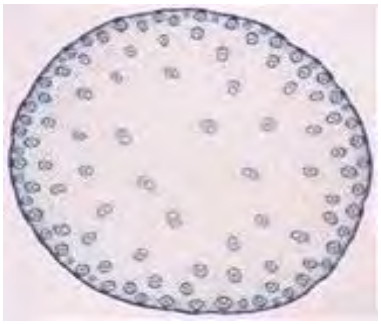
TEST PAPER ONE

SECTION A

1. Which one of the following is the correct route taken by carbon dioxide from the body cells of an insect to the atmosphere?

A. Trachea → Tracheole → spiracles
B. Spiracles → Trachea → Tracheoles
C. Tracheoles → Trachea → Spiracles
D. Spiracles → Tracheoles → Trachea

2. The saprophytic and holozoic modes of feeding are similar because both
   A. Do not feed on cellulose
   B. Do not require chloroplasts
   C. Utilise enzymes to break down complex food substance
   D. Feed only on dead organic matter
3. Which one of the following plant organs is shown in the figure below?



   A. Root of monocotyledonous plant
   B. Stem of a monocotyledonous plant
   C. Stem of a dicotyledonous plant
   D. Root of a dicotyledonous plant
4. Which part of the heart receives blood from the anterior part of the body?
   A. Venacava
   B. Aorta
   C. Ventricle
   D. Sinuses
5. The effect of unidirectional light on the distribution of auxins in the tip of the plant shoot is
   A. Increase in auxins on the illuminated side of the plant
   B. Inhibition of movement of auxins down the plant
   C. Uniform distribution of auxins around the tip
   D. Reduction in concentration of auxins on the illuminated side of the plant
6. Antigens stimulate the production of
   A. Antibodies
   B. Antitoxins
   C. Leucocytes
   D. Lysins
7. Insects in dry areas conserve water by passing wastes in form of
   A. Urea
   B. Uric acid
   C. Ammonia
   D. Urine
8. Which one of the following is a characteristic of sandy soil?
   A. High water retention
   B. Low drainage
   C. High capillarity
   D. High porosity
9. Which one of the following are components of mammalian sweat?
   A. Urea, water and salts
   B. Water and salts only
   C. Ammonia, water and salts
   D. Water, Urea ammonia and salts

10. Gaseous exchange in the larvae of amphibians occurs through the
    A. Skin
    B. Buccal cavity
    C. Lungs
    D. Gills
11. Which one of the following is **not** a component of urine?
    A. Glucose
    B. Water
    C. Sodium chloride
    D. Urea
12. Which of the following groups contains organisms that are closely related?
    A. Species
    B. Family
    C. Order
    D. Class
13. Which one of the following is **not** a reducing sugar?
    A. Maltose
    B. Fructose
    C. Sucrose
    D. Galactose
14. Which of the following fruits is an example of a berry?
    A. Avocado
    B. Beans
    C. Guava
    D. Jack fruit
15. Which of the following would **not** increase the efficiency of the nephrons for purification of blood?
    A. Having along loop of Henle
    B. Having many blood vessels
    C. Possession of a long collecting duct
    D. Having a porous loop of Henle
16. Which of the following is **not** a component of glomerular filtrate?
    A. Urea
    B. Proteins
    C. Salts
    D. Glucose
17. Why does lactic acid accumulate in muscles during vigorous exercise?
    A. The oxygen supply is not enough for the oxidation of food
    B. Energy produced is not enough for the exercise
    C. To prevent generation of too much carbon chloride
    D. There is insufficient food for complete food oxidation
18. When the leaves of the plant *Mimosa pudica* are touched, they are folded. This illustrates
    A. Nastic movement
    B. Tactic movement
    C. Tropic movement
    D. Growth movement
19. A plant grown horizontally bends its roots down wards. This response is an example of
    A. Chemotropism
    B. Thigmotropism
    C. Phototropism
    D. Geotropism
20. Which of the following would **not** be important for the movement of oxygen from the lungs to the blood stream
    A. Presence of a vascular system
    B. Presence of a layer of moisture
    C. Possession of many alveoli
    D. The large size of the alveoli
21. Which of the following organisms has a respiratory system that lacks blood capillaries?
    A. Toad
    B. Fish
    C. Cockroach
    D. Man
22. The following results were obtained in an experiment.
    Soil = $200cm^3$
    Water = $300cm^3$
    Water + soil after mixing = $450cm^3$

The percentage of air in a soil sample is?

A. 10%
C. 25%
B. 20%
D. 30%

23. Which one of the following hormones is secreted by the alpha cells of the Islets of Langerhans?
    A. Glucagon
    C. Adrenaline
    B. Insulin
    D. Anti Diuretic Hormone
24. Select the answer with the correct order of groups starting with the smallest
    A. Species, order, family
    C. Family, order, class
    B. Class, family, phylum
    D. Order, family, class
25. Which of the following organs are used by toads and frogs for gaseous exchange?
    A. Skin
    C. Lungs
    B. External gills
    D. Buccal cavity
26. A male cockroach is different from the female cockroach by having
    A. Styles
    C. Long antennae
    B. Cercus
    D. Broad abdomen
27. Which one of the following is **not** a characteristic of insects?
    A. 2 pairs of antennae
    C. 1 pair of compound eyes
    B. 3 pairs of legs
    D. 3 parts of the body
28. In the leaf, most of the food is made in the
    A. Spongy mesophyll
    C. Palisade mesophyll
    B. Lower epidermis
    D. Upper epidermis
29. Algal blooms in lakes and rivers are due to;
    A. Increased amounts of nutrients
    C. Increased levels of oxygen
    B. Decreased levels of carbondioxide
    D. Accumulation of algae
30. The regions of most active growth in plants are found mainly in
    A. Stems
    C. Axillary buds and flowers
    B. Stems and root hairs
    D. Stems and root apexes

SECTION B

31. An experiment was set up to investigate the effect of light on the rate of photosynthesis in the shoot of a water weed. The shoot was immersed in a 2% sodium hydrogen carbonate solution. The gas given off by the shoot was collected for 5 minutes at different light intensities and the volume measured. The results obtained are shown in the table below.

Light intensity (arbitrary units)	1	2	3	5	10	20	30	40	50
Gas collected (cm^3 per 5 minutes)	0.35	0.60	0.85	1.20	1.55	1.70	1.80	1.79	1.79

a. Using the data given above, plot a graph of gas collected against the light intensity.

(Next page)

b. Describe the variation of gas collected in the following light intensities
    i. 1 – 10

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ii. 30 – 50

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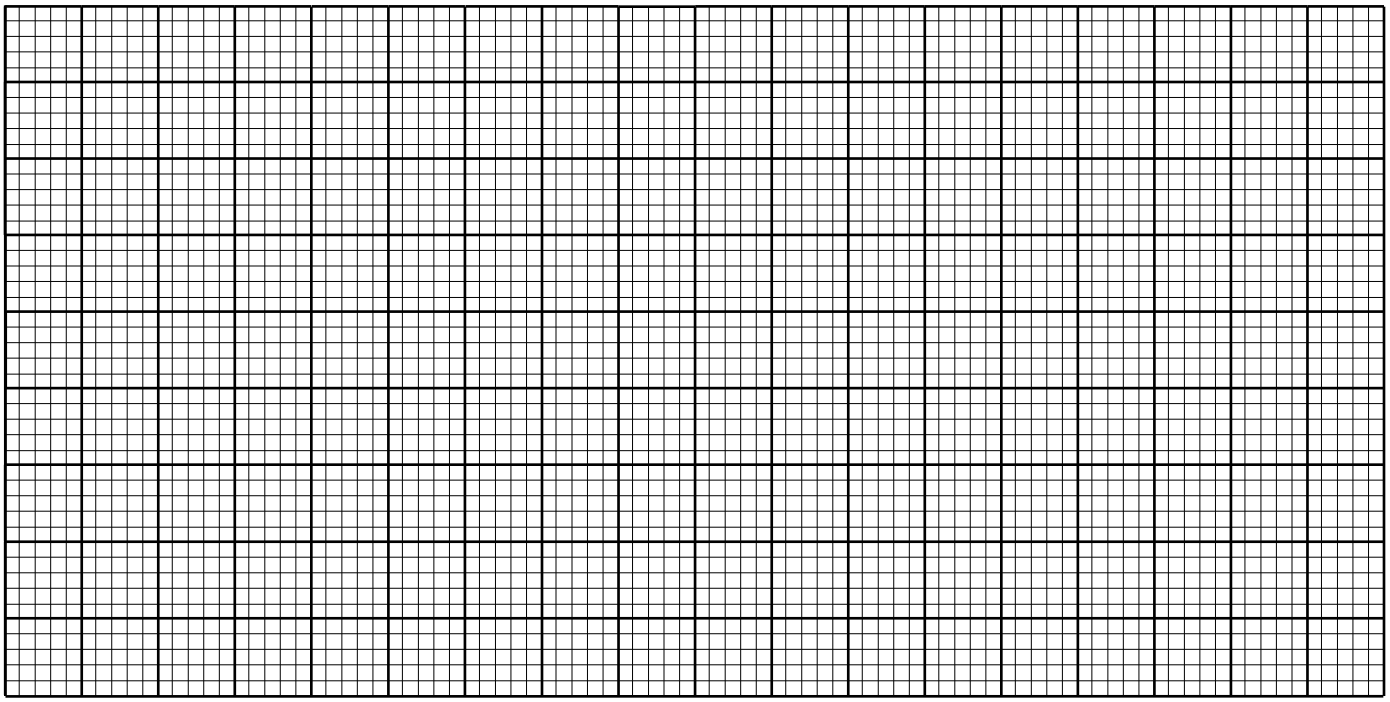

c. Explain the graphs in b(i) and (ii) above

i. 1 – 10

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ii. 30 – 50

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d. What is the role of sodium hydrogen carbonate in this experiment?

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e. State the two conditions, 2 raw materials and two products of the photosynthesis process

- Conditions

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- Raw materials

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- Products

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f. State the functions of the products of photosynthesis.
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32. State the difference between cross pollination and self pollination
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b. Give three structural features of flowers that ensure cross pollination
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c. Give five adaptations of flowers for insect pollination
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33. What is soil erosion?
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b. Name the four types of soil erosion
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c. State the causes of soil erosion
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d. How does mulching aid farmers in water and soil conservation?

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SECTION C

34. Describe the digestion of proteins in the human alimentary canal.

b. What may happen, to the products of digestion of proteins?

35. What is excretion?

b. With the aid of a labeled diagram describe the functioning of the kidney in excretion

36. What is meant by the term homeostasis?

b. State the modification under gone by the body during;

i. Hot conditions

ii. Cold conditions

37. Draw a labeled diagram of a cross section of a young dicotyledonous stem.

b. Give the functions of at least five parts of the structures labeled in (a) above.

Answers for section C

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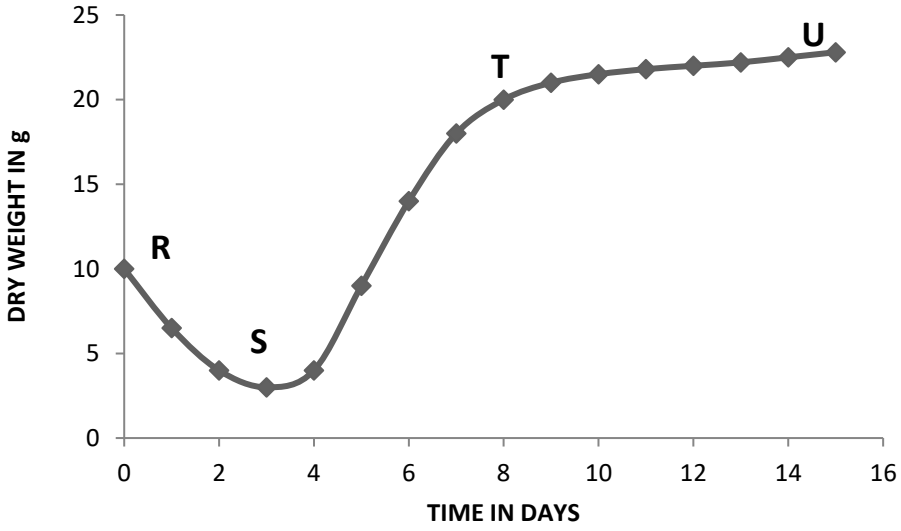
TEST PAPER 2

SECTION A

1. Which one of the following plant food storage organ contains **most** food substances?
   A. Stem tubers
   B. Fruits
   C. Root tubers
   D. Seeds
2. Which one of the following is the correct order of food movement in the gut of a ruminant?
   A Rumen → Reticulum → Psalterium → abomasums
   B Reticulum → Rumen → abomasums → Psalterium
   C Rumen → Reticulum → abomasums → Psalterium
   D Reticulum → Rumen → Psalterium → abomasums
3. Which one of these diseases is caused by hormonal deficiency?
   A. Scurvy
   B. Rickets
   C. Diabetes
   D. Poliomyelitis
4. Under which condition is lactic acid likely to be accumulated in man?
   A. During sleep
   B. When engaged in a vigorous physical exercise
   C. After breathing in excess carbon dioxide
   D. After consuming a lot of malt

   Figure 1 below shows the changes in the dry weight of seedlings during germination. Use it to answer questions 5 and 6



5. Dry weight of seedling decreased between R and S because
   A. Stored food is used up for respiration and growth
   B. Mineral salts are lost to the soil
   C. The seedlings lose water through transpiration
   D. Bacteria present in the soil also consumed some of the food stored
6. The reason for the more or less constant dry weight as shown between points T and U i
   A. The growth of seedlings continues at a steady rate
   B. The seedlings stop feeding
   C. The seedlings have died

D. Growth of the seedlings ceases but they continue to feed

7. Which one of the following types of bacteria causes the conversion of ammonia into nitrites and nitrates?
   A. Nitrifying bacteria
   B. Denitrifying bacteria
   C. Purifying bacteria
   D. Nitrogen fixing bacteria
8. Oxygen is mainly transported in the
   A. Plasma
   B. White blood cells
   C. Platelets
   D. Red blood cells
9. Which one of the following processes is **not** linked with transpiration?
   A. Absorption of water by roots
   B. Transportation of sugars
   C. Cooling of leaves
   D. Provision of mechanical support
10. Which one of the following functions of the skeleton applies only to insects?
   A. Providing camouflage
   B. Protection
   C. Levers of locomotion
   D. Determining body shape
11. One of the major functions of vitamin C in the human body is to
   A. Provide body resistance against diseases
   B. Provide resistance against blood cells
   C. Add bulk to food eaten
   D. Increase rate of heart beat
12. A student heated strongly a dry sample of soil to a constant mass. The loss of mass in the soil is due to.
   A. Loss of mineral salts
   B. Escape of air
   C. Loss of water
   D. Destruction of humus
13. Which of the following are the end products of the digestion cane sugar?
   A. Glucose and fructose
   B. Fructose and galactose
   C. Glycerol and fructose
   D. Galactose and glucose
14. Which one of the following is the correct order of arrangement from the smallest to the largest group of organisms?
   A Species → order → genus → Class → Phylum
   B Species → class → order → genus → Phylum
   C Species → class → order → genus → Phylum
   D Species → genus → order → Class → Phylum
15. In favourable conditions, yeast reproduces by
   A. Fragmentation
   B. Sporulation
   C. Conjugation
   D. Budding
16. Which of the following protozoa has cilia?
   A. Amoeba
   B. Paramecium
   C. Euglena
   D. Plasmodium
17. The chisel – shaped structure of incisor is suitable for
   A. Tearing
   B. Chewing
   C. Cutting
   D. Grinding
18. Which one of the following cells could have their functions adversely affected by the AIDS virus?
   A. Erythrocytes
   B. Leucocytes
   C. Blood platelets
   D. Nerve cell
19. Which of the following is true of respiration but **not** of photosynthesis?

A. Oxygen is given out
B. Carbon dioxide is taken in
C. Glucose is synthesized
D. Carbon dioxide is released

20. Growth of plant root towards water is called positive.
A. Hydrotropism
B. Phototropism
C. Geotropism
D. Thigmotropism

21. Which one of the following takes place by the process of active transport in plants?
A. Up take of water
B. Transpiration
C. Intake of carbon dioxide
D. Uptake of mineral salts

22. Decrease in the number of mammalian red blood cells can reduce the ability of the blood to
A. Clot
B. Destroy harmful bacteria
C. Transport oxygen
D. Distribute heat

23. A sample of food from the hepatic portal vein contains
A. Fats
B. Proteins
C. High concentration of urea
D. High concentration of products of digestion

24. In which part of the gut does mucus (mucin) have a protective function?
A. Oesophagus
B. Small intestine
C. Stomach
D. Rectum

25. The following colours were obtained when testing for reducing sugars in food samples?

Food sample	A	B	C	D
Final colour	Green	Yellow	Orange	Red

Which one of the following solutions has the highest percentage of reducing sugars?
A. D
B. C
C. B
D. A

26. The best method that prevents the start of gully erosion on a cultivated hill is
A. Contour cultivation
B. Strip cropping
C. Tree belts
D. Mulching

27. Which of the following is true about arteries? They
A. Carry blood away from the heart
B. Carry deoxygenated blood
C. Carry oxygenated blood
D. Possess valves along their length

28. Which one of the following features is typical of the class insecta?
A. Jointed legs
B. Complete metamorphosis
C. Three body parts
D. Exoskeleton

29. Which of the following processes need energy?
A. Osmosis
B. Plasmolysis
C. Diffusion
D. Active transport

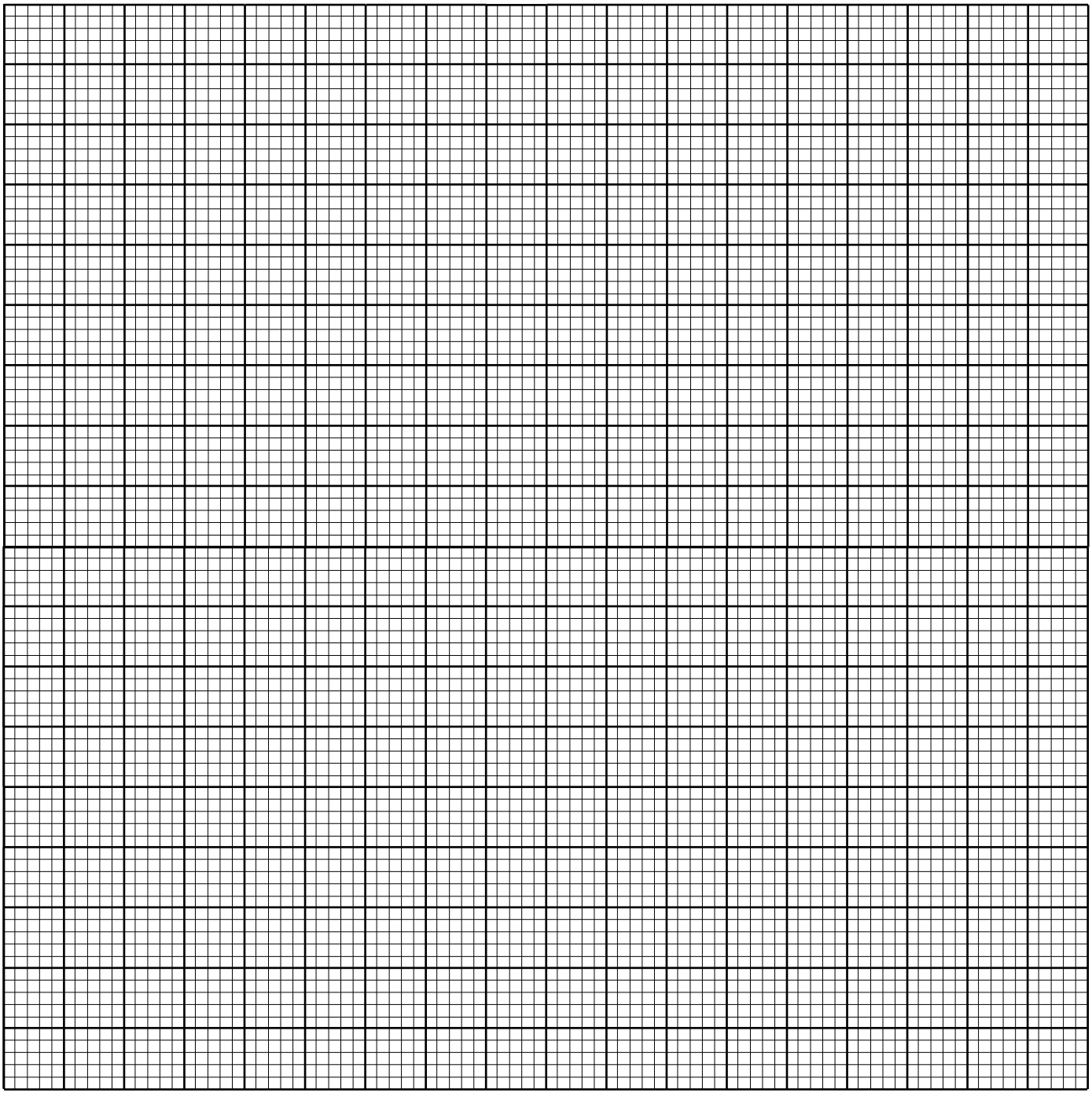
30. The milk teeth in humans consist of
A. Incisors only
B. Incisors, canines and premolars
C. Incisors and canines
D. Incisors and premolars

SECTION B (40 marks)

31. In an interview, two people A and B drank equal amounts of glucose solution. Their blood sugar levels were determined immediately and thereafter at intervals of one hour for the next 6 hours. The results are shown in the table below.

Time (hours)		1	2	3	4	5	6
Blood glucose level (mg/100ml)	**A**	90	220	160	90	90	90
	B	120	360	370	240	90	16

a) Represent the data above on a graph paper



b) Explain the following changes in person A

(i) Between 0 to 1 hour

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(ii) Between 1 and 4 hours

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c) From the graph, what is the normal blood sugar level for human beings?

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d) Suggest a reason for the high sugar level in person B

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e) How can the high sugar level in person B be controlled

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f) What is the biological significance of maintaining a fairly constant sugar level in the human body?

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g) Account for the changes in the blood sugar level for person B after 4 hours?

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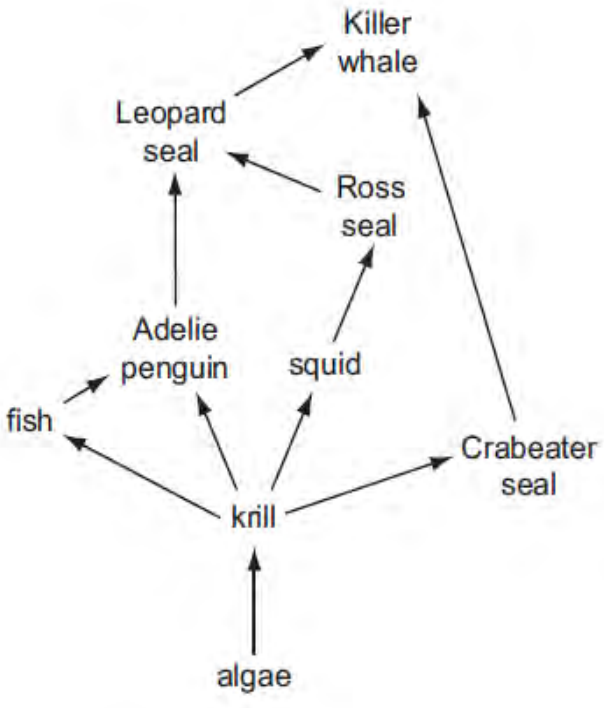
32. The figure below shows a food web for the south Atlantic ocean



a. Name the top carnivore in the food web

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b. Name a member of the food web that is both a secondary and a tertiary consumer?

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c. Use the information from the web to complete the food chain of five organisms

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d. In the future extraction of mineral resources in the Antarctic might occur at a large scale. This could destroy the breeding grounds of the Ross seal.

i. State and explain what effects this might have one the population of the Leopard seal

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ii. State and explain what effects this might have on the population of fish

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33. a) Give five differences between respiration and photosynthesis.

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b) Give three ways in which respiration is important to living organism.

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c) Name two commercial uses of anaerobic respiration.

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SECTION C

34. Recently there has been a campaign on free planting in Uganda. Outline the importance of forest on wildlife conservation in Uganda.
35. (a) What is meant by the term fruit dispersal?
    (b) State any five uses of dispersal to a plant.
    (c) State the adaptations of fruits to dispersal by animals.
36. What are the characteristics of respiratory surfaces?
    (b) Describe the breathing mechanism in man
37. What is meant by the term water pollution?

(b) State any four causes of water pollution

(c) State how the causes above affect the organisms in water

Answers for section C

TEST PAPER 3

SECTION A

1. The respiratory surface of the bony fish is the gill
- A. Bar
- B. Rakers
- C. Chamber
- D. Filament

2. The best reason for a faster breathing rate after a race is to
- A. Allow blood to move faster to the lungs
- B. Replace energy lost during the race
- C. Increase the intake of oxygen
- D. Break down excess carbondioxide

3. Which one of the following can be considered as an air pollutant?
- A. Carbondioxide
- B. Oxygen
- C. Water vapour
- D. Nitrogen

4. Carbondioxide is contained in blood as
- A. Carbonate ions
- B. Gaseous carbondioxide
- C. Bicarbonate ions
- D. Carbonic acid

5. The production of alcohol when plant materials are kept in air – tight and moist conditions is evidence of
- A. Aerobic respiration
- B. External respiration
- C. Anaerobic respiration
- D. Internal respiration

6. The major limiting factor to the number of trophic levels in an ecosystem is?
- A. Energy loss as each successive trophic
- B. Reproductive potential at each successive trophic
- C. The number of predators at each trophic level
- D. Amount of decomposers

7. Which of the following are the respiratory surfaces in insects?
- A. Spiracles
- B. Tracheae
- C. Tracheoles
- D. Bronchioles

8. Which of the following is found in blood but not in lymph?
- A. White blood cells
- B. Water
- C. Red blood cells
- D. Food substances

9. The table below shows the changes in the world population over a period of two hundred years.

Year	**1790**	**1890**	**1990**
Estimated population (millions)	850	1500	5000

What has made the largest contribution to this population?
- A. Decreased food supply
- B. Decreased use of chemical contraceptives
- C. Increased food supply
- D. Increased use of chemical contraceptives

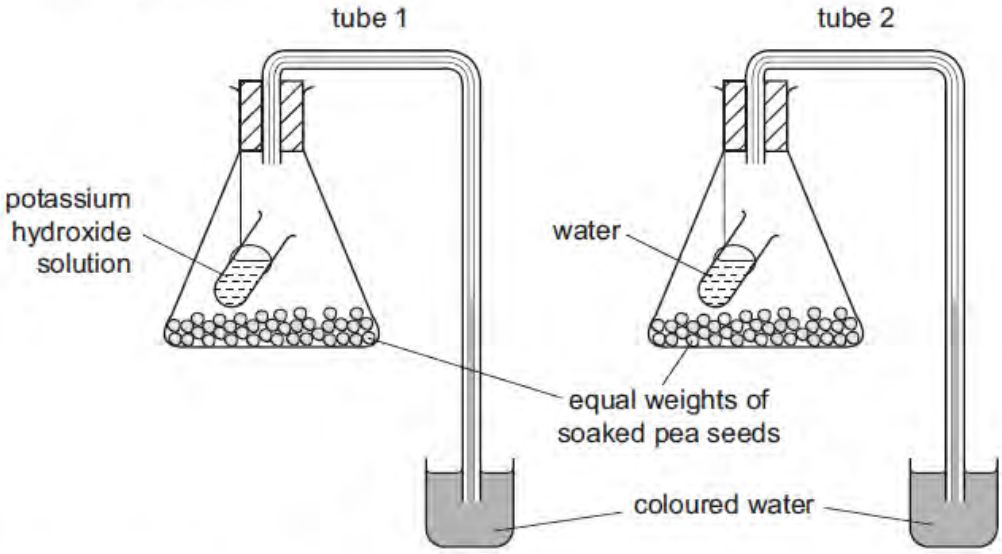
10. Urine is formed by
- A. Selective reabsorption
- B. Ultra filtration
- C. Selective filtration and ultra reabsorption
- D. Selective reabsorption and ultra filtration

11. Insectivorous plants are most likely to be found in places lacking?
- A. Nitrates
- B. Calcium

C. Phosphates
D. Magnesium

12. Which of the following is the nitrogenous excretory product in insects?
A. Urea
B. Uric acid
C. Ammonia
D. Urine

13. An experiment was set up as shown



After four hours, the coloured water will
A. Have gone down by the same amount in both tubes
B. Be higher in tube 1 than in tube 2
C. Be higher in tube 2 than in tube 1
D. Have gone up by the same amount in both tubes

14. Absorption of mineral salts in plants occurs by
A. Osmosis
B. Diffusion
C. Active transport
D. Capillarity

15. Which of the following foods is **not** found in the ileum?
A. Sucrose
B. Glucose
C. Fructose
D. Galactose

16. Which one of the following enzymes is **not** contained in pancreatic juice?
A. Amylase
B. Lipase
C. Trypsin
D. Pepsin

17. Which of the following pairs of organs are responsible for chemical digestion of proteins?
A. Stomach and liver
B. Stomach and duodenum
C. Colon and ileum
D. Duodenum and liver

18. Individuals with poor night vision usually lack vitamin
A. A
B. K
C. C
D. D

19. At temperatures above 50^0C enzymes are
A. Killed
B. Denatured
C. Inactivated
D. Unreactive

20. The specificity of an enzyme depends on
A. Surface area
B. Substrate

C. pH
D. Temperature

21. The products of digestion of lactose sugar are
A. Two glucose molecules
B. Fructose and galactose
C. Glucose and fructose
D. Glucose and galactose

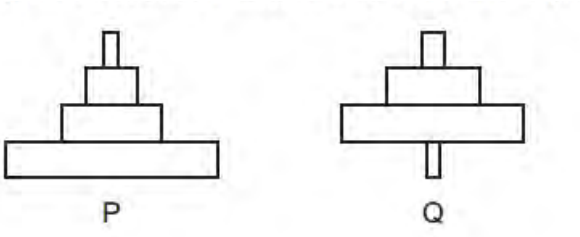
22. Select the answer with the correct order of groups, starting with the smallest
A. Species, order, family
B. Class, family, phylum
C. Family, order, class
D. Order, family, class

23. The maize grain in a fruit because it
A. Stores food in the endosperm
B. Has a cotyledon
C. Has two sugars
D. Has a radicle and cotyledon

24. Which of the following is **not** a reducing sugar
A. Maltose
B. Fructose
C. Sucrose
D. Galactose

25. Cellulose digesting bacteria are found in the digestive system of ruminants in the part called
A. Caecum
B. Omasum
C. Rumen
D. Abomasums

26. The diagram below shows two pyramids based on food chains in which the producer is a large tree



What do the two pyramids represent?

	P	Q
A	Biomass	Biomass
B	Biomass	Numbers
C	Numbers	Biomass
D	Numbers	Biomass

27. Which of the following consists of a complete respiratory system?
A. Spiracle trachea, bronchioles
B. Spiracle trachea, tracheoles
C. Trachea bronchus, bronchioles
D. Trachea, bronchus, tracheoles

28. Which of the following is not produced at the end of anaerobic respiration in plants?
A. Carbondioxide
B. ATP
C. Lactic acid
D. Ethanol

29. In a stem, the tissue responsible for the movement of manufactured food from leaves is the
A. Cortex
B. Cambium
C. Xylem
D. Phloem

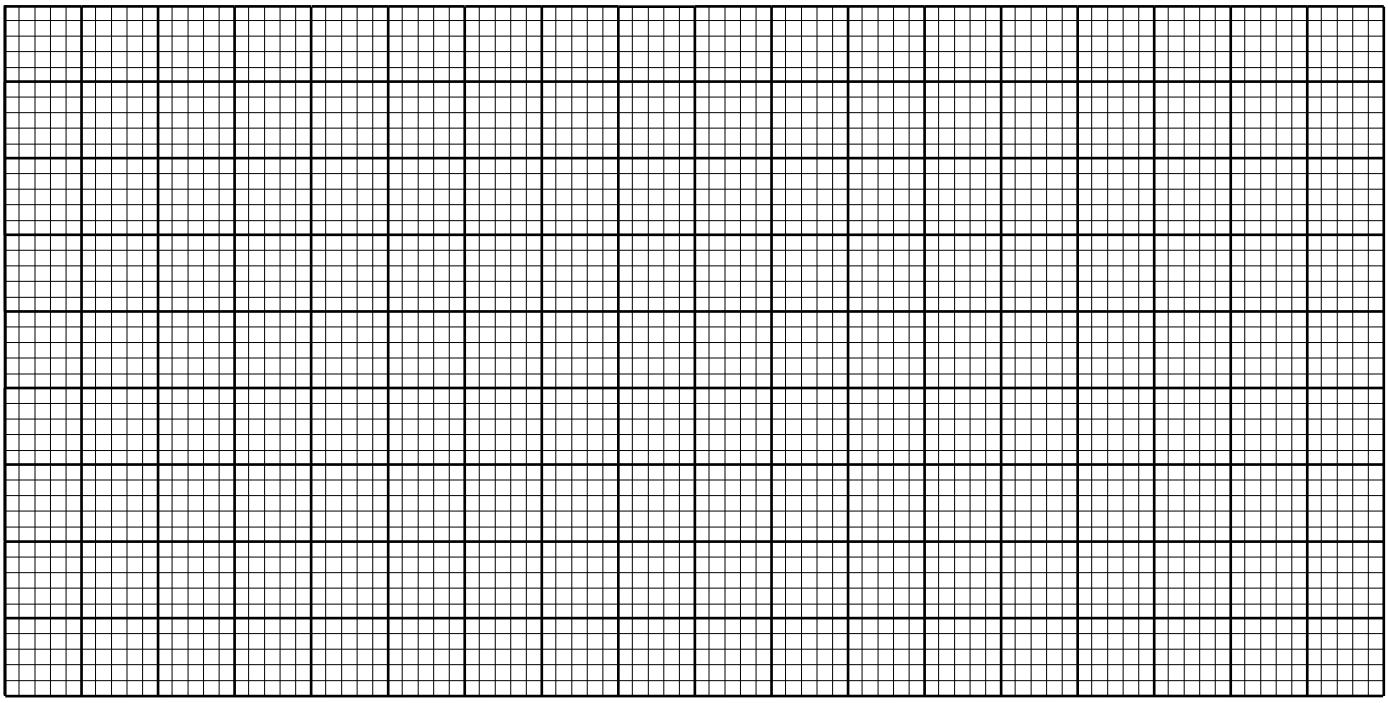
30. Deoxygenated blood does **not** mix with oxygenated blood because of the presence of the
A. Bicuspid valve
B. Septum
C. Tricuspid valve
D. Semi – lunar valves

SECTION B (40 marks)

31. In an experiment to determine the effect of light intensity on the rate of photosynthesis, the volume of oxygen produced by the water weed, elodea, at different light intensities was measured. The results are shown in the table below.

Light intensity (arbitrary units)	Volume of oxygen released (mm^3/minute)
1	4
2	11
3	18
4	25
5	28
6	35
7	38
8	40
9	41
10	41

a. Plot this information in the form of a graph



b. At what light intensity did the plat produce $25cm^3$ of oxygen per minute?

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c. Explain the effect of light intensity on the volume of oxygen produced per minute?

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d. What levels of light intensity had the greatest effect on the rate of photosynthesis? How could this information be useful to a grower of greenhouse tomatoes?

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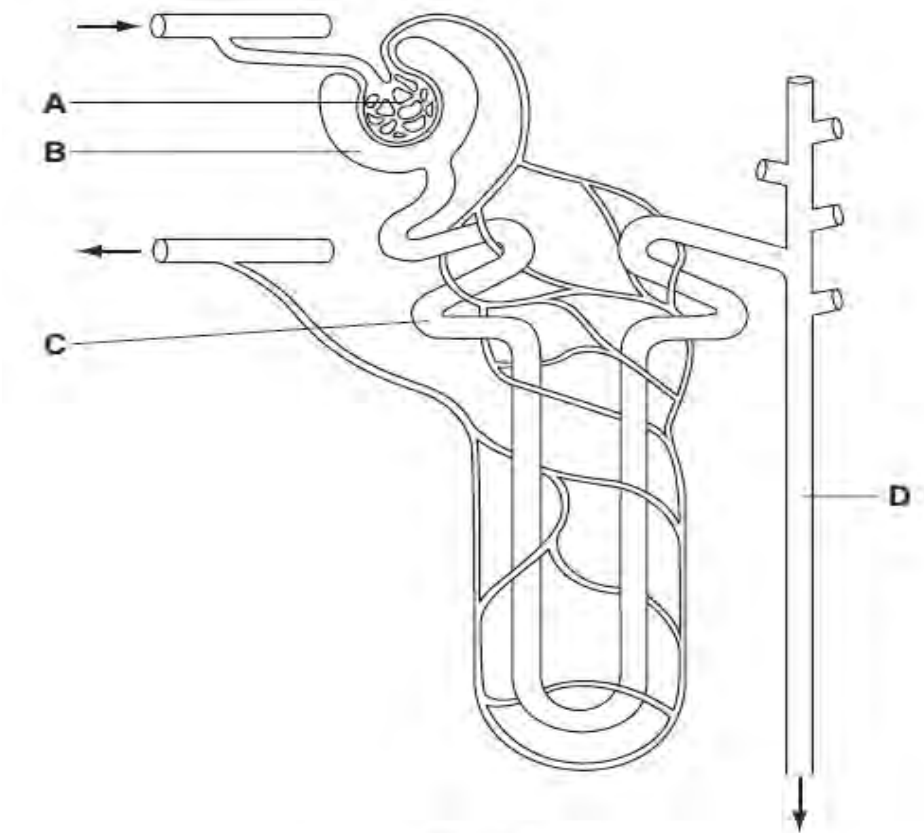
32. The following diagram shows part of the nephron



a) Label parts A to D

A. ……
B. ……
C. ……
D. ……

b) Name:

i. Four substance that may be found in the filtrate in structure A

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……

ii. Two substances or structures that are found in blood but not found in structure A

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……..

c) The volume of blood filtered by the kidneys is $1.18dm^3\ min^{-1}$.

i. Calculate the total volume of blood filtered in 24 hours. (02 marks)

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ii. If the total volume of urine produced in 24 hours is $1.7dm^3$, calculate the percentage of the filtered blood excreted in 24 hours. (02 marks)

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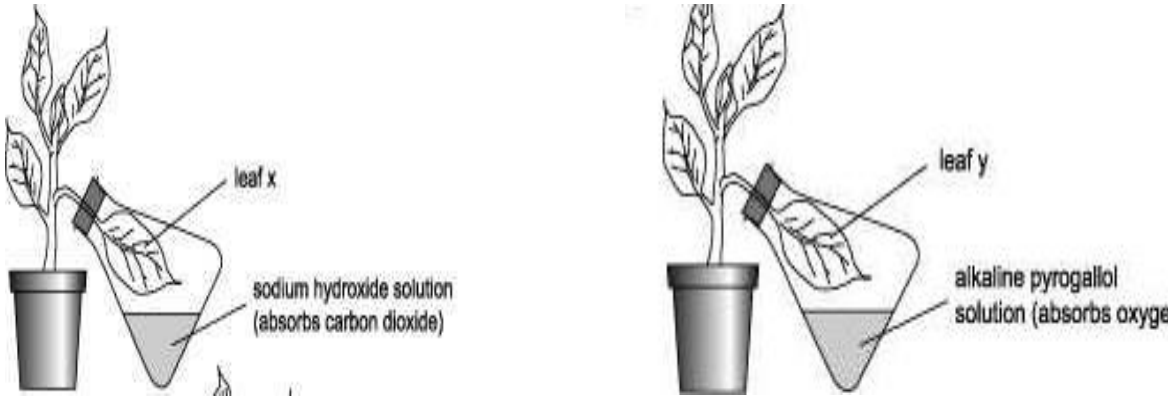
33. The figure below is a set up of an experiment on photosynthesis



a) What factors are being investigated in the above experiment?

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b) How would you test for the presence of starch in leaves X and Y?

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c) Suggest the colour changes you would expect to get in each leaf

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……

d) Which leaf acts as a control?

……

e) State the uses of sugar manufactured in the leaf.

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……

SECTION C

34. Distinguish between diffusion and osmosis

b. Describe an experiment to demonstrate that osmosis occurs in a living plant tissue.

c. How is the root hair suited/ adapted to its function?

35. Explain how the action of muscles causes air to pass from the atmosphere into the lungs.

b. How does oxygen move from the air in the alveolus into the red blood cells?

c. Give three characteristics of an efficient respiratory organ.

36. What is digestion?

b. Describe the digestive processes involving starch in the alimentary canal of a human.

37. What is meant by the terms

i. Aerobic respiration

ii. Anaerobic respiration

b. State three differences between aerobic and anaerobic respiration

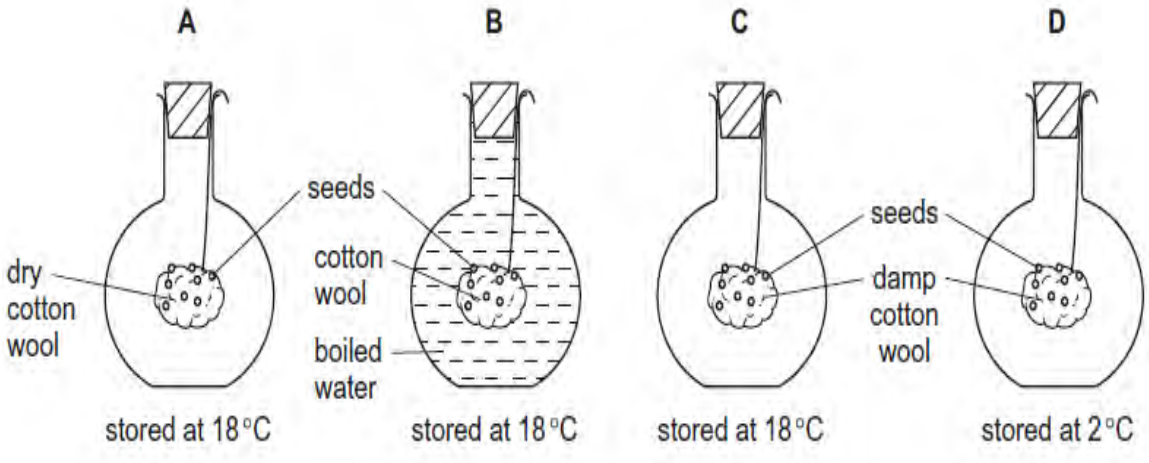
c. Describe an experiment to show that heat is given off by germinating peas.

Answers for section C

TEST PAPER 4

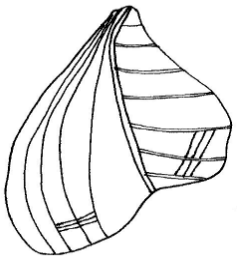
SECTION A

1. Which one of the following insects goes through four stages during its development from egg to adult?
   A. Cockroach
   B. butterfly
   C. cricket
   D. grasshopper
2. The region between the main stem and the leafstalk of a flowering plant is termed as
   A. axil
   B. Internode
   C. bud
   D. node
3. The final product(s) from digestion of proteins is/are called
   A. Glucose
   B. peptides
   C. amino acids
   D. Galactose
4. Which one of the following structures in human prevents food from entering the oesophagus during swallowing?
   A. Tongue
   B. soft palate
   C. epiglottis
   D. pharynx
5. Which one of the following is a condition that is needed for photosynthesis?
   A. Water
   B. sunlight
   C. starch
   D. oxygen
6. Sucrose, a disaccharide is composed of
   A. fructose and mannose
   B. glucose and galactose
   C. glucose and fructose
   D. glucose molecules only
7. Clay soil is water logged because of
   A. Too much water
   B. poor drainage
   C. small pores
   D. a higher force
8. The diagram shows four flasks which were set to investigate the conditions needed for germination.
   In which experiment will the seeds germinate quickly?



9. The deficiency disease caused by lack of proteins in the diet of man is
   A. Marasmus
   B. Kwashiorkor
   C. beriberi
   D. pellagra

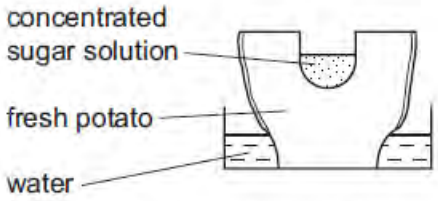
10. Carnassial teeth are characteristic of
    A. herbivores
    B. carnivores
    C. omnivores
    D. parasites
11. The use of fish to control the mosquito larvae is referred to as
    A. Biological control
    B. Cheaper control
    C. Ecological control
    D. African control
12. In most green plants most photosynthesis occurs in the
    A. spongy mesophyll
    B. lower epidermis
    C. upper epidermis
    D. palisade mesophyll
13. The movement of water molecules from a region of low solute concentration to a region of higher solute concentration through a semi permeable membrane is called
    A. osmosis
    B. diffusion
    C. mass flow
    D. active transport
14. The main growth stage of a housefly is
    A. puparium
    B. newly hatched adults
    C. larva
    D. egg
15. The figure below is of the inner wing of a cockroach. It shows that the inner wing,



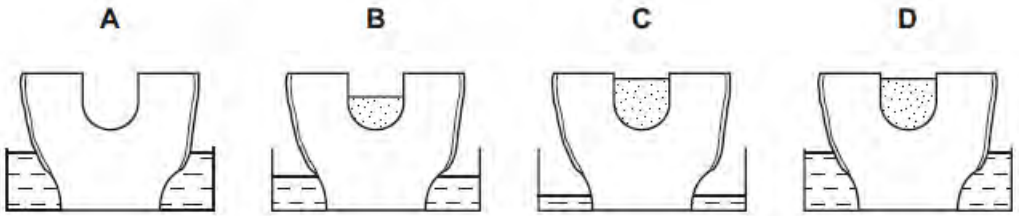
    A. Is transparent
    B. Has many veins for generating a big lift force in flight
    C. Is flexible to aid in flight
    D. Is smooth

16. Which one of the following fruits is an example of a drupe?
    A. passion
    B. tomato
    C. mango
    D. guava
17. Which one of the following does **not** contain a digestive enzyme?
    A. Gastric juice
    B. saliva
    C. pancreatic juice
    D. bile
18. Which one of the following is **not** a property of enzymes? Enzymes are;
    A. denatured by high temperatures
    B. sensitive to PH
    C. not specific
    D. not produced by non living cell
19. The following vitamins are water soluble except, vitamin,
    A. B
    B. A
    C. D
    D. K
20. What is the main function of phloem in green plants?
    A. transporting water
    B. supporting the plant
    C. transporting mineral salts
    D. transporting manufactured food
21. The major agent of dispersal for a black jack fruit is
    A. wind
    B. explosive
    C. animal
    D. water

22. The diagram shows an experiment using a potato



Which shows the result of the experiment after 24 hours?



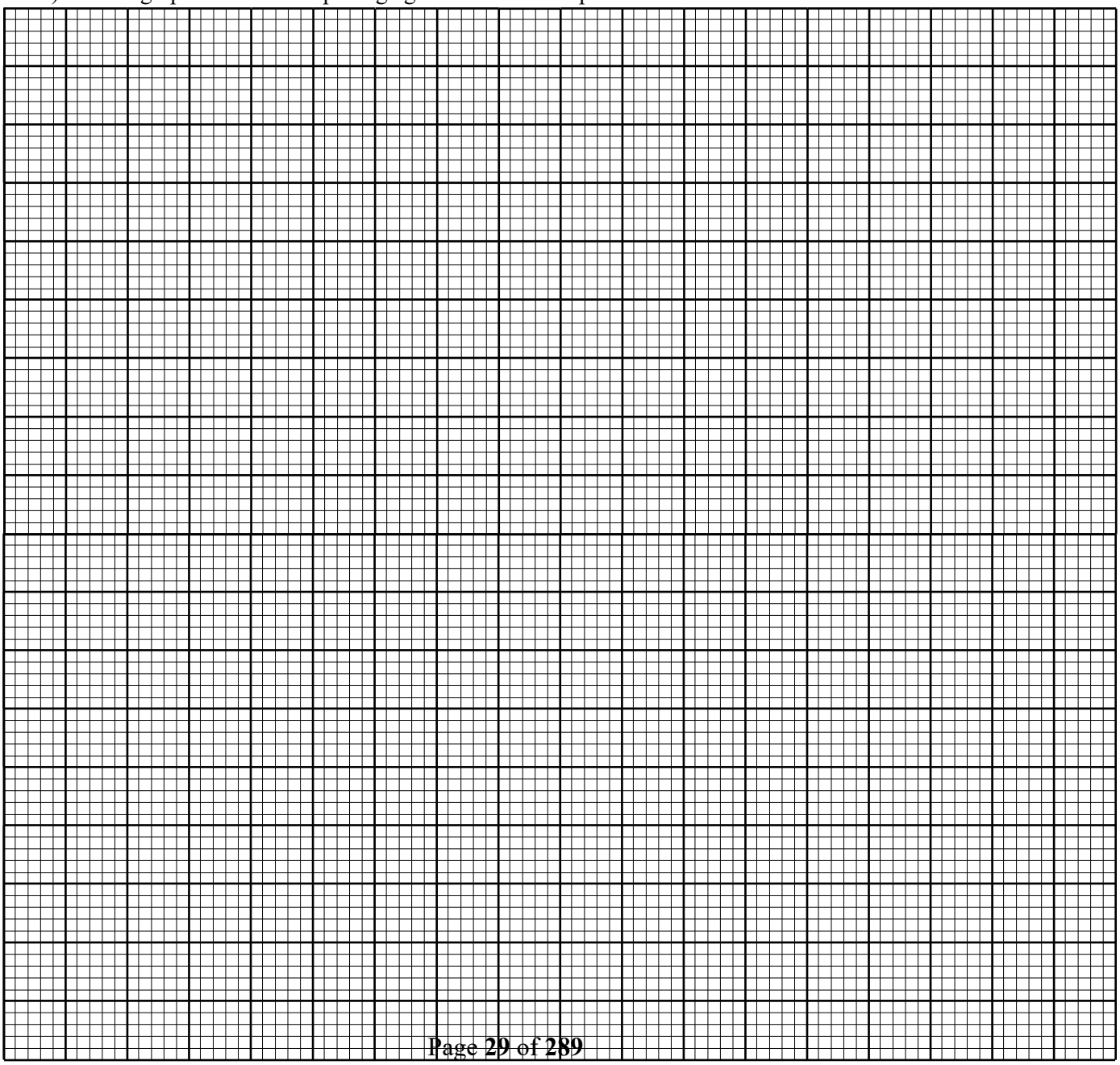
23. Which of the following processes requires energy?
    A. Osmosis
    B. diffusion
    C. active transport
    D. capillarity
24. Which of the following parts of a cell produces ATP?
    A. Nucleus
    B. Mitochondrion
    C. Cell membrane
    D. Cell vacuole
25. Which of the following is **not** correct about xylem vessels? They
    A. lack cross walls
    B. conduct water
    C. provide extra support
    D. conduct manufactured food
26. The concentration of mineral salts may be higher in the root cell sap than in the soil. This can be because of
    A. osmosis
    B. active transport
    C. diffusion
    D. mass flow
25. Which of the cell organelles (parts) is responsible for energy production?
    A. nucleus
    B. mitochondria
    C. cell wall
    D. cell membrane
27. Which of the following elements is present in all proteins?
    A. Sulphur
    B. phosphorous
    C. magnesium
    D. nitrogen
28. External digestion of food occurs in
    A. Amoeba
    B. butter flies
    C. rats
    D. Rhizopus
29. Which of the following is **not** a kingdom
    A. Monera
    B. protozoa
    C. fungi
    D. Animalia
30. The stalk that attaches a seed to the placenta in a fruit is called
    A. Style
    B. Funicle
    C. Locule
    D. Septum

SECTION B

31. The table below shows the effect of wind, still air and stomatal opening on the rate of transpiration of a plant in milligrams of water lost per hour per dm^2. Study the table and answer the questions that follow.

