NAME:…….. **STREAM**……

SENIOR FOUR

553/1

BIOLOGY

PAPER 1

EXAM 5

INSTRUCTIONS:

- Answer all questions in Section A and Section B, plus two questions in Section C.

SECTION A
Attempt all questions.

1. Figure 1, below shows part of the epidemis of a leaf.

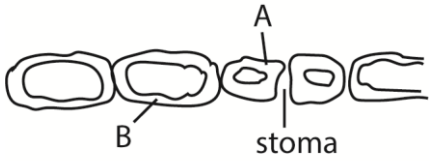

Figure 1

The difference between cell A and B is that;

A. A can photosynthesize while B cannot.
B. B has a cell wall while A does not.
C. B has chloroplasts while A does not.
D. B has a nucleus while A does not.

2. Arthropods are most successful group of organisms on land because;
   A. They have a water proof exoskeleton
   B. They can move very fast
   C. They have jointed legs,
   D. They have segmented bodies.

3. Which one of the following groups of organisms belong to phylum coelenterate?
   A. Tilapia and snake
   B. Jelly fish and sea anemone
   C. Earth worm and leech
   D. Crab and wood louse

4. The interaction between two species as both attempt to use the same environmental resources would be termed as;
   A. Competition
   B. Parasitism
   C. Commensalism
   B. Predation

5. The following are adaptations of hydrophytes to their habitats except;
   A. Most emergent and floating types have broad leaves.
   B. They are deeply modified into thread like straws.
   C. They are shallow rooted with buttress roots.
   D. They have large air-filled tissues.

6. The following reagents are used to test for food substances.
   i. Iodine solution
   ii. Copper II sulphate solution
   iii. Dilute hydrochloric acid
   iv. Dilute sodium hydroxide solution
   Which of the above can be used to test for proteins?
   A. ii and iii
   B. i and iv
   C. ii and iv
   D. ii only

7. Which of the following enzymes convert starch to maltose and maltose to glucose respectively?
   A. Amylase, lactose
   B. Amylase, maltose
   C. Amylase, catalase
   D. Amylase, maltase.

8. A germinating seed was subjected to a food test. What food substance was found to be in large amounts?
   A. Fats
   B. Glucose
   C. Carbohydrates
   D. Proteins

9. 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 and tricuspid valves open and blood enters the ventricles.
   D. Blood in the veins moves much faster.

10. In which two parts of the alimentary canal are proteins chemically digested?
   A. small intestines and mouth
   B. mouth and duodenum
   C. stomach and duodenum
   D. mouth and stomach.

11. Which of the following pairs consists of fat soluble vitamins?
   A. B and A
   B. A and C
   C. K and C
   D. A and D

12. The presence of starch and not glucose is used to show that photosynthesis take place in the leaves. This is because;
   A. Glucose is always formed during photosynthesis.
   B. Starch is always formed during photosynthesis.
   C. Glucose formed is immediately converted to starch.
   D. Glucose is never formed in leaves.

13. Which of the following dental formulae is associated with a carnivore?
   A. $I\ ^{3}/_{3}$ $C\ ^{1}/_{1}$ $PM\ ^{4}/_{4}$ $M\ ^{2}/_{3}$
   B. $I\ ^{2}/_{1}$ $C\ ^{0}/_{0}$ $PM\ ^{3}/_{2}$ $M\ ^{3}/_{3}$
   C. $I\ ^{0}/_{1}$ $C\ ^{0}/_{1}$ $PM\ ^{3}/_{3}$ $M\ ^{3}/_{3}$
   D. $I\ ^{0}/_{0}$ $C\ ^{2}/_{3}$ $PM\ ^{0}/_{3}$ $M\ ^{2}/_{3}$

14. A pregnant mother suffers from weakened bones and teeth, the vitamin and minerals to correct the defect are;
   A. Vitamin C, phosphorous and calcium

B. Vitamin B, iodine and calcium
C. Vitamin A, calcium and clay
D. Vitamin D, phosphorous and calcium.

15. Which one of the following best describes the term “single circulation” in fish?
A. Blood flows into gills and then into the body.
B. Blood passes through the heart once for every complete circulation
C. Blood passes through two chambers of the heart
D. Blood first flows through arteries and then through the veins.

