NAME:…… **STREAM**……

SENIOR FOUR

553/1

BIOLOGY PAPER 1

EXAM 10

2 HOURS 30 MINUTES

Instructions to candidates:

- This paper consists of three questions.
- Answer all questions in sections A and B plus two questions from section C
- Section A circle the correct alternative, answers to section B in the spaces provided and answers to section C in the answer booklets provided.

For Examiner's use only			
SECTION		Marks	Examiner's signature
A			
B	No 31		
	No 32		
	No 33		
C	No		
	No		
TOTAL			

SECTION A: (30 MARKS)

Answer all questions in this section. Write the letter representing the most correct answer to each question in the box provided.

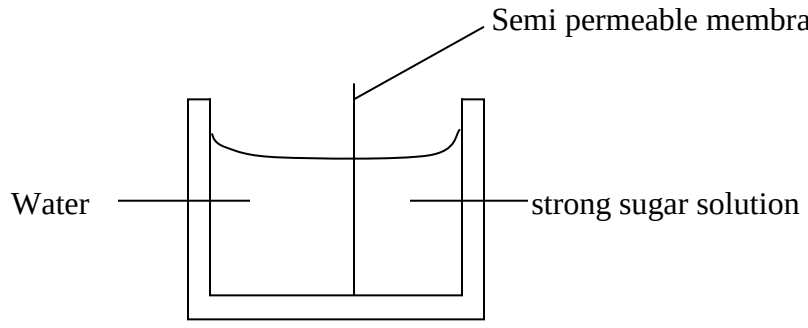
1. Nitrogen compounds are continually being absorbed from the soil. Which one of the following would enable the plant to receive a sufficient supply of nitrogen?
   A: introducing denitrifying bacteria in the soil
   B: adding ammonium sulphate to the soil
   C: keeping the ground well watered
   D: raising the same crop each year

2. Chlorophyll is removed from leaves before they are tested for starch because
   A: otherwise the iodine would not react
   B: boiling in water kills the leaf
   C: this helps the alcohol to penetrate the leaf
   D: colour changes would not be seen easily

3. In a certain food web, toads feed on insects while insects feed on green plants. At the same time, hawks feed on green plants. At the same time, hawks feed on the toads. We can therefore conclude that toads are
   A: primary consumers B: primary producers
   C: secondary consumers D: tertiary consumers

4. An individual was found to experience prolonged bleeding after having an injury. Which one of the following vitamins is likely to be lacking in that individual?
   A: vitamin D B: Vitamin B C: Vitamin K D: Vitamin B_{12}

5. An experiment is set up as shown below



   Which one of the following observations will be made after sometime?
   A: water will be found to contain some sugar B: the level of water will increase
   C: the level of sugar will decrease D: the sugar solution will become dilute

6. The offspring's of a cross between short rooted radical and long rooted radical plants were found to always be oval rooted. This is an example of
   A: incomplete dominance B: mutation
   C: complete dominance D: crossing over

7. In the human male, the tube used to carry both sperm and urine is the
   A: ureter B: sperm duct C: somniferous tubule D: urethra

8. Which of the following bones is not part of the axial skeleton?
   A: Ribs B: skull C: sternum D: scapula

9. If a cell has 46 chromosomes at the beginning of mitosis then at anaphase there would be a total of
   A: 92 chromosomes B: 23 chromosomes
   C: 23 chromatids D: 46 chromosomes

10. A student looked through a microscope and found that it was dark. Which part of the microscope would the student adjust to proceed with the use of the microscope?
   A: fine adjustment B: Diaphragm
   C: stage D: eye piece lens

11. The hormone that causes milk to flow from the mammary glands after birth is
   A: lactogen B: Oestrogen C: prolactin D: oxytocin

12. Plants with bodies not well differentiated into roots, stems and leaves are grouped under the
   A: pteridophytes B: spermatophytes
   C: bryophytes D:gymnosperms