Stomatal opening (μm)	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Wind	40	63	74	86	94	110	124
Still air	0	6	12	19	23	27	30

a) Plot a graph of stomatal opening against rate of transpiration.



b) Using your graph state.

i. Stomatal aperture at which rate of transpiration is 100 in windy air

……

ii. Rate of transpiration when stomatal opening is 4.5µm?

……

c) Describe the rate of transpiration in windy air?

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d) (i) Compare the rates of transpiration in windy and still air conditions?

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ii. Explain your observations.

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e) (i) Name three other factors that affect the rate of transpiration.

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ii. State two functions of transpiration to plants.

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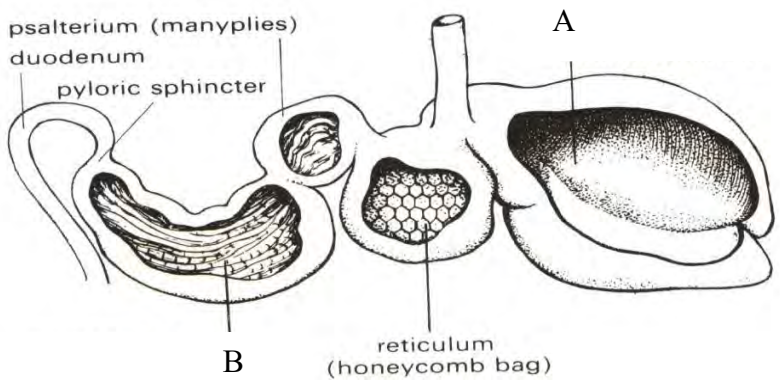
32. The diagram below is of an animal's stomach



(a) Identify the group of animals to which the stomach belongs

……

(ii) Give a reason for your answer in a (i) above.

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……

(b) Give uses of the parts labelled

i. A

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ii. D

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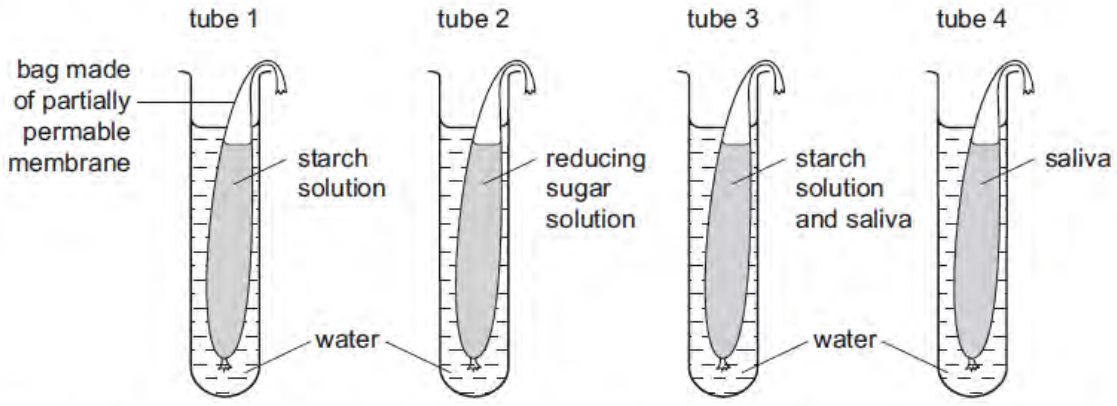
(c) Using arrows show the direction of food movements

33. The experiment below was set up by form three students during their Saturday practical lessons. Use it to answer the questions below.



After 20 minutes at 35°C, a sample of water around the bag in each tube was boiled with Benedict's solution

a. State what was observed with the water from;

i. Test tube 1

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ii. Test tube 2

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iii. Test tube 3

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iv. Test tube 4

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Give explanations for your observations

i. Test tube 1

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ii. Test tube 2

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iii. Test tube 3

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iv. Test tube 4

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SECTION C

34. (a) Define the following terms? (03 marks)
    i. Population
    ii. Ecosystem
    iii. Food chain

(b) In an ecological study carried out by a researcher, the following were observed.

Predatory bug fed on caterpillar and moth
Lizard fed on majority of the organisms
Grasshopper fed on caterpillar, green plants and predatory bug

i. Construct a food web that involves all organisms mentioned above. (06 marks)
ii. Construct a food chain from the drawn food web in (b) (i) above including atleast the caterpillar (02 marks)

(c) (i) What would happen to the food chain drawn in (b) (ii) above if the caterpillar were removed from the environment (03 marks)
(ii) What is the role of green plant in the food above? (01 mark)

35. Describe an experiment that you would carry out to test for the presence of non-reducing sugars in a given solution. Give the uses of each reagent used. (15 marks)
36. Describe an experiment to show that oxygen is produced during photosynthesis. (10 marks)

(b) How are leaves adapted for photosynthesis? (05 marks)

37. (a) Outline the feature on a grass hopper that qualifies it to be an insect? (03 marks)
(b) With the aid of labelled diagrams, describe the life cycle of a grass hopper (08 marks)
(c) Explain why grass hoppers swarm in rainy seasons (04 marks)

Answers for section C

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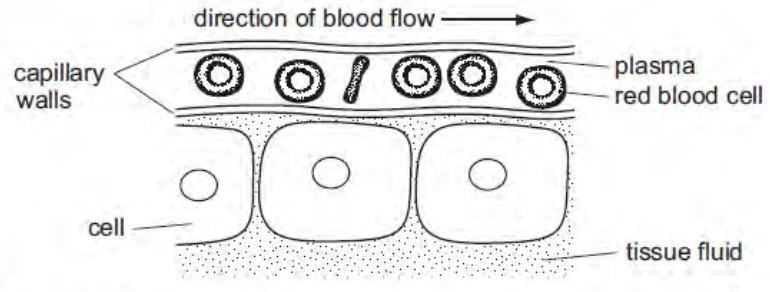
TEST PAPER 5

SECTION A

1. Select the answer with the correct order of groups, starting with the smallest.
   A. species, order, family
   B. family, order, class
   C. class, family, phylum
   D. order, family, class
2. The maize grain is a fruit because it
   A. stores food in the endosperm
   B. has two scars
   C. has a cotyledon
   D. has a radicle and plumule
3. Which of the following represents the diameter of a silt particle?
   A. 2 - 0.2mm
   B. 0.2 - 0.02mm
   C. 0.02 - 0.002mm
   D. 0.002 - 0.0002mm
4. The presence of glucose in urine could be due to;
   A. Inability of the pancreas to secrete insulin
   B. Taking a lot of sugary foods
   C. Inability of the proximal convoluted tubule to reabsorb glucose
   D. Old age
5. Which of these is contained in plant cells but **not** animal cells?
   A. cell membrane
   B. cell wall
   C. cell vacuole
   D. cytoplasm
6. Which of the following is the best way of stating magnification of a drawing?
   A. magnification = 5
   B. magnification = X5
   C. magnification = 5X
   D. magnification; 5
7. Which of the following is very important for wind pollination?
   A. production of large quantities of pollen
   B. having dull coloured petals
   C. flowers being small in size
   D. having a non-sticky stigma
8. Which of the following pairs of bacteria form nitrates from free atmospheric nitrogen?
   A. *Rhizobium* and *Azotobacter*
   B. *Rhizobium* and *Nitrobacter*
   C. *Nitrosomonas* and *Nitrobacter*
   D. *Nitrobacter* and *galactose*
9. Which one of the following **cannot** be used in the classification of plants
   A. structure of a flower
   B. leaf structure
   C. type of seeds
   D. leaf colour
10. The diagram below shows a blood capillary close to some tissue cells bathed in tissues fluid. Exchange of nutrients takes place here



Which row shows the type of nutrient in the plasma and in the tissue fluid and the method of transfer between the two?

	Plasma	Tissue fluid	Method of transfer
A	Amino acid	Amino acid	Diffusion
B	Amino acid	Protein	Osmosis
C	Protein	Amino acid	Digestion
D	Protein	Protein	Active uptake

11. Which of the following enzymes convert starch to maltose and maltose to glucose respectively;
    A. amylase, lactase
    B. lactase, catalase
    C. amylase, maltase
    D. catalase, ptyalin
12. 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
13. Which one of the following organisms carries out intracellular digestion?
    A. fungi
    B. algae
    C. amoeba
    D. hook worm
14. Which of the following methods of birth control is the most reliable?
    A. Use of a condom
    B. Abstinence
    C. Abortion
    D. Safe days
15. The presence of starch and not glucose is used to show that photosynthesis takes place in 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.
16. A sample of soil was poured into a measuring cylinder containing water and the mixture stirred. The readings taken were as follows.
    Volume of water in the measuring cylinder = $15cm^3$
    Volume of water + soil = $60cm^3$
    Volume of water + soil after stirring = $50cm^3$
    What was the percentage of air in the soil?
    A. 10%
    B. 45%
    C. 22%
    D. 35%
17. Which one of the following is **not** an adaptation of plants to reduce water loss
    A. alternate arrangement of leaves
    B. rolled up leaves
    C. leaves reduced to spines
    D. fewer and small leaves
18. Which one of the following phyla consists of human parasites?
    A. Nematoda
    B. mollusca
    C. coelenterata
    D. echinodermata
19. The following are all effects of global warming **except**?
    A. Increased in flooding
    B. Increased desertification
    C. Increased human population
    D. Decrease in the number of habitat
20. There are four main types of erosion by water. Which of the four groups is most dangerous?
    A. splash erosion
    B. gulley erosion
    C. rill erosion
    D. sheet erosion

21. A form three student took a blood sample from the cut tail of a rat and placed it in a dilute salt solution. She later observed that majority of the red blood cells had lost their bi-concave disk shape and had burst. She described the bursting as
    A. flaccidity
    B. plasmolysis
    C. Haemolysis
    D. Turgidity
22. The following are adaptations of the root hair cells **except**
    A. Presence of numerous mitochondria
    B. Presence of concentrated cell sap
    C. Lack of a cell wall
    D. Being flexible
23. Which one of the following takes places by active transport in plants?
    A. uptake of water
    B. up take of mineral salts
    C. intake of carbondioxide
    D. transpiration
24. What is the role of dilute hydrochloric acid to a solution when testing for non-reducing sugars?
    A. neutralise the solution
    B. provide a suitable medium for Benedict's reagent to work
    C. hydrolyse non-reducing sugars
    D. kill the bacteria in the solution
25. Blockage of the bile duct would impair the digestion of
    A. proteins
    B. cellulose
    C. starch
    D. fats
26. Which of the following is **not** a function of the liver?
    A. storage of vitamins
    B. manufacture of plasma proteins
    C. storage of proteins
    D. formation of bile
27. Which of the following is the main function of xylem in green plants?
    A. transporting water
    B. supporting the plant
    C. transporting mineral salts
    D. are sites for photosynthesis
28. Which of the following is **not** adaptation of the housefly to its mode of life as a vector?
    A. Presence of halteres
    B. Hairy body
    C. Segmented body
    D. Extended proboscis
29. Choose the most suitable description of sieve tubes in plants. They are made of
    A. dead cells and transport water in plants
    B. living cells and transport water in plants
    C. dead cells and transport food within plants
    D. Living cells and transport food within the plants.
30. Which one of the following compounds is a constituent of enzymes?
    A. lipids
    B. polysaccharides
    C. proteins
    D. vitamin

SECTION B

31. State four ways in which a leaf is suited for photosynthesis?

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b) Apart from photosynthesis, state any other four functions of leaves.

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c) State two ways in which food transported to growing regions is utilised by the plant.

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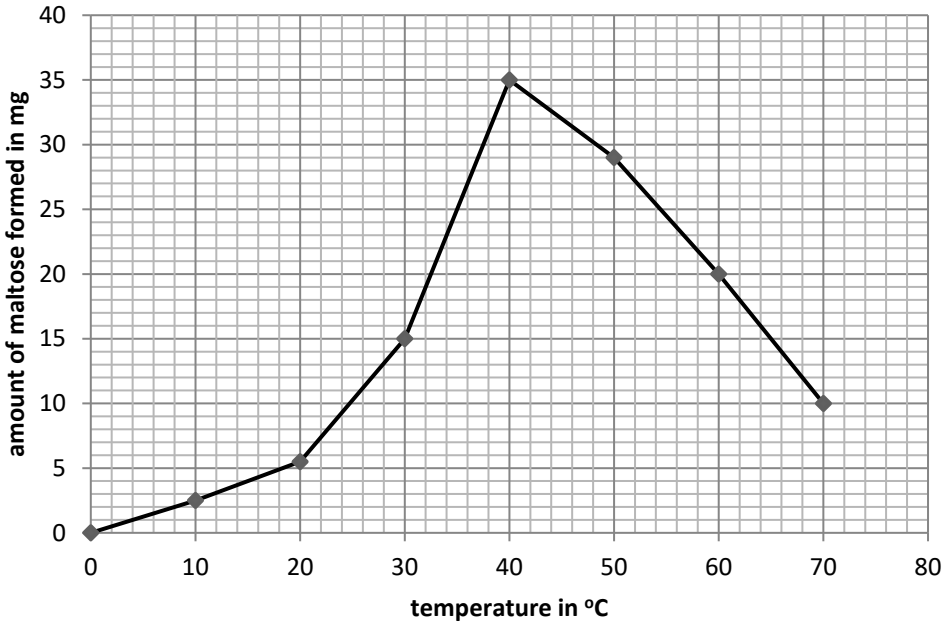
32. Excess of enzyme, amylase was added to 100mg of starch and the mixture incubated at different temperatures. The amount of product (maltose) formed at different temperatures is shown in the graph below.



a. Describe the graph (5 marks)

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b. State:

i. The amount of product (maltose) formed when the incubation temperature was 25°C.

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ii. The temperature at which the formed product was 32mg (02 marks)

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c. (i) To what class of foods does maltose belong? (01 mark)

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(ii)State two uses of the class of food stated in c(i) above (02 marks)

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d. Why was excess of the enzyme used in the experiment? (02 marks)

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e. Describe experiments to test for maltose in the solution used.

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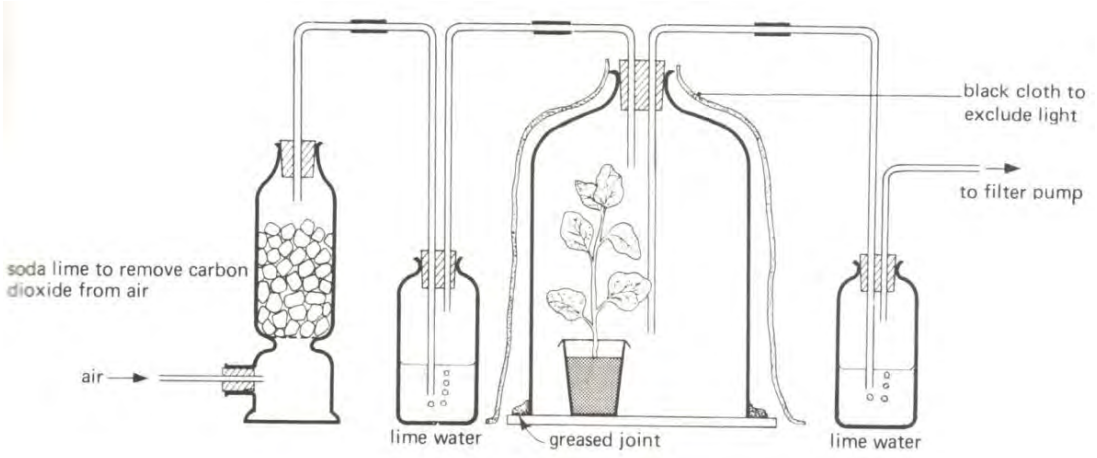
33. The figure below shows an experimental set up to demonstrate transportation in plants



a) Explain why

i. grease is smeared between the glass plate and the bell jar

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ii. Polythene bag is wrapped around the post and tied at the base of the plant

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b) i. What will be observed in this experiment?

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ii. How do you test for the identity of the substance observed in b(i)

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c) Describe the set up of the control for this experiment

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d) State the factors which affect the results of this experiment

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SECTION C

34. In what ways is nitrogen added and removed from the soil

(b) Give the importance of organic matter in soil

35. What is meant by the term excretion?

(b) Why do plants lack complex excretory organs?

(c) With the aid of diagrams, describe excretion in amoeba?

36. Describe the digestion of proteins in a mammal

(b) Explain how the ileum is suited for its function.

37. Give reasons why wild life conservation is encouraged in Uganda today?

(b) What problems are associated with wild life conservation?

Answers for section C

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TEST PAPER 6

SECTION A

1. The figure below shows a type of circulation in animals

Which type of circulation is it?

A. double circulation
B. single circulation
C. closed circulation
D. open circulation

2. The functional unit for gaseous exchange in man is the

A. Bronchiole
B. trachea
C. bronchus
D. alveolus

3. Absorption of mineral salts in plants occurs by

A. Osmosis
B. diffusion
C. active transport
D. capillarity

4. A strong salt solution was placed in a potato cup and the cup was placed in salty water. In which of the following would water move into the cup?

A. when the water contains less salts
B. when the salty water is hypertonic
C. when the water is isotonic to the salt solution
D. when the potato cup contains less salt

5. Which of the following conditions would raise the rate of transpiration?

A. low temperature and low humidity
B. High temperature and low humidity
C. Windy conditions and high humidity
D. Still air and low humidity

6. The following are properties of veins

I. have valves
II. have wide lumen
III. have thin walls
IV. have circular and longitudinal muscle layer

Which of them are essential for blood flow at low pressure.

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

7. Which sequence shows the shortest route taken by blood travelling from a leg to an arm in the human body

A. Leg ⟶ heart ⟶ lungs ⟶ heart ⟶ arm
B. Leg ⟶ heart ⟶ lungs ⟶ kidney ⟶ arm
C. Leg ⟶ kidney ⟶ heart ⟶ lungs ⟶ arm
D. Leg ⟶ lungs ⟶ heart ⟶ gut ⟶ arm

8. The following results were obtained in an experiment

Soil = $200cm^3$
Water = $300cm^3$
Water and soil after mixing = $450cm^3$.

The percentage of air in the soil sample is

A. 10%
B. 20%
C. 25%
D. 30%

9. Digestion in fungi is said to be extra cellular because
   A. enzymes come from the surrounding medium
   B. Food is digested outside before absorption
   C. Enzymes are secreted by the food particles outside
   D. More than one enzyme is involved in digestion
10. Which of the following is **not** part of the process of vasodilation?
   A. blood flows close to the skin, surface
   B. Blood flow to the skin increases
   C. Blood vessels widen
   D. Blood becomes resistant to heat loss
11. Uric acid is an excretory product in some animals because
   A. It is releases in small quantities
   B. It requires little water to be removes
   C. It is very toxic
   D. It mountains the osmotic balance of the body
12. Which of the following is the correct hierarchy of organization of an organism;
   A. cells organs tissues systems organism
   B. cells tissues organs systems organisms
   C. cells tissues systems organs organisms
   D. cells systems tissues organs organisms
13. In a leaf of a terrestrial (land) plant stomata are located mainly in the
   A. Lower epidermis
   B. upper epidermis
   C. palisade mesophyll
   D. spongy mesophyll
14. Movement of water from the soil through the root cortex is mainly by
   A. Diffusion
   B. active transport
   C. osmosis
   D. capillarity
15. Which of the following is not found in the glomerular filtrate?
   A. Glucose
   B. amino acid
   C. salts
   D. proteins
16. Four different food extracts gave the following results when treated with DCPIP solution

Food extract	number of drops of solution needed to cause decolourisation of DCPIP
A_1	5
A_2	10
A_3	3
A_4	1

Which food extract contains the least concentration of vitamin C?
   A. A_4
   B. A_1
   C. A_2
   D. A_3
17. Which of the following has the greatest energy value per unit mass?
   A. Lipids
   B. glucose
   C. proteins
   D. vitamins
18. The androecium of a flower consists of
   A. stamens
   B. filament and anther
   C. carpels
   D. stigma, style and ovary

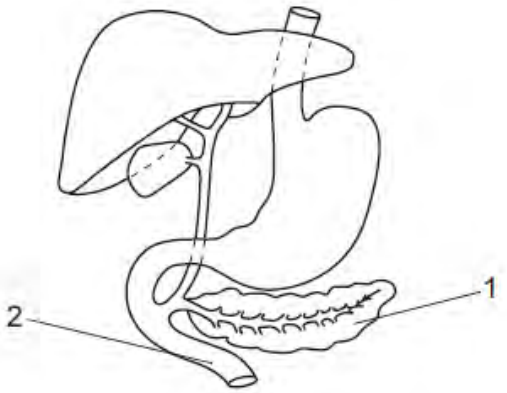
19. An enzyme X catalyses the reaction below

Protein enzyme $\xrightarrow[X]{}$ peptides

Identity enzyme x

A. catalase
B. amylase
C. zymase
D. pepsin

20. The figure below shows part of the human alimentary canal



What is the function of the liquid produced by part 1 and released into part 2? To

A. Digest proteins into amino acids
B. Increase the surface area of fat droplets
C. Acidy the contents of part 2
D. Prevent further digestion of starch

21. Which of the following has the greatest surface area to volume ratio?

A. rat
B. elephant
C. man
D. flea

22. A newborn baby has a skin surface area of about 2500cm^3 and a body weight of about 3Kg. What is the correct formula for calculating surface area to weight ration.

A. $\frac{2500}{3}$
B. $\frac{2500\ X100}{3}$
C. $\frac{3}{2500}$
D. $\frac{3\ X\ 100}{2500}$

23. An Irish potato tuber is swollen because it

A. is a stem tuber
B. lacks leaves
C. stores food
D. has buds

24. The function of Anti Diuretic Hormone (ADH) is to

A. Increase on the amount of water reabsorbed by the kidney tubules
B. decrease on the amount of water reabsorbed by the kidney tubules
C. increase on the amount of water filtered into the glomerular filtrate
D. decrease on the amount of water filtered into the glomerular filtrate

25. The main reason for including foodstuffs containing roughage in the human diet is to

A. provide carbohydrates
B. add bulk to food
C. provide energy
D. provide vitamins

26. Select the condition that **does not** arise from deficiency in diet

A. Kwashiorkor
B. sickle cell anemia
C. marasmus
D. night blindness

27. Which of the following processes does not add carbondioxide to the air?

A. Respiration
B. decomposition
C. photosynthesis
D. burning

28. Thirty wood lice were placed in the centre of a dish with four compartments, each with different conditions. The diagram shows the number of woodlice that had moved into the different compartments after twenty minutes

What do these results show?

A. Woodlice prefer light and damp conditions
B. Woodlice prefer light and dry conditions
C. Wood lice prefer to be in the dark
D. Woodlice prefer to be in light

29. The part of the microscope used to adjust the position of the objective lenses is the:

A. Eye piece
B. Diaphragm
C. Turret
D. Fine adjustment

30. Which of the following organisms is ciliated

A. Paramecium
B. amoeba
C. euglena
D. plasmodium

SECTION B

31. A group of students carried out an experiment to investigate the effect of temperature on photosynthesis during which they determined the volume of oxygen evolved and carbondioxide used. The students' results are shown in the table below. Study the table and answer the questions that follow.

Temperature in ^{o}C	Volume of gases in cm^3	
	oxygen evolved	carbondioxide used
0	0	0
20	10	13
30	28	24
40	35	40
60	18	12
70	6	4

(a) Using the same axes plot a suitable graph for the above data

(Next page)

(b) (i) Describe the graph obtained for the volume of oxygen evolved (5 marks)

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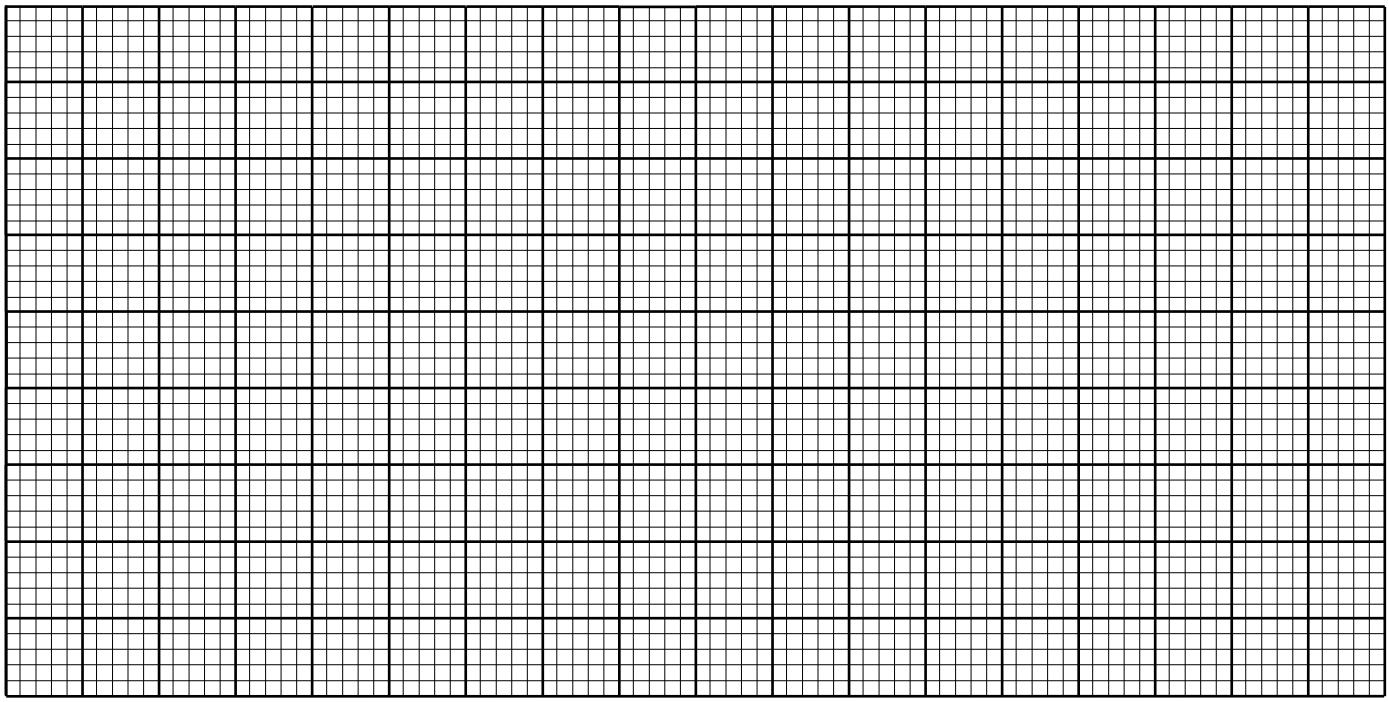

(ii) Explain the shape you have described in b(i) above (4 marks)
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(c) Name two conditions necessary for photosynthesis (2 marks)
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(d) State other factors that affect photosynthesis (3 marks)
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32. (a) State how arteries and veins are suited for their respective functions

i. arteries (3 marks)
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ii. veins (3 marks)

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b) Outline the functions of the **lymphatic system** in humans (4 marks)

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33. One of the methods used by farmers to control crop parasites and pests is the '**Biological Control'** method.

a) How is Biological Control used to reduce the number of crop pests and parasites? (02 marks)

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b) What other common method do farmers use to control insect pests and parasites apart from the manual methods? (01 marks)

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c) Give two main disadvantages of this method as compared with the Biological Control method

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d) Coffee farmers in East Africa once realised that in the presence of certain ants, coffee mealy bugs were piercing and sucking the inner juices of young coffee berries. The mealy bugs could be destroyed by introducing ladybirds that ate them, but lady birds are eaten by the ants. Ants also eat mealy bugs.

i. What are the crop pests mentioned in this passage? (01 mark)

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ii. How could these pests be controlled? (01 marks)

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iii. Construct a food web to illustrate feeding levels in (d) above (03 marks)

SECTION C

34. Describe the digestive processes involved from the time starch is introduced in the mouth up to when its final product of digestion is ready for absorption into blood. (09 marks)

b) What happens to the products of digestion in the human body of
   (i) starch?
   (ii) protein? (6 marks)

35. Give any four external differences between dicotyledonous plants and monocotyledonous plants. (4 marks)

b) Draw a well labeled diagram of a transverse section of a young dicotyledonous stem. (5 marks)

(ii) Give functions of the parts named in the diagram in (b) (i) above. (6 marks)

36. Describe an experiment to determine the percentage of humus in a sample of soil.

b) Describe five practices in which soil can be conserved. (5 marks)

37. Describe the following process in human beings;
   a. Hearing by the ear
   b. Formation of an image in the eye

Answers for section C

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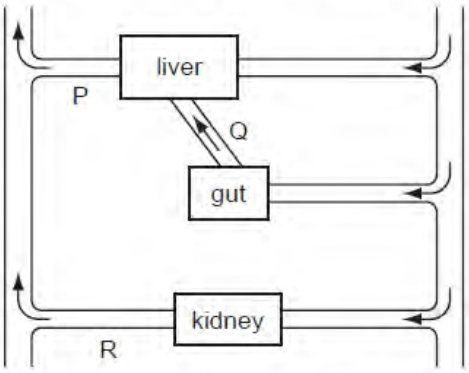
TEST PAPER 7

SECTION A

1. What are the products of digestion of lactose sugar?
   A. Glucose only
   B. fructose and glucose
   C. fructose and galactose
   D. glucose and galactose
2. Which one of the following does **not** contain nitrogen?
   A. Amylase
   B. pepsin
   C. amino acids
   D. glucose
3. How does amoeba feed? By
   A. Engulfing
   B. pinocytosis
   C. photosynthesis
   D. use of contractile vacuole
4. The following are underground stems **except**;
   A. Rhizomes
   B. runners
   C. bulbs
   D. corns
5. In dicotyledonous plants food is/are transported through the
   A. Cambium
   B. epidermis
   C. phloem
   D. xylem
6. Which one of the following insects does **not** lay eggs in its life cycle
   A. Cockroach
   B. butterfly
   C. bee
   D. tsetse fly
7. Which of the following groups of terrestrial animals is most adapted to water conservation?
   A. Mammals
   B. Insects
   C. Birds
   D. Reptiles
8. Which one of the following is **not** a characteristic of clay soil? It
   A. It has the highest capillarity
   B. it has the highest air content
   C. its sticky and compact
   D. it has the highest water holding capacity
9. The diagram represents some human organs and their blood vessels



Immediately after taking an alcoholic drink, how would the levels of alcohol compare in blood vessels P, Q and R?

	P	**Q**	**R**
A	Very high	Some	Very high
B	Some	Very high	Very low
C	Very low	Very low	Some
D	Very high	Very low	Very low

10. The plant cells with the highest concentration of chloroplasts are;
    A. palisade cells
    B. guard cells
    C. epidermal cells
    D. spongy cells
11. The muscular energy used by a squirrel while climbing up a tree originates from the sun. Which of the following is the correct sequence in which energy has been transformed?
    I. Digestion of starch in the squirrel
    II. Deposition of starch in a fruit
    III. Tissue respiration in the squirrel
    IV. Synthesis of sugar in the leaf
    A. IV, I, III and II
    B. II, IV, I and III
    C. IV, II, I and III
    D. IV, II, III, I
12. A tick belongs to
    A. Insecta
    B. myriapoda
    C. arachnida
    D. crustacean
13. The results of an experiment to determine the percentage of water in a sample of soil are shown below.
    Mass of crucible = 15g
    Mass of crucible + soil = 30g
    Mass of crucible + soil after drying = 25g
    What is the percentage of water in the soil?
    A. 33.3%
    B. 18.7%
    C. 66.7%
    D. 20.0%
14. Which one of the following substance **does not** contain a digestive enzyme?
    A. Bile
    B. saliva
    C. gastric juice
    D. pancreatic juice
15. A structure that prevents entry of food into the trachea during swallowing is called
    A. Pyloric sphincter
    B. Cardiac sphincter
    C. Epiglottis
    D. Soft palate
16. Which one of the following statements is correct about flowers?
    A. petals of a flower form the calyx
    B. sepals of a flower form the corolla
    C. the corolla and calyx together form the perianth
    D. a flower in which only androecium is
17. Which one of the following human complications comes as a result of insufficient iodine is the diet?
    A. Anaemia
    B. goiter
    C. rickets
    D. scurvy
18. Which one of the following is **not** an agent of physical weathering?
    A. moving water
    B. temperature
    C. wind
    D. oxygen
19. Which tissue in plants transports manufactured foods from the leaves to all other parts of the plant?
    A. Cortex
    B. phloem
    C. xylem
    D. epidermis

20. The following is the dental formula of a given animal

$$I\ \frac{2}{2}\ C\ 1\ PM\ \frac{3}{1}\ M\ \frac{3}{2}$$

How many teeth does the animal have?

A. 32
B. 16
C. 17
D. 34

21. Which process does not release carbondioxide to the atmosphere

A. Photosynthesis
B. respiration
C. delay
D. burning

22. Which one of the following is **not** an enzyme?

A. ptyalin
B. peptidase
C. insulin
D. trypsin

23. Two monosaccharides combine together to form what type of sugar

A. Polysaccharide
B. Complex sugar
C. Disaccharide
D. Starch

24. Which one of the following belongs to kingdom Protoctista?

A. tape worm
B. Insects
C. Earth worm
D. amoeba

25. Where in the bean seed are most carbohydrates stored?

A. Cotyledon
B. Plumule
C. Radicle
D. Endosperm

26. What should an overweight person feed on in order to reduce weight?

A. Low carbohydrate, low fat foods
B. high carbohydrate, low protein foods
C. High carbohydrate, low fat foods
D. Low fat and high protein foods

27. On their study tour to western Uganda, biology students found an animal which they thought to be a new species. It had a cylindrical body about 13cm long and 10mm diameter. It had a hard outside skin with many body segments and more than 20 legs. Into which of the groups below would you have classified this animal?

A. Myriapoda
B. Crustacean
C. Arachnida
D. Insecta

28. Which substances are not changed in form by enzymes

A. Disaccharides
B. Polysaccharides
C. Mineral salts
D. Proteins

29. The following reaction takes place in a plant

Water + carbondioxide = glucose + X

Name substance X

A. Oxygen
B. water
C. starch
D. protein

30. Which one of the following is not a natural resource?

A. Wildlife
B. Forests
C. Water bodies
D. Electricity

SECTION B

31. The following test-tubes were prepared to investigate the action of a digestive enzyme. After 30 minutes the test tubes were tested for the presence of starch.

Test tube A	**Test tube B**	**Test tube C**
Starch	Starch	Starch
Salivary amylase	Salivary amylase	Salivary amylase
0^0C	37^0C	100^0C

(a) Describe the procedure for testing starch

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(b) In which test tube would starch be absent? Explain

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(c) Why does each of the other tubes still contain some starch

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(d) Which property of enzymes does this experiment test?

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(e) State two uses of starch to plants?

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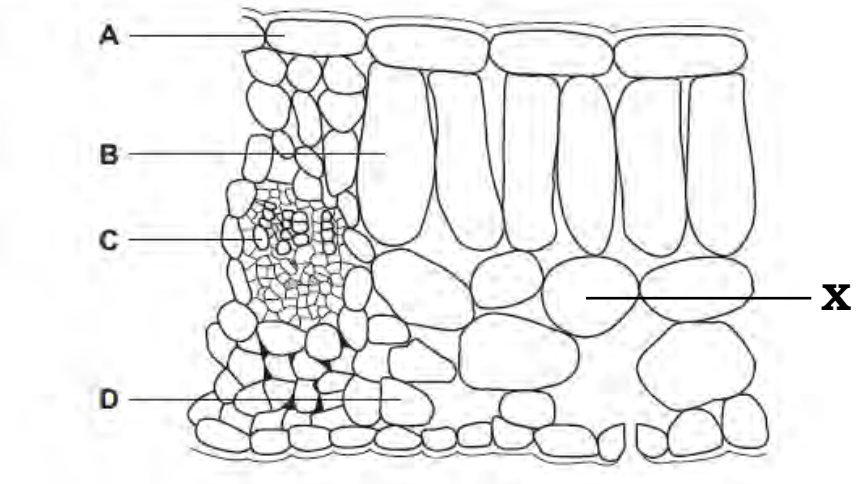
32. The figure below is an internal structure of a leaf



a) Name parts labelled
   A. ……
   B. ……..
   C. …….
   D. ……
b) Give any two gases found in the area labelled X
   ……
   …….
c) Give any two differences between B and D

B	**D**
(i) (ii)	

d) Using evidence from the diagram briefly describe (in two ways) how a leaf is adapted for photosynthesis.
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33. (a) State the parts of the ear concerned with each of the following
   i. Hearing
      ……..
   ii. Balance
      …….

(b) Describe how sound waves reach the ear ossicles (02 marks)
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(c) Describe the role of the following parts of the ear
   i. cochlea (02 marks)
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      ……
   ii. eustachian tube (02 marks)
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(d) Explain why it is not advisable for one to clean his/her ears using a sharp pointed object

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SECTION C

34. What causes global warming? (03 marks)
    (b) Describe how man's activities lead to air pollution. (12 marks)
35. What is meant by the term tropism? (02 marks)
    (b) State any three uses of tropic responses in plants (03 marks)
    (c) Describe an experiment to show that phototropism occurs in plants (10 marks)
36. Outline the characteristic features of a respiratory surface (05 marks)
    (b) Describe the mechanism by which gases are brought into and moved out of the respiratory organs of a named mammal (10 marks)
37. Why are there less stomata found on the lower epidermis of a water plant than the upper epidermis (05 marks)
    (b) Describe an experiment to show that transpiration occurs in plants (10 marks)

Answers for section C

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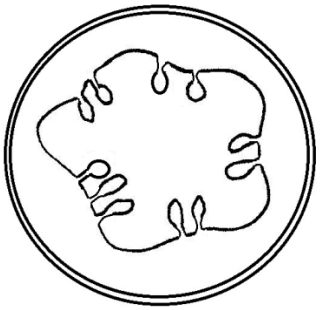
TEST PAPER 8

SECTION A

1. Roughage is essential in the human diet because it;
   A. Adds bulk and eliminates possibility of constipation
   B. Helps the colon to re-absorb much water
   C. Is easily digested and rich in nutrients
   D. Cleans the teeth and minimizes dental decay.
2. Which part of the leaf has most chloroplasts?
   A) Epidermal layer
   B) Palisade layer
   C) Mesophyll layer
   D) Spongy layer
3. Which of the following pairs of bacterial form nitrates from free atmospheric nitrogen?
   A) Rhizobium and Azotobacter
   B) Rhizobium and nitrobacter
   C) Nitrosomonas and nitrobacter
   D) Nitrosomonas and Azotobacter
4. Which of the following is common to both respiration and photosynthesis?
   A) They occur in all living things
   B) Oxidization of food takes place
   C) Oxygen, Carbon dioxide and water are involved
   D) Energy is released in both processes
5. A student heated strongly a dry soil sample to constant mass. The decrease in mass is due to;
   A) Loss of mineral salts
   B) escape of air
   C) Loss of water and soil organs
   D) Destruction of humus
6. Farm crops eventually exhaust the soil where as this doesn't happen with natural bush or forest. This is because of;
   A) Natural forests live longer
   B) Natural vegetation requires less nutrients
   C) Farm crops grow more quickly
   D) Farm crops are harvested
7. The left ventricle of the heart is more muscular than the right ventricle because it has to;
   A) Receive oxygenated blood to the lungs
   B) Pump blood to very long distances
   C) Pump a lot of blood to the lungs
   D) Receive a greater quantity of blood.
8. Which of the following has the smallest number of species
   A) Phylum
   B) Class
   C) Order
   D) family
9. A person cannot commit suicide simply by holding his breath because;
   A) Accumulation of carbon dioxide in the blood forces him to breath
   B) Oxygen accumulated in the blood cannot last for a long time
   C) Oxygen can diffuse into the blood via the skin
   D) Carbon dioxide can diffuse out of the blood via the skin
10. A runner breathes 500cm^3 of air in each breath. His breathing rate is 40 breathes per minute. If the atmosphere contains 15.1% oxygen by volume, what is his oxygen intake per minute?
    A) 300cm^3
    B) 600cm^3
    C) 2000cm^3
    D) 3000cm^3
11. A person accidentally swallowed some tablets which made him to pass out a lot of urine every 10 minutes. After a period of 2 hours he would be found to be suffering from;
    A) Diabetes mellitus
    B) severe dehydration
    C) Diabetes inspidus
    D) Diarrhea

12. The following are stages in the excretion of nitrogenous wastes in a mammal;
    i) Selective re-absorption
    ii) Waste taken to kidney
    iii) Ultra-filtration
    iv) deamination in the liver
    Which of the following is the correct sequence of events?
    A) (i) ,(ii), (iii) and (iv)
    B) (iv), (ii), (iii) and (i)
    C) (ii), (iii), (i) and (iv)
    D) (iv), (iii), (ii) and (i)
13. *Figure 1* below shows the arrangement of seeds in some fruit. Identify the type of placentation shown above?



    A. Free central
    B. Parietal
    C. Basal
    D. Marginal

14. Which of the following is **not** a structural component of an ecosystem?
    A) Energy
    B) Herbivores
    C) Decomposers
    D) Consumers
15. Functionally, the most diversified organ in the human body is the;
    A) Brain
    B) Stomach
    C) Liver
    D) Kidney
16. Which of the following will lead to excretion of large quantities of sugar in the urine of a man?
    A. A hot dry day
    B. Drinking a lot of glucose
    C. Heavy mill rich in carbohydrates
    D. Removal of the pancreas
17. Glomerular filtrate has a high percentage of water than urine because
    A. Water is added to the glomerular filtrate from the blood
    B. Water is reabsorbed from the glomerular filtrate into blood
    C. The nephrone adds salts to the urine making it more concentrated
    D. Glomerular filtrate is produced at a greater rate than urine
18. Four test tubes were set up with the contents as in table 1 below.

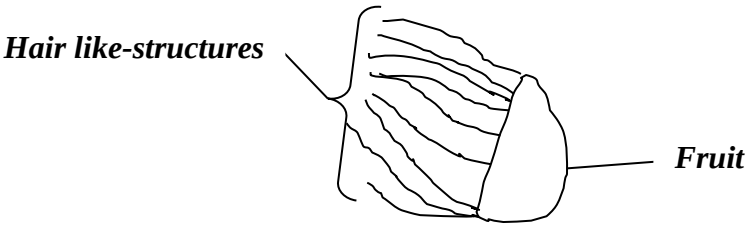
Table 1

Tube	Contents
A	Starch solution + dilute hydrochloric acid + saliva
B	Starch solution + distilled water + dilute hydrochloric acid
C	Starch solution + dilute sodium bicarbonate
D	Starch solution + dilute sodium bicarbonate + saliva

    The four test tubes were kept at about 38^0C for 15 minutes. In which of the four test tubes would you expect to find an orange precipitate after boiling the contents with Benedict's reagent?
    A) Test tube A
    B) Test tube B
    C) Test tube C
    D) Test tube D
19. Which of the following characteristics is unique to birds?

A. Ability to fly
B. Possession of feathers
C. Possession of scales
D. Possession of a spinal cord

20. The forces which mostly help water to move up a tall plant are
    A) Osmosis and diffusion
    B) Osmosis only
    C) Capillarity and transpiration
    D) Capillarity and osmosis
21. Why do some plants produce large quantities of pollen grains? Because;
    A) Some of the pollen grains don't mature
    B) Much of the pollen grains never reach the stigma
    C) The pollen grains are light and easily blown by wind
    D) It doesn't require a lot of energy to produce them
22. The number of trophic levels is limited in a food chain because;
    A) The number of organisms in each are limited
    B) There are producers at each successive trophic level
    C) A lot of energy is lost at each successive trophic level
    D) There is a lot of competition at each level.
23. Why is it easier to destroy a food chain than a food web? This is because;
    A) A food chain has fewer links than the food web
    B) In a food web organisms are alternative food source
    C) More types of organisms are involved in a food web
    D) Organisms in a web prefer certain types of food.
24. *Figure 2* below is of one of the types of fruits.



The fruit can best be dispersed by:
    A) Animals
    B) Wind
    C) Water
    D) Explosive mechanism
25. If a man of **blood group A** marries a woman of **blood group B** and they produce a child of **blood group AB**, which of the following statements is true?
    A) No blood transfusion is possible between family members
    B) The mother can donate blood to the father but not to the child
    C) The child could receive blood from both parents
    D) The child could donate blood to both parents
26. The following are regions of the alimentary canal in man;
    i. Mouth
    ii. Stomach
    iii. Small intestines
    iv. Duodenum

In which of the above regions of the alimentary canal does chemical digestion of lipids/ fats occur?

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

27. Which of the following consists of only insects with similar feeding methods?
    A) Cockroach, locust, butterfly
    B) Locust, housefly honey bee
    C) Tsetse fly, mosquito, butterfly
    D) Termites, tsetse fly, honey bee
28. Which of the following organisms **do not** need a transport system in their gaseous exchange?
    A) Earthworms
    B) Fish
    C) Amphibians
    D) Insects
29. Which of the following sets consists of substances that are stored in the liver?
    A) Glucose iron and vitamin D
    B) Iron, glycogen and vitamin D
    C) Glucose, glycogen and vitamin D
    D) Iron, glycogen and amino acid
30. In an experiment to determine the composition of air in the soil sample, the following results were obtained.
    Volume of soil used = $30cm^3$
    Volume of water added = $50cm^3$
    Volume of water + soil after stirring = $75cm^3$

Calculate the percentage composition of air in the soil.

A) $\frac{30}{75}x100$
C) $\frac{05}{80}x100$
B) $\frac{50}{75}x100$
D) $\frac{05}{30}x100$

SECTION B (40 Marks)

31. Table 2 below represents the body weight, metabolic rate and food eaten per day by six animals A B C D and F

Animal	Body weight (kg)	Metabolic rate (arbitrary unit)	Food eaten per day (kg)	Food eaten per day as % of body weight
A	0.1	800	0.098	
B	2.0	480	1.2	
C	8.0	300	3.0	
D	60.0	150	4.0	
E	200.0	100	15.0	
F	800.0	86	40.0	

a) Describe the relationship between body weight and metabolic rate of the six animals *(1 mark)*

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b) (i) Calculate the amount of food eaten by each of the six animals as a percentage of their body weight and fill in the table above. (show your working) *(2 marks)*

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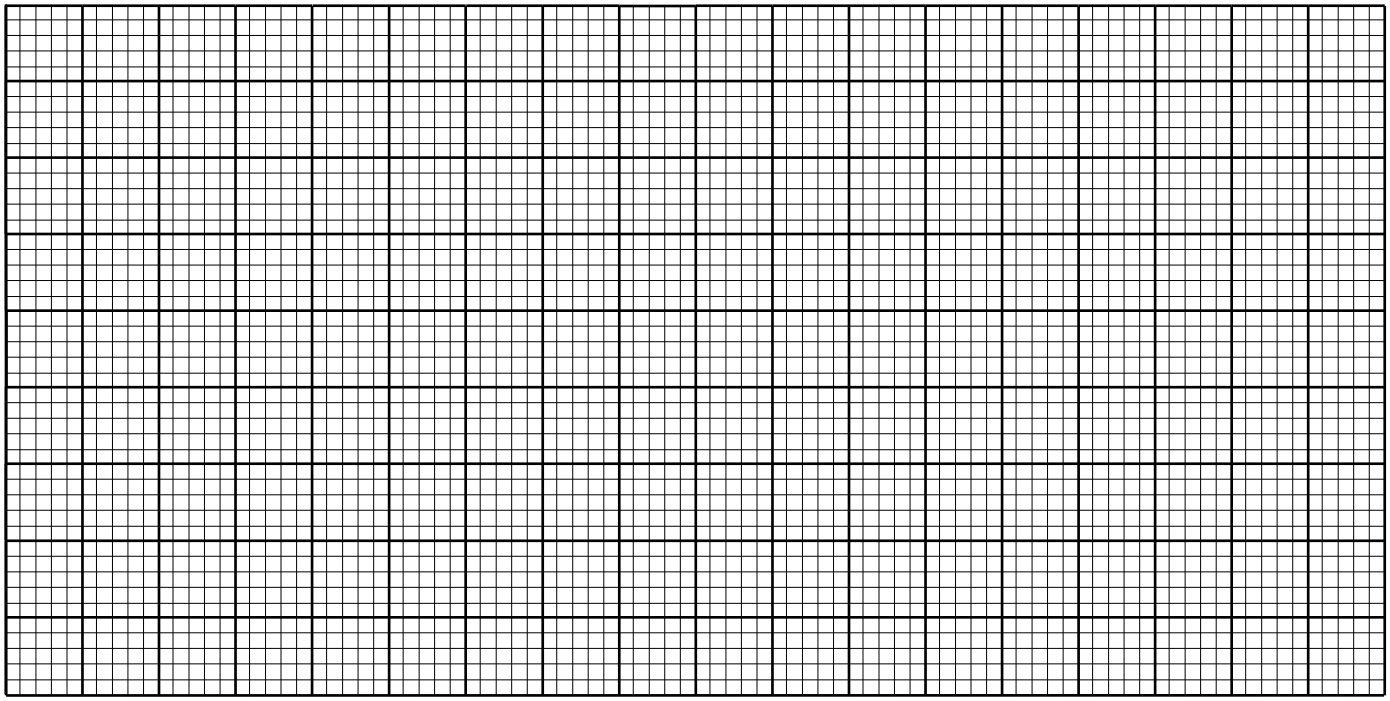
ii) Draw a graph and show how the amount of food eaten as a percentage of body weight varies with the metabolic rate of the six animals. *(05 marks)*



ii) Explain the relationship in b (ii) above. (04 marks) *(4 marks)*

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c) If all the six animals were all mammals living under the same climatic conditions;

i) Suggest with reasons which of the six animals on a hot sunny day would suffer; least dehydration. (03 marks)

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ii) State the disadvantage that organisms such as mammal F experiences over those like mammal A (01 mark)

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iii) Which of the 6 animals is likely to have the simplest transport system? Give a reason for your answer? (02 marks)
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iv) Explain the importance of the structural adaptive features that is expected in animal A when environmental temperatures fall (02 marks)
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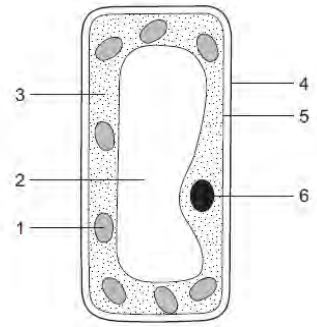
32. Figure 3 below shows a modified plant cell. Study it and answer the questions that follow.



a) Name the parts labeled (i) – (iv) *(2 marks)*
1. ……..
2. ……
3. ……
4. ……..
5. ……..
6. ……..

b) Name the layer in a leaf from which the cell could be obtained (01 mark)
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c) Explain what would happen to the cell if it was placed in a very concentrated solution of salt for 30 minutes (03 marks)
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d) Apart from the structures in the figure above, give any other four adaptations that enable a leaf to photosynthesize effectively. (04 marks)
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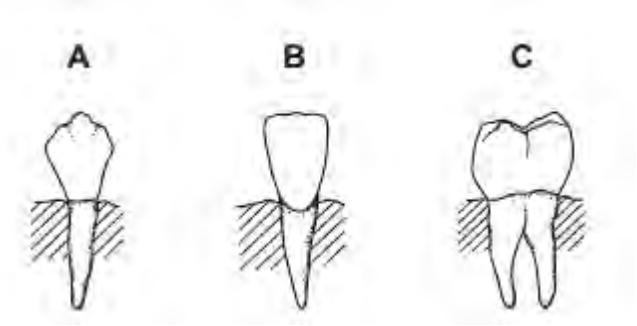
33. Figure 4 below shows different types of teeth from a human.



a) i) Name the types of teeth labeled A and B (02 marks)

A……..