16. Figure 2 below, shows a section through a mammalian kidney.

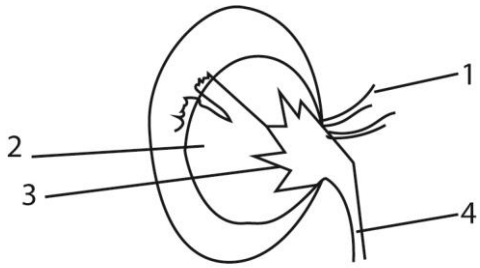

Figure 2

Which of the following shows the correct sequence of naming the parts labeled 1-5 in that order?
A. Medulla, cortex, ureter, pyramid, renal artery.
B. Renal artery, cortex, medulla, pyramid, ureter
C. Renal artery, medulla, pyramid, ureter
D. Ureter, cortex, medulla, pyramid, renal artery.

17. Which of the following is a deficiency disease?
A. Short sightedness
B. Colour blindness
C. Night blindness
D. Trachoma

18. Vertebraterial canals, broad flat transverse processes are characteristics of;
A. Cervical vertebra
B. Sacral vertebra
C. Lumbar vertebra
D. Thoracic vertebra.

19. The urine of a healthy person contains no glucose because;
A. The nephron is impermeable to glucose.

B. Glucose passes back into blood stream.
C. The kidney converts glucose to urea
D. Glucose is used for respiration before reaching the collecting ducts.

20. The following processes are carried out ONLY by living organisms except;
A. Denitrification
B. Nitrification
C. Decay
D. Nitrogen fixation

21. Which of the following changes occur when one walks out of bright sunshine to a poorly lit room? The:
A. circular iris muscles contract
B. circular iris muscles relax
C. lens becomes thicker
D. pupil narrows.

22. The movement of the part of a plant in response to a non-directional stimulus is referred to as;
A. tropism
B. taxis
C. nasty
D. phototropism

23. A woman who has small breasts, beards and a deep voice is likely to be having an over secretion of;
A. testosterone
B. Oestrogen
C. oxytocin
D. adrenalin

24. The route followed by an impulse passing along a motor neuron is;
A. Nerve endings, dendrone, axon, dendrites.
B. Cell body, axon, dendrone, dendrites
C. Nerve endings, dendrites, dendron, and axon
D. Dendrites, dendron, axon, nerve endings.

25. $160cm^3$ of water added to $250cm^3$ of dry soil. The volume of the mixture after stirring was $380cm^3$. Calculate the percentage of air in the soil sample?
A. 7.9%
B. 12%
C. 25%
D. 34%

26. Study the following figure 3 and answer the questions that follows;

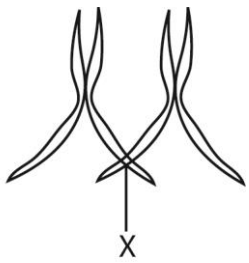

Figure 3

The part marked X on the pair of the chromosomes is called;

A. Crossing over
B. Centromere
C. Chiasma
D. Chromatid.

27. The circulatory system of an embryo is never in direct connection with mothers' blood vessels because;

A. It is connected to the uterus by the placenta.
B. Mother blood pressure would burst the capillary of the embryo.
C. The mother blood contains blood and respiratory gasses.
D. Many substances in mothers' blood are poisonous.

28. The following mechanisms would lead to evolution to occur except;

A. Mutation
B. Isolation
C. Speciation
D. Inbreeding

29. Growth can be measured using any of the following methods except;

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

30. The following occur during mitosis in animal cells:

i) chromosomes thicken and become more visible.
ii) centromere divide

iii) chromosomes line up at the equator of the spindle
iv) daughter centromeres are pulled to the opposite poles of the spindles.