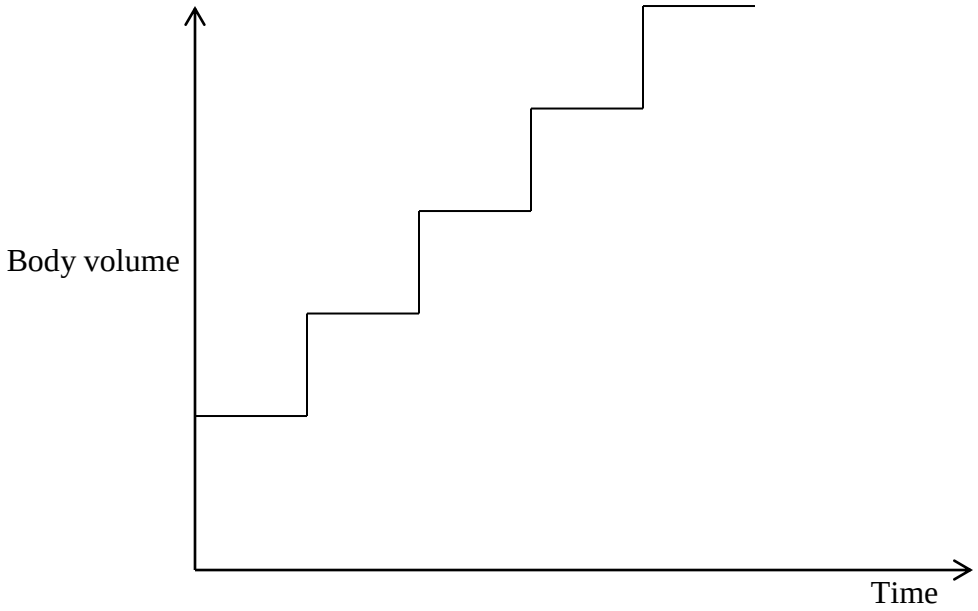
13. When water was powered in a sample of soil placed in a funnel in a laboratory, water quickly run through and collected in a beaker placed under the funnel. This means that soil has;
   A: high capillarity B: high water retention capacity
   C: small air spaces D: low capillarity

14. Which of the following are not larvae?
   A: caterpillar B: maggot C: chrysalis D: wriggler

15. Which of the following characterizes the blood in the renal vein?
   A: high in CO_2 and high in urea B: low in CO_2 and low in urea
   C: high in CO_2 and low in urea D: low in CO_2 and high in urea

16. The response by which tendrils curl around and cling to stems and other objects is an example of
    A: thigmotropism B: photoperiodism
    C: phototropism D: chemotropism

17. Which one of the organisms below has a growth curve represented by the graph below?



    A: bacterium B: insect C: human being D: bony fish

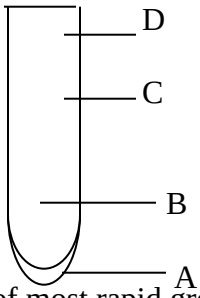
18. In most living organisms, the respiratory gases enter and leave the body of the organisms through the same passage except in
    A: man B: fish C: insect D: flowering plants

19. When setting up an experiment to show that energy is released by germinating seeds, the seeds are first soaked in sodium hypochlorite in order to
    A: provide proper pH for germination
    B: provide nutrients for germination
    C: kill fungal spores that can release energy
    D: absorb carbon dioxide that interferes with the experiment.

20. Gas exchange does not take place in
    A: Alveoli B: Bronchioles C: Tracheoles D: Gill filaments

21. Joan accidentally stepped on a snake and was frightened. Which one of the following is least likely to have happened immediately though it might happen later?
    A: decreased heart beat B: constriction of skin blood capillaries
    C: increased output of blood from ventricles D: increased breathing rate

22. The figure below shows the set up of an experiment to determine the region of most growth in the plant root



The region of most rapid growth is marked
A B C D

23. Which of the following describes characteristics shown by vegetatively produced offspring of a flowering plant?
A: wide variation in shape and type B: resistance to diseases
C: show early and rapid growth D: do not produce flowers

24. The following are results obtained from an experiment
Mass of dish = 50g
Mass of dish and dry soil = 200g
Mass of dish and soil after heating to red hot and cooled = 170g
Which one of the following represents the percentage of humus in the soil sample?
A: 15% B: 25% C: 75% D 20%

25. In the test for non-reducing sugars, sodium bicarbonate is used to
A: Act as an oxidizing agent B: Neutralize the excess acid
C: Act as a reducing agent D: Breakdown complex sugars into simple sugars

26. Which one of the blood groups will not agglutinate with any blood serum when mixed?
A: O B: A C:AB D: B

27. Birds that ride on the back of rhinos and eat bugs they spot in dung have a relationship with the rhino that is best described as
A: symbiosis B: commensalism C: parasitism D: saprophytism

28. According to Darwin, evolution occurs
A: by chance B: because of natural selection
C: by adaptation D: rapidly

29. Which of the following sets of characteristics comprise of only characteristics of discontinuous variation?
A: Tongue rolling, blood groups, sex B: height, body weight, intelligence
C: colour blindness, skin colour D: skin colour, height, albinism

30. To which one of the following bones is the biceps muscle attached by tendons?
A: scapula and radius B: humerus and radius
C: scapula and ulna D: humerus and ulna

SECTIION B: 40 MARKS)

Answer all questions in this section. Answers must be written in the spaces provided.