B…...……..……..

ii) State where in the jaw, tooth type C is found (01 marks)

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b) Explain how regular brushing helps to prevent tooth decay *(4 marks)*

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c) Explain the roles of chewing and enzymes in the process of digestion. *(4 marks)*

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SECTION C (30 Marks)

34. a) Define the term excretion? (01 mark)

b) List any four excretory organs and state the excretory substances each organ eliminates.

c) Describe how the kidney functions as an osmo-regulatory organ? *($7\frac{1}{2}$ marks)*

35. Given the following organisms living in a terrestrial habitat: zebra, impala, grass, hyena, cheetah, lion and giraffe.

(a) Construct a:

(i) food chain, *($1\frac{1}{2}$ marks)*

(ii) food web. *($5\frac{1}{2}$ marks)*

(b) Use the food chain above to construct a pyramid of:

(i) Numbers, *(2 marks)*

(ii) Biomass. *(2 marks)*

(c) State any four causes of air pollution? *(4 marks)*

36 (a) what is self pollination? *(1 mark)*

(b) With examples describe how self pollination is normally prevented in plants (07 *marks)*

(b) Describe the features of a flower that favor pollination by insects. *(07 marks)*

37 Explain the changes that occur in the breathing and heart beat as a person engages in a serious exercise. *(8 marks)*

(b) Explain how these changes affect the working of the muscles involved (*7 marks)*

Answers for section C

TEST PAPER 9

SECTION A

1. A healthy person normally has a concentration of 6,000 leucocytes per cm^3 of blood. A person who has just recovered from an illness would be expected to have
   A. 2,000 per cm^2
   B. 3,000 per cm^3
   C. 6,000 per cm^3
   D. 12,000 per cm^3
2. Which one of the following reactions is likely to occur when a patient of blood group A is transfused with a recipient of blood group B?
   A. antibody a reacts with antigen B
   B. Antigen B reacts with antibody b
   C. antibody b reacts with antigen A
   D. antigen A reacts with antigen B
3. One of the major functions of vitamin C in the human body is to
   A. provide body resistance against diseases
   B. provide resistance against blood cells
   C. add bulk to food eaten
   D. increase the rate of heart beat
4. Phagocytosis is the process whereby
   A. white blood cells ingest and destroy bacteria
   B. white blood cells cause the bacteria to stick together
   C. red blood cells dissolve the outer coats of invading bacteria and so destroying them
   D. Antibodies fight antigens
5. Antigens stimulate the production of
   A. Antibodies
   B. Antitoxins
   C. leucocytes
   D. lysins
6. Which one of the following forms part of the insect respiratory systems?
   A. trachea, tracheoles and bronchioles
   B. spiracle, trachea and tracheoles
   C. Spiracles, trachea and bronchioles
   D. trachea, bronchus and bronchioles
7. Which one of the following is **not** an adaptation to facilitate gaseous exchange in organisms?
   A. increased surface area of organisms involved
   B. decrease in thickness of exchange surface
   C. increased body size of organisms
   D. increase in concentration gradient of a gas
8. In the process of blood clotting, thrombin acts as an enzyme to bring about conversion of
   A. fibrinogen to fibrin
   B. fibrin to fibrinogen
   C. prothrombin to thrombokinase
   D. thrombokinase to prothrombin
9. The kidney purifies blood by
   A. Ultra filtration
   B. absorption and filtration
   C. selective absorption and filtration
   D. ultra filtration and selective reabsorption
10. Which of the following is true of respiration but **not** photosynthesis?
    A. oxygen is given out
    B. carbondioxide is taken in
    C. Glucose is synthesized
    D. Carbondioxide is released
11. Which one of the following takes place by the process of active transport?
    A. Uptake of water
    B. intake of carbondioxide
    C. transpiration
    D. uptake of mineral salts
12. Which of the following structural adaptations of leaves is important for light absorption during photosynthesis?
    A. dense net work of veins

B. large numbers of stomata or leaf surface
C. Large intercellular air spaces in the spongy layer
D. Broad and flat shapes of leaves

13. The condition known as oxygen debt occurs during active physical exercise in animals because of the
    A. accumulation of carbondioxide during physical exercise
    B. the high rate of breathing during physical exercise
    C. accumulation of lactic acid in the body
    D. accumulation of alcohol in the body
14. Which one of the following compounds is a constituent of enzymes?
    A. Lipids
    B. Polysaccharide
    C. Protein
    D. Vitamins
15. The following results were obtained from an experiment done to determine the percentage of air in a sample of soil
    1. volume of water used = $10cm^3$
    2. volume of soil + water = $40cm^3$
    3. volume of soil + water after stirring = $37cm^3$

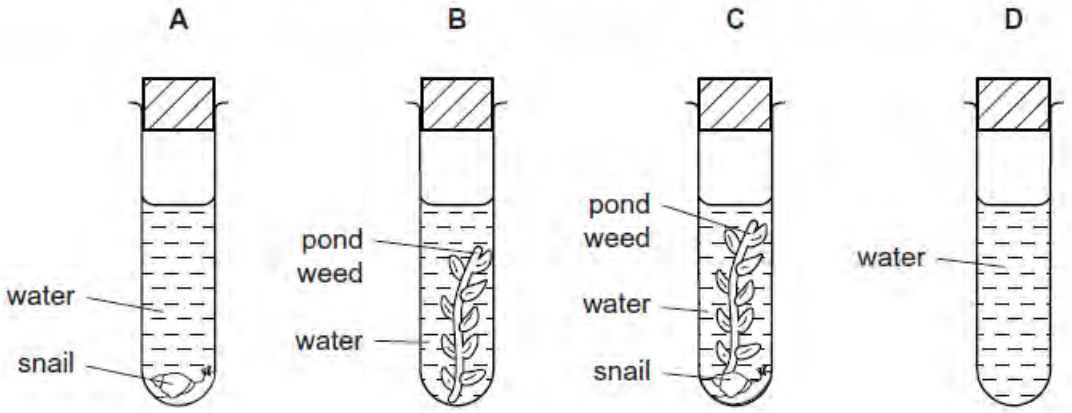
    From results, the percentage of air in the soil is
    A. 7.5
    B. 8.1
    C. 10
    D. 23.3
16. Why is a shoot being prepared for transpiration experiments normally cut under water? To
    A. avoid water loss which may cause wilting
    B. prevent loss of sap
    C. prevent air from entering the xylem vessels
    D. remove damaged tissue
17. Decrease in number of mammalian red blood cells could reduce the ability of the blood to
    A. clot
    B. transport oxygen
    C. destroy harmful bacteria
    D. distribute heat
18. During inspiration
    A. pressure in thoracic cavity is reduced
    B. external inter costal muscles relax
    C. diaphragm becomes dome shaped
    D. the thoracic cavity becomes smaller
19. What are the final products of anaerobic respiration?
    A. Carbondioxide, water and energy
    B. Carbondioxide, water and alcohol
    C. Carbondioxide, alcohol and energy
    D. Carbondioxide and alcohol
20. Which one of the following substances accumulates in muscles during vigorous exercise?
    A. Water
    B. Lactic acid
    C. Carbondioxide
    D. Oxygen
21. Which of the following features is typical of class insecta?
    A. jointed legs
    B. three main body parts
    C. complete metarmorphosis
    D. exoskeleton
22. Which one of the following processes needs energy?
    A. Osmosis
    B. Diffusion
    C. Plasmolysis
    D. Active transport
23. Which one of the following is an excretory organ in insects?

A. Malpighian tubule
B. Spiracle
C. Trachea
D. Tracheole

24. What gas is likely to be evolved from a submerged aquatic plant placed in a bright sunlight?
A. Carbondioxide
B. Hydrogen
C. Oxygen
D. Nitrogen

25. The irregular shape of the white blood cells is important for
A. easy movement of digested enzymes
B. easing the clotting of blood
C. enabling engulfing of the pathogens
D. facilitating entry of materials

26. Four test tubes were set up as shown in the diagram ad left in left in full sunlight. After several hours, which test-tube would contain the most dissolved carbon dioxide?



27. Deoxygenated blood does not mix with oxygenated blood because of the presence of the
A. Bicuspid valves
B. Tricuspid valves
C. Septum
D. Semilunar valves

28. Cells were put in a more concentrated solution. Which of the following changes took place? The
A. Cells increased in size
B. Cells absorbed water
C. Solution became more concentrate
D. Cells lost water

29. Which of the following would occur if a potato strip was place in distilled water?
A. Increase in length
B. Strip would soften
C. Decrease in length
D. Remain unchanged

30. Which are of the following groups of animals uses gills, skin, buccal cavity and lungs for gaseous exchange at some stage in life cycle?
A. Fish
B. Amphibians
C. Reptiles
D. Mammals

SECTION B

31. a) What is meant by the term soil erosion? (1 mark)
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b) Name four types of soil erosion (04 marks)
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c) State the causes of soil erosion (4 marks)

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d) How does mulching help the farmers in water and soil conservation? (01 mark)

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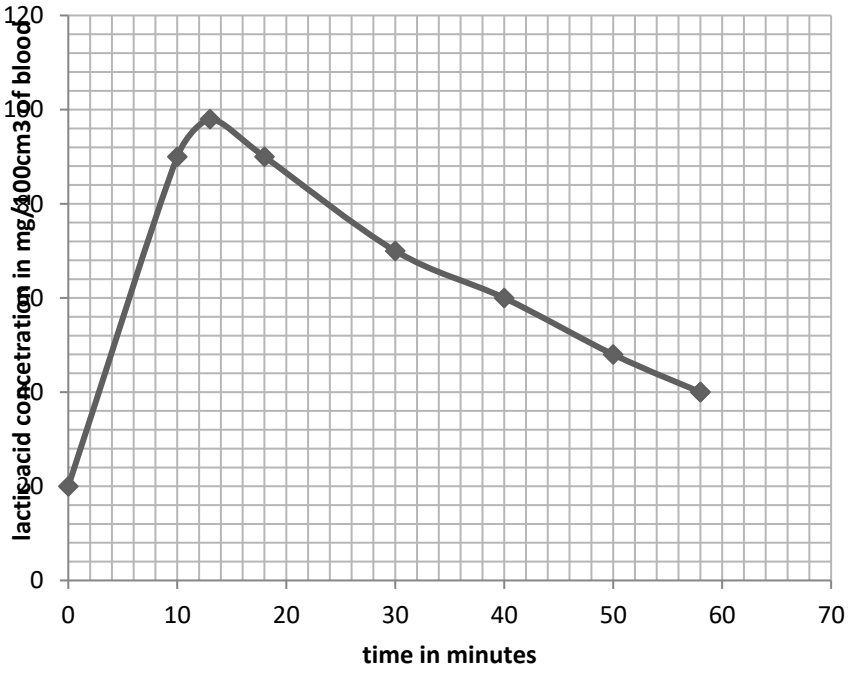
32. The graph below shows the relationship between the concentration of lactic acid and time taken during an exercise.



a) On the graph indicate the following; (03 marks)
   i) Duration of exercise
   ii) Duration of recovery
   iii) When the individual collapsed

b) Describe the shape of the graph (03 marks)

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c) Explain what occurs in the muscles during the period of the exercise (04 marks)
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d) Name the condition under which lactic acid is formed in the bodies of animals.
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e) Use a word equation to show how the lactic acid is oxidized? (01 mark)
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33. The diagram below show the structure of a blood cell

a) Indentify the blood cell. (01 mark)
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b) Give two reasons for the identity above (02 marks)
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…….

c) State the function of the cell identified above? (01 mark)
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d) How is the cell adapted for the function stated in part (c) above (04 marks
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e) Briefly explain what would happen to the numbers of the cell if the individual went to the hills of Kabale? (02 marks)
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SECTION C

34. a) Describe the digestion of proteins in the human alimentary canal
    b) What may happen, to the products of digestion of proteins?

35.a) Draw a labeled diagram of a cross section of a young dicotyledonous stem.
    b) Give the functions of at least five parts of the structures labeled in (a) above.

36.a) Define the term respiration
    b) Describe an experiment to show that heat is given off during respiration
    c) State any three differences between respiration and photosynthesis?

37. What is meant by;
    i. hydrophyte
    ii. Xerophyte
    b. Explain how a xerophyte and a hydrophyte adapted to their respective habitats

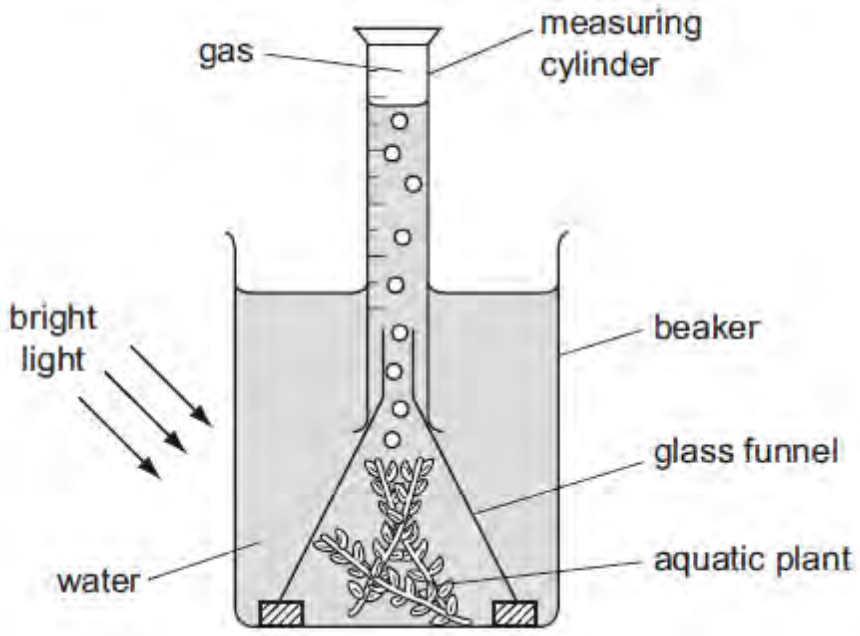
Answers for section

TEST PAPER 10

SECTION A

1. The part of the Irish potato plant responsible for vegetative reproduction is the
   A. Root
   B. Stem
   C. Foliage
   D. Fruit
2. In the red blood cells, oxyhaemoglobin dissociates to oxygen and haemoglobin in the
   A. Tissues where oxygen concentration is low
   B. Liver only when one is at rest
   C. Tissues in reaction to low carbondioxide concentration
   D. Liver only when one active
3. In which of the following body components in the nitrogen of a dead plant or animal locked?
   A. Fats
   B. Proteins
   C. Carbon dioxide
   D. Mineral

The figure above shows the diagram if the apparatus that can be used to collect the gas evolved in photosynthesis. Questions 10 to 11 refer to the diagram.



4. Which one of the following would produce the largest volume of the gas in a given time?
   A. Increasing light intensity
   B. Increasing the temperature
   C. Increasing the concentration of sodium hydrogen carbonate
   D. Increasing both light intensity and the concentration of sodium hydrogen carbonate.
5. Sodium hydrogen carbonate is added to the water because it
   A. Catalyses photosynthesis
   B. Supplies carbon dioxide to the aquatic shoots
   C. Provides a medium in which aquatic plants grow
   D. Is absorbed by the aquatic plant to keep the leaves turgid

6. Which one of the following structural adaptations of leaves is important for light absorption during photosynthesis?
   A. Dense net work of veins
   B. Large numbers of stomata on leaf surfaces
   C. Large intercellular air spaces in the spongy layer
   D. Broad and flat shapes of leaves
7. Which of the following is **not** a component of proteins?
   A. Sulphur
   B. Nitrogen
   C. Carbon
   D. Calcium
8. Which of the following is the best description of the term double circulation in a mammal? Blood,
   A. Flows into the two lungs and then into the body
   B. Passes through two chambers of the heart
   C. Through the heart twice in one circulation
   D. First flows through arteries and then through veins
9. Enzymes are denatured by high temperatures because they
   A. Act on only one kind of substrate
   B. Are protein in nature
   C. Remain chemically unchanged at the end of the reaction
   D. Act in a particular pH medium
10. Which one of the following is the correct pairing of antibody and antigen for an individual with blood group A

	Antigen	Antibody
A	A and B	B
B	B	A
C	None	a and b
D	A	B

11. What are the products of the hydrolysis of lactose?
   A. Galactose and fructose
   B. Glucose and galactose
   C. Glucose only
   D. Glucose and fructose
12. In the human heart, the mixing of oxygenated and deoxygenated blood is prevented by the
   A. Septum
   B. Bicuspid valve
   C. Tricuspid valve
   D. Semi lunar valve
13. The breathing rate in plants appears to be higher at night than during day because
   A. Oxygen taken in at night is less
   B. Carbon dioxide generated is used up during day
   C. Carbon dioxide generated dissolves in moist air
   D. Oxygen diffuses more slowly at night
14. When sodium hydroxide solution was added to a food substance followed by copper II sulphate solution, a blue colour was observed what is the best conclusion?
   A. Reducing sugars were absent
   B. Starch was present
   C. Proteins were absent
   D. Vitamin C was present
15. Fish are said to have a single circulatory system because
   A. Blood is pumped once in a complete circulation

B. They have a single blood vessel
C. Their blood is single, complete transport system
D. They have only blood and no lymphatic system

16. An Irish potato is an example of
A. Rhizome
B. Stem tuber
C. Corn
D. Root tuber

17. The parts of the flower that act as guides and attractants to insects are
A. Sepals
B. Petals
C. Anthers
D. Carpels

18. Blood flowing from the ileum to the liver passes through the
A. hepatic portal vein
B. pulmonary artery
C. hepatic artery
D. mesenteric artery

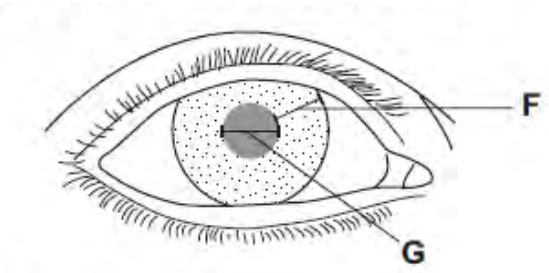
19. The irregular shape of white blood cells is important for
A. easy movement of digestive enzymes
B. easing the clotting of blood
C. enabling engulfing of pathogens
D. facilitating entry of materials

20. Which of these is contained in plant cells but not animal cells?
A. cell membrane
B. cell wall
C. cell vacuole
D. cytoplasm

21. Temperature regulation in man is by
A. Cerebrum
B. Hypothalamus
C. Cerebellum
D. Medulla oblongata

22. Oxygen debt can best be described as
A. Extra oxygen breathed in by an individual during forced inhalation
B. Oxygen required to completely break down glycogen in muscles
C. Amount of oxygen required to oxidise lactic acid
D. Amount of oxygen required to oxidise glucose completely during respiration

23. The diagram below shows the eye of a person in a brightly-lit room



What happens to distance F and distance G when this person moves into a dimly-lit room?

	Distance **F**	Distance **G**
A	Becomes larger	Becomes smaller
B	Becomes smaller	Stays the same
C	Becomes smaller	Becomes larger
D	Stays the same	Becomes smaller

24. How often must a blood cell in the renal artery pass through the heart before it again reaches the renal artery?
A. Once
B. Twice
C. three times
D. four times

25. In amphibians, lungs are not used for gaseous exchange very frequently because
    A. Lungs lies deep in the body
    B. Use of lungs requires a lot of energy which cannot be provided by the organisms
    C. By the time the air reaches them, it has already exchanged gases within the buccal cavity
    D. Lungs are only used during rigorous activity yet amphibians are inactive
26. Which of the following conditions would cause the adrenal glands of a man to secrete a hormone?
    A. Eating a carrot
    B. Seeing a burglar
    C. Smelling a flower
    D. Hearing a song
27. Which part of the ear is responsible for the detection of the position of the body when the body is rotating?
    A. Ossicles
    B. Semi circular canals
    C. Cochlea
    D. Oval window
28. Which of the following statements is **not** true about angiosperms?
    A. Sexual reproduction involves double fertilisation
    B. They are flowering and seed bearing vascular plants
    C. Have true roots, stems, scales and needle like leaves
    D. Seeds are born in fruits arising from ovaries
29. If the liver of a person is damaged, which of the following activities is likely to be affected?
    A. Digestion of proteins
    B. Elimination of urine
    C. Formation of glycogen
    D. Regulation of water
30. Which one of the following has the highest number of organisms?
    A. Kingdom
    B. Phylum
    C. Class
    D. Order

SECTION B

31. Catalase is an enzyme found in plant and animal cells. It has the function of breaking down hydrogen peroxide, a toxic waste product of metabolic processes.
    a. (i) State the term used to describe the removal of waste products of metabolism. (01 marks)

    ……

    (ii) Define the term enzyme. (02 marks)

    ……

    ……

    ……..

An investigation was carried out to study the effect of pH on catalase, using pieces of potato as a source of the enzyme. Oxygen is formed when catalase breaks down hydrogen peroxide, as shown in the equation below.

$$\text{hydrogen peroxide} \xrightarrow{\text{catalase}} \text{water} + \text{oxygen}$$

The reaction rate can be measured by measuring how long it takes for $10cm^3$ of oxygen to be collected.

    b. State the independent variable in this investigation. (02 marks)

    ……

    ……

    ……

c. Suggest two factors that would need to be kept constant in this investigation (02 marks)

……

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……

d. The table below shows the results of the investigation, but it is incomplete.

pH	**Time taken to collect 10cm^3 of oxygen/min**	**Rate of oxygen production/cm^3 min^{-1}**
4	20.0	0.50
5	12.5	0.80
6	10.0	1.00
7	13.6	0.74
8	17.4	
9	19.6	

e. Calculate the rate of oxygen production at pH 8 and 9. (04 marks)

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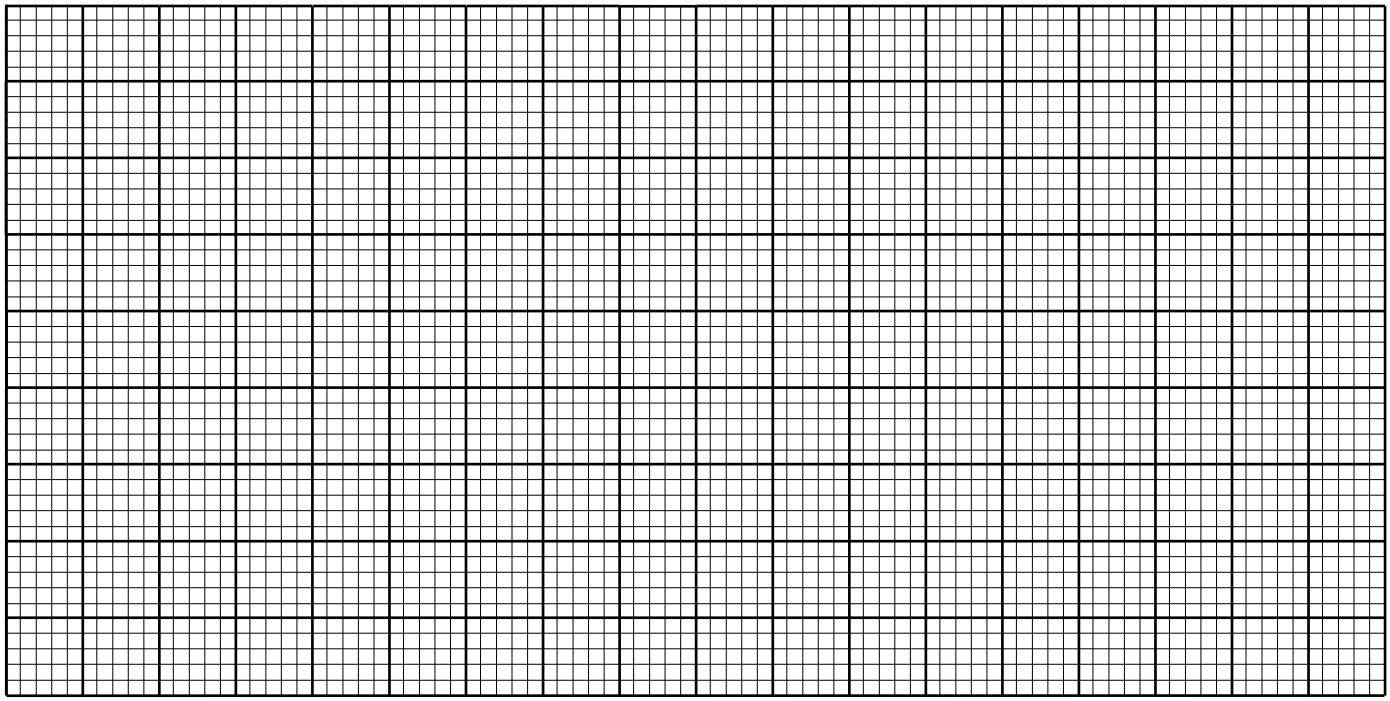
……

……

f. Plot the rate of oxygen production and pH on a graph using a suitable scale. (07 marks)



g. (i) Using the data from the graph, describe the changes in the reaction rate between pH 4 and pH 8. (02 marks)

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(ii) Explain the change in the reaction rate between pH 6 and pH 8. (03 marks)

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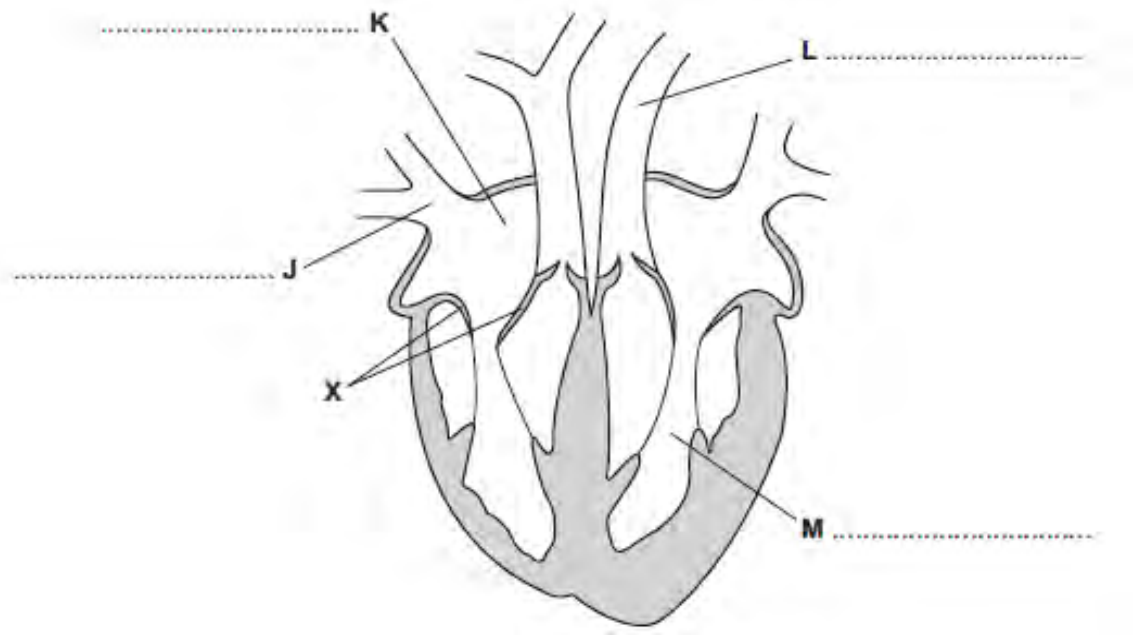
32. The figure below shows a section through the heart.



a. On the figure above,
   i. Label parts J, K, L and M. (04 marks)
   ii. Shade in the blood vessels that carry deoxygenated blood (01 mark)
   iii. Draw a series of arrows to show the direction of blood flow through the heart from the lungs to the rest of the body. (01 marks)

b. Describe the role of valve X. (02 marks)

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33. (a) Adding lime to clay soil improves it and makes it better for crops growth. State three ways by which the above process improves clay soil. (03 marks)

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b) An S.2 student performed an experiment to determine the amount of water and humus in a given soil sample. The following were her results.

Mass of crucible = 10g
Mass of crucible + damp soil = 25g
Mass of crucible + soil after drying = 20g
Mass of crucible + soil after heating the soil it turned red = 15g

i. How did the student dry the soil? (01 mark)

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……

ii. Calculate the percentage of water in soil? Show your working. (04 marks)

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iii. State any 2 functions of soil water? (02 marks)

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SECTION C

34. What is meant by environmental pollution? (02 marks)
(b) Describe the effects of application of nitrogen containing fertilisers on a farm near the shores of a water body (08 marks)
(c) Of what importance in conservation of water bodies to living organisms (05 marks)
35. (a) State two (2) functions of a human nephron (02 marks)
(b) Describe how the body of a human being is able to overcome dehydration (08 marks)
(c) Explain why it is important for the body to maintain the water content constant (04 marks)
36. (a) Why is water a better respiratory medium for fish than air (03 marks)
(b) Describe the mechanism by which a fish obtains oxygen for cellular respiration (08 marks)
(c) How is a gill fish adapted for its functions? (04 marks)
37. Describe how the following are controlled by the human body
a) Proteins (07 marks)
b) Carbohydrates (08 marks)

Answers for section

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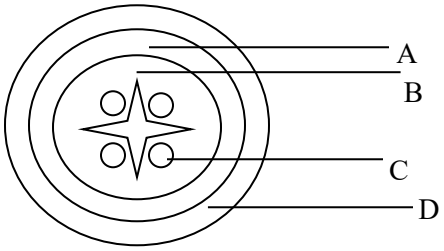
TEST PAPER 11

SECTION A

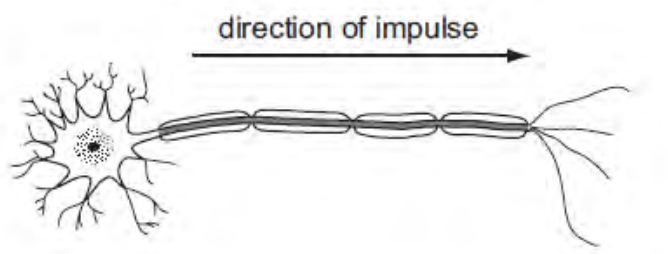
1. Change in weight when a soil sample is heated gently is due to loss of
   A. mineral salts
   B. Water
   C. Air
   D. Humus
2. Which one of the following is **not** a way of preventing self pollination?
   A. plants where protandry occurs
   B. plants where protogyny occurs
   C. plants which are dioecious
   D. Plants which are monoeciuos
3. At temperatures above 50^{o}C, enzymes are
   A. Killed
   B. Denatured
   C. Inactivated
   D. unreactive
4. Which of the following organs are responsible for the chemical digestion of proteins?
   A. Stomach and liver
   B. Colon and ileum
   C. Stomach and duodenum
   D. Duodenum and liver
5. When sodium hydroxide was added to a food substance followed by copper II sulphate solution, a blue colour was observed. What is the best conclusion?
   A. reducing sugars were absent
   B. starch was present
   C. proteins were absent
   D. vitamin C was present
6. Which of the following conditions would raise the rate of transpiration?
   A. Low temperature and low humidity
   B. High temperature and low humidity
   C. Windy conditions and high humidity
   D. Still air and low humidity
7. The figure below shows a cross-section of the plant part region. Which region transports food?



8. Which of the following occurs during inspiration in fish?
   A. Pressure in the mouth is raised
   B. The volume of the mouth is raised
   C. The floor of the mouth is lowered
   D. Water leaves through the operculum
9. Production of alcohol when plant materials are kept in air tight and moist conditions is evidence of
   A. Aerobic respiration
   B. Anaerobic respiration
   C. External respiration
   D. Internal respiration
10. In houseflies, the most rapidly growing stage is the
    A. egg stage
    B. larval stage
    C. pupa stage
    D. adult stage
11. A fruit that has only one line of weakness is called a
    A. Legume
    B. Follicle
    C. Capsule
    D. Cypsela
12. Which one of the following is **not** an adaptation of fruits for dispersal by animals? Possession of
    A. hooks
    B. a bright colour

C. sticky hairs
D. many seeds

13. Diabetes mellitus is due to
    A. Low production of insulin
    B. Low production of ADH
    C. Break down of the pituitary gland
    D. Degradation of the liver cells
14. The products of digestion of maltose are
    A. two glucose molecule
    B. glucose and fructose
    C. fructose and galactose
    D. glucose and galactose
15. Which of the following parts of the leaf has the highest concentration of chloroplast?
    A. Guard cells
    B. Upper epidermal cells
    C. Spongy mesophyll cells
    D. Palisade mesophyll cells
16. Which of these is **not** a function of bile?
    A. Neutralisation of food from the stomach
    B. Breaking down large fat molecules into droplets
    C. Removes cholesterol from digestive system
    D. Breaks down fats to fatty acids and glycerols
17. Plant cells were placed in a more concentrated solution. Which of the following changes took place?
    A. cells increased in size
    B. cells absorbed water
    C. the solution became more concentrated
    D. the cells lost water
18. The diagram shows a neurone carrying an impulse

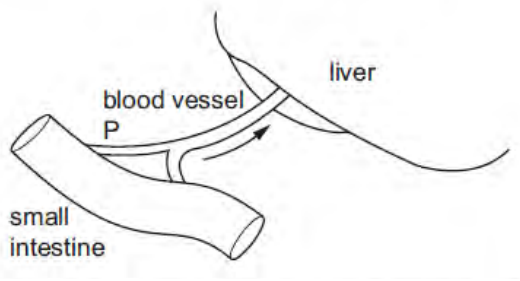


Which row describes the type of neurone and the direction of impulse?

	Type of neuron	**Direction of impulse**
A	Motor	Towards the spinal cord
B	Motor	Away from the spinal cord
C	Senory	Towards the spinal cord
D	Sensory	Away from the spinal cord

19. In which of the following organelles of the plant cell is energy produced?
    A. Mitochondrion
    B. Nucleus
    C. Chloroplast
    D. Vacuole
20. Without water, photosynthesis cannot take place. This is because
    A. water cools the plant during photosynthesis
    B. water combines with carbondioxide to form glucose
    C. Water is split to hydrogen and oxygen. The hydrogen then combines with carbondioxide to form glucose
    D. Water dissolves glucose after formation.

21. The diagram below shows blood vessel P which carries digested food from the small intestine to the liver



The row which describes the level of glucose in blood vessel P and the level of glycogen in the liver, shortly after a meal containing carbohydrates?

	Glucose in blood vessel P	**Glycogen in liver**
A	High	Decreasing
B	High	Increasing
C	Low	Decreasing
D	Low	Increasing

22. Which one of the following groups contains organisms that are closely related?
    A. Species
    B. Family
    C. Order
    D. Class
23. Which one of the following has the biggest surface area to volume ratio?
    A. Amoeba
    B. Snake
    C. Chicken
    D. Elephant
24. Which one of these insects does **not** lay eggs in its life cycle?
    A. Bee
    B. grass hoppers
    C. Tsetse fly
    D. housefly
25. Which one of the following has **no** effect on rate of diffusion?
    A. Density of diffusion medium
    B. Length of diffusion pathway
    C. Size of diffusing molecules
    D. Concentration gradient
26. Which one of the following is an example of a modified root?
    A. Irish potato tuber
    B. cassava tuber
    C. Rhizome
    D. corn
27. What is the main function of the xylem in green plants
    A. Transporting water
    B. Supporting the plant
    C. Transporting mineral salts
    D. Transporting manufactured food
28. Which one of the following components is absorbed by the large intestines?
    A. Water
    B. Glucose
    C. Amino acids
    D. Iron
29. Hibernation occurs if the animal is in an environment that
    A. Is very hot
    B. Is very cold
    C. lacks food
    D. is flooded
30. Respiratory surfaces are thin to
    A. Reduce the diffusion distance
    B. Increase the amount of gases exchanged

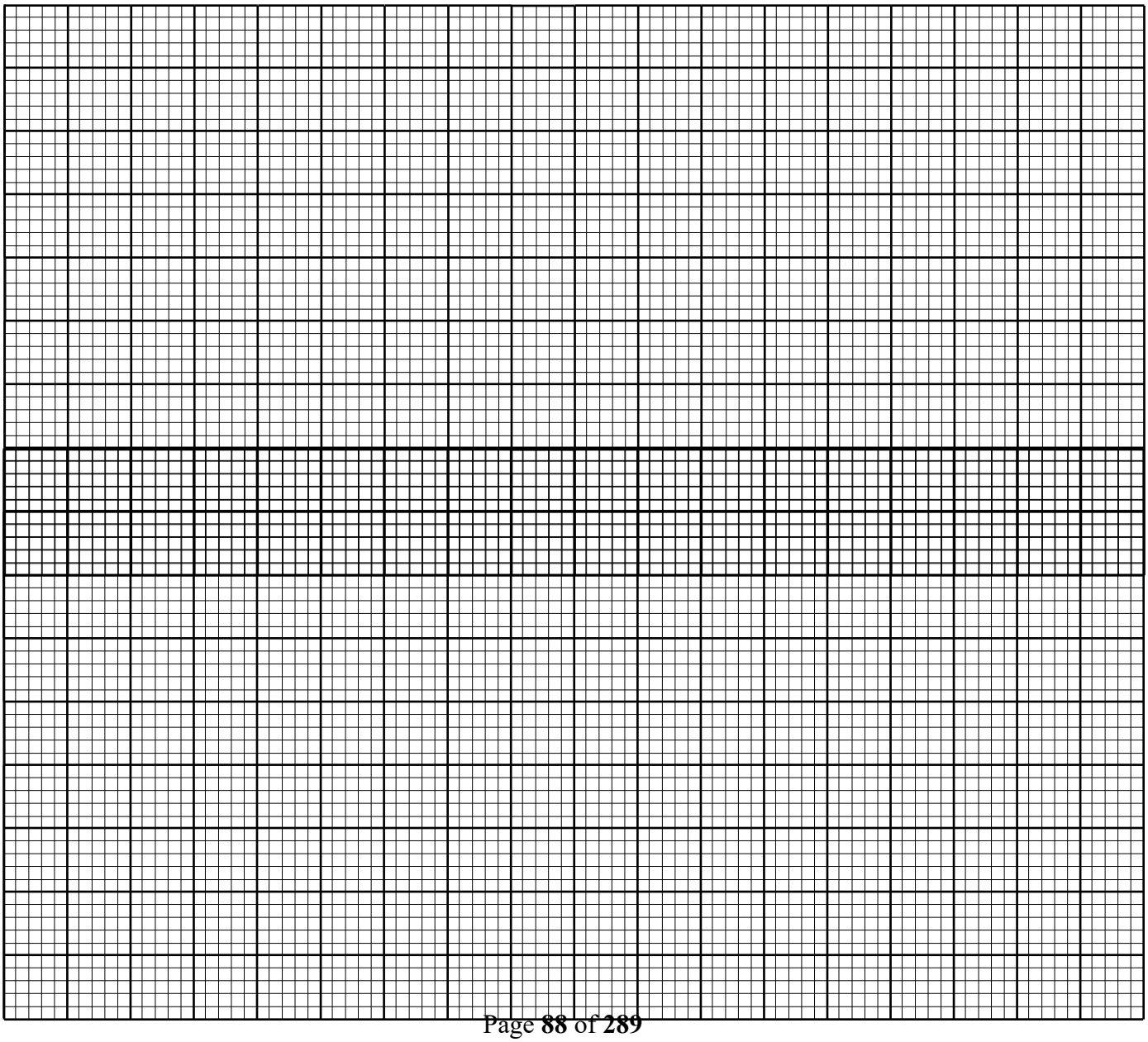
C. Maintain the diffusion gradient
D. Dissolve respiratory gases

SECTION B

31. An experiment was carried out to investigate the effect of temperature on the rate of enzyme controlled reactions. The concentrations of enzymes and substrate were kept constant at all temperature investigated. The results are shown in the table below.

Temperature /^{o}C	5	10	15	20	25	30	35	40	45	50	55	60
Rate of reaction (Mg of product per unit –time)	0.3	.05	0.9	1.4	2.0	2.7	3.3	3.5	3.6	2.3	0.9	0.0

(a) Plot a graph to show how the rate of reaction varies with temperature (rate of reaction on vertical axis and temperature on horizontal axis) (11 marks)



ii. Explain the graph. (05 marks)

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iii. A part from temperature, state and explain two factors that affect the rate of enzyme activity. (4 marks)

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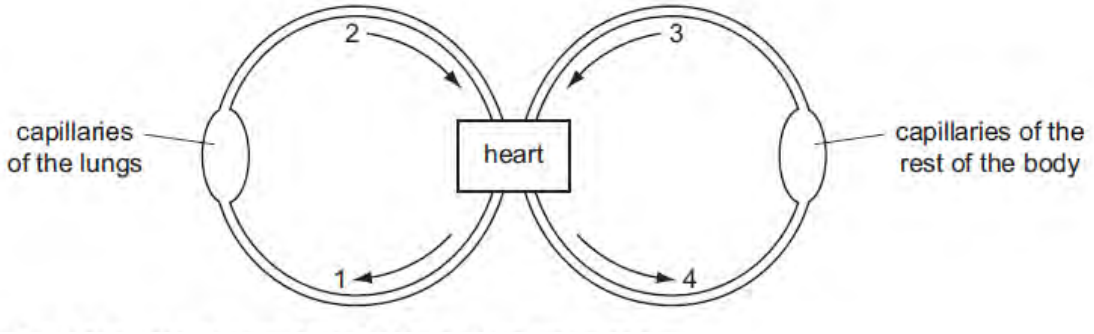
32(a) The figure below is an example of a circulatory system in animals. Use it to answer the questions below.



i. Identify the type of closed circulatory system in the figure below. (01 mark)

……

ii. Give an example of animal with the system identified in a (i) above. (01 mark)

……

iii. State the disadvantage of the system in a(i) above (01 mark)

……
……

(b) Identify the vessels labeled (01 mark)

1. ……
2. ……..

3. ……
4. ……

(c) State the function of capillaries shown above (01 mark)

……

.....

(d) How are the capillaries adapted for the function in (c) above? (02 marks)

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33. In an experiment maize seedlings were allowed to grow in the dark. A young shoot was cut off just infront the zone of elongation.

(a) (i) The cut shoot stopped growing but the uncut shots continued to grow. Explain this observation

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(ii) What was the reason for leaving some shoots uncut?

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(b) In one of the uncut shoots, the tip was cut and replaced. Growth of the shoot continued. Explain.

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(c) In another uncut shoot, a razor blade was stuck horizontally on one side infront of the zone of elongation. The shoot bent to the side with the razor blade. Explain the bending.

……

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(d) Why were the seedlings kept in the dark?

……

……

SECTION C

34. (a) State four qualities of a respiratory surface? (4 marks)

(b) Describe the mechanisms of respiration in an insect? (8 marks)

(c) State three uses of blood in insects? (3 marks)

35. (a) What is the importance of organic matter to soil? (5 marks)

(b) Describe an experiment to determine the percentage of organic matter in soil (10 marks)

36. (a) What is meant by the term osmoregulation

(b) Of what importance is osmoregulation to a mammal?

(c) How is osmoregulation carried out by a mammal?

37. (a) By stating examples, what do you understand by the terms (06 marks)

i. Symbiosis ii. Parasitism

(b) How are parasites adapted to their mode of life (06 marks)

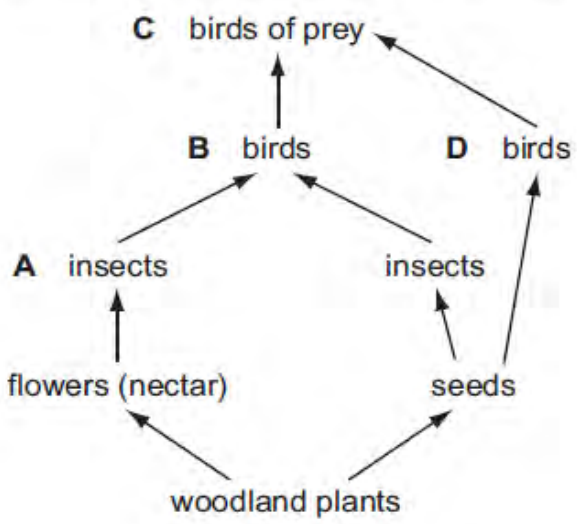
(c) State three ways in which bacteria are important in nature (03 marks)

Answers for section

TEST PAPER 12

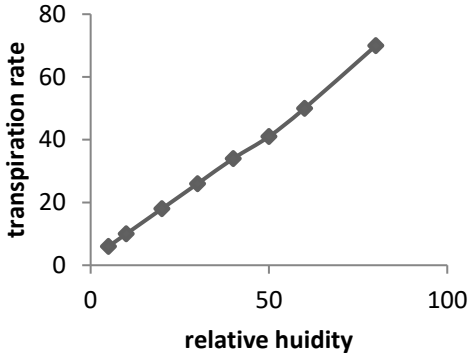
SECTION A

1. Which one of the following control measures against mosquitoes is least harmful to the environment?
   A. Draining of swamps
   B. Introducing fish in ponds
   C. Spraying with insecticide
   D. Covering surface of stagnant water with oil
2. The magnification of a biological drawing is given as X0.5. This means that the drawing is
   A. Five times larger than the specimen
   B. Half the natural size of the specimen
   C. Twice the natural size of the specimen
   D. Five times smaller than the specimen
3. A diet most suitable for strengthening of teeth and bones should be rich in
   A. Iodine and vitamin K
   B. Magnesium and vitamin C
   C. Calcium and vitamin D
   D. Iron and vitamin D
4. Which one of the following digestive process is catalyzed by salivary amylase?
   A. Maltose to glucose
   B. Sucrose to glucose and fructose
   C. Starch to maltose
   D. Lactose to galactose and glucose
5. Which of the following soil samples has a size range of 0.01 to 0.001mm
   A. Clay
   B. Coarse and
   C. Gravel
   D. Fine sand
6. The diagram below shows some food relationships in a woodland area. Which of the labelled animals are in competition with seed-eating insects for their food?



7. Which of the following mineral nutrients are constituents of haemoglobin?
   A. Potassium and sulphur
   B. Nitrogen and iron
   C. Calcium and phosphorous
   D. Zinc and copper
8. Clay soil has a high water retention capacity because it
   A. Has small air space
   B. Is sticky when wet
   C. Contains little amount of humus
   D. Has good capillary attraction
9. Which of the following are **not** respiratory surface in animals?
   A. Spiracles
   B. Gill filament
   C. Tracheoles
   D. Alveoli

10. The figure below shows the effect of relative humidity on transpiration rate.



From the figure, transpiration rate

A. Increases with decreased relative humidity
B. Increases with increased relative humidity
C. Decreases with increased relative humidity
D. Remains constant with increased relative humidity

11. Which one of the following classes has the highest number of species?

A. Crustacea
B. Insecta
C. Arachnida
D. Myriapoda

12. Which one of the following is an adaptation of the leaf for transportation of manufactured food?

A. Numerous chloroplasts
B. Branching net work of vein
C. Numerous stomata
D. Large air spaces in the spongy mesophyll

13. Which of the following is the correct order of cell organization?

A. Cell → organ → tissue → system
B. Tissue → cell → organ → system
C. Organ → cell → tissue → system
D. Cell → tissue → organ → system

14. Which of the following is the least important reason why plants need to ensure efficient dispersal of seeds in nature?

A. Increasing chances of finding a better habitat for multiplication
B. Escape being eaten by animals in its original habitat.
C. Reducing competition for food
D. Ensuring better colonization of different places.

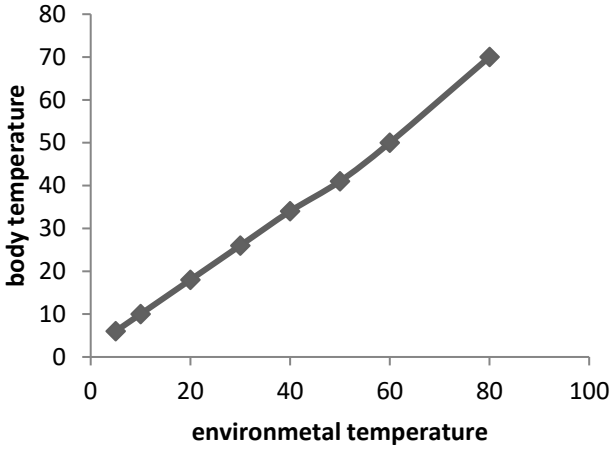
15. Which of the following events occur during inhalation in a mammal?

A. Diaphragm contracts, ribs raised
B. Diaphragm relaxes, ribs lowered
C. Internal intercostals muscles contract, pressure in chest cavity increases
D. Internal intercostals muscles relax, pressure in chest cavity increases

16. Which one of the following organs has a double blood supply?

A. Pancreas
B. Liver
C. Kidney
D. Spleen

17. Figure below shows the changes in the body temperature with environmental temperature in an animal.



Which of the following could be the animal represented?

A. Bird
B. Dog
C. Human
D. Frog

18. Which of the following features differentiates a housefly from a spider?

A. Segmented body
B. Number of body parts
C. Jointed limbs
D. Possession of exo skeleton

19. Decreases in the number of mammalian red blood cells could reduce the ability of the blood to

A. Clot
B. Destroy harmful bacteria
C. Transport oxygen
D. Distribute heat

20. Which one of the following characters shows discontinuous variation?

A. Blood groups
B. Intelligence
C. Height
D. Skin colour in people

21. Which one of the following takes place by the process of active transport in plants?

A. Up take of water
B. Transpiration
C. Intake of carbon dioxide
D. Up take of mineral salt

22. Which one of the following responses is not a growth response?

A. Photonastism
B. Phototropism
C. Thigmotropism
D. Hydrotropism

23. The following are responses to cold conditions in mammals.

I. Verso construction
II. Shivering
III. Hair standing up
IV. Increase in metabolic rate

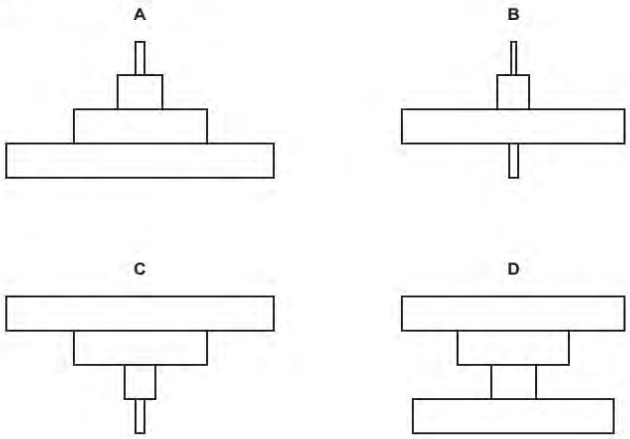
Which of these both reduce heat loss?

