
	Decreases	Increases	Decreases
C	Increases	Decreases	Increases
	Increases	Increases	Decreases

14. Which of the following is the correct route followed by an impulse passing along a motor neuron?

- A. Nerve endings, Dendron, axon, dendrites
- B. Cell body, axon, Dendron, dendrites
- C. Nerve endings, dendrites, Dendron, axon.
- D. Dendrites, Dendron, Axon , Nerve endings

13. diagram an experiment to investigate gas exchange in a leaf.

black cover



substance to absorb carbon dioxide leaf

In which direction does ink drop move and for what reason?

	Direction	Reason
	To the left	Photosynthesis
B	To the left	Respiration
C	To the right	Photosynthesis
D	To the right	Respiration

16. Which of the following happens when ventricles contract? A. Blood is conveyed to the aorta and pulmonary artery.
 B. Blood is conveyed to the vena cava and pulmonary vein.
 C. The bicuspid valve and tricuspid valves open and blood enters ventricles. D. Blood in the veins move much faster.

17. The table below shows the conditions in four test tubes containing equal amounts of starch and salivary amylase. In which test tube is the starch broken down fastest?

	PH	Temperature
	2	27
	2	37
C	7	27
	7	37

18. The following are different responses to cold conditions in mammals.

- (i) Vaso constriction
- (ii) Hairs standing up
- (iii) Shivering
- (iv) Increase in metabolic rate.

Which of the following reduce heat loss?

- A. (i) and (ii)
- B. (i) and (iv)
- C. (ii) and (iii)
- D. (iii) and (iv)

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19. Under which of the following sets of conditions indicated in the table below will bean seeds germinate?

	Temperature(°C)	Light	Water	Oxygen
	20	Absent	Present	Present
	20	Present	Absent	Present
C		Present	Present	Present
	20	Present	Present	Absent

20. What facilitates oxygen to be absorbed rapidly into the blood in the lungs?

- A. Air breathed in has less Oxygen than Air breathed out.
- B. Alveoli have thick walls and large surface area.
- C. Alveoli have thin walls and large surface area
- D. The concentration of Oxygen in the blood is higher than in the alveoli.

21. Which row shows the effects of deficiencies in Nitrate and magnesium ions on plant growth?

	Effects of Nitrate ion deficiency	Effect of magnesium deficiency.
A	Green leaves	Long roots
B	Long roots	Thin stem
C	Stunted growth	Yellow leaves
D	Thick stem	Large leaves

22. What is likely to happen is a maize coleoptile whose tip has been removed, is illuminated from only one side?

- A. The coleoptile would curve towards the direction of light.
- B. The coleoptile would curve away from the direction of light.
- C. The coleoptile would not show any further growth.
- D. The coleoptile would grow upright.

23. The equation shows chemical reaction that occurs in living organisms.



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Which of these characteristics of living organisms is this equation associated with?



	Respiration	Nutrition
		X
C	X	
	X	X

24. Which of the following refers to the process by which water is lost from the plant?

- A. Active transport.
- B. Diffusion.
- C. Osmosis.
- D. Photosynthesis.

25. Plants manufacture their own supplies of carbohydrate.

What are the raw materials and the waste product of this process?

	Raw materials	Waste product
	Carbon dioxide and Chlorophyll	Oxygen
B	Carbon dioxide and water	Oxygen
C	Oxygen and chlorophyll	Carbon dioxide
D	Oxygen and water	Carbon dioxide

26. Which of the following are produced during anaerobic respiration in a yeast?

- A. Carbon dioxide and water. B. Ethanol and carbon dioxide.
- C. Ethanol and water.
- D. Lactic acid.

27. Which row describes a root hair cell?

	Allows water to pass into the plant	Increases the surface area of the root.	Loses water by transpiration.
A	✓	✓	✓
B	✓	✓	X
C	✓	X	✓
D	X	✓	✓

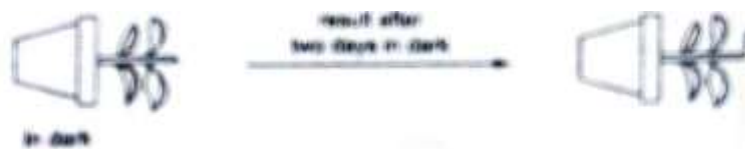
The following statements are about some hormones in the human body:

- V Causes changes in the ovaries during the menstrual cycle.
- W Promotes the development of stronger muscles.
- X Causes the voice to deepen at puberty.