Which of the above occur during anaphase?

A. i and ii
B. i and iii
C. ii and iv
D. iii and iv

SECTION B

Attempt all questions.

31. Small pieces of potato were placed in solution of different salt concentrations. After four hours, they were removed from the solution, wiped dry and reweighed. The results were as shown in the table;

Percentage salt concentration	Percentage change in mass
2.5	+10
5.0	+8
7.5	+5
10.0	+3
12.5	+1
15.0	+1.6
17.5	-4
20.0	-6.4
22.5	-8.6
25.0	-11

a. Represent the results on a graph (Percentage change in mass on a vertical axis and percentage salt concentration on horizontal axis)

(9 marks)

b. How does the weight of the cylinder vary with salt concentration?

(2 marks)

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c. From the graph, determine the salt concentration which is the same as the cell sap of the piece of potato *(1 mark)*

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d. (i) Name the process responsible for the variation in mass of potato cylinders with salt concentration. *(1 mark)*

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(ii) Explain briefly how the process brings about the change in mass of the potato cylinder. *(2 marks)*

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(iii) State any three roles, that take place in living organisms which occur in the same process as that named in d) (i) above. *(3 marks)*

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e. What would happen to the potato cylinder if they were placed in 0% salt concentration. *(2 marks)*

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32. (a) Define the term "mutation" *(1 mark)*

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(b) Name any two causes of mutation *(1 mark)*

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(c) The gene for normal production of haemoglobin is dominant to the mutant gene that causes sickle cell anemia. If the female carrier of genes for sickle cell anemia marries a normal man, show the possible genotypes and phenotypes of the off springs. Use suitable genetic symbols.
(8 marks)

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33. (a) Distinguish between excretion and secretion *(2 marks)*

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(b) Name the secretion produced by the following body organs and their functions *(4½ marks)*

Organ	**Secretion**	**Function**
Duodenum		
Liver		
Stomach		

(c) Name the secretions of the pancreas that is (are) involved;

i) Digestion *(1 mark)*

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ii) Control of blood sugar level *(1 mark)*

(d) Name the secretions of the pituitary gland that are involved in;

i) Water balance *(1 mark)*

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ii) Regulation of growth *(1 mark)*

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SECTION C

Attempt ALL questions in this section.

34. (a) Define the term homeostasis *(1 mark)*

(b) Explain the behavioural and physiological processes that take place in man during the regulation of body temperature.
(10 marks)

(c) Outline any four (4) functions of the human skin other than temperature regulation. *(4 marks)*

35. (a) Describe an experiment to show that anaerobic respiration takes place in yeast. *(10 marks)*

(b) Differentiate between anaerobic and aerobic respiration
(3 marks)

(c) State two commercial applications of anaerobic respiration
(2 marks)

36. (a) Define the following terms; i) Population *(1 mark)*
ii) Ecosystem

(b) In an ecological study carried out by a group of students, the following were observed:
The chameleon fed on the majority of the organisms.
Preying mantis fed on caterpillar and moth
Predatory bug fed on the caterpillar.
Construct a food web that involves the grasshopper, green plants and those other organisms mentioned above.
(5 marks)

(c) (i) Construct a food chain from the drawn food web in (b) above including at least the preying mantis
(1½ marks)

(ii) What would happen to the food chain drawn in (c) (i) if the preying mantis were removed from the environment?
(3 marks)

(d) What is the role of each of the following organisms in the food web drawn in (b) above?

(i) Predatory bug *(1 mark)*

(ii) Grasshopper *(1 mark)*

(iii) Preying mantis *(1 mark)*

(iv) Green plants *(1 mark)*

37. (a) What is air pollution *(1 mark)*

(b) Outline the human activities that cause air pollution *(6 marks)*

(c) How does air pollution affect living organisms *(8 marks)*

END