A. I and II
B. II and III
C. I and IV
D. III and IV

24. Which one of the following would not be found in the glomerular filtrate?

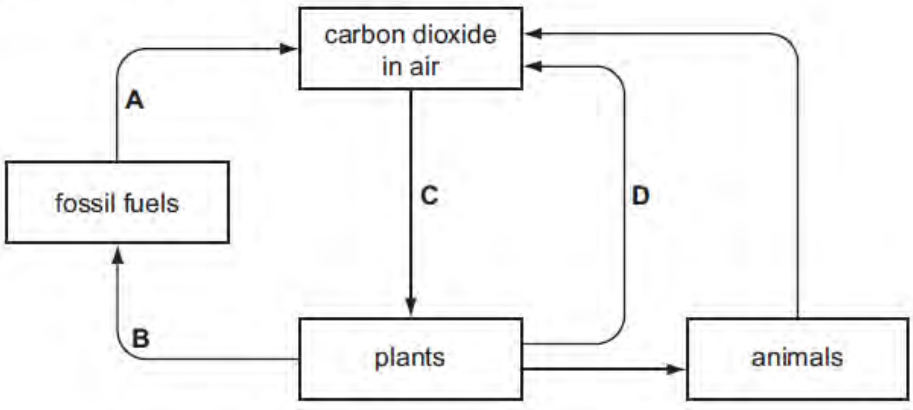
A. Fibrinogen
B. Mineral salts
C. Glucose
D. Urea

25. A single tree is food for a large population of caterpillars. Several small birds eat the caterpillars. The small birds are eaten by a bird of prey.



26. Which one of the following structural adaptations of leaves is important for light absorption?
    A. Dense net work of veins
    B. Large numbers of stomata on leaf surface
    C. Large intercellular air spaces in the spongy layer
    D. Broad and flat shapes of leaves
27. Which one of the following compounds is a constituent of enzymes?
    A. Lipids
    B. Protein
    C. Polysaccharides
    D. Vitamins
28. What is the main function of the phloem in green plants?
    A. Transporting water
    B. Supporting the plant
    C. Transporting mineral salts
    D. Transporting manufactured food

29. The diagram below shows part of carbon cycle. Which letter represents photosynthesizes?



30. The forces which mostly move water up a tall plant are
    A. Osmosis and diffusion
    B. Osmosis only
    C. Capillarity and transpiration
    D. Capillarity and osmosis

SECTION B

31. Irish potato cylinders of uniform thickness and length were placed in different concentrations of sugar solution as shown in the table below.

Solution	**A**	**B**	**C**	**D**
Concentration	O%	5%	10%	20%
Initial length (mm)	20	20	20	20
Final length (mm)	22	21	20	18
Change in length (mm)	2	1	0	-2

a) Which of the substances is likely

i. To be distilled water

……

Reason

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……

……

……

ii. To have the same concentration as the Irish potato cylinders

……

Reason

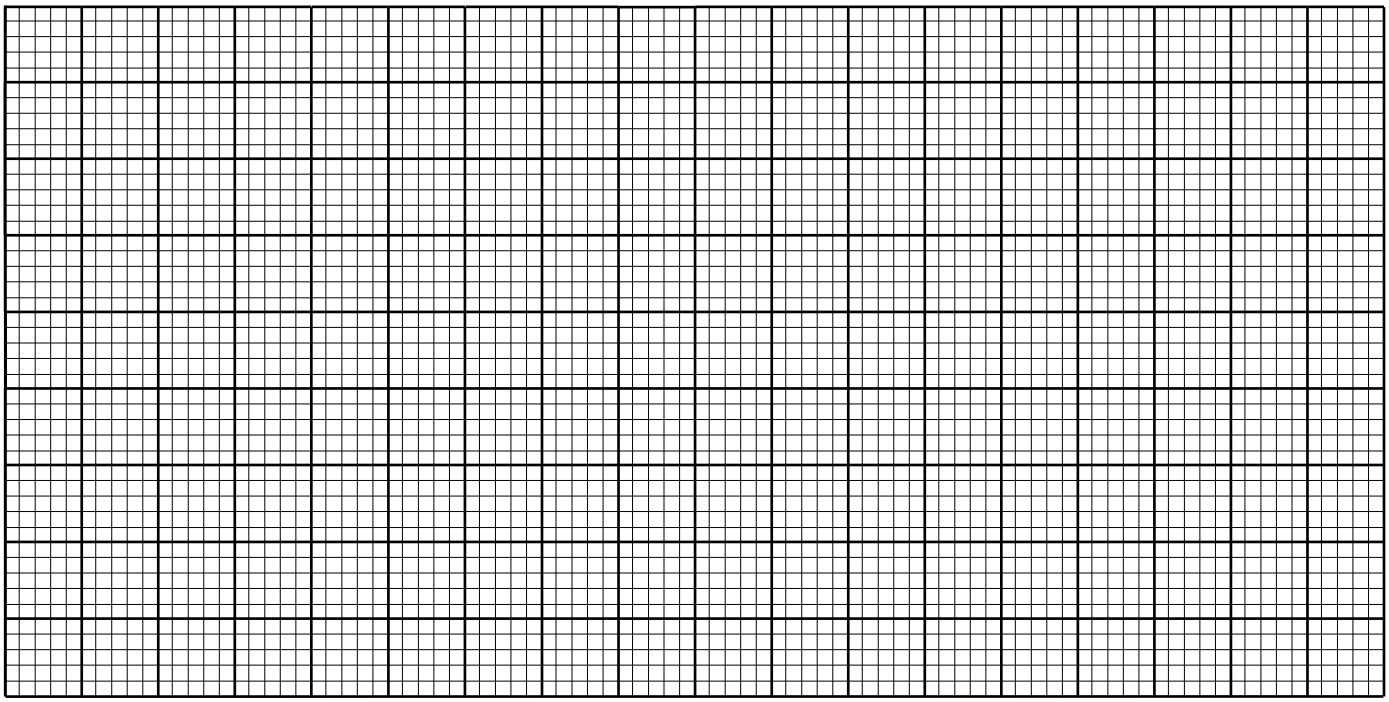
……

……

……

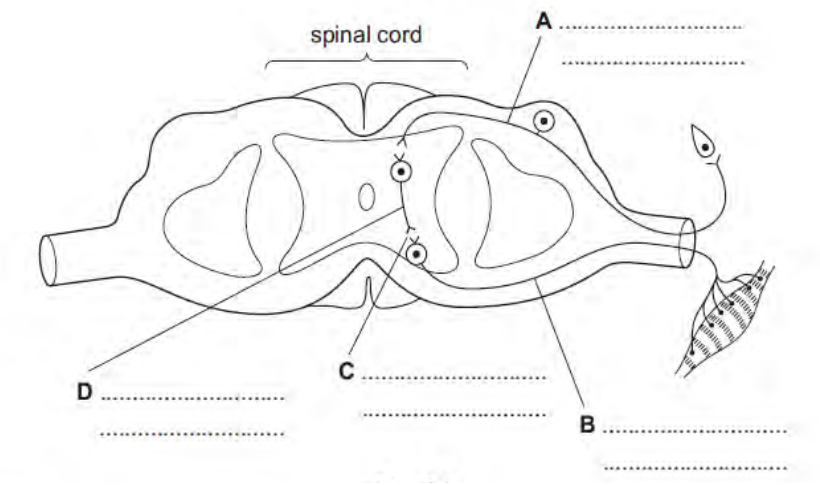
……

b) On graph paper draw a graph of change in length against percentage concentration



c) At what concentration were the cylinders
   i. Longest
   ……
   ii. Shortest
   ……..
d) Explain why there is increase and decrease in length in the cylinders.
   i. Explanation for increase in length
   ……
   ……
   ii. Explanation for decrease in length
   ……
   ……
e) What principle is being investigated in the above experiment?
   ……

32. The figure below shows the structure of reflex arc.



a) Label structures **A, B, C** and **D** on the figure above
b) Name two types of tissue in the body that can act as effectors
   ……
   ……
c) Describe the characteristics of a reflex action resulting from the activity of structures **A, B, C** and **D**
   ……
   ……
   ……
   ……
   ……
d) State one example of a reflex action
   ……

33. .a) Define the term internal respiration.

……

……

b) State the types of respiration

……

……

c) State the byproducts for the type of respiration in absence of oxygen in both plants and animals

i. By products in plants

……

……

ii. By products in animals

……

……

d) State two importance of alcoholic fermentation

……

……

e) State four differences between respiration and photosynthesis

Respiration	Photosynthesis

SECTION C

34. a) What is excretion?

b) Describe the process of urine formation in man

35. a) What is photosynthesis?

b) State the conditions necessary for photosynthesis.

c) Describe an experiment to show that carbondioxide is required photosynthesis.

36. (a) State the external and internal characteristics that can be used to identify a stem (10 marks)
(b) What features on a stem can be associated with vegetative reproduction (03 marks)
(c) Under what environmental conditions is vegetative reproduction advantageous over sexual reproduction? (02 marks)

37. (a) What do you understand by the term homeostasis? (01 mark)
(b) Outline the processes that take place in man during the regulation of body temperature due to overheating (10 marks)
(c) Outline any four functions of the human skin other than temperature regulation (04 marks)

Answers for section

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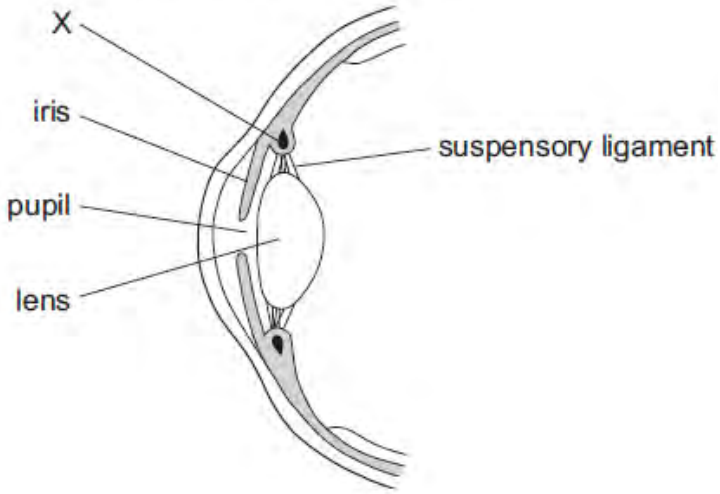
TEST PAPER 13

SECTION A

1. Which of the following sets consists of substances that are stored in the liver?
   A. Glucose iron and vitamin D
   B. Iron, glycogen and vitamin D
   C. Glucose, glycogen and vitamin D
   D. Iron, glycogen and amino acids
2. A number of organisms of different species living in a particular locality is called
   A. A community
   B. A habitat
   C. An ecosystem
   D. A population
3. A person whose body fails to produce Antidiuretic hormone is suffering from
   A. Diabetes mellitus
   B. Diabetes inspidus
   C. Anaemia
   D. Appendicitis
4. Which one of the following excretory organs **does not** eliminate salts?
   A. Lung
   B. Kidney
   C. Liver
   D. Skin
5. The following characteristics are found in arthropods. Which one is found in some?
   A. Exoskeleton
   B. Jointed limbs
   C. Compound eyes
   D. Segmented bodies
6. Which one of the following enzymes catalyses the braking down of starch in the duodenum?
   A. Ptyalin
   B. Salivary amylase
   C. Amylase
   D. Diastase
7. To which organism does the dental formula $I\frac{3}{3}\ C\frac{1}{1}\ Pm\frac{4}{4}m\ \frac{2}{3}$ belong?
   A. Cow
   B. Dog
   C. Man
   D. Sheep
8. Select the element that is required by plants in small quantities
   A. Manganese
   B. Iron
   C. Calcium
   D. Phosphorous
9. Which of the following is **not** required for photosynthesis?
   A. Water
   B. Mineral salts
   C. Light
   D. Carbon dioxide
10. The homeostatic role of the liver is
    A. Blood sugar regulation
    B. Production of body heat
    C. Breaking down excess amino acids
    D. Formation of urea
11. Which of the following processes enables water to move from the loop of Henle to the blood stream?
    A. Osmosis
    B. Active transport
    C. Diffusion
    D. Mass flow
12. Fish are said to have a single circulatory system because
    A. Blood is pumped once in a complete circulation
    B. They have a single blood vessel
    C. Their blood is a single, complete transport system
    D. Their hearts have a single atrium and a single ventricle
13. Which of the following processes requires energy?
    A. Osmosis
    B. Diffusion
    C. Active transport
    D. Capillarity

14. Which of the following is not specialized for conducting materials in plants?
    A. Xylem
    B. Phloem
    C. Tracheids
    D. Cambium
15. The following results were obtained in an experiment.
    Soil = $200cm^3$
    Water = $300cm^3$
    Water and soil after mixing = $450cm^3$.
    The percentage of air in the soil sample is
    A. 10%
    B. 20%
    C. 25%
    D. 30%
16. Which of the following pairs of bacterial form nitrates from free atmospheric nitrogen?
    A. Rhizobium and azotobacter
    B. Rhizobium and nitrobacter
    C. Nitrosomonas and nitrobacter
    D. Nitrosomonas and azotobacter
17. What substances cause changes in genetic material?
    A. Carcinogen
    B. Mutagens
    C. Mutation
    D. Mutants
18. Ecological succession in a habitat ends with a flourishing
    A. Climax community
    B. Pioneer community
    C. Carried community
    D. Genetic community
19. Which of the following best describes an aggregate fruit? Formed from
    A. Pedicel, receptacle, calyx, petals and ovary
    B. A flower whose ovary has many free carpels
    C. An inflorescence
    D. Many free flowers
20. Which of the following statements is correct about energy flowing through an ecosystem?
    A. It flows from producers to decomposers
    B. It is all lost as heat eventually
    C. It increases at each trophic level
    D. It is never reused
21. The diagram shows a section through the human eye.

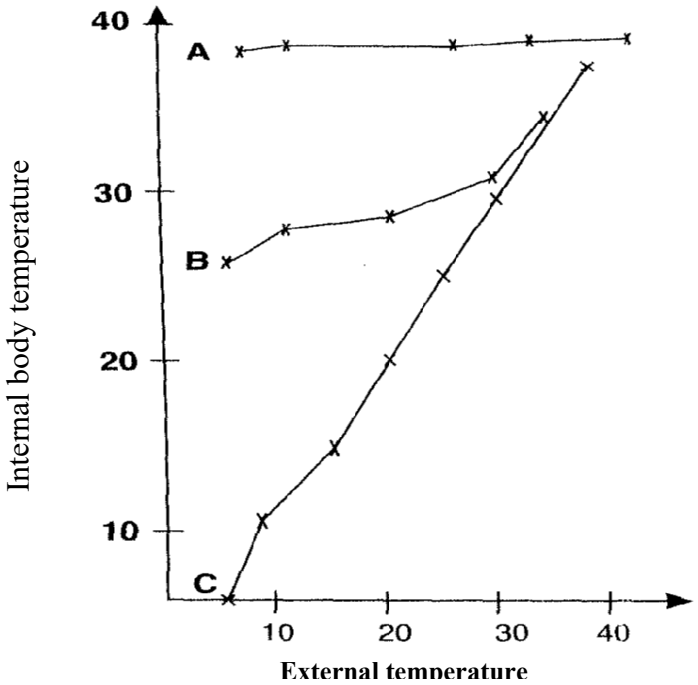


X is a circular muscle. What effect does it have when it contract?
    A. Reduces the pull on the lens, increasing its curvature
    B. Increase the size of the pupil
    C. Pulls on the lens, decreasing its curvature
    D. Decreases the size of the pupil

22. Which of the following gives the **most** reliable information about the ecological importance of organisms in an ecosystem?
    A. Their numbers
    B. Their size
    C. Their biomass
    D. Their density
23. Which of the following would **not** bring about pressure in the glomerulus?
    A. The dense coiling of the glomerulus
    B. The afferent tubule is wider than the efferent tubule
    C. Heavier flow of substances to the afferent tubule than is flowing out
    D. The Bowman's capsule being cup shaped
24. The breathing rate in plants appear to be higher at night than during day because
    A. Oxygen taken in at night is less
    B. Carbondioxide generated is used up during day
    C. Carbondioxide generated dissolves in moist air
    D. Oxygen diffuses more slowly at night
25. Which one of the following organisms are likely to colonise an abandoned piece of land first?
    A. Lichens
    B. Mosses
    C. Herbs
    D. Trees
26. Which of the following conditions would raise the rate of transpiration?
    A. Low temperature and low humidity
    B. High temperature and low humidity
    C. Windy conditions and high humidity
    D. Still air and low humidity
27. Which of these is **not** a function of bile?
    A. Neutralisation of food from the stomach
    B. Breathing down large fat molecules into droplets
    C. Removes cholesterol from digestive system
    D. Breaks down fats to fatty acids and glycerols
28. Which of the following processes requires energy?
    A. Osmosis
    B. Active transport
    C. Diffusion
    D. Capillarity
29. The percentage of nitrogen in inhaled air and exhaled air does not change because
    A. Nitrogen is not used in the body
    B. Nitrogen used is the same as that generated
    C. It does not get into the lungs
    D. Nitrogen diffuses out of the system before it is used
30. Which of these are products of anaerobic respiration in plants
    A. Carbondioxide and alcohol
    B. Carbondioxide water and alcohol
    C. Water and alcohol
    D. Alcohol only

SECTION B

31. The graph below shows how the internal body temperature of a reptile (lizard), mammal, the (cat) and another mammal (spiny ant eater) change with external temperature.



a) Name the animal each of the graphs A, B and C represent? (03 marks)

A. ……

B. ……

C. ……

b) What is the relationship between the internal body temperature of the named animal below and the temperature of the environment

i. lizard (01 mark)

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ii. cat

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c) Account for your answer in (b) (i) and (b) (ii) (04 marks)

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d) From the graph, how are the changes of the temperature from day to night likely to affect the activity of the lizard and the cat?

- Lizard (01 mark)

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- Cat (01 mark)

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ii. What advantage does this give to one of these animals over the other? (02 marks)

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e) What is the body temperature of the spiny anteater when the external temperature is

i. 5ºC? (01 mark)

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ii. 35ºC (01 mark)

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f) From the shape of the graph, what would you expect to happen to its body temperature as the external temperature rose above 35ºC? (01 mark)

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g) Spiny anteaters have no sweat glands; they do not pant and are not able to alter the rate of flow of blood through their skin. Explain how these restrictions make temperature control of this animal difficult (03 marks)

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h) In hot weather, the spiny anteater retreats into burrows/underground holes. How does this habit help the anteater to regulate its body temperature? (01 mark)

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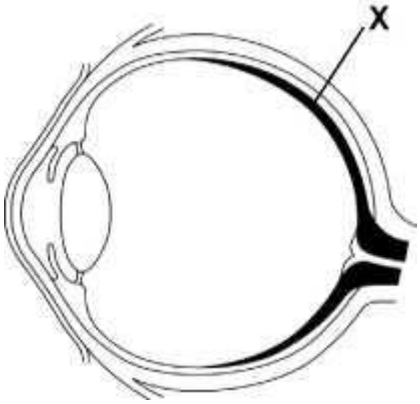
32. The figure below is an incomplete drawing of a section through the mammalian eye. Read through the whole question before you tamper with the drawing



(a) Complete the drawing by labeling the following parts, a pupil, ciliary body, retina, fovea, blind spot and suspensory ligament.

(b) Suppose that a girl is looking at a fly on the page of a book she is reading;

i. Label with letter F, that part of the eye containing muscles that focus light from the fly

ii. By means of an arrow indicate the position of the image of the fly

(c) Describe how the eye focuses the range of the fly on the book

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(d) Assume now that the fly flew away and landed on to a wall and that the girl continued to watch it

i. Draw the shape of the lens when focused on the fly on the wall

ii. What brings about change of the shape of the lens in (d) (i) above?

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(e) Draw on the on the diagram, the rays from the fly that is focused onto part X

(f) State the two types of sensitive cells found in part X

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(g) Explain the fact that an object cannot be seen if its image falls on the blind spot.

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33. (a) What is meant by the term transpiration? (02 marks)

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(b) What are the advantages and disadvantages of transpiration to a plant?

Advantages (04 marks)

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Disadvantages (04 marks)

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SECTION C

34. Describe what happens to a piece of cooked cassava from the time it is eaten up to when it is absorbed into the blood stream of a human being. (08 marks)
    (b) Draw a well labeled longitudinal section through a villus (04 marks)
    c) How is the ileum adapted to its functions? (03 marks)
35. (a) How are red blood cells suited to their function in mammals (04 marks)
    (b) Describe the circulation of blood within the heart of a human being (11 marks)
36. Describe an experiment that you can carry out to demonstrate that animals produce carbon dioxide. (10 marks)
    (b) How do people benefit from the process of anaerobic respiration? (05 marks)
37. Define the term pollution (01 mark)
    (b) Explain the origin and effects of major pollutants to air (10 marks)
    (c) How can air pollution be avoided? (04 marks)

Answers for section C

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TEST PAPER 14

SECTION A

1. Which of the following organisms **do not** need a transport system in their gaseous exchange?

A) earthworms
B) fish
C) amphibians
D) insect

2. Which of the following parts of the eye are the cones most concentrated?

A) cornea
B) retina
C) fovea
D) blind spot

3. What is biological pest control?

A) destruction by toxic drugs
B) being limited in number by others
C) killing using chemical spray
D) treating with antibiotics

4. A runner is

A) horizontal stem above the ground which gives roots and aerial shoots at the nodes
B) stem which bends over the roots in the soil
C) horizontal stem beneath the ground which gives rise to roots and aerial shoots at the node
D) Short vertical stem with buds beneath the soil

5. In which compound is the energy that is released during respiration stored?

A) Adenosine monophosphate
B) Adenosine diphosphate
C) Adenosine triphosphate
D) Lactic acid

6. Select the structure that is **not** used for gaseous exchange

A) Bronchiole
B) Tracheole
C) Alveolus
D) Filament

7. Which one of the following would contain the highest concentration of proteins?

A) blood plasma
B) glomerular filtrate
C) urine
D) serum

8. In which part of the alimentary canal are proteins **not** chemically digested?

A) duodenum
B) mouth
C) colon
D) small intestines

9. The following reagents are used to test for food substances.

i) iodine solution
ii) copper II sulphate
iii) dilute hydrochloric acid
iv) ethanol
v) water

Which of the above can be used to test for lipids?

A. (i) and (iv)
B. (iii) and (iv)
C. (iv) and (v)
D. (iii) , (iv) and (v)

10. Select the organism that uses different openings for taking air in and taking it out

A) Tortoise
B) Flamingo
C) Catfish
D) Rabbit

11. Keeping the factors of the internal environment involves the brain except

A) Carbon dioxide
B) Osmotic pressure
C) Blood sugar
D) Temperature

12. In an experiment to determine the composition of air in the soil sample, the following results were obtained.
    Volume of soil used = $30cm^3$
    Volume of water added = $50cm^3$
    Volume of water + soil after stirring = $75cm^3$
    Calculate the percentage composition of air in the soil.

A. $\frac{30}{75}x100$
B. $\frac{50}{75}x100$
C. $\frac{05}{80}x100$
D. $\frac{05}{30}x100$

13. A student detected sugar in a sample urine. Which of the following could be deduced about the condition of the person whose urine was tested?
    A) Diabetes
    B) Diabetes mellitus
    C) Diabetes inspidus
    D) Diuresis

14. Why is a shoot being prepared for transpiration experiments normally cut under water? To
A) avoid water loss which may cause wilting
B) prevent loss of sap
C) prevent air from entering the xylem vessels
D) remove the damaged tissues

15. One of the major biological reasons why a brewer likes yeast is that yeast;
A) metabolises anaerobically to produce alcohol
B) adds flavor to alcohol
C) is the only source of income to a brewer
D) is cheap

16. Which one of the following sugars is not reducing?
A) maltose
B) fructose
C) sucrose
D) galactose

17. Contraction of the internal intercostals muscles results into
A) decrease pressure in the chest cavity
B) ribs moving inwards and down wards
C) increased volume of the chest cavity
D) flattening of the diaphragm

18. What is the main function of the choroid layer in the human eye?
A) focusing rays of light on the retina
B) supplying nutrients to the eye
C) bringing about accommodation
D) controlling the amount of light entering the eye

19. The following are parts of the nephron
    i) Proximal convoluted tubule
    ii) Distal convoluted tubule
    iii) Loop of Henle
    iv) Collecting ducts
    Which of the above is found in the medulla?
A) (ii) and (iii)
B) (ii) and (iv
C) (iii) and (iv)
D) (i) and (ii)

20. When the leaves of the mimosa pudica plant are touched, they fold. This illustrates
A) nastic movements
B) trophic movements
C) tactic movements
D) growth movements

21. The relationship between a fungus and an algae is known as

A) commensalisms
B) mutualism
C) symbiosis
D) saprophytism

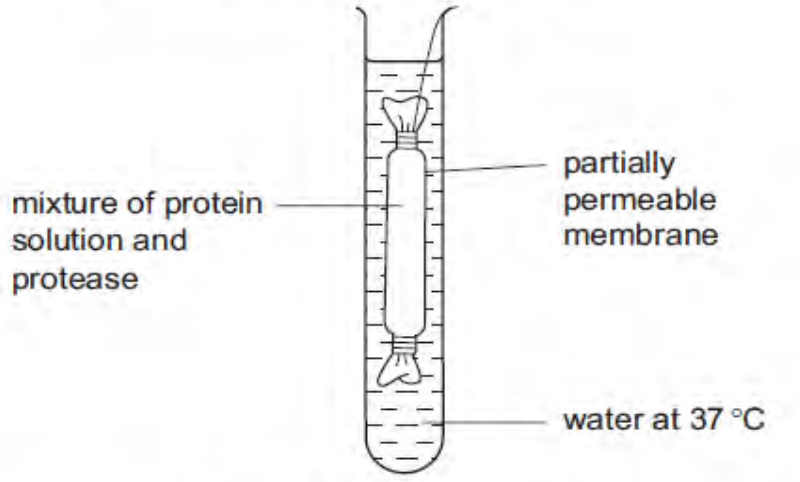
22. Which one of the following groups of organisms belongs to phylum Cnidaria?
A) sponges and corals
B) jelly fish and sea anemones
C) stone fish and bristle star
D) crabs and Portuguese man of war

23. The following vitamins are water soluble except
A) vitamin A
B) vitamin B_2
C) vitamin C
D) vitamin B_{12}

24. Which part of the brain is responsible for regulating body temperature?
A) cerebrum
B) medulla oblongata
C) hypothalamus
D) thalamus

25. Which of the following is a deficiency disease?
A) short sightedness
B) colour blindness
C) night vision
D) trachoma

26. An experiment on diffusion was set up as shown in the diagram



What was found in the water after 15 minutes?
A) Amino acids
B) Fatty acids
C) Glucose
D) Glycerol

27. Which of the following excretory products are eliminated by the lungs?
A) water and urea
B) carbon dioxide and water
C) urea, carbon dioxide and water
D) carbon dioxide and urea

28. Which one of the following organisms has the largest surface area to volume ratio?
A) dog
B) frog
C) cockroach
D) amoeba

29. Which of the following would form producer populations in an aquarium tank?
A) algae, protozoa, pond weed
B) waterlilly, pond weed, Algae
C) mosquito larvae, waterlilly, tilapia
D) water snails, algae, protozoa

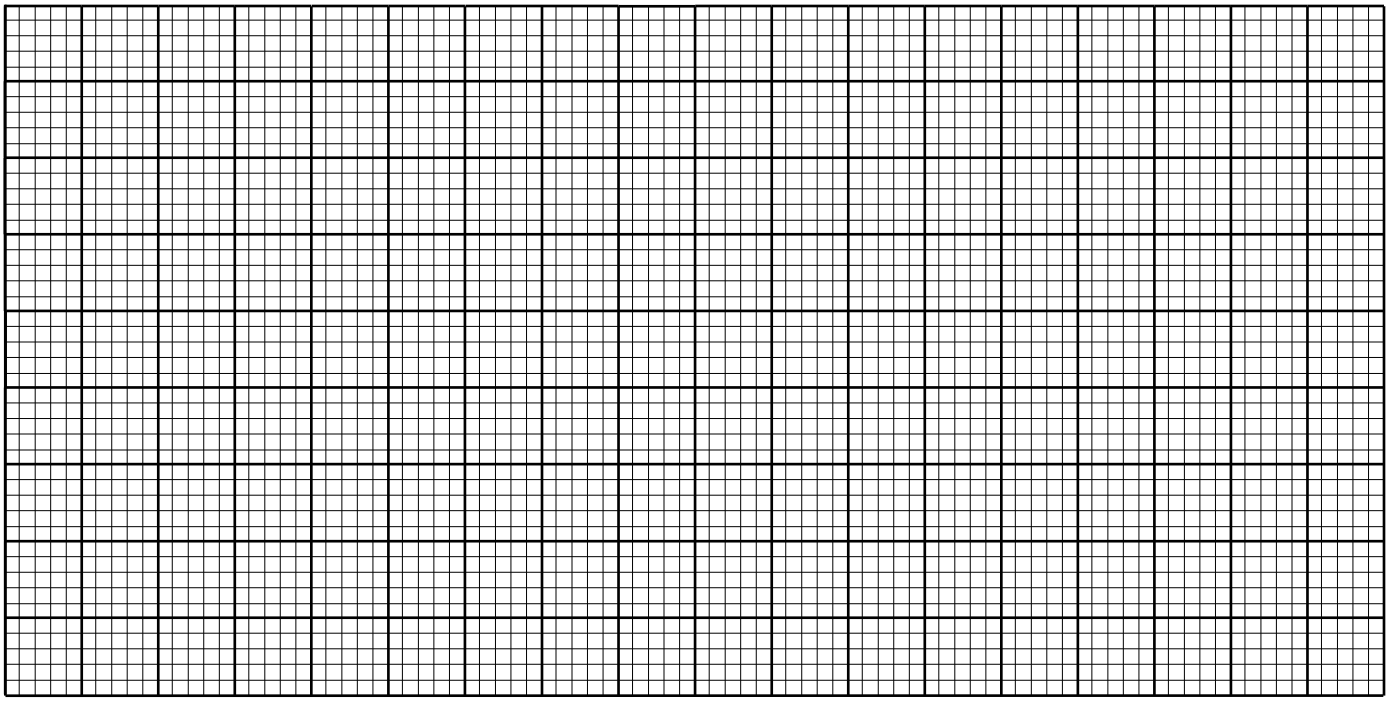
30. Which one of the following is among the essential parts of a flower?
A) stigma
B) epicalyx
C) sepal
D) petal

SECTION B (40marks)

31. An artist sat in a well-lit room. She covered one eye with an eye patch. A pencil was held infront of her eye for 10 seconds. She focused on it and at the same time the thickness of her eye lens was measured using an optical instrument. The pencil was then moved a different distance from the eye. This was repeated over a short period. The results are shown in the table below.

Distance from eye (cm)	Thickness of lens (mm)
10	4.0
20	3.6
30	3.2
60	2.9
90	2.7
120	2.6
150	2.6

(a) Present the information above on a graph paper? (07 marks)



(b) What conclusion can you make using the data above? (01 mark)

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(c) Describe the changes undergone by the eye when the pencil is held 120mm from the eye?

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(d) What changes would the eye under go if the lights were suddenly switched off (04 marks)

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(e) How could the experiment be improved to make the data more valid? (02 marks)

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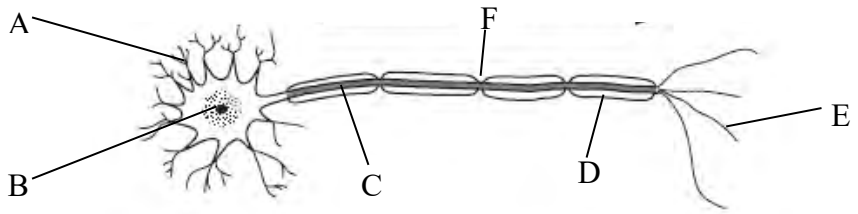
32. The diagram below shows the structure of a neurone.



a) Name the type of neurone represented in the diagram. (01 mark)

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ii. Indicate on the diagram the direction of flow of an impulse. (01 mark)

b) Label the parts A – F (03 marks)

A …….

B …….

C ……

D ……

E ……

F …….

c) State three adaptations that enable the neurone to carry out its function efficiently? (03 marks)

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d) State any two features that would distinguish a sensory neurone from a motor neurone.(02 marks)

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33. The table below shows blood flow in cm^3 per minute to various parts of the body organs during a period of rest and during various stages of exercises. Study it carefully and answer the following questions.

Body organ	**At rest**	**Moderate exercise**	**Maximum exercise**
Heart muscles	250	750	1,000
Skeletal muscles	1,200	12,500	22,000
Kidney	1,100	600	300

Gut (liver)	1,400	600	600
Skin	500	1,900	750
Brain	750	750	750

(a) Explain, giving reasons how blood flow varied in each of the body parts following the start of a maximum exercise from a moderate exercise.

(i) Heart muscles

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(ii) Skeletal muscles

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(iii) Skin

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(iv) Gut

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(b) Explain the outcome of the following changes at moderate exercise to maximum exercise in the;

(i) Heart muscles

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(ii) Skeletal muscles

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(iii) Skin

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(iv) Gut

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(c) Why is the blood flow to the brain constant throughout?

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(d) Basing on the figures, why would not be advisable to undertake a vigorous exercise soon after eating?

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SECTION C

34. a) What is meant by the term homeostasis? (02 marks)

b. Explain how the following organs play their role in animals.

i) kidneys(7marks)

ii) The liver (6marks)

35. a) State the causes of variation. (06 marks)

b) Giving examples, describe the types of variation (6marks)

c) Explain why asexually reproducing organisms do not show variation. (03 marks)

36. Giving two examples in each case, explain the following. (09 mar)

I. Parasitism

II. Commensalisms

III. Mutualism

b. How are parasites adapted to their mode of life? (6marks)

37. Describe how the actions of muscles cause air to pass from the atmosphere into the lungs in mammals. (08 marks)

b) How does oxygen move from the air in the lungs into the blood cells? (04 marks)

c) Give three characteristics of an efficient respiratory organ. (03 marks)

Answers for section

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TEST PAPER 15

SECTION A

1. Which of the following is a class?
   A. arthropoda
   B. amphibian
   C. annelida
   D. chordata
2. Which one of the following animals has an exoskeleton?
   A. round worm
   B. Earth worm
   C. locust
   D. tape worm
3. Which one of the following would happen to turgid cells that have been placed in a concentrated solution for a long time?
   A. their cell vacuoles would enlarge
   B. they would increase in volume
   C. they would become shorter
   D. They would not experience any change in size.
4. "The Sahara desert's rapid spread to the south is a danger to human life" Which one of the following methods would be most effective in stopping the spread of the Sahara Southwards?
   A. planting trees
   B. practice crop rotation
   C. stop charcoal burning
   D. stop nuclear tests in the atmosphere
5. The following parts are involved in the transport of oxygen from the atmosphere to the capillaries in the lungs
   1. Nostrils
   2. air cells
   3. bronchi
   4. trachea
   5. Capillaries

   Which of the following is correct route of oxygen from the atmosphere to the capillaries?
   A. 1,2,3,4,5
   B. 1,3,2,4,5
   C. 1,4,2,3,5
   D. 1,4,3,2,5
6. In which region of the mammalian kidney does pressure filtration occur?
   A. glomerulus
   B. distal convoluted tubule
   C. loop of Henle
   D. proximal convoluted tubule
7. Where in the maize grain are most carbohydrates stored?
   A. cotyledon
   B. radical
   C. endosperm
   D. plumule
8. Which of the following does not occur when the operculum presses inwards?
   A. The volume of the gill cavity reduces
   B. The pressure in the opercular cavity increases
   C. The opercula flap closes
   D. water is forced out of the gill chamber
9. Which of the following mineral nutrients are constituents of haemoglobin?
   A. potassium and sulphur
   B. nitrogen and iron

C. zinc and copper
D. calcium and phosphorous

10. figure 1 shows a leaf modification

Which leaf modification is shown above?
A. reproduction
B. protection
C. photosynthesis
D. food storage

11. Which of the following fins in a fish is used for breaking when the fish is locomoting?
A. anal
B. pelvic
C. dorsal
D. ventral

12. Which of the following is NOT a role of humus in the soil?
A. improving soil aeration
B. water retention
C. prevention of soil erosion
D. increasing soil fertility

13. Which of the following organs exercises uric acid?
A. kidneys
B. Liver
C. lungs
D. malpighian tubules

14. When $80cm^3$ of water was added to $100cm^3$ of soil, the volume of the mixture was $140cm^3$. What was the percentage of air in t he soil sample?
A. 40%
B. 20%
C. 80%
D. 60%

15. The reaction, caseinogens ⟶ casein in young mammals is catalyzed by the enzymes
A. amylase
B. Rennin
C. Pepsin
D. Trypsin

16. A dry fruit that splits along more than two saturates is called a
A. follicle
B. capsule
C. pod
D. caryopsis

17. All amino acids have the following elements except?
A. carbon
B. phosphorous
C. nitrogen
D. oxygen

18. Where in the mammalian skin is the melanin pigment found?
A. malpighian layer
B. cornified layer
C. granular layer
D. subcutaneous layer

19. The part of the brain that controls breathing is the?
A. cerebellum
B. hypothalamus
C. cerebrum
D. medulla oblongata

20. In plants, energy is generated by a….
A. mitochondrion
B. Nucleus
C. cytoplasm
D. ribosome

21. The effect of unidirectional light on the distribution of auxins in the tip of a plant shoot is

A. uniform distribution of auxins around the tip
B. increase in auxins on illuminated side of the plant
C. inhibitions of movement of auxins down the plant
D. reduction in auxin concentration on illuminated side of plant

22. What is the functional unit of nervous system?
A. dendrite
B. neuron
C. axon
D. synapse

23. What are the final products of anaerobic respiration?
A. carbondioxide, water, energy
B. carbondioxide, water, alcohol
C. carbondioxide, alcohol, energy
D. carbondioxide and alcohol

24. The least effective environmental factor in soil formation is
A. wind
B. heat
C. water
D. light

25. Individuals with blood group O are said to be universal donors because they have
A. no antibodies
B. no antigens
C. both antigens A and B
D. both antigens and antibodies

26. Which of the following is a pair of raw materials used in the process of photosynthesis?
A. glucose and oxygen
B. glucose and water
C. carbondioxide and oxygen
D. carbondioxide and water

27. After manufacturing food, plants transport it in a…
A. xylem
B. cortex
C. pith
D. phloem

28. Part of the middle ear is linked to the inner ear by,
A. steppes
B. eardrum
C. cochlea
D. oval window

29. Which one of the following glands has secretions that control growth hormones?
A. pituitary gland
B. adrenal gland
C. thyroid gland
D. gonad

30. Many senior four girls were seen frequenting urinals on a cold day, this was because
A. their kidneys absorbed less water from blood
B. their kidneys absorbed more water from blood
C. they had taken more porridge than usual
D. their bodies lost very little water as sweat.

SECTION B

31. The table below shows the percentage composition of inhaled and exhaled air in a human being at rest and also the composition of exhaled air, during exercise. Use the information in the table below to answer questions that follow.

	Water vapour	Nitrogen	Carbondioxide	Oxygen
Inhaled air at rest	Variable	79%	0.03%	20.9%
Exhaled air at rest	0.8%	79%	4.1%	16.2%
Exhaled air during exercise	0.92%	79%	4.5%	15.58%

a) State the differences in composition between inhaled and exhaled air at rest (03 marks)

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b) Give a reason for each difference stated in (a) above (06 marks)

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c) State the changes that occur in the composition of exhaled air in a human being who is previously at rest, then takes an exercise (03 marks)

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d) Give a reason why each change stated in (c) occurs (06 marks)

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e) During exercise, the breathing rate increases. From the information provided, suggest why this happens. (03 marks)

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f) Why is the percentage of nitrogen constant in inhaled and exhaled air?

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32. Define

i. Gaseous exchange (1½ marks)

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ii. Internal respiration (1½ marks)

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iii. Fermentation (01mark)

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b) Explain how the skin of the frog is adapted for gaseous exchange (06 marks)

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33. Define the following processes

i. Homeostasis (01 mark)

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ii. Excretion (02 marks)

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b) What is the role of the liver in homeostasis? (07 marks)

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SECTION C

34. Explain the benefits from transpiration (04 marks)

b) Describe how plants in arid/dry areas control excessive loss of water (11 marks)

35 Explain the advantages of ectothermy and Endothermy (09 marks)

b) A shrew is the smallest mammal in East Africa. Is eats a lot of food which is mainly seeds, rich in fats. Explain why the shrew eats

i. a lot of food (03 marks)

ii. mainly insects rich in fats (03 marks)

36 (a) What are the main components of mammalian blood?

b) Name the blood vessels that supply the liver with blood and state where the blood comes from

c) How does the composition of blood change as blood flows through the liver?

37 Explain the features that enable the leaf to be an efficient organ for the photosynthesis process

b) Describe an experiment to show that in absence of chlorophyll, photosynthesis does not take place in green plants (07 marks)

c) What happens to the products of photosynthesis in green plants? (02 marks)

Answers for section

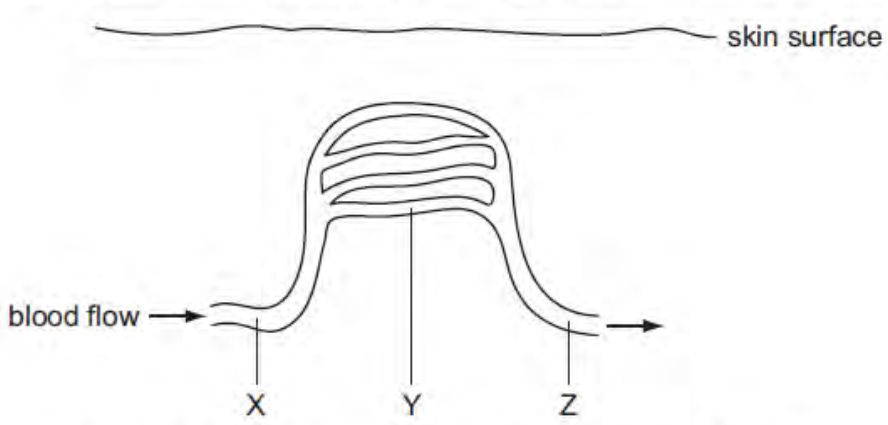
TEST PAPER 16

SECTION A

1. Which one of the following parts of the brain is responsible for temperature regulation in man?
   A) Cerebrum
   B) Cerebellum
   C) Hypothalamus
   D) Medulla oblongata
2. Which one of the following conversions takes place in *Homo Sapiens* under conditions of extreme starvation?
   A) Fatty acid to carbohydrate
   B) Proteins to carbohydrates
   C) Glucose to lipids
   D) Lipids to fatty acids
3. Which one of the following blood components provides target cells for the AIDS virus?
   A) Erythrocytes
   B) Platelets
   C) Lymphocytes
   D) Phagocytes
4. Friesian and Boran cattle belong to the same
   A) Genus but different species
   B) species but different varieties
   C) order but different genera
   D) family but different orders
5. Which one of the following is **not** homeostatically regulated in the body
   A) Glucose
   B) Water
   C) Carbon dioxide
   D) Fat
6. Which one of the following describes the green house effect?
   A) depletion of the ozone layer increases atmospheric temperature
   B) the earth retains the heat it gains from the sun
   C) increasing atmospheric carbon dioxide prevents heat loss from the earth
   D) the earth gives out carbon dioxide which prevents light rays from the sun reaching the earth
7. Which one of the following represents the correct route taken by a molecule of oxygen from the lungs to the liver?
   A) Pulmonary artery, bicuspid valve, aorta, hepatic vein
   B) Pulmonary artery, tricuspid valve, aorta, hepatic artery
   C) Pulmonary vein, bicuspid valve, aorta, hepatic artery
   D) Pulmonary vein, tricuspid valve, aorta, hepatic vein
8. Very small mammals cannot live at altitude over 3500 metres on the mountains of East Africa because;
   A) they would lack suitable food materials
   B) they lack sufficient fur to keep warm
   C) their surface area to volume ratio is too high
   D) at such high altitudes, the oxygen partial pressure is too low
9. Which one of the following is both an endocrine and exocrine gland?
   A) Pancreas
   B) Salivary gland
   C) Gastric gland
   D) Sweat gland
10. The function of the tooth shown in the figure below is

   A. Cutting
   B. Tearing
   C. Crushing
   D. Shearing

11. Which of the following enzymes does **not** catalyse the breakdown of its substrates to simpler substances?
    A) Amylase
    B) Pepsin
    C) Renin
    D) Lipase
12. Plant roots in association with symbiotic bacteria is an indication that
    A) the plant is unhealthy
    B) the soil around the roots lacks nitrogen
    C) the soil around the roots lacks water
    D) the roots have a viral infection
13. Growth of bacteria in a culture medium would not be affected by;
    A) other microbes present
    B) light
    C) nutrients in the culture
    D) size of the culture
14. Which one of these plasma constituents is reabsorbed in the distal convoluted tubule?
    A) Urea
    B) Chloride
    C) Glucose
    D) Proteins
15. Termites are able to eat wood because they;
    A) Produce cellulose enzyme
    B) Possess strong mandibles
    C) Contain fungi in the gut
    D) Contain cellulose digesting bacteria in the gut
16. The diagram shows blood vessels near the surface of the skin

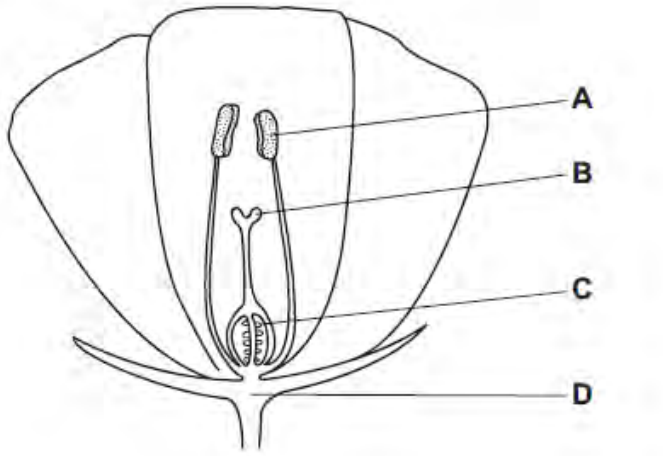


If vasoconstriction occurs at X, what happens to blood flow at Y and Z?

	Y	Z
A	Decreases	Decreases
B	Decreases	Stays constant
C	Increases	Increases
D	Increases	Stays constant

17. Water moves across the cortex to the endoderm by means of
    A) Cohesion
    B) Capillarity
    C) Active transport
    D) Osmotic potential

18. Which of the following statements about immunity is incorrect?
    A) Antibodies are produced against specific antigens
    B) Heat killed bacteria become antibodies
    C) Antibodies are special proteins
    D) Antigens can be molecules on a foreign microbe
19. Self pollination in plants is inhibited by;
    A) the dioecious condition
    B) the self compatibility
    C) having the anthers longer than the stigma
    D) the androecium
20. Which of the following is **not** a waste product of metabolism?
    A) Urea C) Sweat
    B) Water D) Carbondioxide
21. Which one of the following structures is a gas exchange surface?
    i. Trachea iii. Bronchioles
    ii. Tracheoles iv. Bronchus
22. In a spirogyra, the chloroplast is for;
    B) Starch storage D) Osmo-regulation
    C) Photosynthesis E) Floatation
23. The maize fruit is an example of;
    A) Schizocarp C) Caryopsis
    B) Berry D) Drupe
24. The diaphragm of a microscope is used to;
    A) Regulate amount of light C) Reduce amount of light
    B) Reflect light on the stage D) Increase amount of light
25. The development of a worker bee from larvae depends on;
    A) Fertilization C) Chance
    B) The diet D) Mating
26. The diagram below shows a flower in section. Where will fertilisation occur?



27. Guttation occurs if the;
    A) Humidity is high C) Leaves fall off
    B) Temperature is low D) Wind speed is so high

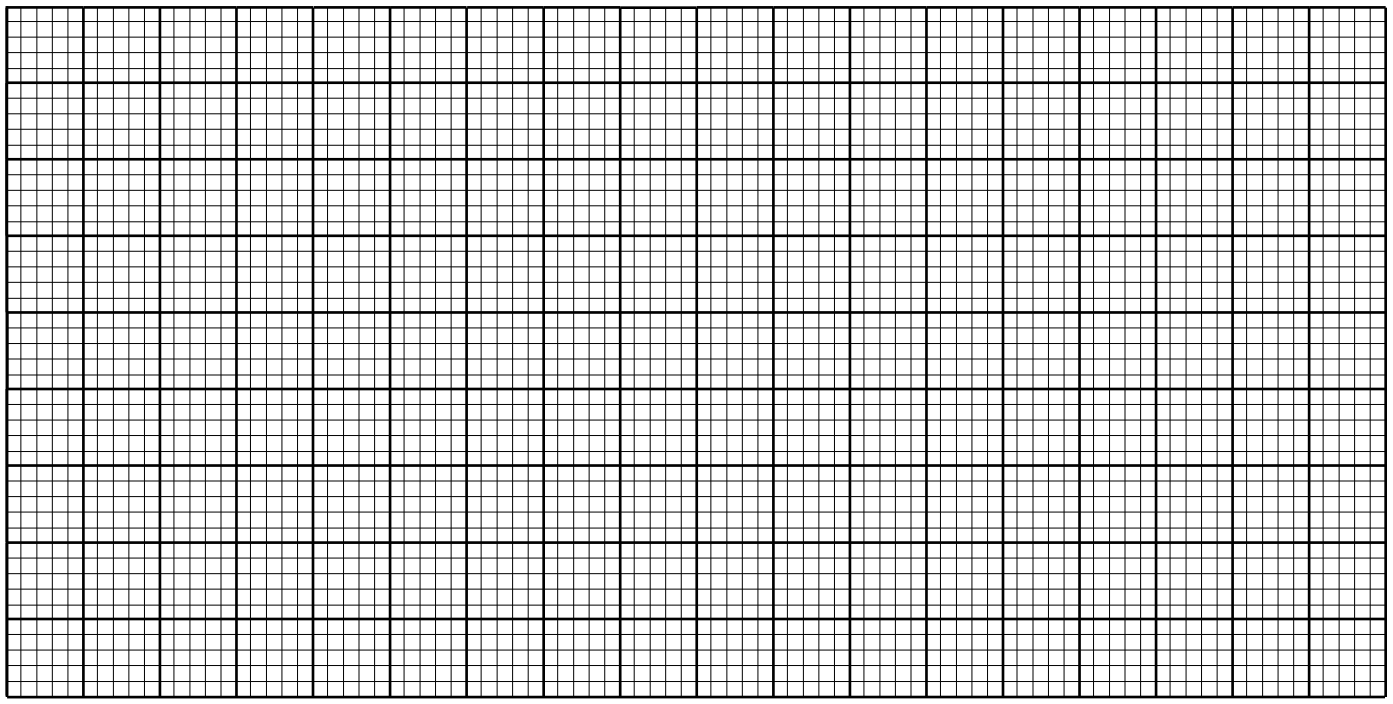
28. In a plant tissue, water moved from cell A to cell B. This indicates that
    A) Cell A and Cell B had the same osmotic potentials
    B) Cell A has a higher osmotic potential than cell B
    C) Cell A was older than cell B
    D) Cell B was older than Cell A
29. Tropisms are controlled by
    A) Hormones
    B) Gibberellins
    C) Auxins
    D) Cytokinins
30. The muscular energy used by Tom while climbing up a mango tree originates from the sun. Which of the following is the correct sequence in which energy has been transformed?
    (i) Digestion of starch
    (ii) Deposition of starch in the mango
    (iii) Tissue respiration in Tom's muscles
    (iv) Synthesis of sugar in a leaf
    A) (iv), (ii), (i), (iii)
    B) (i), (iv), (ii), (iii)
    C) (ii), (iv), (i), (iii)
    D) (iv), (i), (iii), (ii)

SETION B

31. The data below was picked from Kajo-Keji National Game Park on the number of antelopes and lions in the year 2011 from the month of January to December.