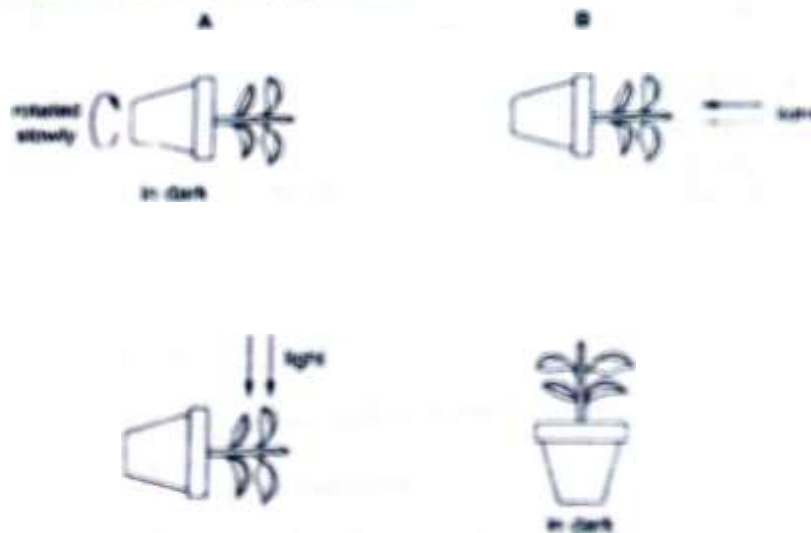
Which statements are correct for testosterone?

- V and W
- V and X
- W and X
- X and Y

29. The diagram shows an experiment to investigate the response of plant stems to gravity:



What is the suitable control for the experiment?



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30. A pure breeding plant with smooth stems was crossed with heterozygous plant with hairy stems. What will be the ratio of hairy: smooth stems in the resulting plants?
- A. 1 hairy : 1 Smooth
 - B. 1 Hairy : 3 Smooth
 - C. 3 Hairy : 1 Smooth
 - D. All hairy.

SECTION B (40 MARKS)

Attempt all questions in section. Answers MUST be written in spaces provided.

31. In an experiment about soil, two glass tubes of equal diameter were filled with equal volumes of dry soil sample A and Soil sample B, and one end of each tube was placed in water. The experiment was observed at intervals over a period of eight hours and results are shown by the graph below. Study it and answer questions that follow.

50

45

40

35

30

25

20

15

10

-74

Time in Hours

(a) (i) Suggest a suitable title for the graph. (01 mark)

Graph showing variation of height reached by water with time; ✓

(ii) What was the aim of the experiment? (01 mark)

To investigate capillarity of soil sample A and soil sample B; ✓

(b) From your graph, describe curve for ;

(i) Soil sample A (03 marks)

from 0 hours to 1 hour, there was rapid increase in height reached by water; ✓

from 1 hour to 4 hours, there was gradual increase in height reached by water; ✓

from 4 hours to 8 hours, height reached by water remained constant; ✓

(ii) Soil sample B (03 marks)

from 0 hour to 0.5 hours, there was gradual increase in height reached by water; ✓

from 0.5 hours to 2 hours, there was rapid increase in height reached by water; ✓

from 2 hours to 6 hours, there was gradual increase in height reached by water; ✓

(c) Explain the difference in height reached by water in the two soil samples between;

(i) 0 hours and 2 hours.

~~(04 marks)~~

The height reached by water in soil sample A is more than height reached by water in soil sample B. Because soil sample A has larger air spaces, that enable water to rise more rapidly; ✓

(02 marks)

Rej
- 0 to 4 hours.
- 0 - 4 hours.
- (0-4) hours

(ii) 2 hours and 8 hours.

(04 marks)

Height reached by water in soil. (3 marks)
Sample B is more than height reached by water in soil sample A. Because soil sample B has smaller soil particles which present a large surface area over which water molecules cling.

(d) State with reason which soil sample has more nutrients.

(03 marks)

Soil sample B. Because has high capillarity enables water with dissolved nutrients to rise to high levels. Small spaces b/w its particles inhibits leaching.