31. During the germination and growth of a cereal, the dry weight of the endosperm, the weight of the embryo and the total dry weight were determined at two-day intervals. The results are as shown in the table below

Time after planting (days)	Dry weight of endosperm (mg)	Dry weight of embryo (mg)	Total dry weight (mg)
0	43	2	45
2	40	2	42
4	33	7	40
6	20	16	37
8	10	--	35
10	6	--	39

(a) Complete the table above by filling in the weight of embryo on day 8 and day 10. (1 mark)
(b) On the same axes, plot a suitable graph to show the above information (11 ½ marks)
(c) What was the total dry weight on day 5? (½ mark)
(d) Explain the changes in dry weight of endosperm, weight of embryo and total dry weight with time.
(i) Dry weight of endosperm (2 marks)

……
……
……
……
……
……..

(ii) Weight of embryo (3 marks)

……
……
……
……
……
…….

(iii) Total dry weight (3 marks)

……
……
……
……
……
……..

32. A normal couple produced twins when one of the twins is an Albino.

(a) Explain why

(i) Parents with normal skin colour produced an Albino. (3 marks)

……
……
……
……
……
……
……..

(ii) Only one of the twins from the same pregnancy was an Albino. (2 marks)

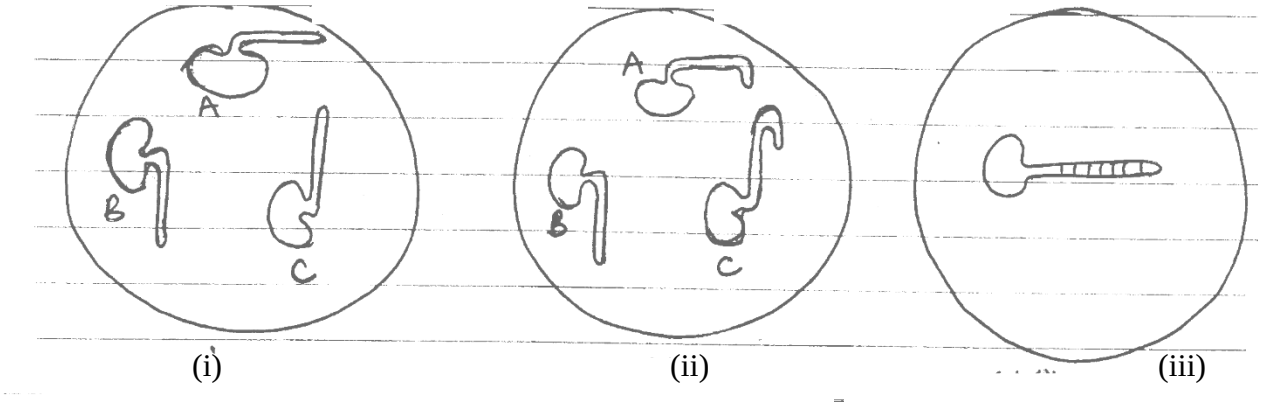
……
……
……
……
……
……

(b) Using suitable symbols, carry out a genetic cross to illustrate the difference in skin colour of the twins (5 marks)

……
……
……
……
……
……
……
……

……
……

33. Three germinating beans with straight radicles were placed in a petri dish containing most cotton wool as shown in (i) below. The dish was kept in a vertical position for 2 days in the dark. The appearance of the beans after 2 days is shown in (ii) below.



(i) (ii) (iii)

(a) State the change that was observed in all the three radicles. (1 mark)

……
……
……
……
……
……

(b) Explain the observed change in (a) above (2 ½ marks)

……
……
……
……
……
……
……

(c) Petri dish (iii) was put in a clinostat which kept rotating. Explain the expected results after two days. (2 marks)

……

……

……

……

……

……

(d) The seedling in petri dish (iii) had equally spaced marks in Indian ink along its length at the beginning of the experiment. Draw a diagram to show the appearance of the marks after two days. (1 ½ marks)

(e) Explain this appearance. (3 marks)

……

……

……

……

……

……

SECTION C: (30 MARKS)

Answer two questions from this section.
Answers are to be written in the answer booklets provided.

34. (a) Explain the mechanism involved and the pathway taken by oxygen from the atmosphere to the liver cells in human beings. (8 marks)
(b) Describe how inspiration occurs in bony fish. (7 marks)

35. (a) What is parasitism? (1 mark)
(b) Give four effects of ecto-parasites on their hosts (4 marks)
(c) Describe how schistosoma mansoni is adapted to the parasitic mode of life (10 marks)

36. (a) Describe the process of fertilization in human beings. (5 marks)
(b) Explain how pregnancy is sustained until parturition. (10 marks)

37. Describe how the various parts of the human digestive system are adapted to their functions. (15 marks)

END