Month		1	2	3	4	5	6	7	8	9	10	11	12
Number of animals	Antelopes	39	47	55	50	40	30	37	47	55	47	37	30
	Lions	32	39	44	48	50	25	38	32	30	36	44	50

(a) Draw a suitable graph to represent the information above *(06 marks)*



(b) (i) Explain the nature of the graph above? *(04 marks)*

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ii. What is the relationship between antelopes and lions? *(01 mark)*

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(c) state the ecological niches of;

(i) lion *($\frac{1}{2}$ marks)*

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(ii) antelopes *($\frac{1}{2}$ marks)*

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(d) (i) State three adaptations of lions as predators of antelopes *(03 marks)*

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(ii) State three means used by the antelopes to prevent being preyed upon by the lions *(03 marks)*

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(e) Describe what would happen to the National Game Park if all the lions were killed by an infection*?* *(02 marks)*

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32. (a) Fill in the missing information in the table below. *(03 marks)*

Blood group	**Antigen**	**Antibody**
AB		
	B	
		b
	None	

(b) A girl who is heterozygous for blood group A claimed that a boy of blood group AB made her pregnant. She produced a baby boy of blood group O. Using appropriate symbols, workout the possible blood groups of the children that could be produced by the girl and the alleged boy and hence justify her claim as correct or wrong. *(06 marks)*

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33. (a) Name one hormone in each case that is responsible for carrying out the following activities and the gland that produces it.

	Activity	**Hormone**	**Gland producing the hormone**
(i)	Reducing of sugar level in blood		
(ii)	Control of basal metabolic rate and hence growth		
(iii)	Control of the development of secondary sexual characteristics in females		

(b) Why do plants lack complex excretory systems like animals? *(04 marks)*

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SECTION C

34. (a) What is meant by the term environmental conservation? (02 marks)

(b) Giving examples describe how human activities cause environmental degradation (13 marks)

35. (a) What is the difference between humus and manure? *(02marks)*

b) With named examples describe the role of bacteria and fungi in the soil. *(08marks)*

c) Give the economic importance of fungi. *(05marks)*

36. **(a)** Make a labeled diagram to show the structure of a root hair *(05 marks)*

(b) What roles do diffusion and osmosis play in the movement of water and solutions from the soil to the xylem of a root? (05 marks)

(c) Describe how a root hair is adapted to its function? *(05 marks)*

37. (a) Make a well labelled drawing of a nephron? *(05 marks)*

(b) What part is played the Bowman's capsule and convoluted tubules during urine formation? (10 *marks)*

Answers for section C

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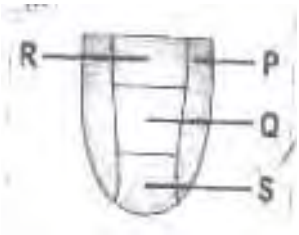
TEST PAPER 17

SECTION A

1. The fins which keep the fish stable in water are the
   A. Pelvic and pectoral fins
   B. Caudal and pelvic fins
   C. Dorsal and pelvic fins
   D. Anal and dorsal fins
2. Which one of the following contain the least concentration of proteins
   A. Serum
   B. Urine
   C. Lymph
   D. Blood plasma
3. Which one of the following is true about dividing cells at the tip of plant shoots? They
   A. Have rigid cell walls
   B. Have soft cell walls
   C. Are specialized
   D. Have large vacuoles
4. The figure shows the location of taste buds. Which ones are sensitive to sour substances?



   A. P
   B. Q
   C. R
   D. S

5. The following are characteristics of blood vessels;
   i. Presence of valves
   ii. Thick walls
   iii. Wide lumen
   iv. Elastic walls

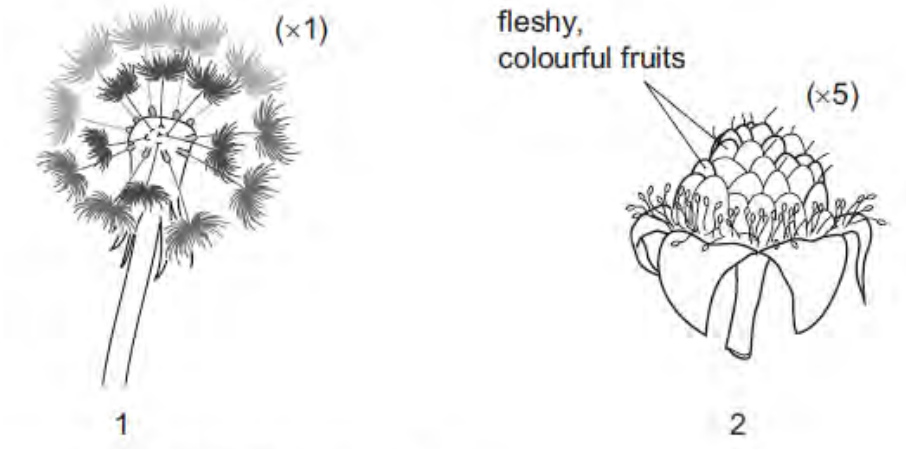
   Which of the characteristics belong to veins?
   A. i and ii
   B. i and iii
   C. ii and iii
   D. iii and iv
6. The mode of nutrition used by *Rhizopus* is?
   A. Saprotrophism
   B. Parasitism
   C. Autotropism
   D. Heterotrophism
7. Which one of the following would be observed in a plant growing in soil lacking magnesium?
   A. Yellowing of buds
   B. Poorly developed root system
   C. Yellowing of leaves
   D. Poorly developed shoot system
8. The blood constituents that leads to formation of a blood clot at the site of an injury are?
   A. Platelets and fibrinogen
   B. Platelets and leucocytes
   C. Platelets and erythrocytes
   D. Platelets and hormones
9. Which one of the following parasites is transmitted by the Anopheles mosquito?
   A. Schistosoma
   B. Plasmodium
   C. Trypanasoma
   D. Human Immune Virus
10. The following are body secretions:
    i. Amylase
    ii. Trypsin
    iii. Hydrochloric acid
    iv. Pepsin
    v. Rennin

    Which of them are constituents of gastric juice?
    A. i and iii
    B. ii and iv
    C. iii and v
    D. i and ii

11. What is the function of the phloem in green plants?
    A. Transporting manufactured food
    B. Transporting mineral salts
    C. Transporting water
    D. Supporting the plant
12. How is lactic acid produced in muscles got rid of? By
    A. Oxidation
    B. Converting it into ethanol
    C. Storing it in the liver
    D. Converting it into water
13. Which one of the following groups contains the smallest number of organisms?
    A. Order
    B. Class
    C. Phylum
    D. Family
14. Which of the following do not carry out respiration?
    i. Virus
    ii. Red blood cells
    iii. Amoeba
    iv. Xylem vessels
    A. I and II
    B. I, II and III
    C. I, II and IV
    D. III and IV
15. The data below shows the amount of carbon dioxide in inhaled air, rate of breathing at rest and volume of air in a breath, in humans:
    Percentage of carbon dioxide = 0.025%
    Number of breaths per minute = 36
    Volume of breath taken in at rest=500cm^3
    The volume of carbon dioxide inhaled per minute at rest is?
    A. 0.9 cm^3
    B. 45 cm^3
    C. 12.5 cm^3
    D. 450 cm^3
16. Which of the following serves a different function from the others?
    A. Has sticky stigma inside the flower
    B. Produces small amounts of large sticky pollen grains
    C. Has long feathery stigma outside the flower
    D. Has large, brightly coloured petals
17. Which one of the following is an example of a reflex action?
    A. Salivating on smelling food
    B. Screaming after kicking a stone
    C. Riding a bicycle to work
    D. Eating chicken at church
18. The plants that live in well watered soils are
    A. Hydrophytes
    B. Halophytes
    C. Mesophytes
    D. Xerophytes
19. Blood flows in the pulmonary artery at a lower pressure than in the aorta because in the pulmonary circulation
    A. Fewer organs are supplied
    B. The vessel carrying blood is small
    C. The right ventricle has thinner walls
    D. Blood travels a shorter distance
20. Which of the following statements is **not** true about guard cells?
    A. They have no chloroplasts
    B. Their cell walls have uneven thickness
    C. They have a central vacuole
    D. The wall away from the pore is more elastic than the one near the pore
21. Functionally, the least diversified organ in the human body is the?
    A. Brain
    B. Liver

C. Eye D. Kidney

22. The diagram below shows two kinds of fruit



How are the seeds of these fruits dispersed?

	1	2
A	Birds	Mammals
B	Birds	Wind
C	Mammals	Birds
D	Wind	Mammals

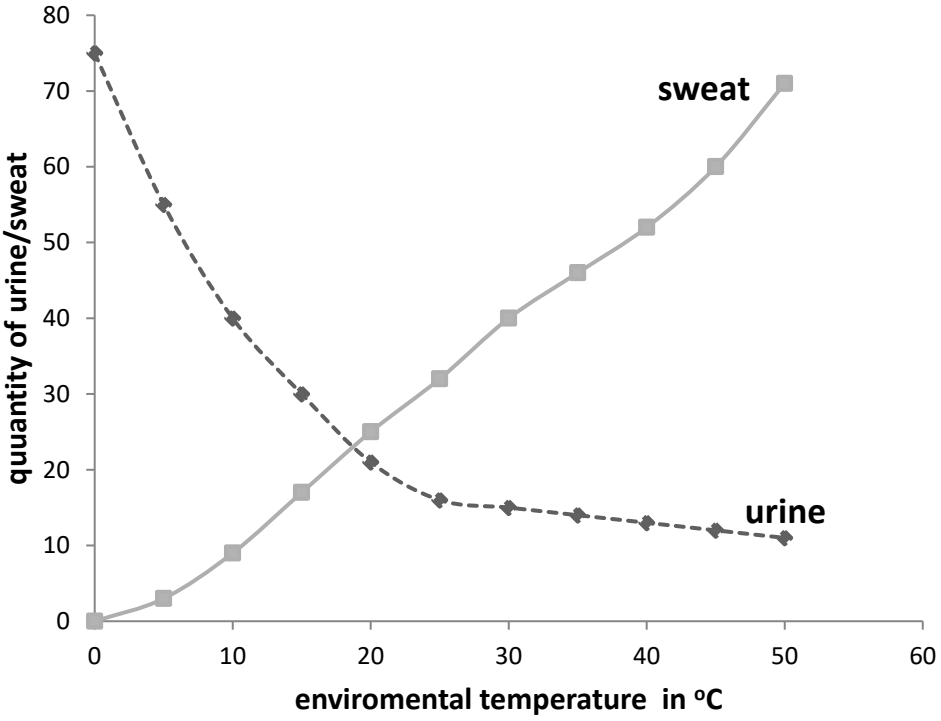
23. Which one of the following is an example of a modified root?
    A. Corm C. Cassava tuber
    B. Rhizome D. Irish potato tuber
24. Which one of the following events occur during inhalation in a whale?
    A. Diaphragm contracts and the ribs are raised
    B. Internal intercostals muscles relax and pressure in the chest cavity increases
    C. Diaphragm relax and the ribs are raised
    D. Internal intercostals muscles contract and pressure in the chest cavity increases
25. What is the main function of the choroid layer in the human eye?
    A. Controlling amount of light entering the eye
    B. Bringing about accommodation
    C. Supplying nutrient to the eye
    D. Focusing light rays to the retina
26. Which one of the following pairs of hormones is produced by reproductive organs in mammals?
    A. Insulin and oestrogen
    B. Progesterone and testosterone
    C. Oestrogen and leutenising hormone
    D. Follicle stimulating hormone and testosterone
27. Which one of the following is **not** true of parasites?
    A. Take nutrients from the host C. Produce toxic substances
    B. Destroy tissues of the host D. Produces antibodies
28. A student put a soil sample in a beaker and added water to it. He stirred and then left the mixture to settle. Which particles settled first?
    A. Clay B. Gravel

C. Sand D. Silt

29. Dumping of polythene adversely affects the growth of plants. Which of the following is **not** a reason for this observation? Polythene
    A. Prevents penetration of soil by water
    B. Prevents penetration of soil by roots
    C. Is non biodegradable
    D. Decomposes to form toxic substances
30. Which of the following represents the diameter of a silt particle?
    A. Less than 0.002 mm
    B. 0.02 - 0.002 mm
    C. 0.2 – 0.02 mm
    D. 2- 0.2 mm

SECTION B

31. The graph below shows the variation in the amount of sweat and urine with temperature in humans.



(a) How does the increase in temperature affect (02 marks)
    (i) Urine production
    ……
    ……
    (ii) Sweat production
    ……
    ……

(b) Explain your answers in (a) (i) and (ii) above *(04 marks)*
    (i) Explanation for (a) (i)
    ……
    ……
    ……
    ……

(ii) Explanation for (a) (ii)

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(c) State the conditions under which humans pass out concentrated urine *(03 marks)*

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(d) Apart from sweating three other body responses by mammals to overheating *(03 marks)*

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(e) Describe how the kidney nephrone is adapted to its function *(08 marks)*

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32. (a) What is an enzyme? *(01 mark)*

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(b) Other than pH, state three factors which affect enzyme action? *(03 marks)*

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© The optimum pH for enzyme X is 2.00 and for enzyme Y is 9.00. Suggest the name of the enzymes X and Y, and name the parts of the alimentary canal where you would expect to find each enzyme *(04 marks)*

Enzyme	Name of enzyme	Part of alimentary canal the enzyme is found
X		
Y		

(d) state two enzymes contained in the pancreatic juice, the food substrate acted on by each enzyme and the product formed in each case *(03 marks)*

Enzyme	Food substrate acted upon	Product formed

33. (a) Fill in each space with a missing word in the two sentences below (04 marks)
    - The hormone……produced by the adrenal glands is carried to the ……where reserve …… is converted to ……..
    - The hormone insulin is produced by the…….and is carried to the ……where ……is converted to ……..

    (b) Under what circumstances/conditions would you expect an individual to;
    i. Produce adrenalin hormone (02 marks)
    ……
    ……..
    ii. Pass out dilute and large volumes of urine (03 marks)
    ……
    ……
    ……..

    (c) Outline two differences between endocrine and exocrine glands (02 marks)

Endocrine	Exocrine
_____	_____
_____	_____

SECTION C

34. Describe an experiment to show that carbon dioxide is necessary for photosynthesis? *(09 marks)*
    (b) Explain why the respiration rate seems to be higher in plants at night (03 marks)
    (c) Why is dangerous to keep potted plants inside a house? (03 marks)
35. (a) What is the importance of sensitivity to living organisms? *(05 marks)*
    (b) (i) Name two systems which affect the coordination of the body *(02 marks)*
    (ii) What similarities are there between their modes of action? (08 marks)
36. (a) What is self pollination? *(2 marks)*
    (b) How is self pollination naturally prevented in plants? (*6 marks)*
    © describe the features of a flower that favour pollination by insects? *(7 marks)*
37. How does gaseous exchange occur in amphibians in aquatic and terrestrial habitats? *(15 marks)*

Answers for section C

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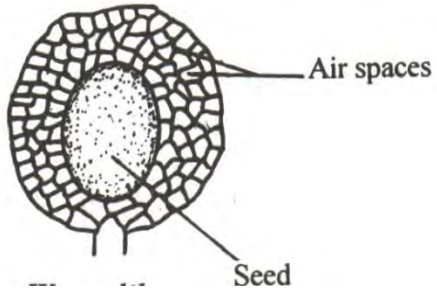
TEST PAPER 18

SECTION A (30 MARKS)

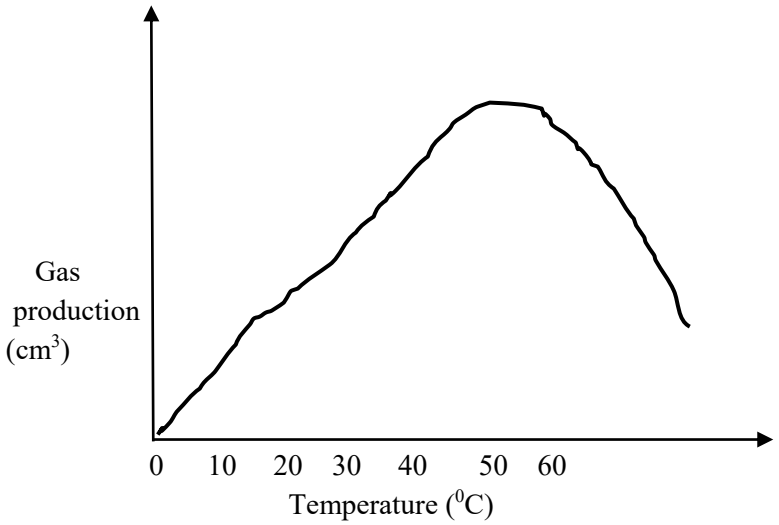
1. Which one of the following diseases is **not** transmitted by insects?
   A. Cholera
   B. Malaria
   C. Sleeping sickness
   D. East coast fever
2. Which one of the following is **no**t a characteristic of veins?
   A. Presence of valves
   B. Wide lumen
   C. Thin wall
   D. Elastic wall
3. Aestivation occurs in some animals in order to survive conditions of:
   A. Extreme cold
   B. Drought
   C. Great heat
   D. Food shortage
4. Which of the following is the best way to estimate the population of earthworms in a garden?
   A. Capture-mark-recapture
   B. Transect
   C. Total count
   D. Quadrant method
5. Which of the following insects undergoes complete metamorphosis?
   A. Cockroach and housefly
   B. Grasshopper and butterfly
   C. Grasshopper and cockroach
   D. Housefly and butterfly
6. Which of the following statements best describes gymnosperms? They produce
   A. flowers
   B. seeds protected by fruits
   C. naked seeds
   D. seeds borne in cones
7. Free vibration of the fluid in the inner ear is allowed for by the;
   A. Oval window
   B. Semi-circular canal
   C. Eustachian tube
   D. Round window
8. The following are methods of birth control in human beings. Which one of them prevents ovulation?
   A. Condom
   B. Pill
   C. Ring
   D. Intra-uterine device
9. Figure 1 below is of one of the types of fruits.



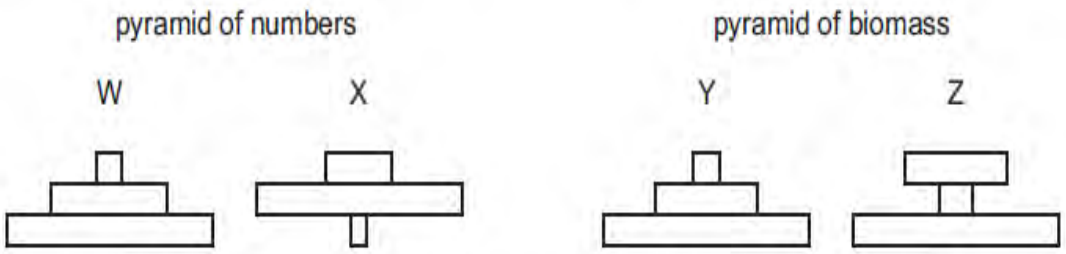
   The fruit can best be dispersed by…….
   A. Animals
   B. Wind
   C. Water
   D. Explosive mechanism

10. Addition of lime to clay soil;
    A. Makes it less permeable
    B. Makes it more permeable
    C. Makes its acidic
    D. Breaks up the particles
11. How does a small size help desert animals over-come the problem of over-heating? They have;
    A. Low metabolic rate
    B. High metabolic rate
    C. Large surface area to volume ratio
    D. Small surface area to volume

12. Which of the following respiratory surfaces is not vascularised?
    A. Skin
    B. Gill filaments
    C. Tracheoles
    D. Alveoli
13. Figure 2 below shows the volume of gas produced during photosynthesis by a plant.



What is the possible reason for the fall in the volume of the gas after 40^0C?
    A. There was too much sunlight and heat
    B. Starch was converted sugar
    C. Enzymes were denatured
    D. Oxygen was used up in the atmosphere
14. Yellowing of plant leaves may be caused by lack of?
    A. Carbon dioxide
    B. Phosphorous
    C. Magnesium
    D. Calcium
15. A single plant provides food for many herbivores. The herbivores supply food for a few carnivores.



Which pyramid of numbers and which pyramid of biomass show this information?

	Pyramid of numbers	**Pyramid of biomass**
A	W	Y
B	W	Z
C	X	Y
D	X	Z

16. What is the main force for moving up water in the xylem to the leaves of a tall tree?
    A. Root pressure
    B. Osmosis
    C. Capillarity
    D. Transpiration pul

17. The housefly and mosquito belong to the same order Diptera because they;
    A. Have short antennae
    B. Have two wings
    C. Have six legs
    D. Suck juices
18. If both parents are of blood group AB, they cannot produce a child of blood group:
    A. A
    B. AB
    C. B
    D. O
19. During anaerobic respiration, animals produce
    A. Ethanol
    B. Ethanol and carbon dioxide
    C. Lactic acid and carbon dioxide
    D. Lactic acid
20. Some of the blood vessels involved in the transport of digested food are shown below.
    i. Right auricle
    ii. Hepatic vein
    iii. Hepatic portal vein
    iv. Posterior vena cava

    What is the correct path of a glucose molecule from the ileum to the intestines?
    A. iii, ii, iv, i
    B. iv, iii, ii, i
    C. iv, ii, iii, i
    D. ii, iii, iv, i
21. Which one of the following processes would need energy to take place?
    A. Diffusion
    B. Osmosis
    C. Plasmolysis
    D. Active transport
22. People who are easily frightened probably display over reactive
    A. Adrenal glands
    B. Gastric glands
    C. Pancreatic glands
    D. Gonads
23. A sample of urine from a man was boiled with Benedict's solution and the mixture turned orange in colour. Which of the following is the best deduction about the condition of this man?
    A. His kidneys were damaged
    B. His diet has a lot of sugar
    C. He has a deficiency of insulin in his blood
    D. He has a deficiency of Antidiuretic Hormone (ADH)
24. Four test tubes were set up with the contents as in table 1 below.

Table 1

Tube	Contents
A	Starch solution + dilute hydrochloric acid + saliva
B	Starch solution + distilled water + dilute hydrochloric acid
C	Starch solution + dilute sodium bicarbonate
D	Starch solution + dilute sodium bicarbonate + saliva

    The four test tubes were kept at about 38^0C for 15 minutes. In which of the four test tubes would you expect to find an orange precipitate after boiling the contents with Benedict's reagent?
    A. Test tube A
    B. Test tube B
    C. Test tube C
    D. Test tube D
25. The conversion of atmospheric nitrogen into nitrates in the soil is a process known as……..
    A. Nitrogen fixation
    B. Decomposition
    C. Denitrification
    D. Nitrification
26. *Mimosa pudica* is a very sensitive plant and when it is touched, it closes its leaves. This is an example of?

A. Tactic movement
B. Nastic movement
C. Tropic movement
D. Thigmo movement

27. Which one of the following organisms **is most** limited in the sources of food?
A. Herbivores
B. Carnivores
C. Omnivores
D. Detritivores

28. Which one of the following cells could have their functions adversely affected by HIV?
A. Erythrocytes
B. Blood platelets
C. Leucocytes
D. Chondrocytes

29. A certain plant has the following characteristics;
- Leaves reduced to thin spines
- Stomata are few and sunken into pits
- Leaves are covered with thick cuticle

In which of following areas is the above plant likely to be found?
A. Forest
B. Wet land
C. Desert
D. Open grass land

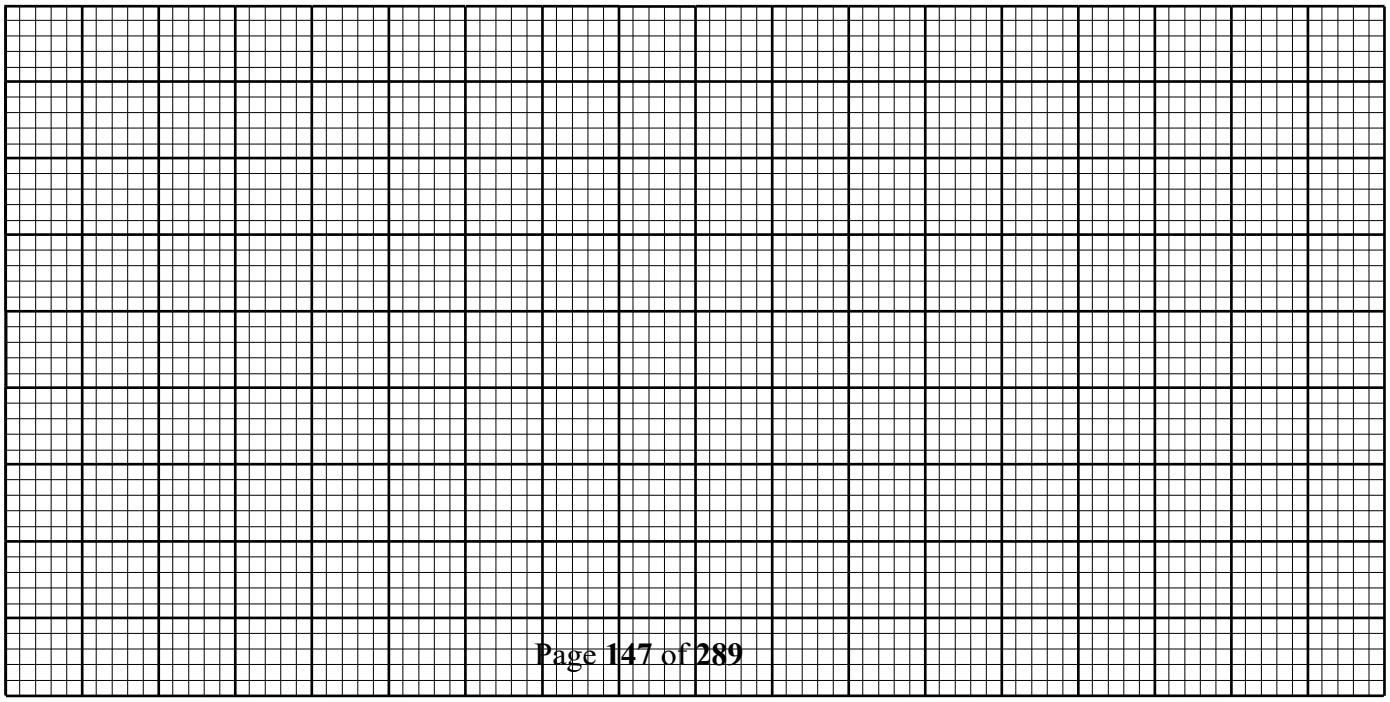
30. The magnification of a biological drawing is given as X0.5. This means that the drawing is
A. Five times smaller than the specimen
B. Five times larger than the specimen
C. Half the natural size of the specimen
D. Twice the natural size of the specimen

SECTION B

31. The table below shows changes in mass of starch and protein in a typical pea seed during the first 20 days of germination.

Food substance in the seed	**Days of germination**					
	0	4	8	12	16	20
Starch (mg)	60	56	32	8	5	4
Protein (mg)	28	21	11	5	3	2

a. Using the same axes, draw two graphs to show the change in mass of starch and protein during the first 20 days of germination of the pea seed. *(08 marks)*



b. How are the changes in mass of starch and protein

i. Similar *(02 marks)*

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ii. Different *(02 marks)*

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c. Explain why the mass of starch and proteins change in the germinating seed. In each case state the reactions that result into the changes. (04 marks)

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d. Suggest two ways in which the products from each of starch and proteins may be used in the germinating seed.

i. Starch *(02 marks)*

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ii. Proteins *(02 marks)*

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32. (a) (i) State what is meant by the term balanced diet (02 marks)

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(ii) Balanced diets should include fat, fibre, mineral salts and vitamins. Name two other types of nutrients that should be present in a balanced diet. (01 mark)

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(b) Suggest and explain the effects on a person of a diet with:

(i) Too little fibre, (02 marks)

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(ii) Too much animal fat. (02 marks)

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(c) Calcium, a mineral salt, is needed in the diet. Explain the role of calcium in the body and the effect of calcium deficiency. (03 marks)

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33. An investigation was made to determine the rate of flow and composition of components at different positions of the kidney nephron. The results are shown in the table below:

Position	Flow rate ($cm^3\ min^{-1}$)	Soluble concentrations (g/100ml)			
		Proteins	Glucose	Salts	Urea
Afferent arteriole	1000	7.5	0.1	0.8	0.03
Bowman's capsule	100	0	0.1	0.8	0.03
Loop of Henle	20	0	0	1.0	0.15
Collecting duct	1	0	0	1.9	1.80

(a) Describe the changes that occurred in the composition of:

i. Protein

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ii. Glucose

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iii. Urea

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(b) Explain the changes in the composition of the components above

i. Protein

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ii. Glucose

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iii. Urea

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(c) Explain why the total flow rate at the afferent arteriole is very high compared to the rest of the parts.

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ii. Of what significance is the above to the proper functioning of the nephron?

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(d) Calculate the concentration factor of urea and salts from the time it was filtered up to when it was released in urine.

i. Urea

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ii. Salt

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iii. Explain the difference in the concentration factors of urea and salts

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(e) If red blood cells are damaged in the blood stream, the haemoglobin in them may appear in urine. Why is this so?

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(f) Comment briefly on the effect of each of the following would have on the amount and composition of urine.

i. Eating a protein rich meal

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ii. A hot day

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SECTION C

34. (a) Define the term accommodation as used in vision by the eye *(02 marks)*

(b) Describe how the eye is able to see near-by and distant objects *(10 marks)*

© Draw the shape of the lens, only, when the eye is focusing on a near and distant objects respectively? (*03 marks)*

35. (a) Outline the characteristic features of a respiratory surface *(05 marks)*

(b) Describe the mechanism by which gases are brought into and moved out of the respiratory organs of a named mammal *(10 marks)*

36. Explain how;

(a) Deforestation may harm the environment *(07 marks)*

(b) Tress may conserve soil *(08 marks)*

37. (a) outline the internal structural differences between monocotyledonous and dicotyledonous plants in the following parts:

i. Stems *(03 marks)*

ii.Roots *(02 marks)*

(b) Describe how leaves of green plants are suited for photosynthesis. *(10 marks)*

Answers for section C

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TEST PAPER 19

SECTION A

1. Which of the following organisms do **not** need a transport system in their gaseous exchange?

A. Earthworms
C. Amphibians
B. Fish
D. Insects

2. Which of the following parts of the eye are the cones **most** concentrated?

A. Cornea
C. Fovea
B. Retina
D. Blind spot

3. What is biological pest control?

A. Destruction by toxic drugs
C. Killing using chemical sprays
B. Being limited in number by others
D. Treating with antibiotics

4. A runner is

A. Horizontal stem above the ground which gives roots and aerial shoots at the nodes
B. Stem which bends over the roots in the soil
C. Horizontal stem beneath the ground which gives rise to roots and aerial shoots at the nodes
D. Short vertical stem with buds beneath the soil

5. In the female mammal, fertilization occurs in the

A. Uterus
C. Vagina
B. Ovary
D. Oviduct

6. Some people prefer growing some crops vegetatively rather than through seeds because;

A. These crops are usually ornamental
B. This has always been the practice
C. In vegetative reproduction, the off springs are the same as parents
D. Vegetative structures are safer to carry over long distances

7. Which one of the following would contain the highest concentration of proteins?

A. Blood plasma
C. Urine
B. Glomerular filtrate
D. Serum

8. In which part of the alimentary canal are proteins **not** chemically digested?

A. Duodenum
C. Colon
B. Mouth
D. Small intestines

9. The following reagents are used to test for food substances.

i. Iodine solution
ii. Copper II sulphate
iii. Dilute hydrochloric acid
iv. ethanol
v. water

Which of the above can be used to test for lipids?

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

10. In an experiment to determine the composition of air in the soil sample, the following results were obtained.

Volume of soil used = $30cm^3$
Volume of water added = $50cm^3$
Volume of water + soil after stirring = $75cm^3$

Calculate the percentage composition of air in the soil.

A. $\frac{30}{75}x100$
B. $\frac{50}{75}x100$
C. $\frac{05}{80}x100$
D. $\frac{05}{30}x100$

11. Which one of the following is an example of discontinuous variation?

A. Height
B. Weight
C. Eye colour
D. Skin colour

12. When a homozygous black mouse (BB) was mated with a homozygous white mouse (WW), the off springs were all brown. What would be the colour of mice produced if one of F_1 off springs is crossed with a homozygous white parent?

A. 3 brown : 1 white
B. 1 brown : 3 white
C. 1 brown : 1 white
D. all white

13. 'Essential amino acids' are referred to as essential because they

A. are the only ones in the body
B. can only be produced from an outside source
C. are very important but the body cannot manufacture them
D. are of high biological value to the body

14. Why is a shoot being prepared for transpiration experiments normally cut under water? To

A. avoid water loss which may cause wilting
B. prevent loss of sap
C. prevent air from entering the xylem vessels
D. remove the damaged tissues

15. One of the major biological reasons why a brewer likes yeast is that; yeast

A. metabolises anaerobically to produce alcohol

B. adds flavor to alcohol

C. is the only source of income to a brewer

D. is cheap

16. Which one of the following sugars is not reducing?

A. Maltose

B. Fructose

C. Sucrose

D. Galactose

17. Contraction of the external intercostal muscles results into

A. Increased pressure in the chest cavity

B. Ribs moving inwards and down wards

C. Increased volume of the chest cavity

D. Flattening of the diaphragm

18. Albinism is caused by having a double recessive gene for skin pigmentation. What is the percentage of the children having a normal skin colour if an albino woman marries a man who is heterozygous for albinism?

A. 100%

B. 75%

C. 50%

D. 25%

19. What is the main function of the iris in the human eye?

A. Focusing rays of light on the retina

B. Supplying nutrients to the eye

C. Bringing about accommodation

D. Controlling the amount of light entering the eye

20. The following are parts of the nephrone.

i. proximal convoluted tubule

ii. distal convoluted tubule

iii. loop of Henle

iv. collecting ducts

Which of the above is found in the medulla?

A. (ii) and (iii)

B. (ii) and (iv)

C. (iii) and (iv)

D. (i) and (iv)

21. When the leaves of the *mimosa pudica* plant are touched, they fold. This illustrates

A. Nastic movements

B. Trophic movements

C. Tactic movements

D. Growth movements

22. The relationship between a fungus and an algae is known as

A. Commensalisms
C. Symbiosis
B. Mutualism
D. Saprophytism

23. Which one of the following groups of organisms belong to phylum Cnidaria?

A. Sponges and corals
C. Stone fish and bristle star
B. Jelly fish and sea anemones
D. Crabs and Portuguese man of war

24. The following vitamins are water soluble except

A. Vitamin A
C. Vitamin C
B. Vitamin B_2
D. Vitamin B_{12}

25. Which part of the brain is responsible for regulating body temperature?

A. Cerebrum
C. Hypothalamus
B. Medulla oblongata
D. Thalamus

26. Which of the following is a deficiency disease?

A. Short sightedness
C. Night vision
B. Colour blindness
D. Trachoma

27. Which of the following excretory products are eliminated by the lungs?

A. Water and urea
C. Urea, carbon dioxide and water
B. Carbon dioxide and water
D. Carbon dioxide and urea

28. Which one of the following organisms has the largest surface area to volume ratio?

A. Dog
C. Cockroach
B. Frog
D. Amoeba

29. Which of the following would form producer populations in an aquarium tank?

A. Algae, protozoa, pond weed
C. Mosquito larvae, water lily, tilapia
B. Water lily, pond weed, Algae
D. Water snails, algae, protozoa

30. Which one of the following is among the essential parts of a flower?

A. Stigma
C. Sepal
B. Epicalyx
D. Petal

SECTION B

31. The data below shows a comparison on number of stomata per square centimeter on leg surfaces of two different categories of plants. Plants in **category A** have horizontally oriented leaves white plants in **category B** have their leaves vertically spread. The data collected in as shown in the table below.

	Group A			Group B		
	Apple	Bean	Pumpkin	Grass	Onion	Pine
Stomata on upper leaf surface	0	400	200	9000	17,000	12,000
Stomata on lower leaf surface	38,000	24,000	27,000	10,000	17,000	12,000

(a) Explain why there are no stomata on the upper leaf surface of the apple plant (02 marks)

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(b) Calculate the ratio of stomata on the lower leaf surface to upper lead surface for

i. Bean plant (02 marks)
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ii. Pumpkin plant (02 marks)
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(c) From the results in (b) above suggest the possible habitant for the two plants. (02 marks)

i. Bean plant
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ii. Pumpkin plan
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(d) (i) Which general observation can be mode in the vertically oriented leaves? (01 mark)

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(ii) Give reasons for the observation in (d) (i) above (04 marks)

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(e) Other than vertical orientation, state three other adaptations that grass leaves may have to reduce excessive transpiration. (03 marks)
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(f) State three functions of transpiration in plants (03 marks)
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(g) Briefly describe a simple experiment that can be used to demonstrate distribution of stomata on lower and upper leaf surfaces?

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32(a) Define the term respiratory surface? (02 marks)

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(b) Complete the table below (06 marks)

Animal	**Medium of gaseous exchange**	**Respiratory surface**	**Transport system**
Cockroach			Tracheal system
Toad	Air/water		Blood stream
	Water	Gill	

(c) State any 2 characteristics of common to all respiratory surfaces (2 marks)

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33. Adding lime to clay soil improves it and makes it better for crops growth.

a) State three ways by which the above process improves clay soil. (03 marks)

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(b) A form two student performed an experiment to determine the amount of water and humus in a given soil sample. The following were her results.

Mass of crucible = 10g
Mass of crucible + damp soil = 25g
Mass of crucible + soil after drying = 20g
Mass of crucible + soil after heating the soil it turned red = 15g

i) How did the student dry the soil? (01 mark)

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ii) Calculate the percentage of water in soil, show your working (04 marks)

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iii) State any 2 functions of soil water? (02 marks)

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SECTION C

34. (a) Define the term tropism?
(b) Describe an experiment to show that plant shoots are positively phototropic?
(c) Apart from light, state any other four stimuli that plants respond to?
35. An experimenter crossed a plant with purple flowers with a plant of the same species bearing white flowers. All offsprings produced purple flowers. When the offsprings were crossed, 49 of them had white flowers while 152 had purple flowers.
Using suitable symbols, work out crosses that explain the above results.
36. Describe the role of the skin in temperature regulation in mammals?
(b) What are the advantages of maintain a constant body temperature?
(c) What other factors are kept constant in mammals?
37. How does an adult housefly differ from an adult mosquito in the ways it spreads disease to organisms?
(b) Using your knowledge of the life cycle and habits of housefly, explain how this pest can be controlled

Answers for section C

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TEST PAPER 21

SECTION A

1. Which one of the following is **not** a waste product of metabolism
   A. Carbon dioxide
   B. Excess water
   C. Undigested food
   D. Urea
2. A plant cell is said to be flaccid when;
   A. It contains a high concentration of starch
   B. The cell contains sufficient cell vacuoles for its size
   C. The cell membrane is separated from the cell wall
   D. Sufficient water has entered the cell so that the cell membrane exerts a pressure on the cell wall
3. Glomerular filtrate has a high percentage of water than urine because
   A. Water is added to the Glomerular filtrate from the blood
   B. Water is reabsorbed from the glomerular filtrate into blood
   C. The nephrone adds salts to the urine making it more concentrated
   D. Glomerular filtrate is produced at a greater rate than urine
4. The principal function of **Anaphase I** of meiosis is to enable
   A. Chromatids migrate to the poles of the spindle
   B. Homologous chromosomes separate and move towards opposite poles
   C. Homologous chromosomes lie on the equator of the spindle
   D. Homologous chromosomes form chiasmata
5. Insects and worms are the main diet of most toads. This means that toads are?
   A. Carnivorous
   B. Herbivorous
   C. Insectivorous
   D. Omnivorous
6. A certain plant has the following characteristics;
   i. Has numerous stomata
   ii. Has large flattened leaves
   iii. Has a soft fleshy stem

   Such a plant is commonly found in:
   A. Forests
   B. Deserts
   C. Water logged environment
   D. Grass lands
7. Which of the following lives on land **but** has an aquatic larva stage?
   A. Snail
   B. Dragon fly
   C. Snake
   D. Mosquito
8. The rate of flow through the renal artery was found to be $1200cm^3$/minute; the urea concentration in the renal artery was $32mg/100cm^3$. If the flow rate of blood remained constant, determine the quantity of urea removed from the kidney in one hour.
   A. 40mg
   B. 360mg
   C. 2,160,000mg
   D. 2,400mg
9. Which one of the following is the storage form of carbohydrates in man?
   A. Starch
   B. Glucose
   C. Sucrose
   D. Glycogen

10. The following are regions of the alimentary canal in man;

v.	Mouth	vii.	Small intestines
vi.	Stomach	viii.	Duodenum

In which of the above regions of the alimentary canal does chemical digestion of lipids/ fats occur.

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

11. Which one of the following is the process by which seeds absorb water during germination?
A. Osmosis
B. Diffusion
C. Active transport
D. Imbibition

12. Which of the following is true of amphibians such as toads and frogs? the
A. Adult is herbivorous
B. Adult is omnivorous
C. Tadpole is herbivorous
D. Tadpole is carnivorous

13. Which one of the following is the least effective method for controlling HIV prevalence rate?
A. Circumcision
B. Behavior change
C. Use of condoms
D. Abstinence

14. In a breeding experiment, a black cock was mated with a white hen. All the chicks had grey appearance. This indicates that the allele for black feather colour is?
A. Linked to that of white
B. Co-dominant to that of white
C. Recessive to white
D. Dominant to that of white

15. A frog and toad have following characteristics;

i. Mucus layer on the skin
ii. Webbed feet
iii. Nictating eye lids
iv. Mouth cavity lined with numerous blood vessels

Which statement makes the organism to attain maximum respiratory gases?

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

16. Under what conditions is lactic acid likely to accumulate in a racing horse?
A. After breathing in excess carbon dioxide
B. After consuming a lot of food
C. During sleep
D. During a race

17. In a food web, which of the following organisms are decomposers?
A. Bacteria
B. Water lice
C. Water beetle
D. Unicellular green algae

18. Which one of the following genetic terms describes the mating of an offspring with one of its parents?
A. Back cross
B. Test cross
C. Cross breeding
D. Inbreeding

19. The following results were obtained from an experiment done to determine the percentage of air in a sample of soil.

Volume of water used = $10cm^3$
Volume of soil + water before stirring = $40cm^3$
Volume of soil + water after stirring = $37cm^3$

What is the percentage of the air in the soil sample?

A. 20%
B. 15%
C. 10%
D. 5%

20. Which one of the following features of a cockroach qualifies it to move in narrow places?
A. Long jointed antennae
B. Jointed appendages
C. Dorso-ventrally flattened body
D. Long hind legs

21. Which one of the following is the correct reason why some fluid feeding insects produce anticoagulants?
A. To digest fluid
B. To disinfect the fluid
C. To avoid clotting of the fluid
D. To dissolve solid fluid

22. Which one of the following substances is **not** contained in the glomerular filtrate in the mammalian kidney?
A. Plasma protein
B. Plasma
C. Urea
D. Mineral salts

23. Which of the following pairs in the table below show where air breathed in and out by a toad passes?

	Entry	**Exit**
A	Nostrils	Mouth
B	Nostrils	Nostrils
C	Mouth	Nostrils
D	Mouth	Mouth and nostrils

24. Which one of the following is an adaptation of reptiles for terrestrial environment?
A. Lungs
B. Limbs
C. Elongated body
D. Scales

25. Which one of the following is an advantage of vegetative propagation?
A. Competition between parents and offspring is minimal
B. Maintenance of parental characteristics in offspring
C. Variation among offspring occurs
D. Colonization of new habitat

26. When a growing shoot is placed horizontally, it bends upwards after some times. Which of the following best explains this response?
A. Low auxin concentration on the lower side makes the lower side grow faster
B. High auxin concentration on the lower side makes the lower side grow faster
C. High auxin concentration on the lower side inhibits growth on the upper side.
D. Lack of auxins on the upper side inhibits growth on the upper side

27. What is the main function of the choroid layer in the human eye?
A. Controlling amount of light entering the eye
B. Bringing about accommodation
C. Focusing rays of light on the retina
D. Supplying nutrients to the eye

28. Which one of the following parts of the kidney carries out excretory functions?
A. Nephrone
B. Pelvis

C. Cortex
D. Medulla

29. Which one of the following is the mode of feeding in the mould?
A. Holozoic
C. Autotrophic
B. Saprophytic
D. Parasitic

30. Which of the following contains the least amount of species?
A. Phylum
C. Family
B. Class
D. Order

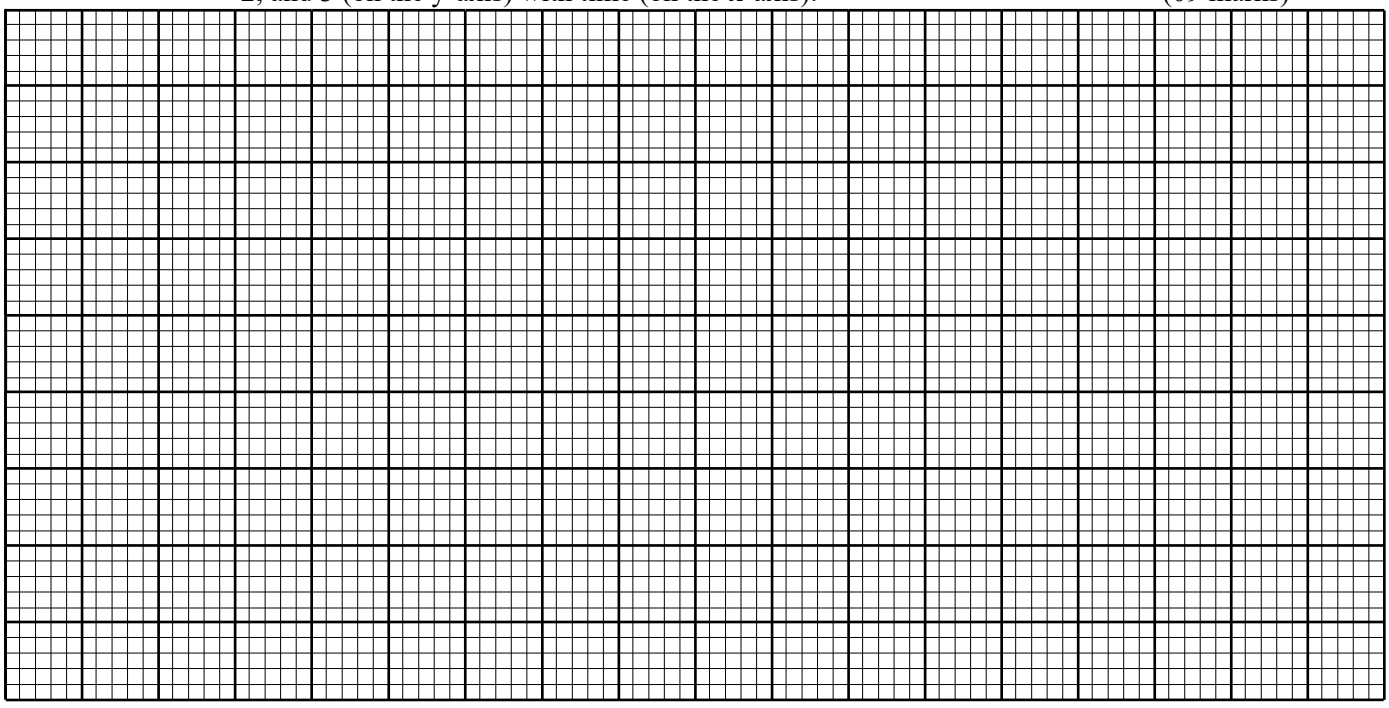
SECTION B

31. In an experiment to investigate the rate of enzyme activity, three extracts of fresh plant materials were mixed with a fixed concentration of hydrogen peroxide solution in 10ml measuring cylinders, labeled 1, 2, and 3.

The volume of the mixtures including froth (foam) were read and recorded every 20 seconds for 60 seconds.

Time (seconds)	**Volume of mixture (cm^3)**		
	with extract 1	with extract 2	with extract 3
0	5.0	5.0	5.0
20	5.2	5.3	5.4
40	5.4	5.6	6.0
60	5.6	6.0	9.0

a. On the same axes, plot graphs on the graph paper provided for the volume of mixtures 1, 2, and 3 (on the y-axis) with time (on the x-axis). (09 marks)



b. Using your graph to calculate the rate of reaction $\left[\frac{\text{change in volume}}{\text{change in time}}\right]$ in cm^3 per second between 20 and 40 seconds for the reaction with each extract.

i. Rate with extract 1 (02 marks)

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ii. Rate with extract 2 (02 marks)

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iii. Rate with extract 3 (02 marks)

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c. Explain the results for the rate of reaction in (b) above (03 marks)

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d. Besides the factor being investigated in the experiment, state any three other factors that may affect enzyme activity ($01\frac{1}{2}$ marks)

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32. The data below is of a savannah ecosystem. Use it to answer the questions that follow.

Type of organism	**Number**
Locust	200
Kites	3
Snakes	30
Green plants	Many
Chameleon	90

a. Draw an ecological pyramid to represent the data and name the trophic levels on the pyramid (05 marks)

b. Explain what will happen if all the chameleons died (03 marks)

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c. Explain why there are few kites as compared to locusts (02 marks)

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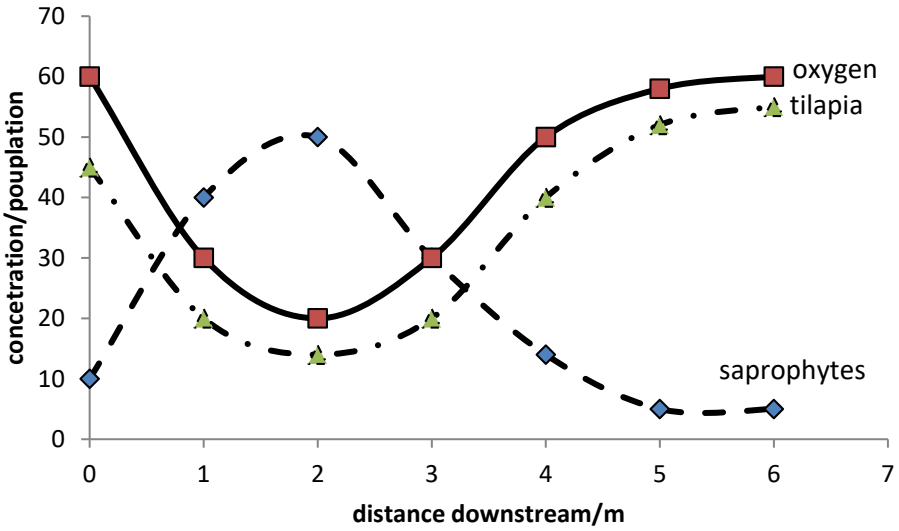
33. The graph below shows the oxygen content, population of tilapia and saprophytic microorganisms in a river where untreated sewage was discharged.



(a) Explain the changes in the following;

i. Levels of oxygen downstream

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ii. Population of saprophytes down stream

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iii. Population of tilapia downstream

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(b) Explain the relationship between saprophytes and tilapia in the ecosystem

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(c) Describe how untreated sewage affected the ecosystem at a distance of 2m downstream

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(d) How can pollution problems caused by sewage in water sources be checked?