(e) (i) Explain how the physical properties of soil sample B can be improved. (02 marks)

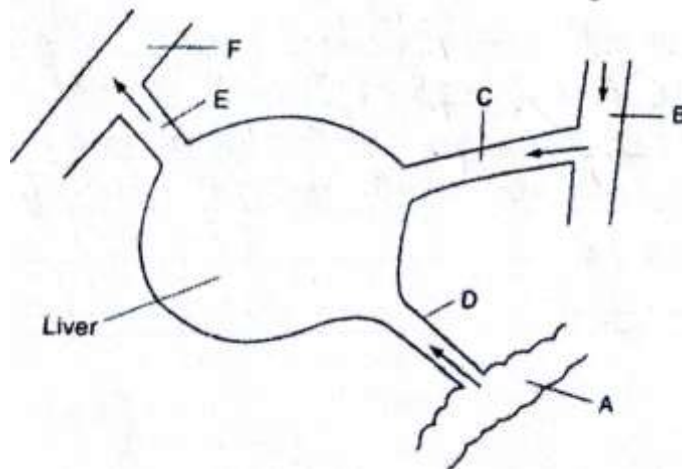
Adding humus to improve on poor drainage.

(ii) Name two other physical properties of soil sample B.

(02 marks)

- High water retention capacity
- less porous
- poor drainage
- poorly aerated

32. The diagram below illustrates blood circulation in certain organs in humans.



(a) Name part labelled A.

(01 mark)

Gut ; ✓
Accept Intestines

0 1

(b)

(i) Name blood vessels labelled D, E, C, B and F. (04 marks)

D - Hepatic portal vein ✓
E - Hepatic vein ✓
C - Hepatic artery ✓
B - Aorta ✓
F - Vena cava ✓

Rej. wrong spelling 04

(ii) State how the composition of blood in vessels E differs from that in vessel D.

(03 marks)

Blood in vessel E	Blood in vessel D
- Less nutrients	- more nutrients
- more urea	- less urea
- more carbon dioxide	- less carbon dioxide
- more heat	- less heat
- less oxygen	- more oxygen

03
Any 3
Rej. lack (No

(iii) State two nutrients that are stored in the liver.

(02 marks)

Vitamin E ✓ Vitamin D ✓ Vitamin K ✓
Iron ✓

2
Any two

VI+arm.

Jr-am

33. The figure below shows a food chain, Study it and answer the questions that follows.

Tree Insect larva (Caterpillar) → Small bird -----+ Hawk

(a) From the above example, name the .

- (i) Primary consumer. (01 mark)
..... Insect larva (caterpillar) 9
- (ii) Producer (01 mark)
..... tree 9
- (iii) Herbivore (01 mark)
..... Insect larva (caterpillar) 9

(b) Carbon dioxide from air around the leaves of tree might eventually become part of the flesh of hawk. Name in each case the process by which;

- (i) Carbon dioxide becomes part of the tissue of the leaf. (01 mark)

..... - photosynthesis; ✓
.....

Tissue of the leaf becomes part of the caterpillar. (01 mark)

..... - feeding; ✓
.....

(ii)

- (iii) Carbon dioxide is eventually turned to the atmosphere from the body of the living hawk. (01 mark)

..... - Respiration; ✓
.....

(c) State;

- (i) The source of energy passed along food chain. (01 mark)

..... - sun; ✓
.....

- (ii) Three processes by which energy is lost as it flows along the food chain. (03 marks)

Respiration;

Digestion;