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SECTION C

34. (a) Explain what is likely to happen the concentration of oxygen in the air surrounding the plant of a cereal crop during a 24 hour period of a growing season (10 marks)
    (b) Why is unhealthy to keep potted plants in your dormitory at night while you sleep?
35. Baldness in man is controlled by a recessive gene carried on the X chromosome.
    (a) What name is given to this kind of inheritance? (01 mark)
    (b) Explain, using a cross, why a bald man may not produce a bald son. (10 marks)
    (c) Has the knowledge of genetics benefited man? (05 marks)
36. What is meant by the term seed dormancy? (02 marks)
    (b) Of what importance is seed dormancy? (03 marks)
    (c) Describe any five causes of seed dormancy. (05 marks)
    (d) How are the causes above are eliminated? (05 marks)
37. (a) What is seed and fruit dispersal? (02 marks)
    (b) Describe how seeds and fruits are adapted to their different methods of dispersal (13 marks)

Answers for section C

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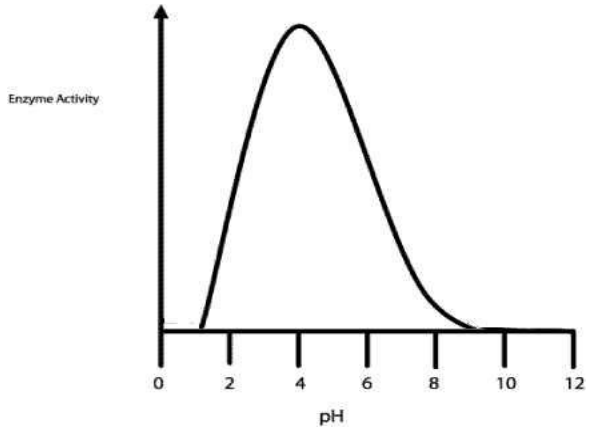
TEST PAPER 21

SECTION A

1. Which of the following is an insect product useful to humans?
   A. Wool
   B. Rayon
   C. Linen
   D. Silk
2. Which vitamin is needed for quick healing from diseases?
   A. Thiamine
   B. Retinal
   C. Nicotic acid
   D. Riboflavin
3. Figure one below shows the effect of pH on enzyme activity. Indentify the part of the alimentary canal from which it is located?



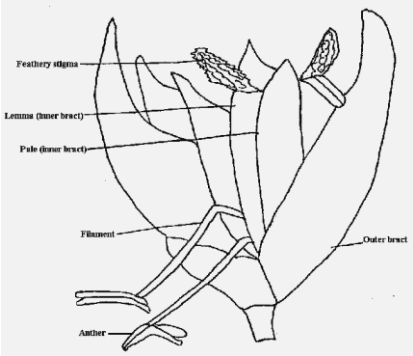
   A. Stomach
   B. Mouth
   C. Ileum
   D. Colon
4. Which of the following is not a product of aerobic respiration?
   A. Water
   B. Carbon dioxide
   C. Oxygen
   D. ATP
5. Which one of the following methods of controlling malaria does not harm the environment?
   A. Draining ponds
   B. Introducing fish into ponds
   C. Spraying oil on top of water ponds
   D. Use of insecticides such as DDT
6. The main use of humus to soil is to absorb;
   A. Water
   B. Minerals
   C. Air
   D. Sunshine
7. The hormone that influences osmoregulation of blood is;
   A. Luteinising hormone
   B. Anti-diuretic hormone
   C. Follicle stimulating hormone
   D. Adrenalin
8. Part of a section of a leaf showed irregularly shaped cells which were loosely packed and had few chloroplasts. This part of the leaf is most likely to be that of the
   A. Spongy mesophyll layer
   B. Palisade mesophyll layer
   C. Upper epidermis
   D. Lower epidermis
9. The following is a dichotomous key for invertebrates:

1	a)	Has 8 legs……W
	b)	Has 6 legs……..2
2	a)	Has long antennae……X
	b)	Has short antennae……...3
3	a)	Has proboscis……Y
	b)	Has mandibles……Z

Which one of the organisms is a fly?

A. W
B. X
C. Y
D. Z

10. The type of pollination that the flower in figure two is adapted for is



A. Cross pollination
B. Self pollination
C. Wind pollination
D. Insect pollination

11. Which one of the following is an example of a rhizome;

A. Straw berry
B. Bryophylum
C. Ginger
D. Bulb

12. Vasodilation is likely to occur together with

A. Shivering
B. Increased metabolism
C. Vasoconstriction
D. Sweating

13. The surface area of each of three foxes is known, one lives in hot climate, the other cold and the other temperate. What else is required to know where each lives? The,

A. Age
B. Diet
C. Volume
D. Colour

14. The shock absorber at a joint is,

A. Cartilage
B. Synovial fluid
C. Ligament
D. Tendon

15. Which of the following parts of a plant cell provides shape and rigidity?

A. Nucleus
B. Cell wall
C. Protoplasm
D. Cell membrane

16. Which one of the following pairs of parts of the human eye refracts light?

A. Cornea and choroid
B. Cornea and iris
C. Iris and ciliary body
D. Aqueous and vitreous humours

17. The structure of a desert animal like camel responsible for storage of metabolic water is the;

A. Hoof
B. Hump
C. Heart
D. Kidney

18. An athlete breathes 500cm^3 of air at each breath. His breathing rate is 40 breaths per minute. If the atmospheric air contains 15% oxygen by volume, what is his oxygen intake per minute?

A. 3000cm^3
B. 2000cm^3
C. 600cm^3
D. 300cm^3

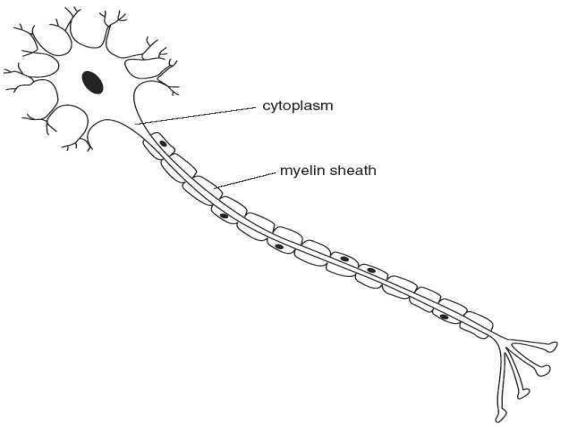
19. Which one of the following is a water borne disease?

A. Measles
B. Typhoid
C. Polio
D. HIV/AIDS

20. The blood serum of a universal donor contains

A. Antigen A
B. Antigen B
C. Antibodies a and b
D. No antibodies

21. Figure three below is of a neuron. Indentify the neuron and its function?



	Neuron	Function
A	Motor	Transports impulses from receptors to relay neuron
B	Sensory	Transports impulses from the relay neuron to the effectors
C	Motor	Transports impulses from the relay neuron to the effectors
D	Sensory	Transports impulses from receptors to relay neuron

22. Which one of the following is an arachnid?

A. Crab
B. Scorpion
C. Hydra
D. Cockroach

23. Which one of the following organisms does not transport oxygen by blood?

A. Cockroach
B. Fish
C. Frogs
D. Birds

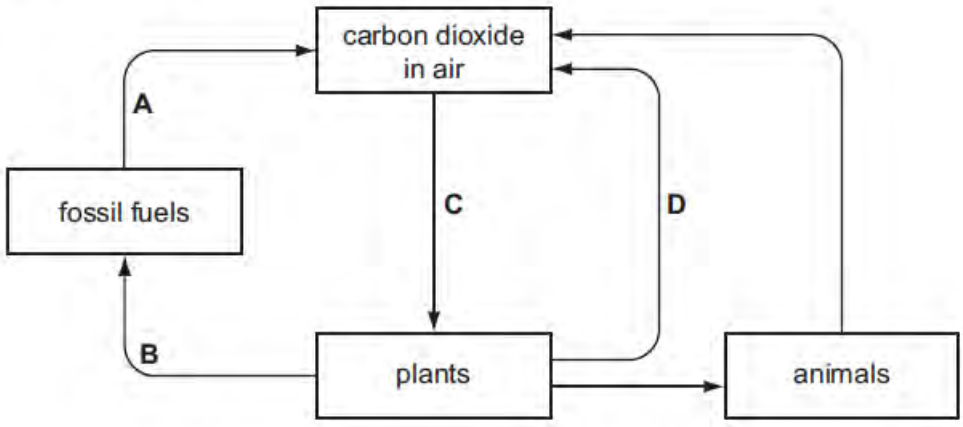
24. The following are parts of the nephron.

i. Proximal convoluted tubule
ii. Distal convoluted tubule
iii. Loop of Henle
iv. Collecting ducts

Which of the above parts are found in the medulla?

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

25. The diagram shows part of the carbon cycle. Which letter represents photosynthesis?



26. Which one of the following groups of organisms in a food chain contains the least amount of energy?
    A. Tertiary consumers
    B. Secondary consumers
    C. Primary consumers
    D. Producers

27. Four foods were analysed for protein, fat and carbohydrate. Which of the food proportions shown in table 1 below would contain the most energy per 100g portion?

	Protein (%)	**Fat (%)**	**Carbohydrate (%)**
A	20	7	1
B	10	9	20
C	4	5	6
D	0.5	0.5	5

28. The best way to control sheet erosion is by
    A. Terracing
    B. Planting cover crops
    C. Adding humus to the soil
    D. Construction of gabions

29. When 80 cm^3 of water was added to 100cm^3 of soil, the volume of the mixture was 140cm^3. What was the percentage of air in the soil sample?
    A. 20%
    B. 40%
    C. 60%
    D. 80%

30. Select the answer with the correct order of groups, starting with the smallest.
    A. species, order, family
    B. family, order, class
    C. class, family, phylum
    D. order, family, class

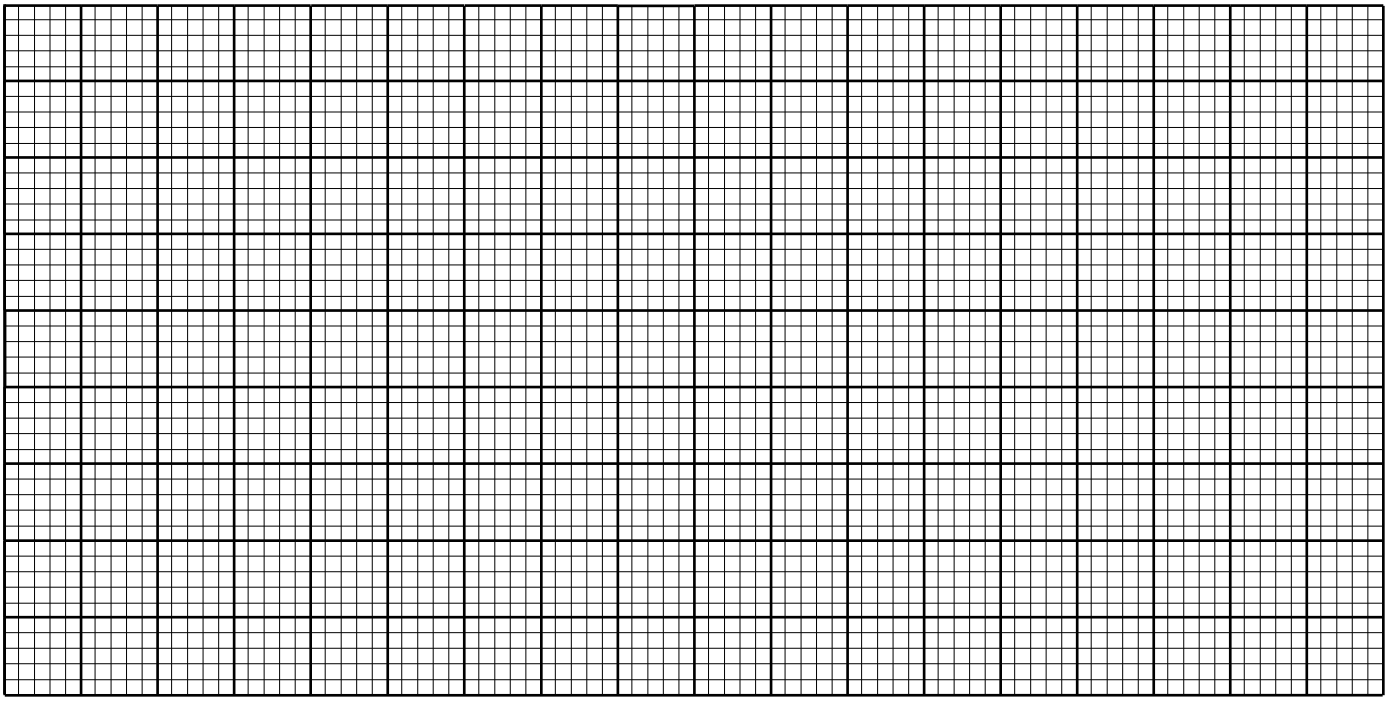
SECTION B

31. The table below shows the average total energy requirements for people of different weights.

Boy weight (Kg)	Total energy requirement (KJ)	Energy requirements per Kg of body weight (KJ)
7	3150	
14	6090	
21	7875	
32	10560	
45	11925	
60	12000	
65	12657	

A. Work out the energy requirements per Kg of body weight of each person and fill them in the table. (07 marks)

B. Use the values you worked out to draw a graph showing their relationship with body weight (04 marks)



C. Describe the relationship between body weight and energy requirements per Kg of body weight (03 marks)

……

……

…..……

D. Explain the relationship described in (c) above (03 marks)

……

……

……

E. Mammals require more energy intake than reptiles of the same size. Explain this observation. (03 marks)

……

……

……

32. (a) State the organ in the human body that secrets insulin hormone. (01 mark)

……

(b) Explain why a person suffering from diabetes

i. Has to be given regular doses of insulin (03 marks)

……

……

……..

ii. Has to eat more frequently (02 marks)

……

……

……..

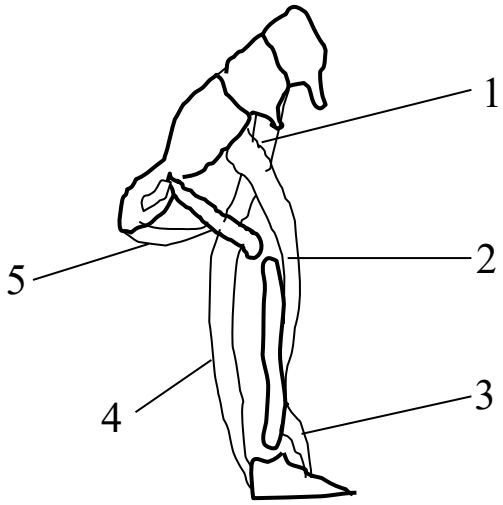
(c) Glucose and not sucrose is recommended to be given to an athlete after a race. Explain this observation. (04 marks)

……

……

……

33. Figure four below shows some muscles of the hind limb of a cat.



(a) What are antagonistic muscles? (01 mark)

……

……

(b) From figure 4 above, which pairs of muscles are antagonistic? (02 marks)

……

……

……

(c) Why do muscles work antagonistically? (03 marks)

……

……

……..……

(d) Give two examples of antagonistic muscles in man, (02 marks)

……

……..

(e) What movement of the limb above will be brought about by the simultaneous contraction of 2, 4 and 5? (02 marks)

……

……

SECTION C

34. (a) Describe the structure of the different types of skeletons in animals, giving an example in each case (09 marks)

(b) Explain how the vertebral column in mammals is adapted to its functions. (06 marks)

35. (a) Explain how the action of muscles causes carbon dioxide to pass from the lungs into the atmosphere. (05 marks)

(b) How does oxygen move from the air in the alveoli into the body tissues? (07 marks)

(c) How are respiratory surfaces adapted to their functions? (03 marks)

36. (a) Describe two ways in which the white blood cells defend the body. (02 marks)

(b) Explain how red blood cells are adapted to their function. (10 marks)

(c) Describe the changes that occur in an individual's blood if the person moves from a lowland and goes to live on a highland. Explain your answer. (03 marks)

37. (a) Distinguish between dominance and co-dominance in genetics. (02 marks)

(b) When tall pea plants were crossed with short pea plants, all the plants in F1 generation were tall. When two plants of the F_1 generation were crossed, both tall and short plants were produced in the F_2 generation.

(i) Why were all plants tall in the F_1 generation? (03 marks)

(ii) Using suitable symbols, show the crosses to produce the F_1 and F_2 generations? (10 marks)

Answers for section C

TEST PAPER 22

SECTION A

1. The magnification produced by a microscope depends on its?

   A. Eyepiece lens
   B. Objective lens
   C. Mirror and objective lens
   D. Eye piec and objective lens

2. Which of these may not be found in a plant cell?

   A. Cell membrane
   B. Glycogen granule
   C. Mitochodria
   D. Vacuole

3. Excretory substances move out of cells by?

   A. Active transport
   B. Osmosis
   C. Diffusion
   D. Facilitated diffusion

4. If a potato cube has an area of $4mm^2$ and its sides measure 2mm. Its surface area to volume ratio is

   A. 12:1
   B. 6:1
   C. 4:1
   D. 3:1

5. Carbohydrates are transported in blood in form of

   A. Galactose
   B. Fructose
   C. Glucose
   D. Maltose

6. Herbivores digest plant material with the help of

   A. Protozoa
   B. Cellulose
   C. Bacteria
   D. Cellulase

7. All amino acids have the following elements except

   A. Carbon
   B. Nitrogen
   C. Phosphorous
   D. Oxygen

8. Whenever it rains, water takes long to sink in swamps where there is clay soil because they have?

   A. poor capillarity
   B. Small air spaces
   C. High porosity
   D. High water retention

9. The following are the results of a class experiment

   Mass of the dish = 50g
   Mass of dish + dry soil = 200g
   Mass of the dish + red hot cooled soil = 170g
   What is the percentgae of humus in the soil sample?

   A. 75%
   B. 20%
   C. 20%
   D. 15%

10. The main nitrogenous excretory product of amphibian tadpoles is?

    A. Uric acid
    B. Urea

C. Ammonia
D. Urine

11. Growth in plants differs from growth in animals because it is

A. Unlimited
B. Slow
C. Discontinous
D. Continous

12. The following are characteristics of blood vessels?

I. Presence of valves
II. Thick walls
III. Wide lumen
IV. Elastic wall

Which of the following characteritics belong to arteries?

A. I and II
B. I and III
C. II and III
D. III and IV

13. A certain plant has the following characteristics:

- Leaves reduced to spines
- Sunken stomata
- Leaves with thick cuticle

Which of the following is the most likely habitat of the plant?

A. Open grassland
B. Wetland
C. Aridland
D. Rain forest

14. Which of the following is the best advantage of crop rotation?

A. Helps to reduce soil erosin
B. Improves soil erosin
C. Controls growth of weeds
D. Prevents exhaustion of certain nutrients

15. Which of the following would be the recommended diet for an over weight person?

A. Low carbohydrates, high protein and low fats
B. Low carbohydrates, high protein and high fats
C. High carbohydrates, high protein and low fats
D. High carbohydrates, low protein and low fats

16. Why is it unlikely for an insect to attain the size of a man. This is because

A. Man has an endoskelton whereas insects don't
B. The digestive system of insects is too simple
C. Insects lack a brain and blood
D. Insects feed only on vegetation like grass

17. Which of the following reduce the rate of transpiration?

A. Low tempearature, still air and high humidity
B. Low temperature, windy conditions and low humidity
C. High temperature, windy conditions and low humidity
D. High temperature, still air and low humidity

18. Which one of the following comparisons in the table below is NOT true?

	AEROBIC RESPIRATION	PHOTOSYNTHESIS
A	Oxygen is required	Oxygen is given out
B	Continues at all time	Takes place only in light
C	Energy is used up	Energy is liberated
D	Carbondioxide is released	Carbondioxide is absorbed

19. A seedling grown in a culutre solution lacking magnesium had yellow leaves. Which of the following is the correct conclusion?

A. Magnesium is esential for chlorophyll formation
B. Without magnesium, photosynthesis cannot occur
C. Magnesium should be lacking in order for leaves to be yellow
D. Synthesis of proteins stops in the absence of magnesium

20. Which of the following gases is likely to be released by a submerged aquatic plant placed in darkness?

A. Carbon dioxide
B. Oxygen
C. Ammonia
D. Carbon monoxide

21. Which one of the following is **TRUE** about nastic responses?

A. Depend on the direction of the stimulus
B. Do not involve hormones
C. Is relatively slow
D. Does not involve growth

22. Which of the following is the function of the kidney?

A. Control of salt and water level in the body
B. Regulation of blood glucose level
C. Formation of urea for excretion in urine
D. Controls body temperature especially when cold

23. Which of the following is NOT true of the breathing process in man?

	INHALATION	EXHALATION
A	Ribs raised	Ribs lowered
B	Diaphragm flattens	Diaphragm dome shaped
C	Thoracic volume decreases	Thoracic volume increases
D	Air pressure decreases	Air pressure increases

24. In which of the following sets do you expect the seeds to germinate but quickly die off?

A. Dry seeds on wet cotton wool
B. Dry seeds on dry cotton wool
C. Soaked seeds on wet cotton wool
D. Soaked seeds on dry cotton wool

25. The number of trophic levels in a food chain is limited because

A. The number of organisms are limited
B. There is a lot of competition at successive levels
C. A lot of energy is lost at each level
D. The size of the organisms increase at each level

26. An adult person is stripped naked and placed in a room at 20ºC for two hours. How does the body react to this prolonged exposure at this temeparture?

A. The body temperature is lowered from 37ºC to 20ºC
B. Hairs are raised and sweating continues
C. Blood capillaries of the skin dilate
D. Grows goose pimples and shivers

27. Which of the following is the best reason for leaving a plant in darkness for 48 hours before carrying out experimntes on photozythesis?

A. To stop the photosythetic process in the leaf
B. To remove chlorophyll in the leaf
C. So that light doesn't reach the plant
D. To remove starch from the leaves

28. Which of the following statemements are true for a person living at sea level as compared to one who lives at a higher altitude?

I. Breathes more slowly at a higher altitude
II. Breathes more quickly at a hgher altitude
III. Has fewer red blood cells
IV. Has more red blood cells

A. I and II
B. II and III
C. I and III
D. II and IV

29. Which of the following characteristics of respiratory surfaces is **TRUE** of humans but not of insects?

A. Highly vasculraised
B. Large surface area
C. Moist linning
D. Thin walled

30. A patient has a high temperature due to a bacterial infection in the lungs. Which one of the following would his blood show when examined under a microscope?

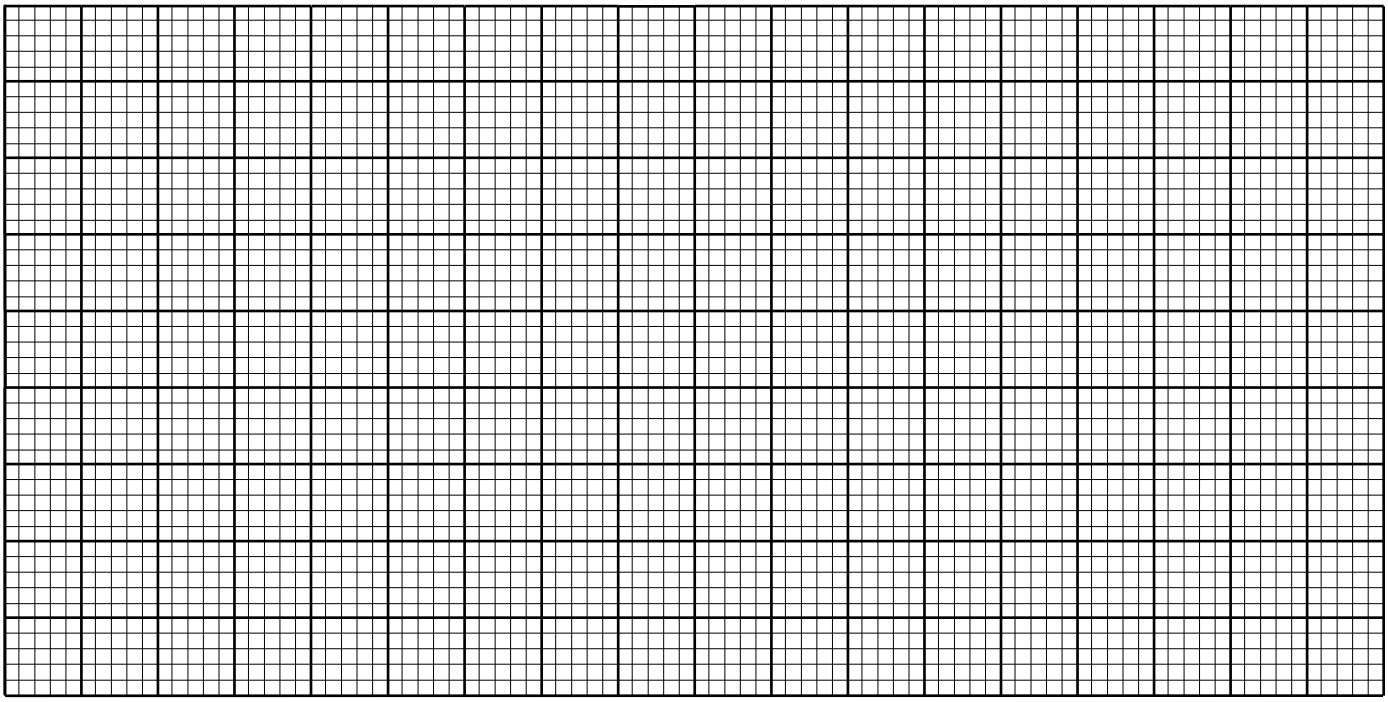
A. Malaria parasites in the red blood cells
B. Increased number of red blood cells
C. Increased number of white blood cells
D. Decrease in the number of white blood cells

SECTION B

31. Two sets of ten pea seeds were germinated. Set A was placed in normal day light conditions in the laboratory whereas set B was placed in a dark cupboard. Starting a few days later, the shoot lengths were measured after every 10 hours, and the mean lengths are shown in table below.

Time (hours)		**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**
length	**Set A**	10	12	18	21	26	29	45	52
(mm)	**Set B**	15	21	26	32	46	60	78	94

(a) Using the data in the table above plot the figures on a graph paper to show the growth curves of the two sets of seeds. (07 marks)



(b) From the graph state the mean shoot length of each set of seedlings at on day 2

i. Set A (01 mark)

……

ii. Set B (01 mark)

……..……..

(c) Sate two external conditions which should be constant for both sets of seeds (02 marks)

……

……

(d) Explain briefly why curve A is different from curve B (04 marks)

……

……

……

……

(e) Suggest the fate of seedlings in set B if they were allowed to continue growing under these conditions. (01 mark)

……
……

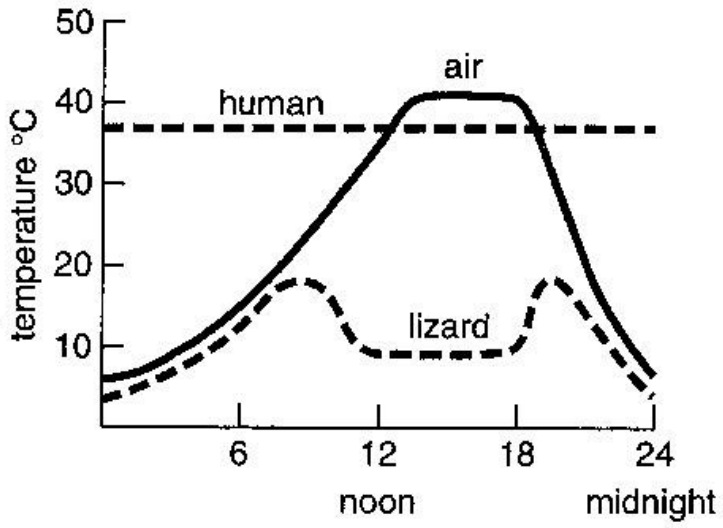
(f) What biological phenomenon was being investigated in the experiment (01 mark)

……

(g) What is the use of the phenomenon above to a seed planted in soil (03 marks)

……
……
……

32. The graph below shows the variation in temperature of air, human body and lizard during a 24 hour peri



a. For the period shown, describe the temperature of the air (03 marks)

……
……
……..

b. Explain what the lizard was probably doing at:

i. 8 hours (02 marks)

……
……

ii. Noon (02 marks)

……
……

c. Explain how the human controlled body temperature physiologically at 13 hours (05 mark)

……
……
……

d. What terms describe the two animals in regard to temperature regulation? (01 mark)

i. Lizard:
……

ii. Human:
……..

33. Measuring the mass changes of leaves can be used to give a quantitative comparison of water loss from different leaf surfaces. A number of leaves are smeared with vaseline, weighed and then left in a drying atmosphere for 48 hours, and reweighed at intervals. The results from this investigation are shown in the table below.

Leaf number	Treatment	Initial mass (g)	Final mass (g)	Change in mass (g)	Percentage change in mass (%)
1	Both sides smeared	4.2	4.1		
2	Only lower surface smeared	4.6	4.4		
3	Only upper surface smeared	3.9	2.5		
4	Neither surfaces smeared	4.1	2.4		

a. Calculate the percentage change in mass for each leaf (02 marks)
b. Why did leaf 3 lose a greater proportion of its mass than leaf 2? (04 marks)
……
……
c. Why was it important that leaves from the same species were used? 01 marks)
……
d. State three adaptations of leaves to reduce on the rate of transpiration. (03 marks)
……
……
……

SECTION C

34. (a) Explain the changes that occur in the breathing and heart beat as a person engages in a serious exercise. (07 marks)
(b) Explain how these changes affect the working of the muscles involved. (08 marks)
35. (a) State five biological uses of wetlands (05 marks)
(b) Describe the human activities that have lead to wetland degradation (05 marks)
(c) What strategies are currently being employed in Uganda to control wetland destruction?
36. (a) (i) What is meant by the term germination? (01 mark)
(ii) Distinguish between epigeal and hypogeal germination. (04 marks)
(b) Describe an experiment to show the necessity of environmental factors in germination (12 marks)
37. a) What is meant by the term mutation? (02 marks)
ii. give any four agents of mutations? (02 marks)

b) Sickle cell anaemia is a comdition in humans where red blood cells attain sickle shapes. A normal man married a woman who is a carrier of sickle cell trait. Carry out test crosses to determine the genotypic ratio of the likely offsprings (08 marks)

c) How has the knowledge of genetics been used to improve plant breeds? (03 marks)

Answers for section C

TEST PAPER 23

SECTION A

1. Which one of the following diseases is **not** transmitted by insects?
   A. Cholera
   B. Malaria
   C. Sleeping sickness
   D. East coast fever
2. *Figure 1* below shows the tongue's taste areas;

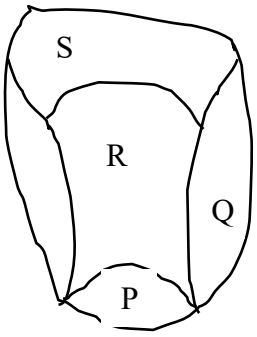


Figure 1

Which part is responsible for the bitter taste?
   A. P
   B. Q
   C. R
   D. S

3. Which one of the following is **not** a characteristic of veins?
   A. Presence of valves
   B. Wide lumen
   C. Thin wall
   D. Elastic wall
4. Aestivation occurs in some animals in order to survive conditions of:
   A. Extreme cold
   B. Drought
   C. Great heat
   D. Food shortage
5. Which of the following is the best way to estimate the population of earthworms in a garden?
   A. Capture-mark-recapture
   B. Transect
   C. Total count
   D. Quadrant method
6. Which of the following serves a different function from the others?
   A. Buttress root
   B. Clasping roots
   C. Stilt roots
   D. Root tuber
7. Free vibration of the fluid in the inner ear is allowed for by the;
   A. Oval window
   B. Semi-circular canal
   C. Eustachian tube
   D. Round window
8. *Figure 2* below is of one of the types of fruits.

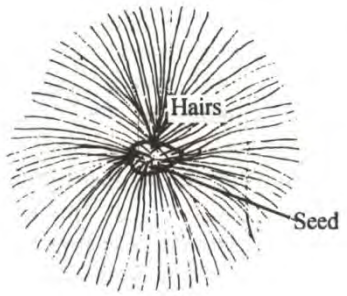


Figure 2

The fruit can best be dispersed by……..
   A. Animals
   B. Wind
   C. Water
   D. Explosive mechanism

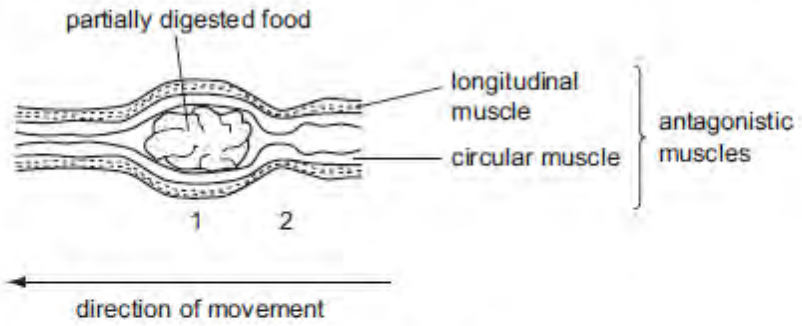
9. Which of the following hormones is produced by the pituitary gland?
   A. Adrenalin
   B. Anti-diuretic hormone
   C. Oestrogen
   D. Testosterone
10. Yellowing of plant leaves may be caused by lack of?
   A. Carbon dioxide
   B. Phosphorous
   C. Magnesium
   D. Calcium
11. What is the main force for moving up water in the xylem to the leaves of a tall tree?
   A. Root pressure
   B. Osmosis
   C. Capillarity
   D. Transpiration pull
12. Which of the following insects undergoes complete metamorphosis?
   A. Cockroach and housefly
   B. Grasshopper and butterfly
   C. Grasshopper and cockroach
   D. Housefly and butterfly
13. If both parents are of blood group AB, they **cannot** produce a child of blood group:
   A. A
   B. AB
   C. B
   D. O
14. Addition of lime to clay soil;
   A. Makes it less permeable
   B. Makes it more permeable
   C. Makes its acidic
   D. Breaks up the particles
15. How does a small size help desert animals over-come the problem of over-heating? They have;
   A. Low metabolic rate
   B. High metabolic rate
   C. Large surface area to volume ratio
   D. Small surface area to volume
16. During anaerobic respiration, animals produce
   A. Ethanol
   B. Ethanol and carbon dioxide
   C. Lactic acid and carbon dioxide
   D. Lactic acid
17. Some of the blood vessels involved in the transport of digested food are shown below.
   i. Right auricle
   ii. Hepatic vein
   iii. Hepatic portal vein
   iv. Posterior vena cava

   What is the correct path of a glucose molecule from the ileum to the intestines?

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

18. Which one of the following stages of cell division may be related to dormancy?
   A. Interphase
   B. Metatphase
   C. Telophase
   D. Anaphase
19. Which one of the following processes would need energy to take place?
   A. Diffusion
   B. Osmosis
   C. Plasmolysis
   D. Active transport
20. People who are easily frightened probably display over reactive
   A. Adrenal glands
   B. Gastric glands
   C. Pancreatic glands
   D. Gonads
21. The conversion of atmospheric nitrogen into nitrates in the soil is a process known as……..
   A. Nitrogen fixation
   B. Decomposition
   C. Denitrification
   D. Nitrification

22. Haemophilia is caused by a recessive gene and is sex-linked and it occurs mainly in males. If a haemophiliac male marries a carrier female, what will be the percentage of haemophiliac daughters among the children?
    A. 0
    B. 25
    C. 50
    D. 75
23. Which one of the following organisms is most limited in the sources of food?
    A. Herbivores
    B. Carnivores
    C. Omnivores
    D. Detritivores
24. Some women become infertile because their ovaries fail to develop the grafian follicles needed to release ripe ova into their reproductive systems. This is because the pituitary gland has failed to produce?
    A. Thyroxine
    B. Oestrogen
    C. LH
    D. FSH
25. Which one of the following cells could have their functions adversely affected by HIV?
    A. Erythrocytes
    B. Blood platelets
    C. Leucocytes
    D. Chondrocytes
26. The diagram shows a section of the small intestine in which partially digested food is being pushed along



What is the state of the longitudinal muscles at 1 and 2

	1	**2**
A	Relaxed	Relaxed
B	Contracted	Relaxed
C	Relaxed	Contracted
D	Contracted	Contracted

27. A certain plant has the following characteristics;
    - Leaves reduced to thin spines
    - Stomata are few and sunken into pits
    - Leaves are covered with thick cuticle

In which of following areas is the above plant likely to be found?
    A. Forest
    B. Wet land
    C. Desert
    D. Open grass land
28. Which one of the following structures is found in cervical vertebrae only?
    A. Vertebra-arterial canal
    B. Transverse process
    C. Neural spine
    D. Centrum

29. Mucor undergoes sexual reproduction to produce

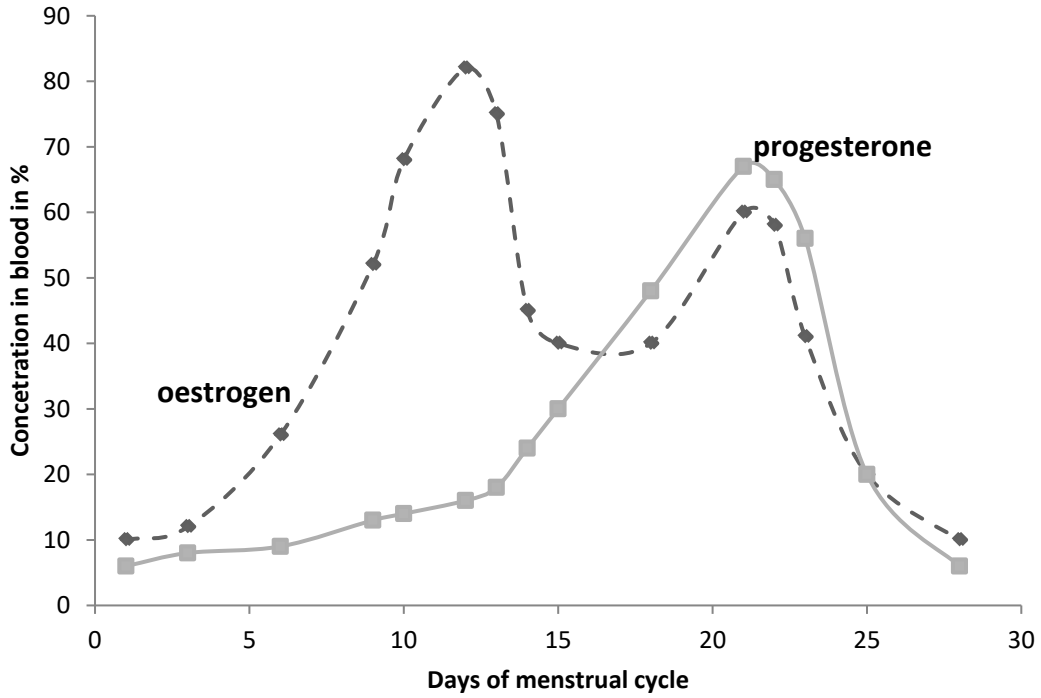
A. Sporangia
B. Zoospores
C. Zygospores
D. Spores

30. Which one of the following substances is present in lower concentration in renal artery than renal vein?

A. Amino acid
B. Glucose
C. Carbon dioxide
D. Urea

SECTION B

31. The graph below shows the changes in the concentrations of progesterone and oestrogen in a monthly period of an adult female. Use the information given to answer the questions that follow.



a) Explain the trend of the curves for

i. oestrogen (04 marks)

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ii. progesterone (03 marks)

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b) Describe the process that occurs between day 1 and day 5. (03 marks)
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c) At around what day from the graph is the level of oestrogen highest? (01 mark)
……

d) State two functions of the hormones.

i. Oestrogen (02 marks)
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ii. progesterone (02 marks)
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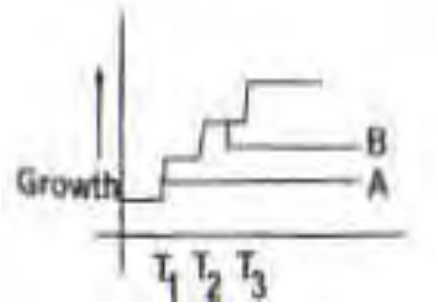
a) What is being explained by the graph? (01 mark)
……

b) State two other hormones produced during the process in (e) above and their functions.

i.Hormone: …… (½ mark)
Function: …… (1mark)

ii.Hormone …… (½ marks)
Function: ……. (1mark)

32. The graph below was plotted after collecting data about the growth of an organism study it and answer the questions that follow



(a) Name an organism whose growth pattern is represented
……

(b) What happened during

i. A
……..

ii. B

……

(c) What happens at times T_1, T_2 andT_3?

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(d) Give an explanation for the pattern of growth in the graph

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(e) Draw a graph to show the growth pattern of a mammal

33. (a) Define the term variation? *(02 marks)*

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(b) State three differences between continuous variation and discontinuous variation (03 marks)

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© An albino man married a darker-skinned woman and produced children. Some of whom were albinos. Using genetic crosses, work out the percentages of the albinos in the family

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SECTION C

34. (a) Define the term accommodation as used in vision by the eye *(02 marks)*

(b) With the aid of diagrams describe how the eye is able to see

i. Near-by and distant objects *(08 marks)*

ii. dim and bright objects (05 marks)

35. (a) What is meant by the term support? (02 marks)

(b) Describe how support is obtained in different plants? (13 marks)

36. Explain how;

(a) Deforestation may harm the environment *(07 marks)*

(b) Tress may conserve soil *(08 marks)*

37. (a) What is meant by the term humus? (02 marks)

(b) State any four uses of humus to soil (04 marks)

(c) Describe an experiment to show that loam soil contains humus (09 marks)

Answers for section C

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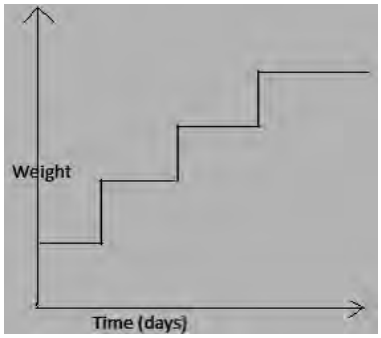
TEST PAPER 24

SECTION A

1. Which of the soil samples below has good aeration and low water retention?
   A. sandy soils
   B. loam soils
   C. clay soils
   D. laterite soils
2. The growth curve shown below is termed as

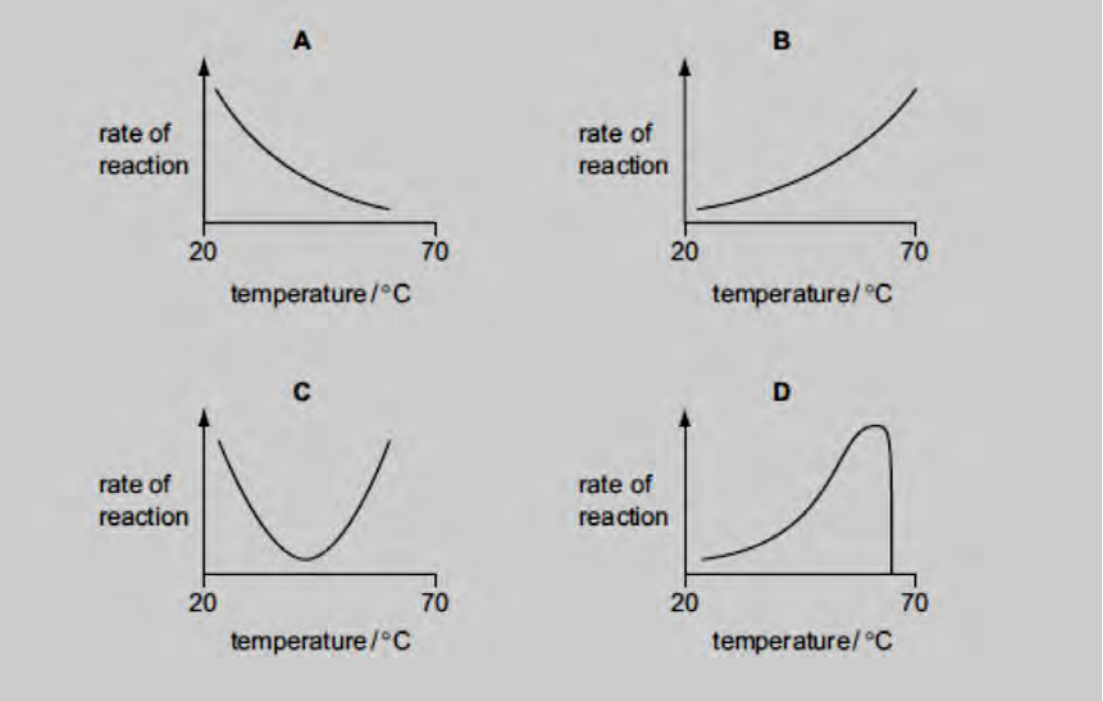


   A. Exponential growth curve
   B. Rapid growth curve
   C. Intermittent growth curve
   D. Gradual growth curve
3. The advantage that internal fertilization has over external fertilization is that in internal fertilization,
   A. new of-springs are exactly like the parent
   B. production of large number of gametes is un-necessary
   C. copulation and fusion of gametes is passive
   D. fewer individuals are produced
4. Which of the following is **not** a component of proteins?
   A. sulphur
   B. nitrogen
   C. carbon
   D. calcium
5. Erection of a penis is caused by;
   A. flow of semen
   B. contraction of muscles in it
   C. flow of blood into it
   D. muscular relaxation
6. A gene that **does not** express itself unless in homozygous state is
   A. Dominant
   B. Sex-linked
   C. co-dominant
   D. recessive
7. In the red blood cells, oxyhaemoglobin dissociates to oxygen and haemoglobin in the
   A. tissues where oxygen concentration is low
   B. blood
   C. liver and only when one is at rest
   D. Tissues in reaction to low carbon dioxide concentration.
8. The diagram below shows an arthropod animal.

Which features are characteristic of all arthropods?
   A. Jointed legs and segmented body
   B. Jointed legs and thorax
   C. Segmented body and wings
   D. Thorax and wings

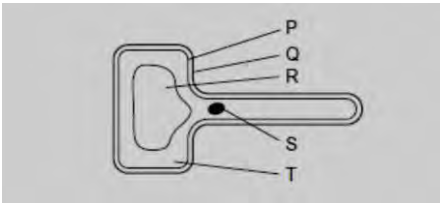
9. In plants, the problem of obtaining oxygen for respiration is solved by having
   A. Thin lower epidermis and thick upper epidermis
   B. very large air spaces in the tissues
   C. Compact mesophyll cells
   D. Very thin needle-shaped leaves with high surface area
10. Which one of the following characteristics of the leaves is associated with reduced photosynthesis?
   A. numerous chloroplasts
   B. thick cuticle
   C. network of veins
   D. large intercellular air spaces
11. Which one of the following physiological methods increases heat loss from a mammalian skin?
   A. vasoconstriction
   B. decreased sweating
   C. contraction of the erector pilli muscles
   D. lowering of skin hair flat
12. Which of the following is **not** associated with anaerobic respiration in muscles?
   A. lactic acid
   B. energy
   C. ethanol
   D. carbon dioxide
13. In which part of the alimentary canal are proteins **NOT** chemically digested?
   A. Duodenum
   B. Mouth
   C. Colon
   D. Small intestines
14. Which one of the following is the function of myelin sheath on the axon of a neurone?
   A. protects the axon
   B. reduces the speed of impulses
   C. synthesizes proteins
   D. produces energy for active transport
15. Which one of the following is not used in representing ecological relationships in an area?
   A. energy flow in the ecosystem
   B. number of organisms at each level in the ecosystem
   C. biomass of the ecosystem
   D. adaptation of the organisms at each level to the ecosystem
16. Which one of the following diseases is associated with bacteria?
   A. malaria
   B. dysentery
   C. cholera
   D. trypanasomiasis
17. Many endo-parasites are more successful in their way of life because
   A. They have well developed digestive system
   B. They have well developed tough cuticles
   C. Of production of numerous eggs
   D. They have well developed limbs for easy movement
18. the following characteristics are adaptations to efficient gaseous exchange in plants except;
   A. well ventilated
   B. well supplied with transport vessels
   C. moist cell surface
   D. large surface area
19. Which one of the following methods increases variability of off springs?
A. sporulation
B. fragmentation
C. fertilization
D. binary fission

20. Which graph shows the effect of temperature on the activity of a human digestive enzyme?



21. The most likely habitat of a plant with many stomata on the upper surface of its leaves is
    A. Water
    B. Salty marsh
    C. desert
    D. high altitude

22. The diagram below shows a plant cell.



Which labelled structures are found in plant cells but not in animal cells?
    A. P and Q
    B. Q and R
    C. R and S
    D. S and T

23. The parts of the flower that act as guides and attractants to insects are
    A. sepals
    B. petals
    C. anthers
    D. carpels

24. What is the main function of the epididymis in mammalian testis?
    A. Storage of sperms
    B. Secretion of testosterone
    C. storage of semen
    D. production of sperms

25. Which one of the following is least important in energy provision to the body?
    A. ascorbic acid
    B. fatty acid
    C. amino acids
    D. glycerols

26. Which one of the following is important in bending the root towards water?
    A. thigmotropism
    B. chemotropism
    C. phototropism
    D. hydrotropism

27. Transpiration is important in plants except for;
    A. absorption of water and dissolved salts
    B. regulation of plant temperature
    C. transportation of water to the leaves
    D. elimination of excess water in plants

28. One of the following is an example of discontinuous variation.

A. Height
C. length of the toes
B. tongue rolling
D. colour of the skin

29. Which one of the following excretory wastes conserves most water in the organisms?

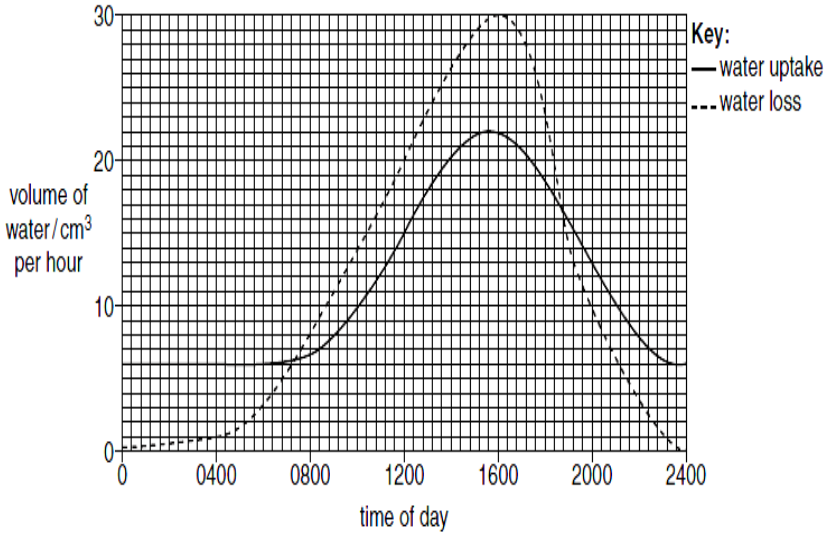
A. urea
C. ammonia
B. uric acid crystals
D. uric acid

30. Reptiles are adapted to living in dry areas because of

A. possession of lungs
C. internal fertilization
B. possession of limbs for movement
D. possession of dry epidermal scale

SECTION B

31. The figure below shows the rate of water uptake and water loss for a plant over a 24-hour period



a. Compare the water uptake and water loss as shown in the figure for the whole period of the experiment.

Similarities

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Differences

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b. Determine the rate of water uptake at

i. 1200 hours (01 marks)

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ii. 1800 hours (01 marks)

……

c. Name the cells;

i. Through which water is absorbed from the soil (01 marks)

……

ii. Between which water vapour passes to the atmosphere (01 marks)

……..

d. state two uses of water within a plant between

i. midnight and 0400 hours (02 marks)

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ii. 0800 and 1900 hours (02 marks)

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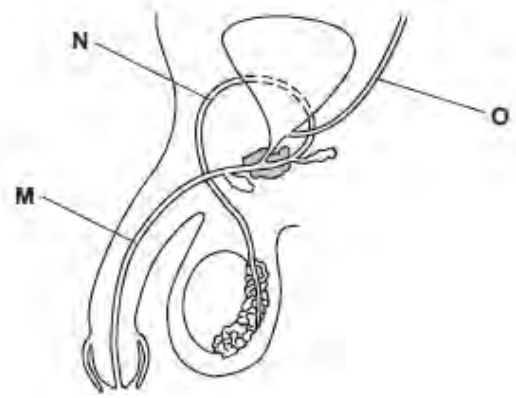
32. The figure below shows a section through part of the male reproductive and urinary systems



A. Name the tubes labelled M,N and O

M……..……..