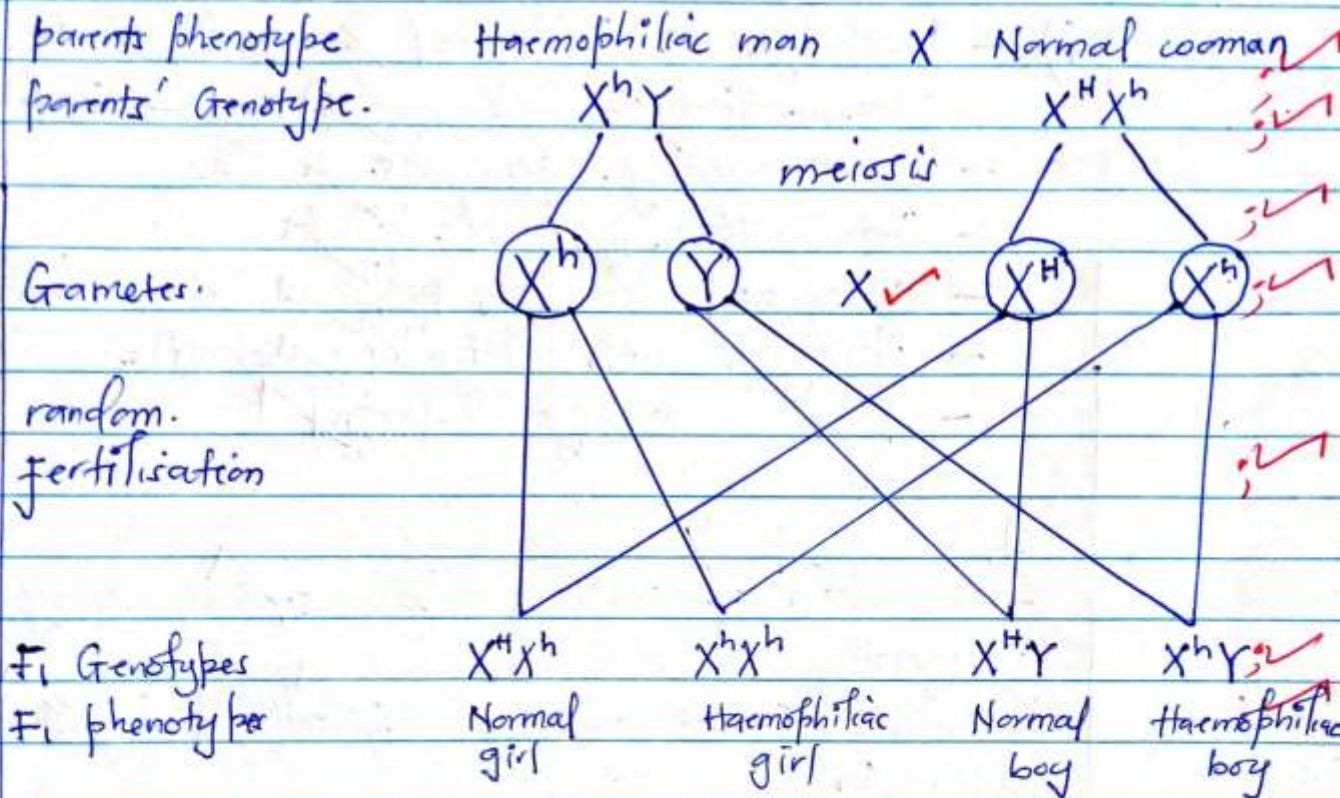
Death;

No. 34(a)

Haemophilia refers to a condition when an individual lacks one or more blood clotting factors leading to prolonged bleeding even from minor injuries.

No. 34(b)

i) let H represent allele for normal blood clotting.
h represent allele for haemophilia.



ii) Genotypic ratio: $1X^H X^h : 1X^h X^h : 1X^H Y : 1X^h Y$

phenotypic ratio: 1 normal girl : 1 Haemophiliac girl : 1 Normal boy : 1 Haemophiliac boy.

Accept: 1 haemophiliac : 1 Normal

c) By Genetic screening.

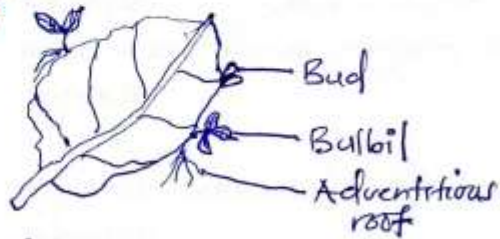
No. 35

- leaf modification, suitability of a leaf to perform other functions which are not its primary function

Reproduction leaf sprout new shoots, vegetative propagation eg Bryophyllum

- Has buds, grow into new shoot
Adventitious roots, for anchorage of new shoot

Fleshy: for water provision to new shoot



Support provide support to plant eg passion fruits, Garden peas. Has tendrils, prolongation of lamina or midrib to enable shoot cling onto other plant for support



Protection

- Scale leaves of rhizome, protect inner parts from mechanical damage.
- Sharp pointed structures thorns, protection against herbivory eg Cactus, pineapples

Storage

- Thick fleshy leaves for water and food storage eg in onions
- Swollen lamina, with food
- Hairy lamina, for water conservation

No. 36

a)

- Unisexual flowers, both sexes appear on different plants (dioecious) eg pawpaw

- Self sterility in monoecious plants like maize

- Dichogamy: stamens and pistils ripen at different time
protandry → ~~pistil~~ stamen ripen before pistil

protogyny → pistil ripen before stamens

- stigmas being higher than anthers.

b). random

Involves fusions of gametes, formed by meiosis, involve crossing over in prophase 1.

Random fusion of gametes

NO. 37

a) pollution; introduction of substances into the environment to levels that are harmful to life of living organisms.

- b) - Discharge of industrial fumes into atmosphere.
- Combustion of fuels, produce smoke soot
- Bush burning, generate smoke
- Construction, generate dust
- Charcoal burning, produce Carbon dioxide
- Spraying with pesticides; volatile
- poor Garbage disposal

Any 7

07

- c) - formation of acidic components, that destroy vegetation
- smoke causes poor vision; reduced light penetration
- Global warming.

02

Any 3