N……..

O …….

B. Explain the roles of the testis, the prostate gland and the scrotum.

Testes

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Prostate gland

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Scrotum

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C. Humans use a variety of methods of birth control

i. On the figure above, put an X, where a vasectomy could be carried out (put your answer on the figure)

ii. Explain one method of birth control, used by males that can also protect against infection by a sexually transmitted disease.

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33. A person is stung by an insect and automatically withdraws their hand.

a. Explain the part played by the nervous system in this action

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b. Explain why the heart then beats faster

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c. State any three causes for increased heart beat.

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SECTION B

34. In an experiment, a long winged male drosophila was crossed with a short winged female drosophila. All the offspring in the F_1 generation were long winged. When two members of the F_1 generation were mated, the F_2 generation consisted of 62 long winged flies and 21 short winged flies.

a. Suggest an explanation why all the F_1 generation flies were long winged. (02 marks)

b. What type of flies would develop from a mating between;

i. 2 short winged flies in the second generation? Give a reason for your answer.

ii. a short winged fly in F_2 generation with a long winged in the F_1 generation (use genetic crosses where possible)

c. State any four importances of mitosis

35. (a) Describe flight in insects? (10 marks)

(b) How are insects adapted for flight? (05 marks)

36. (a) What is meant by the term germination? (02 marks)

(b) Describe the process of germination? (07 marks)

(c) Explain why seeds may fail to germinate even if availed with the necessary conditions?

37. (a) What is meant by the term succession? (02 marks)

(b) Describe primary succession on land (08 marks)

(c) State any five effects of global warming (05 marks)

Answers for section C

TEST PAPER 25

SECTION A

1. Which of the following minerals nutrients are important in the formation of chlorophyll?

A. Potassium and sulphur
B. Nitrogen and magnesium
C. Calcium and phosphorus
D. Zinc and copper

2. Which of the following structures is responsible for locomotion?

A. Food vacuole
B. Contractile vacuole
C. Pseudopodia
D. Cell membrane

3. Which of the following methods of controlling malaria would have least damage to environment

A. Draining swamps
B. Spraying
C. Contractile vacuole
D. Cell membrane

4. The figure below shows energy flow through different feeding levels in an ecosystem.

Producers → Primary consumers → Secondary consumers → Tertiary consumers

From the above, which of the following is **not** correct?

A. Energy flows in one direction
B. Producers depend on primary consumers for energy
C. All consumers depend on primary producers for energy
D. During energy, flow, there is eating and being eaten

5. Which of the following organism belong to a different kingdom?

A. Bread mould
B. Moss
C. Fern
D. Mango tree

6. Which of the following is the correct sequence of a scientific study method?

A. Observation, hypothesis, experiment, conclusion
B. Observation, experiment, hypothesis, conclusion
C. Hypothesis, experiment, observation, conclusion
D. Hypothesis, observation, experiment, conclusion

7. A guard cell differ from other epidermal cell in that it.

A. Has a cell vacuole
B. Has chloroplasts
C. Lacks a nucleus
D. Has holes

8. The part of an optical microscope which gives the first magnification to the object being viewed is the;

A. Mirror
B. Diaphragm
C. Objective lens
D. Eye piece

9. Which one of the following levels of classification contains organisms having the least degree of similarities…

A. Kingdom
B. Variety
C. Species
D. Family

10. Which part of the bulb stores food?

A. Underground roots
B. Underground stem
C. Leavers
D. Aerial stem

11. The following are types of roots **except**

A. Buttress
B. Prop
C. Decussate
D. Fibrous

12. After a period of study, a student observed that two organisms Q and P lived together in a loose relationship P surviving on Q; however Q was not affected in any way by the presence or absence of P. This type of relationship is termed.

A. Symbiosis
B. Parasitism
C. Commensalism
D. Autotrophism

13. Which of the following is **not** true about a Ruminant like a cow?

A. It has four stomachs
B. It chews the cud
C. It has a stomach made of four chambers
D. It has micro organisms which produce enzymes which digest cellulose

14. What will happen to an enzyme if the temperature of its medium is raised beyond the optimum levels? The enzyme will be.

A. Killed
B. Inactivated
C. Denatured
D. Activate

15. Crossing over occurs during the;

A. End of prophase II
B. Metaphase II
C. Early prophase II
D. Anaphase II

16. Peristalsis is an example of a

A. Conditional reflex action
B. Reflex action
C. Voluntary action
D. Conditional action

17. Which of the following is function of the ear?

A. Smelling
B. tasting
C. Temperature regulation
D. Balancing

18. Cattle may be brown or white. The hybrid is deserved as a ROAN colour. If a roan cow is crossed with a roan bull; the off spring would be.

A. All roan
B. All brown
C. All white
D. A mixture of brown, white and roan

19. Select the structure in a kidney that consists of the Bowman's capsule and the glomerulus

A. Malpighian body
B. Malpighian layer
C. Malpighian corpuscle
D. Malpighian tubule

20. Which of the following plant products is formed in a metabolic process that uses energy from respiration?

A. Glucose
B. Oxygen
C. Protein
D. Carbondioxide

21. Which of the following does not cause salivation in mammals?

A. Tasting food
B. Thinking about food
C. Feeling hungry
D. Seeing food

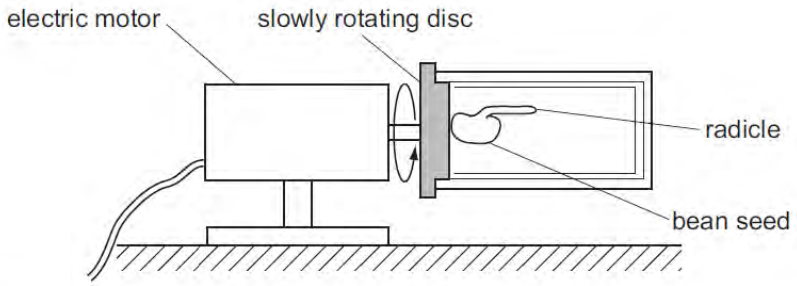
27. Which of these is not caused by malnutrition?

A. Kwashiorkor
B. Marasmus
C. Obesity
D. Diabetes

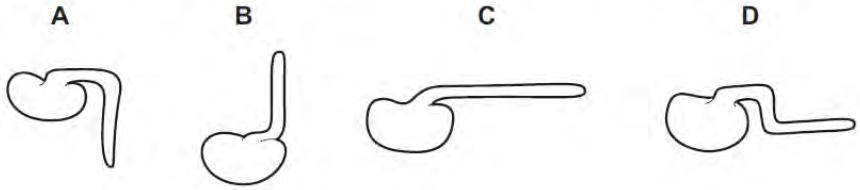
28. Which element do carnivorous plants obtain from the insects that they feed on?

A. Phosphorous
B. Sulphur
C. Nitrogen
D. Carbon

22. The diagram shows a germinated bean seed with a horizontal radicle. This is placed on a slowly rotating disc and is left for three days.



Which diagram shows the appearance of the radicle after three days?



23. A group of cells which are coordinated to perform a particular function is called

A. An organ
B. A tissue
C. A system
D. An organism

24. Which of the following plant storage organs does **not** store starch?

A. Rhizome
B. Corm
C. Bulb
D. Stem tuber

25. Which of the following blood vessels has capillaries at both ends?

A. Renal vein
B. Hepatic vein
C. Pulmonary vein
D. Hepatic portal vein

26. The best description of the figure below is

A.Pinnate and parallel venation
B.Palmate and net veined
C.Pinnate and net veined
D.Bipinnate and parallel veined

29. Which of the following is the respiratory pigment found in muscles?

A. Myoglobin
B. Chlorophyll
C. Chloroplast
D. Haemoglobin

30. Which chamber of the heart pumps blood to the head and the rest of the body?

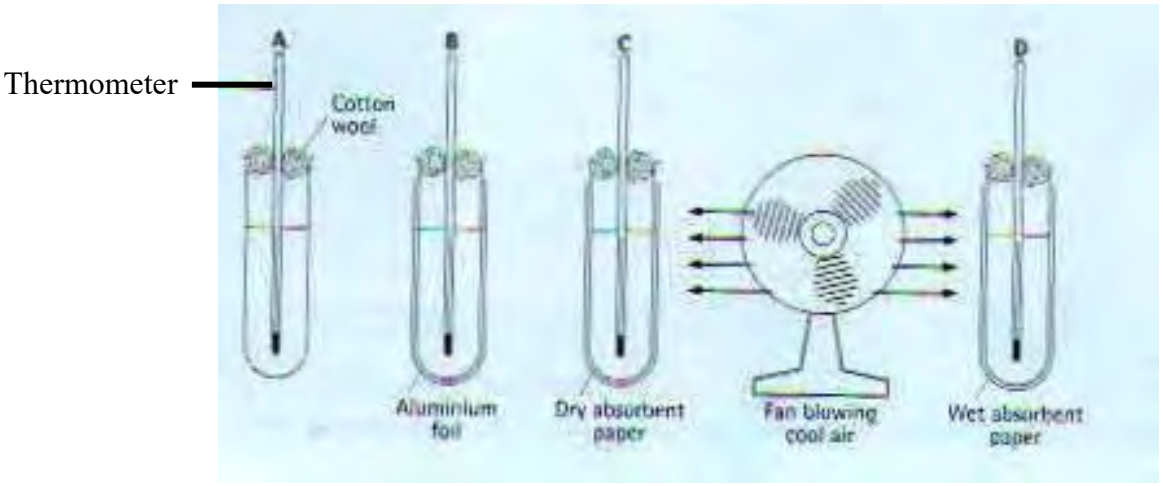
A. Left ventricle
B. Right auricle
C. Left atrium
D. Right ventricle

SECTION B

31. During an investigation into heat loss, three boiling tubes were set up as shown in the figure below. The same volume of very hot water was placed in each boiling tube. The temperature of

each tube was placed in each boiling tube. The temperature of each tube was recorded every two minutes for 10 minutes. The results are shown in the table below

Time (minutes)	**Temperature (^{0}C)**			
	Tube A	Tube B	Tube C	Tube D
0	83	84	82	83
2	81	83	81	80
4	80	82	80	75
6	78	82	79	71
8	76	81	78	66
10	72	80	76	61



(a) During the investigation, the thermometers were kept in the middle of the tubes and did not touch the glass. Suggest a reason for this.

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(b) Represent the data above on a the same axes on the graph paper

(b) Explain the difference in the rate of temperature fall in tubes A and B

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(c) A new born baby is sometimes wrapped in aluminum foil. Use the results of the investigation and your knowledge to explain why this is done

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(d) Explain why it could be harmful to go out in wet clothing on a windy day

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(e) Sweating is an important method of controlling the temperature of the body. Use the results of the investigation and your own knowledge to explain how sweating helps to keep the body cool

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(f) On a hot day, we sweat more but produce less urine than on a cold day, even if we drink the same amount of liquid.

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(g) The change in the volume of urine produced is controlled by antidiuretic hormone (ADH). Explain how ADH maintains the correct amount of water in our bodies.

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32. (a) Explain what is shown by a food web?

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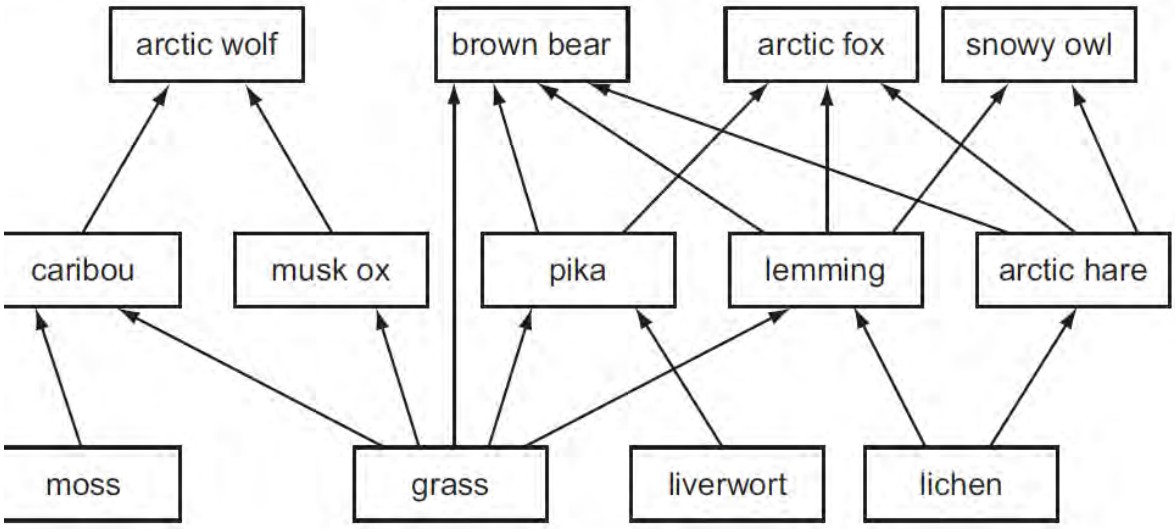
(b) The figure shows part of the food web in the arctic tundra



i. Name one organism shown above that feeds on both animals and plants

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ii. The arctic wolf is sometimes described as a top carnivore. Define the term carnivore?

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(c) Suggest why top carnivores, such as the arctic wolf, are usually only present in very small numbers in the area

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(d) The number of lemmings in an area undergoes a rapid decrease every few years. Explain how a decrease in lemmings may affect the number of:

i. Arctic foxes

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ii. Arctic hares

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33. The table below shows the composition of blood of three adult individuals. One lives at high altitude, another is anaemic and the other has an infection. It also shows the average number of each blood component in an adult human. Study the information and answer the questions that follow:

Components of blood per mm^3	**Person A**	**Person B**	**Peron C**	**Average number in an adult human**
Red blood cells	7,500,000	5,000,000	2,000,000	5,000,000
White blood cells	6,000	8,000	12,000	5,000-10,000
Platelets	250,000	255,000	100,000	250,000

a. giving a reason, suggest the person who,

i. lives at high altitudes (03 marks)

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ii. is anaemic (02 marks)

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iii. has an infection (03 marks)

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b. suggest the likely effect of the observed number of blood platelets in person C (02 marks)

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SECTION C

34. (a) In what ways are diffusion and active transport different?
    (b) What is the importance of
        i. Diffusion in plants and animals
        ii. Osmosis in flowering plants
        iii. Active transport in plants and animals
35. (a) Define locomotion and give reasons why it is necessary for animals?
    (b) Name any three organisms whose movement does not involve the use of muscles and briefly explain how they move
    (c) State two ways in which movement in animals differs from that in plants
36. (a) What is sexual reproduction? (02 marks)
    (b) Describe sexual reproduction in rhizopus (08 marks)
    (c) What are functions of the placenta in a sexually reproducing mammal? (05 marks)
37. Distinguish between the following;
        (i) Genotype and Phenotype.

(ii) Homozygote and Heterozygote.

(b) In an experiment, a pure red flowering plant was crossed with pure White flowering plant. All the plants of the F_1 generation had Pink flowers. Later the F_1 plants were selfed.

i. Explain why all the F1 were pink

ii. Using appropriate symbols, work out F_2 generation.

(c) The number of off springs in F_2 was 224, if any, how many were,

A) White

B) Red

C) Pink

Answers for section C

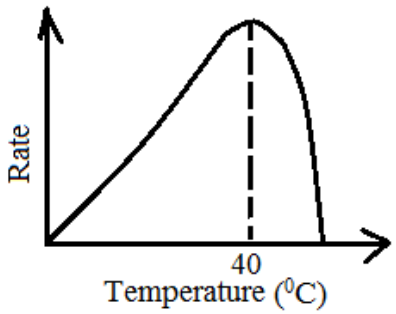
TEST PAPER 26

SECTION A

1. A housefly and a spider belong to the same phylum Arthropoda because both of them have
   A. Three body divisions
   B. two pairs of antennae
   C. three pairs of legs
   D. jointed limb
2. The following are results obtained from a class experiment on soil
   - Mass of the dish = 50 g
   - Mass of dish of dry soil = 200 g
   - Mass of dish + soil on strong heating = 170

   Which of the following represent the percentage of humus in the soil samples?

   A. 15%
   B. 20%
   C. 25%
   D. 75%
3. A field produces poor crop of maize after having been used for the same crop for several years. The next year beans were grown and the following year maize was successfully grown again. Which of the following is the probable explanation of the effect of beans on the soil? The
   A. Texture of the soil has improved
   B. Amount of air in the soil has increased
   C. Nitrogen content has increased
   D. Acidity of the soil has reduced
4. The effect of temperature on an enzyme controlled reaction was determined on the results are as shown below.



   Why did the peak occur as shown in the graph?
   A. Optimum temperature for enzymes is around 40^0C
   B. Number of enzyme molecules has increased at 40^0C
   C. Most enzymes are denatured beyond 40^0c
   D. Enzymes had already acted on the substrate.
5. Which of the following reactions is likely to occur when a donor of blood group A is transfused with a recipient of blood group B?
   A. Antibody 'a' reacts with antigen B
   B. antigen B reacts with antibody 'b'
   C. antibody 'b' reacts with antigen A
   D. antigen A reacts with antigen B.
6. Which of the following vessels would have the biggest concentration of sugars?
   A. phloem and hepatic portal vein
   B. xylem and hepatic portal vein
   C. phloem and hepatic vein
   D. xylem and hepatic vein
7. Which of the following plants would depend most on wind for its reproduction? A plant with
   A. Sticky pollen grains and explosive fruits
   B. Numerous pollen grains and enclosed stigma

C. Coloured petals and small winged and hairy fruits
D. Small flowers and light seeds.

8. The plant that grows on another plant and absorb nutrients from it is called
   A. Saprophyte
   B. epiphyte
   C. xerophytes
   D. halophyte
9. Why is the dry mass the best method of estimating growth in seedlings? Because it
   A. Gives the actual mass of protoplasm made
   B. Easier to determine quickly
   C. Doesn't involve destroying the seedlings
   D. Is not influenced by environmental factors.
10. Where is the pivot joint located in a mammal?
   A. In the wrist and ankle
   B. at the shoulder and hip
   C. Between the axis and atlas vertebrae
   D. Between the ribs and the vertebrae
11. Which of the following features are most useful to amphibians living in an aquatic habitat?
   A. Moist skin, membrane around eggs, gills
   B. membrane around eggs, gills, webbed toes
   C. long hind limb, short tail, gills
   D. webbed toes, moist skin, gills
12. Which of the following best explains why fat digestion doesn't occur in the stomach?
   A. The PH of the stomach is too low for lipase to function
   B. Bile salts which emulsifies fats is lacking
   C. The PH is too high for lipase to act
   D. Lipases are only active within a narrow range of the gut.
13. What would be the effect of removing the islets of Langerhans from the human pancreas?
   A. blood sugar level increases
   B. starch would not be digested
   C. more glucose would be absorbed
   D. Conversion of sugars to the substances would stop.
14. Which of the following is the adaptation of reptiles to a terrestrial ecosystem?
   A. Possession of lungs and shelled eggs
   B. Possession scales and long tails
   C. Ability to climb trees and avoid predators
   D. Body shape and ability to regulate body temperature.
15. Which of the following **is not** an adaptation of leaves for photosynthesis? It;
   A. Is broad and thin
   B. has thick cuticle
   C. has stomata and air spaces
   D. numerous chloroplasts
16. In the upward movement of water in the xylem the water molecules don't easily fall apart because of;
   A. High viscosity
   B. cohesive force
   C. dissolved salts
   D. adhesive force
17. If the dorsal fin of a fish is removed, the fish would;
   A. Tend to roll
   B. be viable to turn efficiently
   C. reduce speed of movement
   D. be viable to swim upwards
18. The immediate effect in a child born with a hole in the wall between the two ventricles is to;
   A. Prevent flows of blood into the aorta
   B. Prevent flows of blood to pulmonary artery
   C. Cause blood to flow back into the veins
   D. Mix oxygenated with deoxygenated blood
19. Which of the following changes may result in the increase in the pressure of the thoracic cavity?
   1. Contraction of abdominal muscles
   2. Relaxation of external intercostals muscles
   3. Contraction of the diaphragm
   4. Relaxation of the intercostals muscles
   A. 1 and 2
   B. 1 and 3

C. 3 and 4 D. 2 and 4

20. The following table shows the main nitrogenous wastes which are removed from blood by the kidney

Wastes	**% in blood**	**% in urine**
Protein	7-9	0
Urea	0.0.3	2.0
Uric acid	0.0005	0.05
Ammonium ions	0.0001	0.05

Which of the following is the correct conclusion from the table?

A. The kidney removes all proteins from blood
B. The amount of poisonous substances are more in urine
C. No salts lost from the any part of urine
D. The kidney removes urea more effectively than uric acid

21. Which of the following may happen when a mammal is subjected to severe cold?

A. Superficial blood vessels are dilated C. Sweating and pointing occurs
B. The hairs are lowered D. Rate of metabolism increases

22. Why is it that blood **does not** clot within the blood vessels despite the presence of thrombokinase enzymes and calcium ions?

A. Anti-thrombin is always present in excess in blood
B. The co-enzyme for activating thrombokinase is lacking
C. The enzyme for the process is only released when broken platelets are exposed
D. Prothrombin is inactive in the blood.

23. In the mark-recapture study of fish population in a lake, 40 fish were caught, marked and released. In the 2nd capture, 45 fish were caught and 9 of these were marked. What is the estimated fish population?

A. 90 C. 1800
B. 360 D. 200

24. Which of the following organisms is **not** correctly paired with its trophic level?

A. Grasshopper – primary consumer C. Phytoplankton – primary producer
B. Zooplankton - secondary consumer D. Eagle – tertiary consumer

25. Meiotic cell division is important because it ensures that

A. There is variation in the number of chromosomes
B. The number of chromosomes is not doubled during fertilization
C. Chromosomes of the daughter cells are identical
D. Bad traits are not passed to the off springs

26. Which of the following is a function of thyroxin hormone? It;

A. Promotes development of follicles in the ovary
B. Prepares the body for flight-flight action
C. Controls the body metabolic rate
D. Regulate the sugar level in the body

27. The recent increase in the carbon dioxide level in the atmosphere is associated with;

A. Primary productivity C. increased human population
B. burning of fossil fuel D. reducing amount of rain

28. Which of the following is true of parthenogenesis?

A. An individual may change its sex
B. Specialized groups of cells, grow into new individuals
C. An egg, develops without being fertilized

D. Reproductive organs of both male and female are involved.

29. The enzyme that hydrolyses starch in germinating seeds is
    A. Amylase
    B. Diastase
    C. Ptyalin
    D. Carbohydrase

30. A homozygous red flowered plant was crossed with a homozygous white flowered plant. The offspring were all pink. This show that
    A. The gene for red and white flower colour are co-dominant
    B. The two genes are incompatible to one another
    C. Both genes are recessive
    D. Neither of the two gens is slowing enough.

SECTION B

31. A farmer wished to plant a certain species of trees in his farm. However, the seeds normally take long to germinate after sowing. To overcome this problem he soaked several seeds in hot water at 50^0C. Batches of 20 seeds were removed at one-minute intervals and then planted in trays containing moist soils. After 15 days, the number of seedlings that grew in each tray were counted. The results obtained are shown in the table below.

Batch order	1	2	3	4	5	6	7	8	9	10	11
Time interval (minutes)	0	1	2	3	4	5	6	7	8	9	10
Germinated seeds	3	3	8	15	18	13	10	6	2	0	0
Percentage germination											

(a) (i) Calculate the percentage germination for each batch and fill in the table above.

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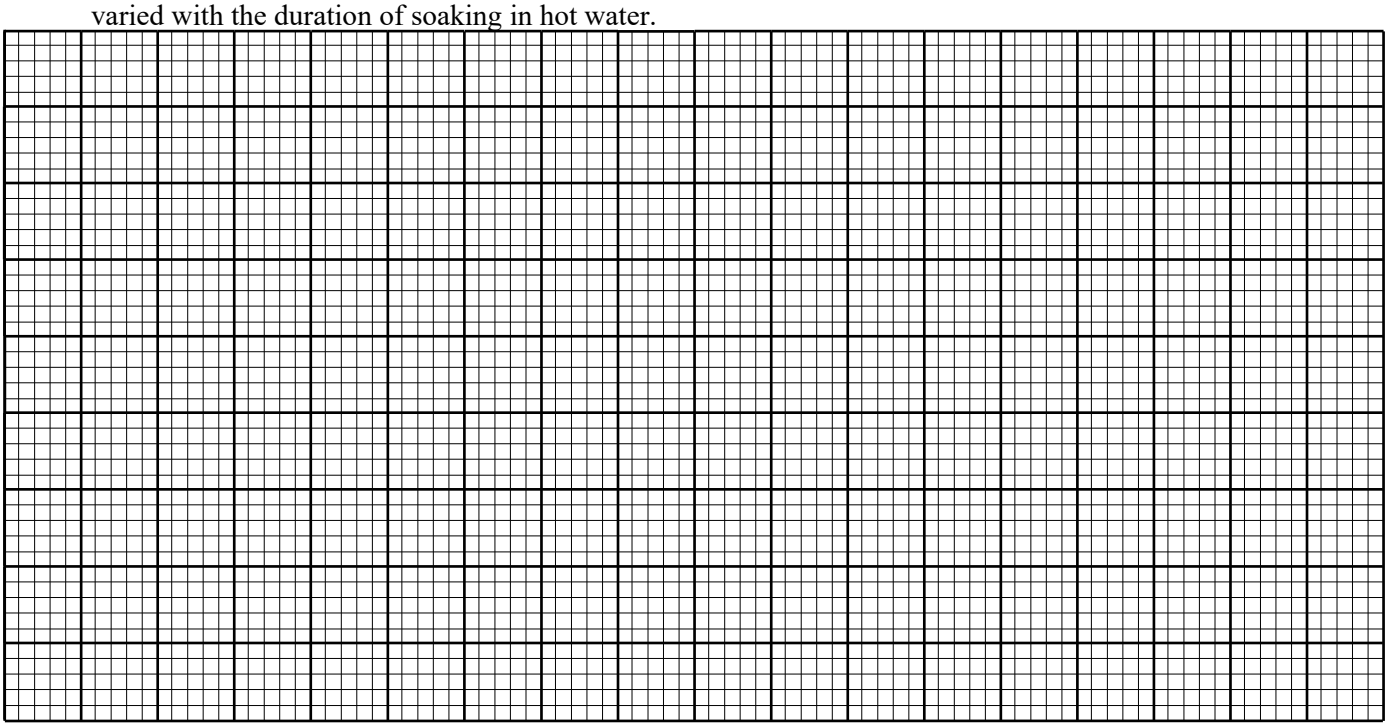
(ii) Use your result for (a) (i) above and plot a graph showing how the percentage germination varied with the duration of soaking in hot water.



(b) From the graph, calculate the expected number of seeds that would germinate if the seeds were soaked for 4½ minutes.

……..

(c) Using the graph briefly describe the effect of hot water heated in the seeds of the plant.

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(d) Explain the differences in the germination success between seeds soaked in hot water up to 8 minutes and those not soaked.

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(e) Explain why there was no germination of seeds soaked for 9-10 minutes.

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(f) Besides hot water treatment, suggest another simple method that could be used to speed up germination in such plants.

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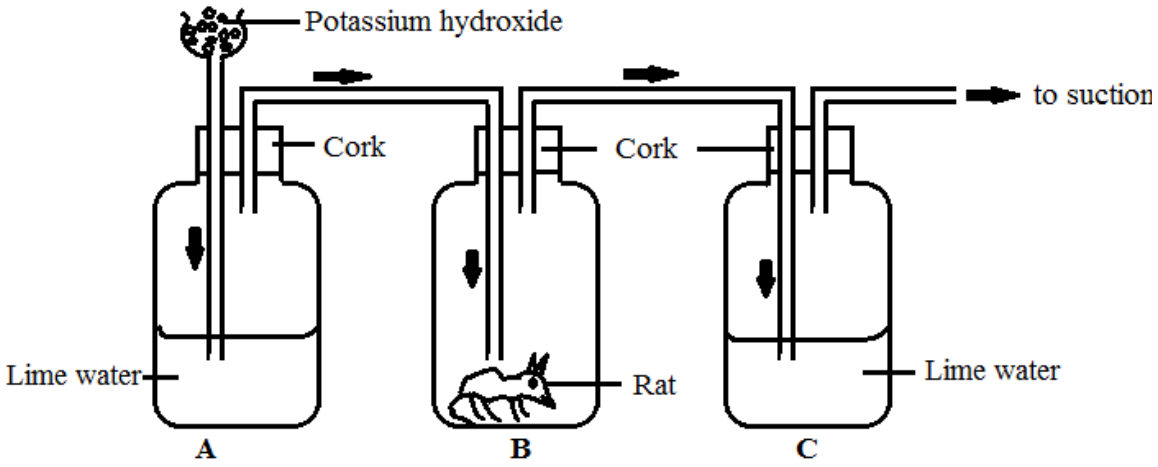
32. The experimental set up below was to demonstrate a physiological process in a mammal. Study it carefully and answer the following questions.



a) State the aim of the experiment

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b) State with reasons the use of each of the following in the experiment:

(i) Potassium hydroxide

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(ii) Lime water in A

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(iii) Lime water in B

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c) Explain the changes of any in the lime water in

(i) Jar A

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(ii)Jar C

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d) Which jar is acting as control?

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e) If the same set up was to be used to show the same biological process in green plants placed in jar B.

(i) What precaution must be taken to ensure that the same result is obtained when the animal was used?

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(ii) Give a reason for your answer.

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33. Immediately after birth a set of triplets, two of whom were known to be identical twins were separated and brought up by different families. The table below shows data for the triplets at the age of 20 years.

	Mary	**Jane**	**Betty**
Height in metres	1.78	1.78	1.74
Weight in Kg	78	80	86
Blood group	O	AB	O
I.Q	135	140	125

(a)(i) Which two girls are identical twins?

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(iii) Which characteristics in the table enabled you to identify the identical twins?

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(iv) Explain your answer above.

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(c) Suggest why these two girls who are identical twins were different from each other in any one of the wings shown in the table.

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(d) Identify which of the normal characteristics show

(i) Continuous variation

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(ii) Discontinuous variation

……

(e) What is the genotype of the parents of these triplets as regards the blood groups?

…….

SECTION C

34 (a) Approximately equal numbers of males and females are born. Suggest reasons to explain why this is so.

(b) What are the possible blood groups likely is to be inherited by children born to a **'group A'** father and a **'group B'** mother? Fully explain your reasoning.

35(a) With the aid of a diagram, briefly explain how gaseous exchange occurs between a plant leaf and the atmosphere during the night.

(b) Explain how this process might be affected by lack of water in the soil.

36(a) How does an adult housefly differ from an adult mosquito in the way they:

(i) Feed

(ii) Spread disease organisms?

(b) Using your knowledge of the lifecycle and habits of the housefly, explains how this pest can be controlled.

37(a) What are the essential features of sexual reproduction?

(b) Briefly explain the roles hormones play in the sexual cycle of human

Answers for section C

TEST PAPER 27

SECTION A

1. Roughage is **not** digested in the human alimentary canal because;

A. It adds bulk and eliminates possibility of constipation
B. It helps the colon to re-absorb much water
C. Of lack of digesting enzymes
D. Cleans the teeth and minimizes dental decay.

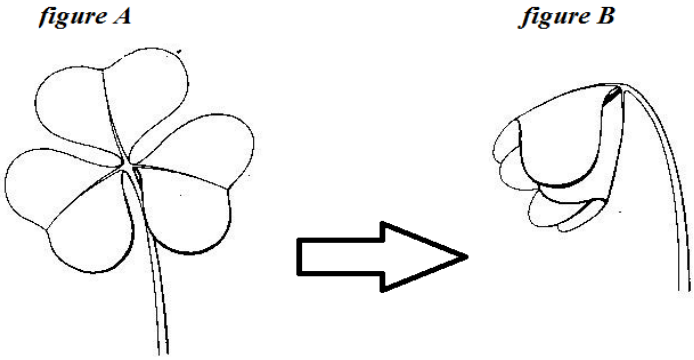
2. In which leaf region does **least** photosynthesis occur?

A) Epidermal layer
B) Palisade layer
C) Mesophyll layer
D) Spongy layer

3. Which of the following fins in a fish is used for breaking when the fish is locomoting?

A. Anal
B. Pelvic
C. Dorsal
D. Ventral

4. Which of the following is true about the growth response shown in the figure?



It:

A. does not involve growth
B. involves growth
C. is irreversible
D. photosynthesis ceases temporarily

5. Farm crops eventually exhaust the soil where as this doesn't happen with natural bush or forest. This is because of;

A. Natural forests live longer
B. Natural vegetation requires less nutrients
C. Farm crops grow more quickly
D. Farm crops are harvested

6. The left ventricle of the heart is more muscular than the right ventricle because it has to;

A. Receive oxygenated blood to the lungs
B. Pump blood very long distances
C. Pump a lot of blood to the lungs
D. Receive a greater quantity of blood.

7. The product of the first meiotic division are two

A. identical cells each with a diploid chromosomes number
B. identical cells each with a haploid chromosome number
C. non identical cells each with a haploid chromosome number
D. non identical cells each with a diploid chromosome number

8. A person **cannot** commit suicide simply by holding his breath because;

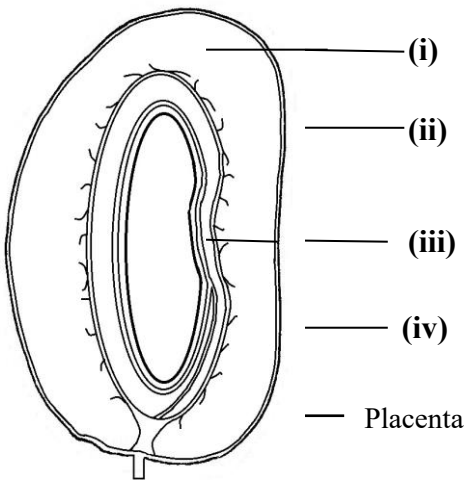
A. Accumulation of carbondioxide in the blood forces him to breath
B. Oxygen accumulated in the blood can last for a long time
C. Oxygen can diffuse into the blood via the skin
D. Carbondioxide can diffuse out of the blood via the skin

9. A runner breathes 500cm^3 of air in each breath. His breathing rate is 40 breathes per minute. If the atmosphere id 40 breathes contains 15.1% oxygen by volume, what is his oxygen intake per minute?
   A. 300cm^3 **C.** 2000cm^3
   B. 600cm^3 **D.** 3000cm^3
10. A person accidentally swallowed some tablets which made him to pass out a lot of urine every 10 minutes. After a period of 2 hours he would be found to be suffering from;
   A. Diabetes mellitus **C.** Diabetes inspidus
   B. severe dehydration **D.** Diarrhea
11. The following are stages in the excretion of nitrogenous wastes in a mammal;
   1-Selective reabsorption 3-Ultra-filtration
   2-Waste taken to kidney 4-deamination in the liver
   Which of the following is the correct sequence of events?
   A. 1,2,3 and 4 **C.** 2,3,1 and 4
   B. 4,2,3 and 1 **D.** 4,3,2 and 1
12. During germination, there is usually initial decrease in the dry mass of the seeding. This is because;
   A. The stored food is used up during respiration and growth
   B. Mineral salts are lost to the soil
   C. The seedling is losing water through transpiration
   D. Bacteria in the soil are using and decaying the stored food.
13. Which of the following can help in brightening an image on the retina in dim light?
   A. Decreasing the pupil size **C.** Relaxing the iris muscle
   B. Contracting the iris muscles **D.** Contracting the ciliary muscles
14. A feeding relationship which proceeds from grass to rabbit to fox and lion is best described as a
   A. A. food web **C.** who eats who
   B. structured feeding relationship **D.** food chain
15. Which of the following will lead to excretion of large quantities of sugar in the urine of a man?
   A. A hot dry day C. Heavy meal rich in carbohydrates
   B. drinking a lot of glucose D. removal of pancreas
16. Which of the following is **NOT** true of all vertebrae?
   A. Vertebrarterial canals **C.** Spinous process
   B. Transverse process **D.** Centrum
17. Which of the following characteristics is unique to birds?
   A. Variable body temperature C. Possession of scales and ability to fly
   B. Possession of feathers D. Possession of spinal cord
18. Which of the following is **NOT** a function of skeleton in mammals?
   A. Protection of delicate organs **C.** Storage of phosphorous and calcium
   B. Formation of foetal red blood cells **D.** Allowing flexibility during locomotion
19. Identical twins are produced when;
   A. Each of the 2 ovaries releases an egg and both fertilized
   B. One ovary releases two eggs and birth fertilized
   C. An egg divides into two individuals
   D. One fertilized egg divides into two individuals
20. Why do some plants produce large quantities of pollen grains? Because;
   A) Some of the pollen grains don't mature

B) Much of the pollen grains never reach the stigma
C) The pollen grains are light and easily blown by wind
D) It doesn't require a lot of energy to produce them.

21. A characteristic common to all food chains is that
    A. they all begin with micro-organisms
    B. man is at the top most level
    C. there is energy loss across throughout
    D. producers are at every level
22. Guard cells differ from other epidermal cells of leaves in that they
    A. lack nuclei
    B. are square in shape
    C. contain chloroplasts
    D. do not photosynthesize
23. The local cattle variety are crossed with imported varieties because the offspring are;
    A. Resistant than local and imported varieties
    B. Productive and resistant than local and improved varieties
    C. Productive than local and imported variety
    D. Productive than local and resistant imported varieties
24. A heterozygous red-flowed pea plant was crossed with a homozygous red flowered plant. What were the ratios of the offspring phenotypes?
    A. All red
    B. 3 red: 1 white
    C. 2 red: 1white
    D. 1 red: 3 white
25. The following results were obtained when the F1 generation of pure breeding parents for round seeds and wrinkled seeds were crossed.
    -Dominant traits - round seeds
    -Recessive trait - wrinkled seeds
    -Number of F_2 offspring - 7524
    From the above results, it can be concluded that the actual number of round seeds obtained in the F_2 generation was;
    A. 1881
    B. 5643
    C. 2508
    D. 22572
26. If a man of blood group A marries a woman of blood group B to bear a child of blood group AB, which of the following statements is true?
    A. No blood transfusion is possible between family members
    B. The mother can donate blood to the father but not to the child
    C. The child could receive blood from both parents
    D. The child could donate blood to both parents

27. Below is a diagram of longitudinal section of a fruit.



Which part enables establishing the exact identity of the fruit?
A. (i)
B. (ii)
C. (iii)
D. (iv)

28. Which of the following consists of only insects with similar feeding methods?

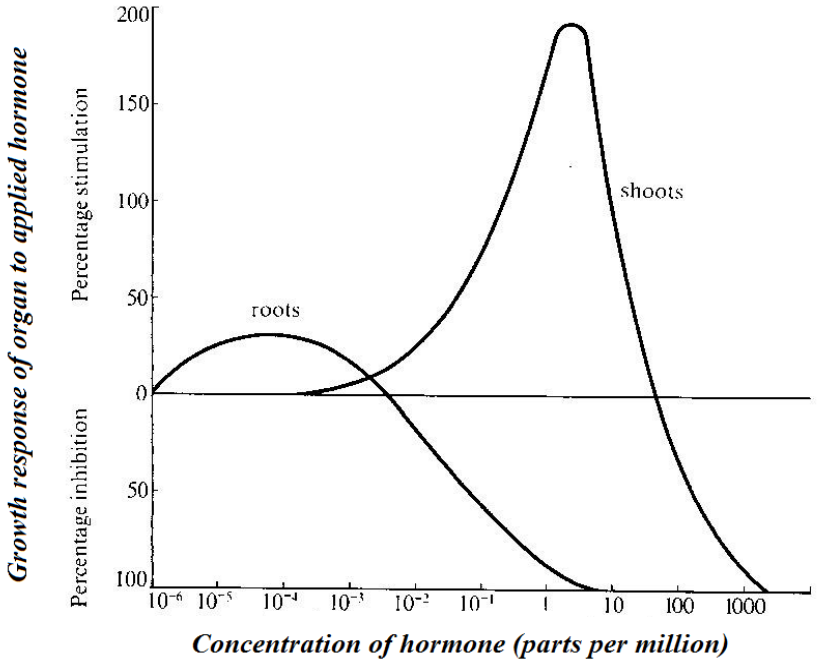
A. Cockroach, locust, butterfly
C. Tsetse fly, mosquito, butterfly
B. Locust, housefly honey bee
D. Termites, tsetse fly, honey bee

29. The most suitable method for estimating the fish population in a pond is

A. total counting
C. random sampling
B. Capture release recapture
D. removal sampling

SECTION B

31. The graph below shows the effect on growth of the different concentrations of a **plant hormone** applied to the shoots and roots. A positive response indicates increased growth compared with plants in the **control experiment**, while a negative response indicates reduced growth.



(a) (i) What is meant by the term:

Hormone? (01 Mark)

……

Control experiment? (01 Mark)

……

(ii) Suggest what the plant hormone used in this experiment could be (01 Mark)

……

(b) Compare the growth response of roots and shoot from the growth above

(ii) Differences (03 Marks)

Growth response of roots	Growth response of shoots

(ii) Similarities (03 Marks)

……

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……

(c) What general conclusion can be drawn regarding the relationship between hormone concentration and:

(i) Shoot growth? (02 Marks)

……

……

(ii) Root growth? (02 Marks)

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(d) Calculate the concentration of the plant hormone above in grammes per decimeter (g dm^{-3}) which caused maximum shoot stimulation. (1 g dm^{-3} = 1,000 ppm). **Display your working clearly.** (03 Marks)

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(e) Suggest **two** ways in which hormonal coordination in plants and animals:

(i) are similar (02 Marks)

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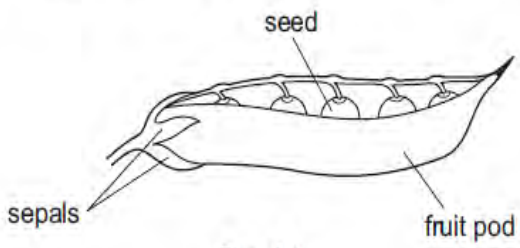
(ii) differ (02 Marks)

hormonal coordination in plants	**hormonal coordination in animals**

32. The figure below is a section through the fruit of a pea plant showing some of its seeds.



a) Explain why the cells of the fruit pod, as shown in the figure, are genetically different from the cells of the embryo in the seeds (03 marks)

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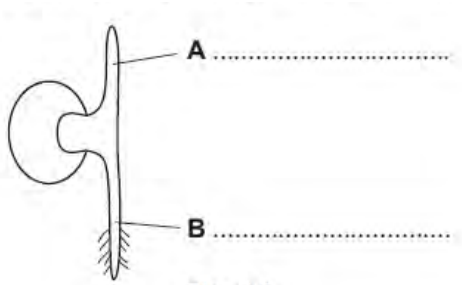
b) (i) below is a diagram of a pea seedling after germination had begun



Name the structures labelled A and B (write your answers on the diagram)

ii. State three conditions that are always required for germination

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c) Define the terms growth and development

Growth

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Development

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33. Plants **D** and **E** are homozygous for leaf shape, and plant **F** is heterozygous. The leaf shape is controlled by two alleles.

a) State the phenotype of the heterozygous plant

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b) Construct a generic diagram to show how a particular cross will always result in all offspring having a different phenotype from both parents

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c) Suggest the explanation for the above results

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d) In some cases when two plants shown above are crossed, the offspring produced have two different leaf shapes in the ratio 1:1. Use suitable genetic symbols to show how this happens.

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SECTION C

34. (a) Define the a mutation (01 mark)
(b) Outline five causes of mutations (05 marks)
(c) Give five characteristics of mutations (05 marks)
(d) Give four examples of naturally occurring mutations (04 marks)

35. (a) (i) What is meant by an **enzyme**? (02 marks)
ii. State the differences between enzymes and inorganic catalysts. (04 marks)

b) Explain how the following affect enzyme activity: (09 marks)
i. PH
ii. Temperature

36. (a) state the advantages of a sexual reproduction (05 marks)

b) Explain why plant species which one self pollinated are reproduced a sexually but less well adopted than species that one cross pollinated. (10 marks)

37. a) Explain with details how transpiration rate of a plant is affected by;
i. Decreasing humidity of surrounding air (06 marks)
ii. Increasing the temperature of surrounding air (06 marks)

b) Suggest why some insects, which are parasitic on plants obtain their food from the phloem rather than the xylem. (03 marks)

END

Answers for section C

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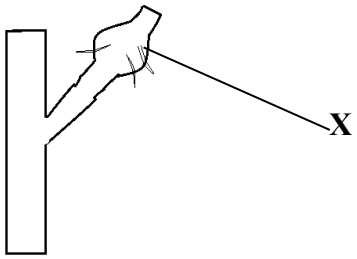
TEST PAPER 28

SECTION A

1. Which one of the following is **does not** result from osmosis?
   A. support
   B. wilting
   C. absorption of some digested food
   D. absorption of water by roots
2. The solute concentration of an Irish potato tuber cells is about **0.25M**. What happens when potato tuber cells are placed in solute concentration of **1M**?
   A. cells absorb water and burst
   B. cells absorb water and become turgid
   C. cells lose water and shrink
   D. cells neither lose nor absorb water
3. A plant branch was ringed and the growth response was as shown.



Which of the following is true at region marked **X**?

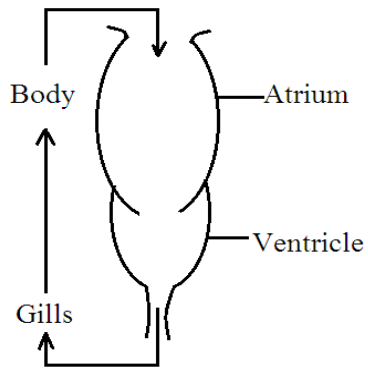
A. accumulation of water and mineral salts

B. in folding of the bark

C. accumulation of waste substances

D. accumulation of manufactured food

4. The Irish potato is swollen due to
   A. being a root
   B. storage of food
   C. being an organ of vegetative reproduction
   D. the presence of buds and scale leaves.
5. The wall of the heart is supplied by nutrients from;
   A. coronary artery
   B. hepatic artery
   C. pulmonary artery
   D. aorta
6. The figure below shows:

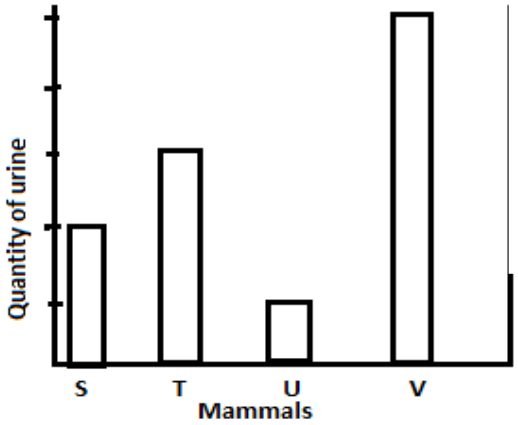


   A. open circulation
   B. closed circulation
   C. single circulation
   D. double circulation
7. Which of the following conditions would raise the rate of transpiration in plants?
   A. low temperature and low humidity
   B. high temperature and low humidity
   C. windy conditions and high humidity
   D. still air and low humidity
8. Which one of the following is the correct path air takes in an insect during gas exchange.

A. Trachea, Tracheoles and bronchioles
B. Spiracle, trachea and bronchioles
C. Spiracle, trachea and tracheoles
D. Trachea, bronchus and bronchioles

9. Maize bears both male and female flowers. The best term to describe this condition is?
A. Protandry
B. Protogyny
C. Dioeciousness
D. Monoeciousness

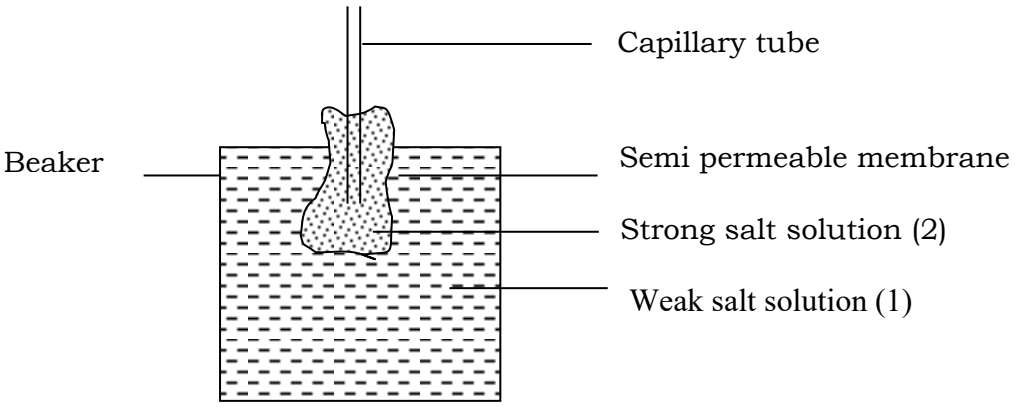
10. The quantity of urine passed per day was measured in four mammals S, T, U and V, of the same species, in their natural habitats. The results are as shown in the figure below.



Which of the four mammals is likely to be a desert dweller?
A. S
B. T
C. U
D. V

11. In insects, blood flows from hearts to body cavity and then rejoins the hearts via the Ostia. This is describes as
A. open circulation system
B. closed circulation system
C. single circulation system
D. double circulation system

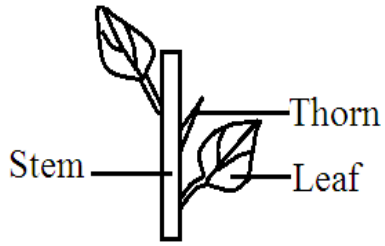
12. The figure below shows an experiment which was set up and left to be observed the following day.



Which of the following events would **not** have taken place?
A. rising of solution 2 high in the capillary tube
B. reduction of the level of solution 1
C. the level of solution 2 in the capillary tube will have fallen
D. Reduction in the concentration of solution 2.

13. When humans eat yams they are acting as
A. Decomposers
B. Secondary consumers
C. primary consumers
D. Primary producers

14. *Mimosa pudica* plant folds leaves independently of the direction of the stimulus when touched. This is an example of:
    A. Nastism
    B. Phototropism
    C. Taxism
    D. Fear behaviour
15. What does a potometer actually do? It:
    A. measures water uptake by roots
    B. reduces water loss by leaves
    C. measures water loss from leaves
    D. regulates water uptake by roots
16. Which of the following is **not** an adaptation for dry habitat?
    A. long roots
    B. shiny leaf surface
    C. more stomata at underside of leaves
    D. more stomata at upper side of leaves
17. When the ciliary muscles of the eye contract, the
    A. lens becomes this and the eye sees near objects
    B. lens becomes thick and the eye sees near objects
    C. lens becomes thin and the eye sees far objects
    D. lens becomes thick and the eye sees far objects
18. Which plant tissue transports food?
    A. xylem
    B. phloem
    C. cambium
    D. parenchyma
19. The organs chiefly involved in regulation of blood sugar level in the body are
    E. pancreas and liver
    F. pancreas and gall bladder
    G. liver and muscles
    H. intestines and liver
20. Eggs of birds are larger cells than those of mammals mainly because
    A. The development of chicks is external
    B. Chickens have feathers
    C. Mammalian foetal development is internal
    D. Mammalian foetus is more delicate
21. When sodium hydroxide solution was added to a food substance followed by copper II sulphate solution, a colourless solution turned to blue. What best conclusion can you draw?
    A. reducing sugars were present
    B. starch was present
    C. proteins were absent
    D. vitamin C was present
22. The figure below shows part of stem of Bougainvillea plant. What is it modified for?



    A. Vegetative propagation
    B. Support
    C. Storage of water
    D. Attraction of pollinators

23. Biological control of cotton boll worms would involve
    A. spraying with insecticides
    B. Burning infected cotton plants
    C. introducing predatory worms
    D. Hand picking infected cotton bolls
24. When sodium hydroxide solution was added to a food substance followed by copper II sulphate solution, a colourless solution turned blue. What best conclusion can you draw?
    A. reducing sugars were present
    B. starch was present
    C. proteins were absent
    D. vitamin C was present

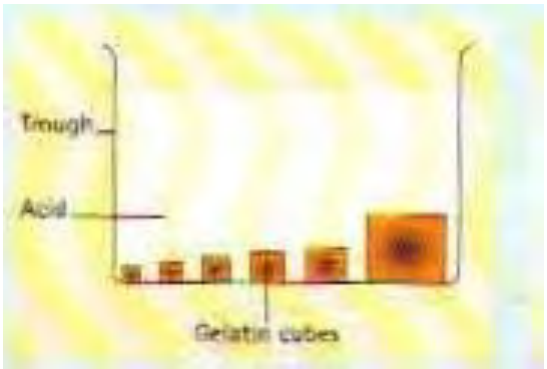
25. If the rate of blood flow through the renal artery is 1200cm^3 per minute and urea concentration in the renal artery is 32mg per 100cm^3 , what quantity of urea would be removed from the kidney in one hour; assuming the rate of blood flow remains constant?
    A. 96mg
    B. 576mg
    C. 5760mg
    D. 11520mg
26. Which of the following cells of the leaf are non photosynthetic?
    A. guard cells, except other epidermal cells
    B. epidermal cells, except guard cells
    C. spongy mesophyll cells
    D. palisade mesophyll cells
27. The following would not cause the guard cells to open except
    A. too much transpiration taking place
    B. increase in atmospheric temperature
    C. high concentration of water
    D. high concentration of sugars present
28. Which of the following is most important in absorption of mineral salts by roots?
    A. Active transport
    B. Osmosis
    C. Diffusion
    D. Translocation
29. Insectivorous plants e.g. Venus flytrap capture insects, digest and absorb nutrients from them. Which of the following consists of the nutrient obtained from this act and what the plant manufactures from the nutrient?

	NUTRIENT	**USED TO MAKE**
A	Carbon	Carbohydrate
B	Nitrogen	Protein
C	Oxygen	Fats
D	Hydrogen	Water

30. Which of the following teeth are **nonexistent** in the human milk set of teeth
    A. Premolars
    B. canines
    C. molars
    D. incisors

SECTION B

31. In an investigation to measure the speed of diffusion, cubes of gelatin which had been stained purple with an indicator solution were placed in dilute acid as shown in the diagram.



The time taken for the each cube to turn completely orange is shown in the table

Length of side of cube (mm)	**Time taken to turn orange (s)**	**Surface area of cube (mm^2)**	**Volume of cube (mm^3)**	**Surface area to volume ratio**
1	20			
2	41			
3	76			
4	104			
5	188			
10	600			

(a) Complete the table (09 marks)

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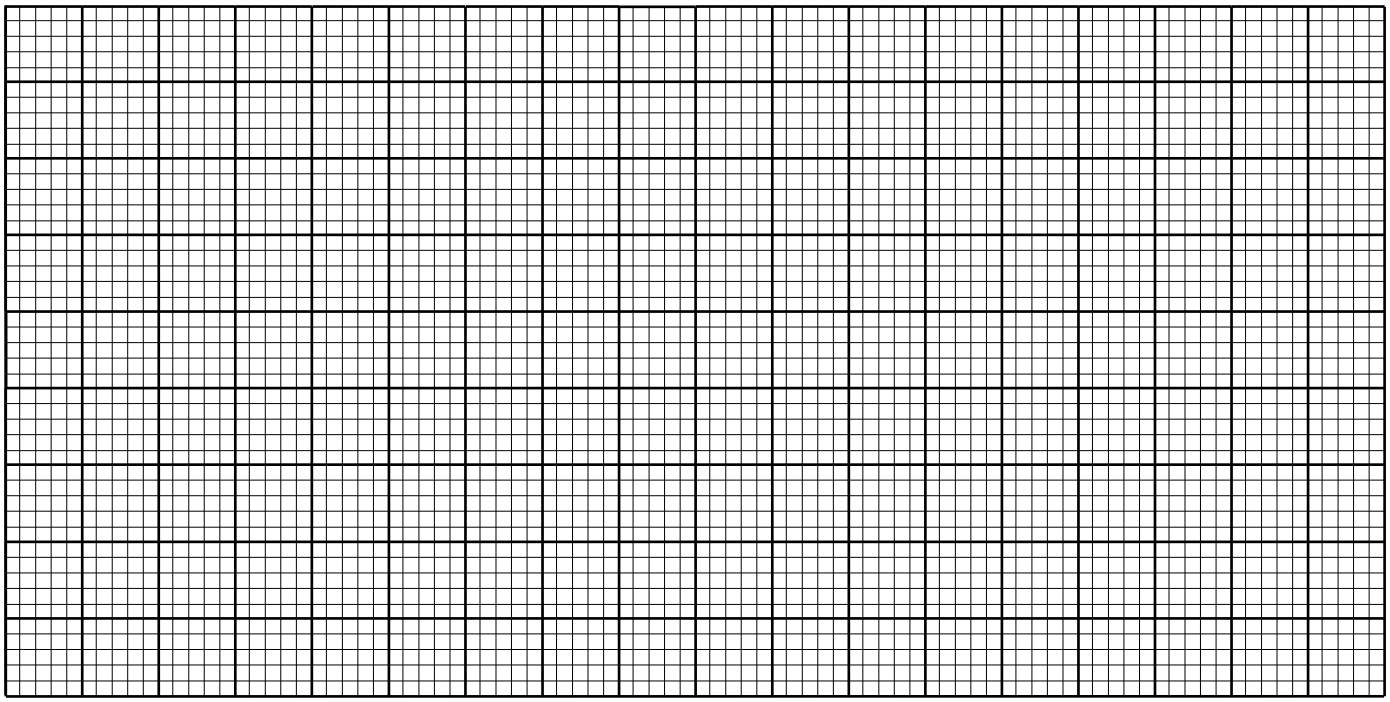
(b) Plot a graph of surface area to volume ratio against time taken to turn orange

(05 marks)



(c) What do the results suggest about the efficiency of diffusion in supplying materials to the centre of an organism's body (03 marks)

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(d) Suggest methods which organisms might use to improve the supply of materials by diffusion. Try to provide examples of these methods. (03 marks)

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32. The information given in the table below summarises reproductive habits of three different animal species.

Feature	**Species A**	**Species B**	**Species C**
Egg diameter (mm)	8.0	0.5	2.0
Amount of yolk in egg	Large	Very little	Moderate
Site of embryonic development	Shelled egg	Uterus	Water
Epidermal covering	Scales	Hair	Mucus
Adult habitat	Terrestrial	Marine	Terrestrial

(a) Suggest the identity of the three species

Species A

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Species B

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Species C

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(b) (i) Suggest which species will release the largest number of eggs at one given time. Give reasons for your answer.

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(ii) Suggest the ecological advantage that species have by producing the largest number of eggs.

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(c) (i) One of the species used gills for gaseous exchange at one stage of its life cycle. Indentify the species and give a reason for your choice.

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(ii) State two advantages that species A gains by having embryonic development inside shelled eggs.

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33. (a) Approximately equal numbers of males and females are born. Suggest a reason to explain why this is so. (show how you arrive at this conclusion)

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(b) A colour blind woman married a woman who delivered both colour blind daughters and a colour blind sons. Using your genetics knowledge to determine how many of their children can differentiate color.

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SECTION C

34. (a) Describe flapping flight in birds
    (b) State the adaptations of birds to flight
35. (a) Define the transpiration
    (b) What are the;
        i. Advantages of transpiration
        ii. Disadvantages of transpiration
    (c) Why should plants be watered in the morning or evening rather than in the afternoon?
36. (a) Distinguish between exocrine and endocrine glands
    (b) Draw a labelled diagram to show the location of endocrine glands in man
    (c) How is the blood sugar level maintained after a meal rich in carbohydrates?
37. (a) Why do living organisms need food?
    (b) Describe digestion of food in a ruminant
    (c) How does digestion in carnivores differ from that in ruminants?

Answers for section C

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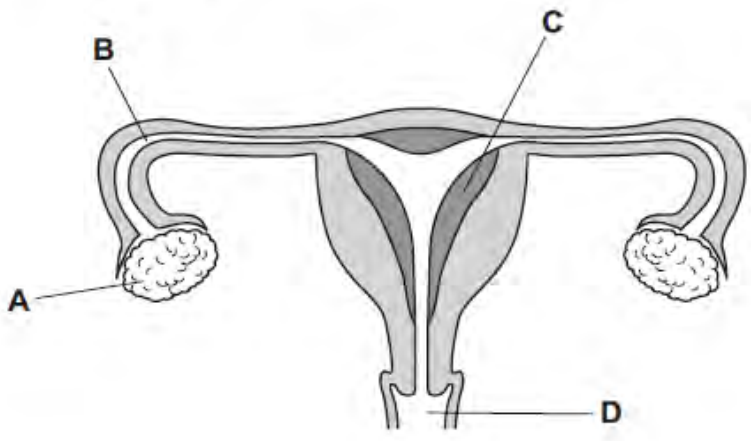
TEST PAPER 29

SECTION A

1. The role of boiling a leaf in methylated spirit during starch test is to
   A. Remove the green pigment
   B. soften the leaf
   C. Break the chloroplast
   D. stiffen the leaf
2. Which of the following substances is not transported in blood?
   A. Amylase
   B. sodium chloride
   C. urea
   D. insulin
3. The dry fruit which splits open along many lines of weakness is
   A. Follicle
   B. capsule
   C. Achene
   D. legume
4. The organelle in the cell responsible for the formation of ATP is
   A. Nucleus
   B. centriole
   C. mitochondria
   D. ribosome
5. Which of the following cannot be used in the classification of plants?
   A. Leaf size
   B. leaf structure
   C. type of seeds
   D. flower structure
6. Which of the following parts of the brain controls breathing?
   A. Cerebellum
   B. medulla oblongata
   C. Cerebrum
   D. hypothalamus
7. Which of the following blood groups will not agglutinate with any blood serum when mixed
   A. O
   B. A
   C. AB
   D. B
8. A knee jerk is an example of
   A. Voluntary action
   B. conditioned reflex
   C. Reflex action
   D. nastic response
9. The diagram below shows the female reproductive system.
   Where does implantation normally occur?



10. The structure of the mammalian ear concerned with balance is
    A. Semi circular canals
    B. cochlea
    C. Eustachian tube
    D. Oval window
11. Secondary growth is dicotyledonous plant causes an increase in
    A. Number of branches
    B. height
    C. Length
    D. thickness

12. Blockage of the bile duct would impair the digestion of
    A. Starch
    B. proteins
    C. fats
    D. cellulose
13. Alcoholic fermentation occur by
    A. Virus
    B. a mould
    C. bacteria
    D. a fungus
14. Movement of water up the xylem of a tall tree is greatly attributed to
    A. Root pressure
    B. transpiration pull
    C. Osmosis
    D. capillary
15. The best method of studying distribution of a grass species in a football pitch is
    A. Quadrate
    B. line transect
    C. Direct counting
    D. capture recapture
16. Global warming is a result of
    A. Increased carbon dioxide in the atmosphere
    B. Increased nitrogen in the atmosphere
    C. The sun moving near the earth
    D. Increased oxygen in the atmosphere
17. Liverworts belong to phylum.
    A. Pteridophyta
    B. bryophyta
    C. Ciliophora
    D. Angiospermatophyta
18. Lymphocyte effect immunity by
    A. Releasing of antibodies
    B. coagulating of foreign bodies
    C. Engulfing foreign bodies
    D. production of antigens
19. The yellowing of leaves in growing maize indicates a deficiency of
    A. Calcium
    B. nitrogen
    C. iodine
    D. sulphur
20. Haemolysis is a result of
    A. Osmosis
    B. diffusion
    C. phagocytosis
    D. active transport
21. If a species has 36 chromosomes in each somatic cell, how many chromosomes will the ovum contain
    A. 6
    B. 18
    C. 24
    D. 72
22. In vertebrates, the joint between an axis and Atlas vertebrates is
    A. Ball and socket
    B. hinge
    C. pivot
    D. gliding
23. The following are the events that occur during seeds germination.
    (i) Testa splits
    (ii) Hypocotyls grows fast
    (iii) Epicotyls grows fast
    (iv) Cotyledons appear above the ground
    (v) Cotyledons remain below the ground

The correct order for epigeal germination is
    A. (i), (ii) and (iv)
    B. (i), (iv) and (ii)
    C. (i), (iii) and (iv)
    D. (i), (iv) and (iii)
24. Which one of the following body activities occurs during cold weather?
    A. Sweat production increase
    B. sweat production decreases
    C. Blood capillaries dilates
    D. metabolic rate decreases

25. Excess glucose in blood is removed by
    A. Glucagon
    B. insulin
    C. Adrenaline
    D. thyroxine
26. Which one of the following **does not** increase the rate of gaseous exchange?
    A. Increased surface area
    B. Decreased thickness of exchange surface
    C. Increased body size of organism
    D. Increased concentration gradient
27. What is the genotype of the offsprings if a heterozygous man with a normal skin married an albino?
    A. Aa and aa
    B. Aa only
    C. AA and aa
    D. Aa and AA
28. The vertebra bone with short neural spine, small centrum and vertebrarterial canal found in
    A. Cervical region
    B. lumbar region
    C. thoracic region
    D. caudal region
29. A medium of high pH stops the action of
    A. Pepsin
    B. lipase
    C. ptyalin
    D. maltase
30. Which one of the following as not a function of the liver.
    A. Detoxification of poisons
    B. Regulation of cholesterol production
    C. Storage of amino acids
    D. Storage of vitamins.

SECTION B

31. The table below shows the assumed percentage composition of gases in both alveolus and blood in human hat at rest.

Gases	**Oxygen**	**Carbondioxide**	**Nitrogen**
In alveolus	20%	3.0%	78.8%
In blood	16%	4.0%	78.8%

(a) From the above table, state the similarities and differences in percentage composition between alveolus and human blood.

(i) Similarities (1 mark)

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Give reasons for the similarities given above. (2 marks)

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(ii) Differences. (2 marks)

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Give reasons for the differences given above. (4 marks)

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(b) (i) State the advantages of the difference in percentage composition given in a (ii) above. (2 marks)

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(ii) Explain how the differences in a (ii) above are maintained. (3 marks)

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(iii) State a condition that would lead to uniform percentage composition of gases between the alveolus and blood. (2 marks)

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(c) Explain the effects of strenuous exercise in man to percentage composition of gases in alveolus and blood. (4 marks)

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32. Colour blindness is a genetic condition in humans. It is caused by a recessive gene caned on X chromosome.

(a) By using crosses, show how parents of normal sight produce a colour blind male child. (06 marks)

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(b) (i) What is the probability of producing a colour blind female child? Show your working. (2 marks)

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(ii) State why colour blindness is common in male humans. (2 marks)

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33. (a) What is meant by the term ecosystem? (2 marks)

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(b) Construct a food web which may exist in a grass land area comprising of the following organisms lizard, green plants, snakes, field mice, hawk and insects in its community. (4 ½ marks)

(c) What would happen to that grass land community if,

(i) All the snakes were removed from the community at once (2 marks)

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(ii) All green plants were removed at once. (2 marks)

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SECTION C

34. (a) Describe the events that lead to the fast withdraw of the hand when a person touches a hot object. (7 marks)

(b) Outline four differences between simple reflex action and voluntary responses. (4 marks)

(c) State the advantages of tropism to plants. (4 marks)

35. (a) What is the importance of excretion in organisms? (2 marks)

(b) Describe the process of urine formation in man. (10 marks)

(c) Describe the effect of anti diuretic hormone deficiency in man. (3 marks)

36. (a) What is metamorphosis in insects? (2 marks)

(b) Describe the life cycle of anopheles mosquitoes. (7 marks)

(c)(i) Explain how man can reduce death caused by malaria. (4 marks)

(ii) State the effect of malaria to man. (2 marks)

37. (a) What are the effects of fire to ecosystem? (6 marks)

(b) Describe the human activities that have destroyed wetland. (6 marks)

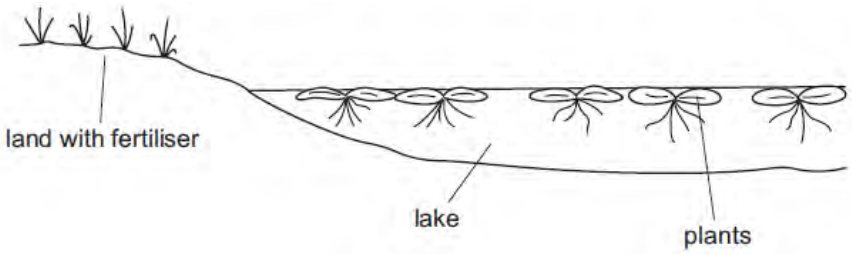
(c) State three uses of wet land to man. (3 marks)

Answers for section C

TEST PAPER 30

SECTION A

1. Which of the following is a pair of raw materials used in the process of photosynthesis?
   A. Glucose and Oxygen
   B. Glucose and Water
   C. Carbondioxide and Oxygen
   D. Carbon dioxide and Water
2. Which of the following processes requires a high blood pressure?
   A. Selective re absorption
   B. Glomerular filtration
   C. Tubular absorption
   D. Selective absorption
3. A maize grain is an example of ……..
   A. An achene
   B. a drupe
   C. a caryopsis
   D. a seed
4. Monocotyledonous plants have the following basic characteristics;
   A. False fruits
   B. sheathed leaf
   C. True fruit
   D. Reticulate venation
5. In plants energy is generated by …….
   A. mitochondria
   B. Nucleus
   C. Cytoplasm
   D. Ribosomes
6. Which of the following compounds combines with fatty acids to form fats?
   A. Acids
   B. Fructose
   C. Glycerol
   D. Glucose
7. Which of the following is a method of asexual reproduction for amoeba?
   A. Binary fission
   B. Binary fusion
   C. conjugation
   D. multiple fission
8. A farmer put some fertiliser on his field. Soon afterwards, there was a heavy storm and some of the fertile drained into a lake.



What is the effect of the fertiliser on the growth of the crop plants in the field and the plants in the lake?

	Crop plants	**Lake plants**
A	Increase growth	Increase growth
B	Increase growth	Decrease growth
C	Decrease growth	Increase growth
D	Decrease growth	Decrease growth

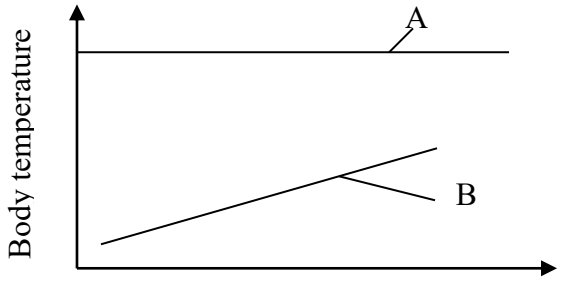
9. In living organisms, energy is stored in a compound called …….
   A. Adenosine diphosphate
   B. Adenine
   C. Adenosine triphosphate
   D. Antidiuretic
10. After manufacturing food, plants transport it in a ……..
    A. Xylem
    B. Cortex
    C. Pith
    D. Phloem
11. Plasmodium parasites are transmitted by:
    A. Tsetse fly
    B. Anopheles mosquito

C. Housefly D. Aedes mosquito

12. A maize seedling was planted in a solution lacking magnesium, this plant was more likely to have leaves that are:
    A. Purple C. Yellow
    B. Green D. Brown
13. Unlike mammals, the type of growth shown by insects is
    A. Even C. Intermittent
    B. Un even D. Interstitial
14. Which one of the following features varies in any way different from the others?
    A. height in man C. Eye colour in man
    B. skin colour in man D. weight in man.
15. Which one of the following substances does **not** contain Nitrogen?
    A. Urea C. Glycerol
    B. Amylase D. Amino acids
16. The relationship between the root nodules and Nitrogen fixing bacteria is ……
    A. Symbiosis C. Rotism
    B. Parasitism D. Nodulism
17. Which of the following examples explains tropism?
    A. Withdrawal of woodlice from light C. withdrawal of housefly larva from light
    B. bending of mimosa plant on touch D. growing of a been root towards water
18. In flowering plants, an endosperm is formed when, the second male nucleus fuses with the
    A. Egg Nucleus C. Antipodals
    B. Polar nucleus D. Embryo Sac
19. Part of the middle ear is linked to the inner ear is the ;
    A. Stapes C. Cochlea
    B. Eardrum D. oval window
20. Which one of the following glands has secretions that control growth hormones?
    A. Pituitary gland C. Thyroid gland
    B. Adrenal gland D. Gonads
21. Which one of the following is a long term adaptation of mammals to low environmental temperature?
    A. Raising of hair C. Deposition of fat under the skin
    B. Increase in metabolic rate D. Reduction of blood flow to the heart
22. Which of the following is less important during flight in birds?
    A. Hollow bones C. Pectoral muscles
    B. Quill feathers D. Down feathers.
23. Which one of the following methods would be the best for estimating population density of rats in a bush?
    A. Direct counting C. Line transect
    B. Quadrant method D. Capture – recapture method
24. In pea plants, a cross between pure breeding tall and short peas, produces tall peas. The phenotypic ratio expected when a heterozygous plant is crossed with a short plant will be …
    A. 50% tall, 50% short C. 25% tall,75% short
    B. 100% tall D. 75%tall and 25% short
25. Fertilization immediately results in the formation of ……..
    A. A zygote C. a placenta
    B. an embryo D. Foetus
26. Many students were seen frequenting urinals on a cold day, this was because;

A. Their kidneys absorbed less water from blood
B. Their kidneys absorbed much water from blood
C. They had taken more water than usual
D. Their bodies lost very little water as sweat.

27. What is the importance of haemoglobin in red blood cells.
    A. Gives a red colour to the cells
    B. Prevents a person from falling sick
    C. Readily combines with food
    D. Readily combines with oxygen
28. A vertebra that has a short neural spine, large neural canal, inter vertebrarterial canals is more likely to be;
    A. Thoracic vertebra
    B. Caudal vertebra
    C. Lumber vertebra
    D. cervical vertebra
29. The figure below shows how the body temperature of animals varies with environmental temperatures.



Which of the following explains well the figure?
    A. Body temperature of A is dependent on environmental temperature.
    B. Body temperature of B is dependent on environmental temperature
    C. A has a higher body temperature than that of B.
    D. B loses more heat than A.
30. Which one of the following does not qualify to be called an animal?
    A. Cockroach
    B. amoeba
    C. Snake
    D. Frog

SECTION B

31. The data below was collected from a garden when Irish potato tubers were planted, germinated and dry weighed of tubers and stems measured over a period of seven weeks and tabulated as follows:

Dry weight (g)	**Number of weeks**						
	1	2	3	4	5	6	7
Tubers	16.2	13.1	10.0	8.6	7.4	5.2	4.3
Stems	0	0	0.2	0.4	0.8	2.2	3.4

a) Represent the above data on a graph (08 marks)

(Next page)

b) (i) Describe the graph for Tubers. (02 mark)

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ii. Give reasons for the changes in dry weight of the tubers (1 ½ marks)

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c) Describe the graph for stems (02 marks)

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ii. Give reasons for the changes in dry weight of the stems. (1 ½ marks)

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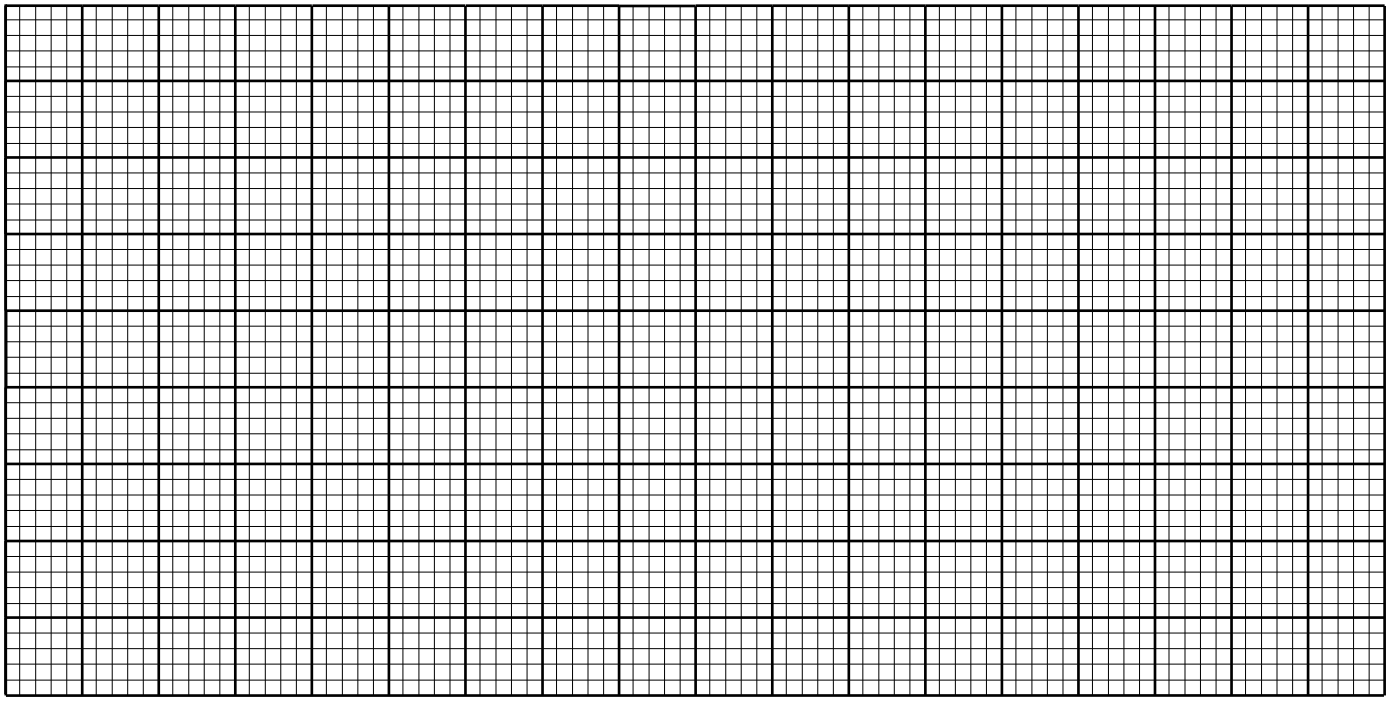

d) (i) What was the aim of the experiment? (01 mark)

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ii. Why is dry weight used instead of fresh weight? (02 mark)

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iii. Suggest two other ways by which this experiment can be carried out other than the one used

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32. a)(i) What is pollination? (01 mark)

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ii. Distinguish between cross pollination and self pollination (02 marks)

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b) (i) Why is pollination important to plants? (02 marks)

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ii. Give **three** adaptations of flowers for insect pollination. (03 marks)

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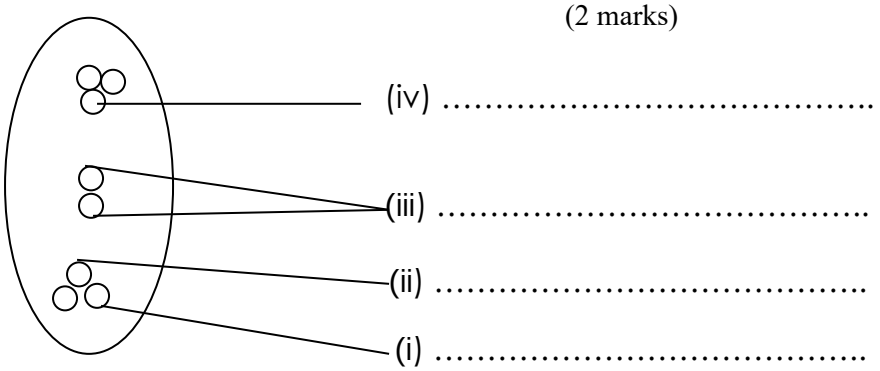
iii. Below is a diagram of a plant structure, Name parts labeled (i) – (iv). On the diagram (2 marks)



33. An extract of cabbage leaves was prepared by crushing cabbage leaves with a little water in a mortar. An unheated extract was added drop wise to 2ml of DCPIP in a test tube until the DCPIP lost its colour. Extracts heated for 5 and 15 minutes were tested similarly. The results obtained are shown in the table below.

Time for heating the extract in minutes	**Number of drops of extract that decolourised DCPIP**
0	5
5	20
15	Dye remained blue after 50 minutes

a) What is DCPIP used to test? (01 mark)

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b) What is the effect of heating the extract? (01 mark)

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c) What would happen if the cabbage is shredded or cut into very small pieces before cooking? Give reasons. (02 marks)

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d) What advice would you give about the preparation of vegetables for human consumption?

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e) State any three uses of vegetables in the human diet (03 marks)
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SECTION: C

34. (a) Distinguish between double and single circulatory systems. (1 mark)

b) Explain how each one of the following blood vessels are adapted for their function;

i. Capillaries ii. Veins iii. Arteries

a) Describe the route taken by blood from the Kidney until it is oxygenated (05 marks)

35. (a) Describe the digestive processes of proteins, lipids and starch in the small intestines.11

(h) How is the absorption surface of the alimentary canal adapted for its functions

36. (a) What is environmental degradation? (2 marks)

(b) Describe how man's activities may lead to soil degradation. (7 marks)

(c) How can the above problem be solved? (6 marks)

37. (i) What is mutation?

(ii) Give three causes of mutation. (4 marks)

(b) Sickle cell anaemia is a trait controlled by a recessive gene. If a woman heterozygous for sickle cell anaemia marries a sickler, illustrate using suitable symbols, the possible genotypes and phenotypes of their off springs. (7 marks)

(ii) What is the ecological advantage of such genes? (2 marks)

(iii) Name two other mutant traits in man. (2 marks)

Answers for section C

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TEST PAPER 31

SECTION A

1. A medium of high pH stops action of

   A. Pepsin
   C. ptyalin
   B. lipase
   D. maltase

2. Choose the most suitable description of a sieve tube in plants. They are made up of

   A. Living cells and transport water in plants
   B. Living cells and transport food within plants
   C. Dead cells and transport water in plants
   D. Dead cells and transport food within plants

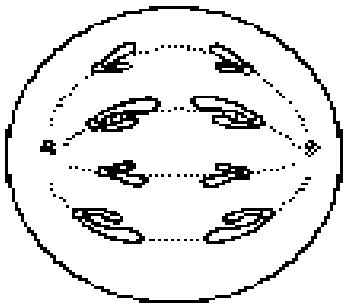
3. Which of the following is the function of the choroid during accommodation in mammals?

   A. Perceives black, white and grey images
   C. Supplies food to the eye
   B. Absorbs dust entering the eye
   D. Prevent reflection of light in the eye

4. In mammals, the anti-diuretic hormone(ADH)

   A. Inhibits the reabsorption of water
   C. Stimulates water absorption
   B. Inhibits water absorption
   D. Stimulates water reabsorption

5. What stage of cell division represented in the diagram below?



   A. Anaphase
   B. metaphase
   C. Prophase
   D. Telophase

6. The path followed by impulse during a reflect action is

   (i) Muscle
   (iv) Relay neuron
   (ii) Sensory organ
   (v) Motor neuron
   (iii) Sensory neuron

A. (iii),(iv), (ii), (v), (i)
C. (i), (v), (iv),(v), (i)
B. (iii), (ii), (iv), (v), (i)
D. (ii), (iii) ,(iv), (v), (i)

7. To carry out photosynthesis, a plant requires the presence of

   A. Oxygen, light chlorophyll and water

   B. Carbon dioxide, light, chlorophyll and water

   C. Chlorophyll, oxygen, carbon dioxide and water

   D. Water, carbon dioxide, sugar and light

8. Which one of the following is **not** an example of excretion

   A. Sweating
   C. Dropping of leaves

   B. salivation in dogs
   D. a goat inhaling

9. Which one of the following plants would depend most on wind for its reproduction?

   A. Small inconspicuous flower and light seeds

   B. Sticky pollen grain and explosive fruits

   C. Numerous pollen grains and enclosed stigma

   D. Coloured petals and small hairy fruits

10. A trait which does **not** express itself unless homozygous is said to be

   A. Sex – linked trait
   C. A linked trait

   B. a multiple allele trait
   D. a recessive trait

11. Secondary growth in plants causes an increase in

   A. Length
   C. height

   B. thickness
   D. number of branches

12. Which one of the following protozoa has least developed locomotory structure?

   A. Amoeba
   C. paramecium

   B. Euglena
   D. plasmodium

13. Which one of the following is a long term adaptation of mammals to low environmental temperature

   A. Reposition of fats under the skin
   C. Reduction of blood flow to the skin

   B. Increase in metabolic rate
   D. Raising of hair on the skin

14. Which one of the following sets of flower parts don't match?

   A. Sepals and petals together form a perianth
   C. Petals form the corolla

   B. Sepals form the calyx
   D. Carpels form the androecium

15. A heterozygous red flowered plant is crossed with a homozygous white plant. A gene for red colour is dominant over the one for white, what will be the phenotype of the offsprings?

A. All red
C. pink and white
B. all white
D. Red and white

16. Yellow leaves in growing maize plants indicates deficiency of

A. Mercury
C. Sulphur
B. Copper
D. magnesium

17. Which one of these characters is not an example of a continuous variation in man?

A. Skin colour
C. Body weight
B. height in man
D. blood groups in man

18. Which of the following characteristics increases water holding capacity of soils?

A. Much clay, much humus and much sand
C. Much clay, little humus and much sand
B. Much clay much humus and little sand.
D. Little clay, much humus and much sand

19. Which one of the following methods would you use to estimate the frequency of plant species in an area

A. Quadrant method
C. Belt transect
B. capture recapture
D. Aerial photograph

20. The part of the brain that controls breathing is the

A. Cerebellum
C. Medulla oblongata
B. cerebrum
D. hypothalamus

21. Haemoglobin is a protein molecule usually in combination with;

A. Phosphorus
C. Iodine
B. sodium
D. iron

22. In a mammal urea is made in the

A. Liver
C. Kidney
B. Bladder
D. Pancreas

23. The red marrow of the long bones of the human skeleton

A. Stores carbohydrates
C. Secretes hormones
B. acts as a shock absorber
D. Manufacture blood cells

24. In which phase in the process of cell division does crossing over occur.

A. Anaphase of meiosis I
C. Metaphase of mitosis
B. Prophase of meiosis I
D. prophase of meiosis II

25. Which one of the following occurs during exhalation in a mammal? The

A. Diaphragm relaxes
C. Volume of the chest cavity increases
B. Ribs move upwards
D. External intercostal muscles contract

26. Which one of the following are the end product of sucrose:

A. Glucose and glucose
C. glucose and fructose
B. Glucose and galactose
D. fructose and galactose

27. Aerobic respiration is more efficient than anaerobic respiration because it.

A. Uses more oxygen
C. Yields less energy
B. uses less oxygen
D. yields more energy

28. In which part of alimentary canal does mucus have a protective function?

A. Small intestine
C. Stomach
B. Oesophagus
D. Rectum

29. Identical twins are formed when;

A. One egg is fertilized by two sperms
C. one unfertilized egg divides into two
B. Two eggs are fertilized at the same time
D. A zygote separates into two parts

30. Stunted growth and mental retardation in children may be caused by

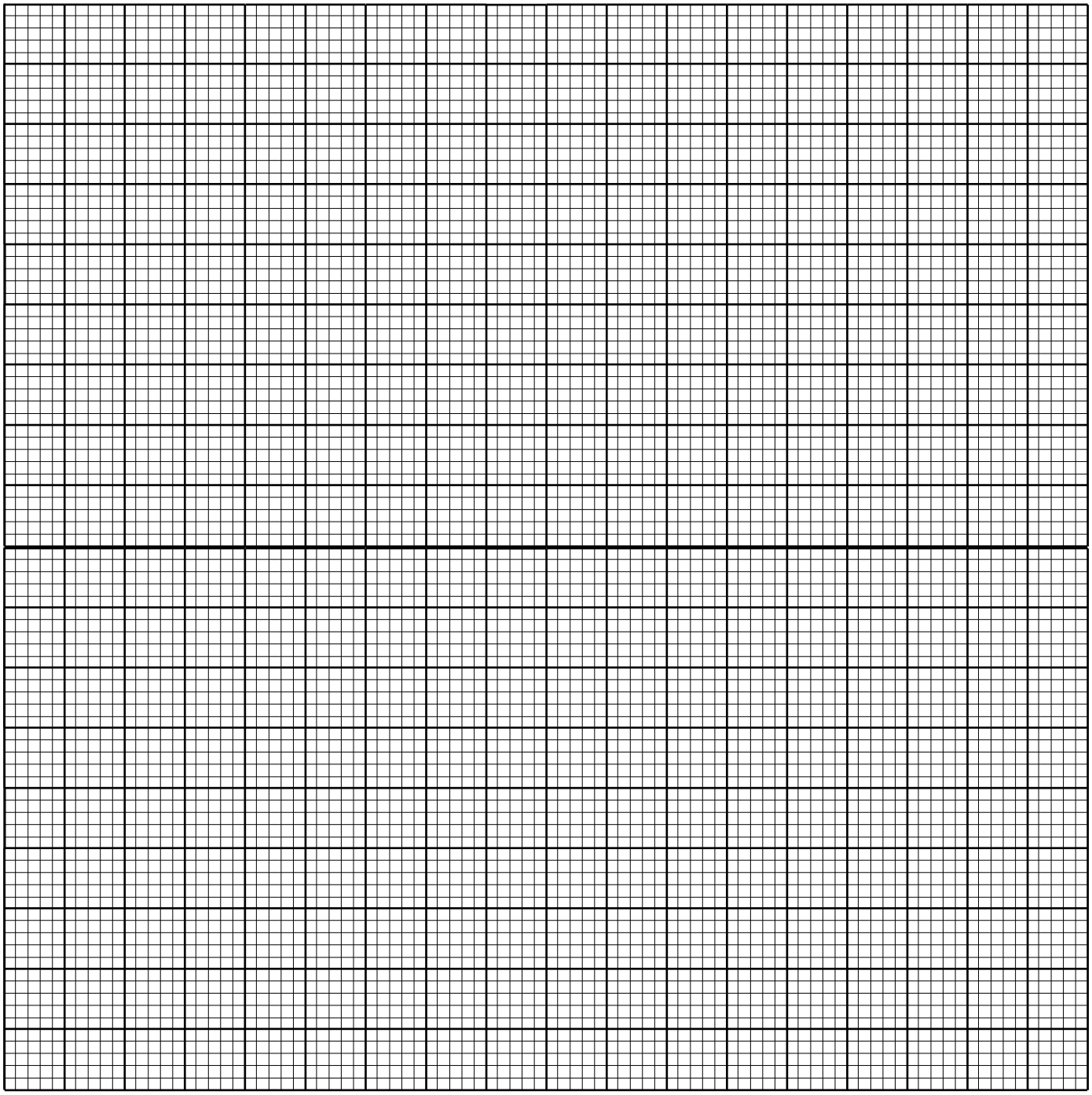
A. Under production of pituitary hormone
C. Deficiency of thyroxine hormone
B. Under production of insulin
D. Deficiency of adrenaline hormone.

SECTION B

31. An experiment was carried out to investigate the population growth of mice in a laboratory setting.
Twenty young mice were placed in a cage.
The amount of food supplied to the mice each day was kept constant.
The results obtained were as shown in the table below.

Time in months	0	2	4	6	8	10	12	14	16	18
Number of mice	20	20	65	115	310	455	455	190	145	160

(a) Plot a graph showing how the population of the mice varies with period of the experiment



(b) From the graph, explain the changes in mice population between

(i) O to 2 months (02 marks)

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(ii) 2 to 10 months (02 marks)

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(iii) 10 to 12 months (02 marks)

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(iv) 12 to 16 months (02 marks)

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(c) What population changes would be expected if the investigation was continued up to 24 months? (01 mark)

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(d) Suggest three factors that could cause increase in population of the mice if the experiment was carried out in wild environment. (03 marks)

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32. Define the term

(i) Allele (02 marks)

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(ii) Genotype

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(b) A colour blind man married a woman whose father was color blind.

i. Using a well defined genetic symbols, show the proportion of the children who will be colour blind for the couple (06 marks)

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ii. State the cause of colour blindness in the affected children. (02 marks)

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33. (a) What is ventilation? (01 mark)

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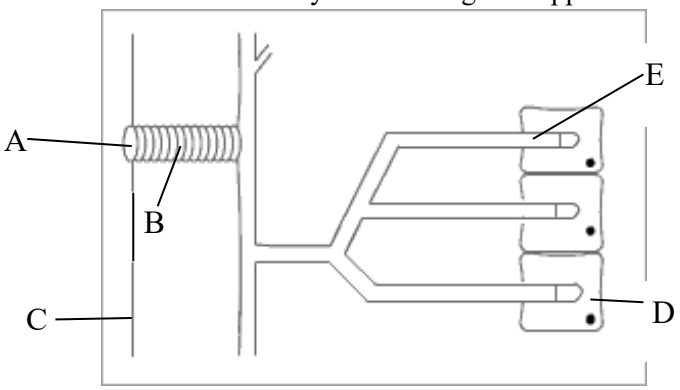
(b) The figure below shows the tracheal system in the grasshopper.



(i) Name the parts A – E ($02\frac{1}{2}$ marks)

A. …….....

B. ……

C. …….

D. ……

E. ……...

(c) Using evidence from the figure above, describe how the tracheal system is suited for its role. (04 marks)

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(d) Explain the absence of gaseous exchange system in amoeba. (02 marks)

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SECTION C

34. (a) Describe the hieratic events that cause flight in birds. (07 marks)

(b) Describe any other adaptations of birds to flight other than the skeleton. (08 marks)

35. (a) Define the term metamorphosis. (02 marks)

(b) With examples distinguish between complete and incomplete metamorphosis. (04 marks)

(c) How are the following adapted to their mode of life in the life cycle of the butterfly?

(i) The Larva (04 marks)

(ii) The adult (05 mark

36. (a) How is the skin of the frog adapted for gaseous exchange? (04 marks)

(b) Describe how an adult toad uses its lungs for gaseous exchange. (11 marks)

37. (a) With an example in each define

(i) Tropism (ii) Nastic movement (iii) Tactic movement

(b) Describe how auxins cause phototropism in plant shoot. (06 marks)

(c) What is the importance of positive phototropism in plants? (03 marks)

Answers for section C

TEST PAPER 32

SECTION A

1. Which one of the following protozoa uses false legs for movement?
   1. euglena
   2. plasmodium
   3. amoeba
   4. trypanosome
2. Which one of the following bounds an animal cell?
   A) cell membrane
   B) both cell membrane and cell wall
   C) cell wall
   D) nuclear membrane
3. Which one of the following fins is important in forward movement in fish?
   A) anal fin
   B) caudal fin
   C) pectoral fin
   D) dorsal fin
4. Which one of the following is an important gas exchange surface in insects?
   A) trachea
   B) longitudinal trachea
   C) spiracles
   D) tracheole
5. Which one of the following organisms has no nuclear membrane?
   A) plasmodium
   B) bacteria
   C) amoeba
   D) star fish
6. Which one of the following plant structures is not used in vegetative propagation?
   A) leaves
   B) stems
   C) flowers
   D) roots
7. Which of the soil samples has good aeration and low water retention
   A) sandy soils
   B) loam soils
   C) clay soils
   D) laterite soils
8. Which one of the following occurring natural processes is involved in lowering soil fertility?
   A) nitrogen fixation
   B) nitrification
   C) putrefaction
   D) denitrification
9. Which one of the following is **not** used in representing ecological relationships in an area?
   A) energy flow in the ecosystem
   B) biomass of the ecosystem
   C) number of organisms at each level in the ecosystem
   D) adaptation of the organisms at each level to the ecosystem
10. Which one of the following diseases is associated with bacteria?
    A) malaria
    B) dysentery
    C) cholera
    D) trypanasomiasis
11. Many endo-parasites are more successful in their way of life because
    A) Have well developed digestive system
    B) have well developed tough cuticles
    C) production of numerous eggs
    D) have well developed limbs for easy movement
12. Which one of the following hormones is essential for sugar balance in the body of man?
    A) thyroxin
    B) insulin
    C) vasopressin
    D) parathormone
13. Which one of the following is least important in energy provision to the body?
    A) ascorbic acid
    B) fatty acids
    C) amino acids
    D) glycerols
14. Which one of the following is important in bending the root towards water?
    A) Thigmotropism
    B) Chemotropism

C) phototropism
D) hydrotropism

15. Which one of the following methods increases variability of off springs?
    A) sporulation
    B) fragmentation
    C) fertilization
    D) binary fission
16. Which one of the following characteristics of the leaves is associated with reduced photosynthesis?
    A) numerous chloroplasts
    B) thick cuticle
    C) network of veins
    D) large intercellular air spaces
17. The enzyme in the alimentary canal of man which works best at low pH is called?
    A) pepsin
    B) trypsin
    C) pancreatic amylase
    D) peptidase
18. Which one of the following physiological methods increases heat loss from a mammalian skin?
    A) vasoconstriction
    B) decreased sweating
    C) contraction of the erector pill muscles
    D) lowering of skin hair flat
19. Which one of the following is not a function of secondary growth in plants?
    A) formation of storage tubers
    B) healing of damaged tissues in plant
    C) formation of seeds for propagation
    D) vegetative reproduction
20. Which one of the following stages in insects is associated with rapid growth and feeding?
    A) egg
    B) larva
    C) pupa
    D) imago
21. Which one of the following neurons conducts impulses from the receptors to the central nervous system?
    A) relay neurone
    B) motor neurone
    C) unipolar neurone
    D) sensory neurone
22. Which one of the following is the function of myelin sheath on the axon of a neurone?
    A) protects the axon
    B) synthesizes proteins
    C) reduces the speed of impulses
    D) produces energy for active transport
23. Which of the following is **not** associated with anaerobic respiration in muscles?
    A) lactic acid
    B) energy
    C) ethanol
    D) carbondioxide
24. The following characteristics are adaptation to efficient gaseous exchange in plants except;
    A) well ventilated
    B) well supplied with transport vessels
    C) moist cell surface
    D) large surface area
25. Which one of the following organs excretes carbondioxide in mammals?
    A) kidney
    B) skin
    C) liver
    D) lungs
26. Transpiration is important in plants **except** for;
    A) absorption of water and dissolved salts
    B) regulation of plant temperature
    C) transportation of water to the leaves
    D) elimination of excess water in plants
27. Skeleton is least important in;
    A) providing surface for muscle attachment
    B) providing of shape to the organism
    C) storage of calcium ions
    D) manufacturing of lymph
28. One of the following is an example of discontinuous variation.
    A) height
    B) tongue rolling
    C) length of the toes
    D) colour of the skin
29. Which one of the following excretory wastes conserves most water in the organisms?
    A) urea
    B) uric acid crystals

C) ammonia
D) uric acid

30. Reptiles are adapted to living in dry areas because of
A) possession of lungs
B) possession of limbs for movement
C) internal fertilization
D) possession of dry epidermal scales

SECTION B

31. The surface area to volume ration of three animals A, B and C was determined as shown in table 1 below. The amount of urine produced per hour by these animals in a specific habitat was also determined as shown in table 2.

Table 1

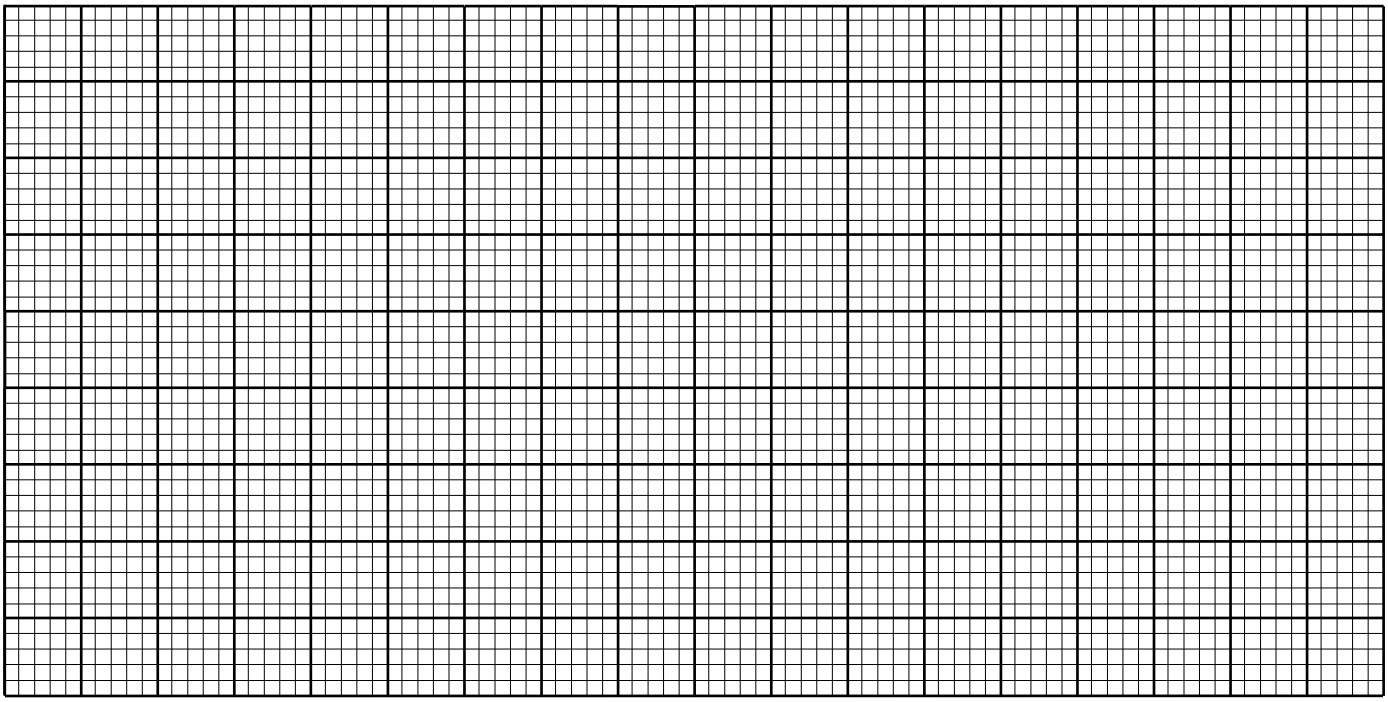
Animal	Ratio
A	0.5
B	4.0
C	2.0

Table 2

Time in hours	**Volume of urine (ml)**		
	A	**B**	**C**
0	20	1	4
1	15	6	2
2	10	8	2
3	10	7	2
4	10	6	2

a) i) Plot three graphs on the same axes of the amount of urine produced against time

(10marks)



ii. Describe the relationship that exists between urine production and surface area to volume ratio. (05 marks)

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b) Name the animal that is likely to be more active at any given time. Give reasons for your answer. (02 marks)

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c) Which animal is likely to lose less water in a desert environment and give reasons for your answer? (03 marks)

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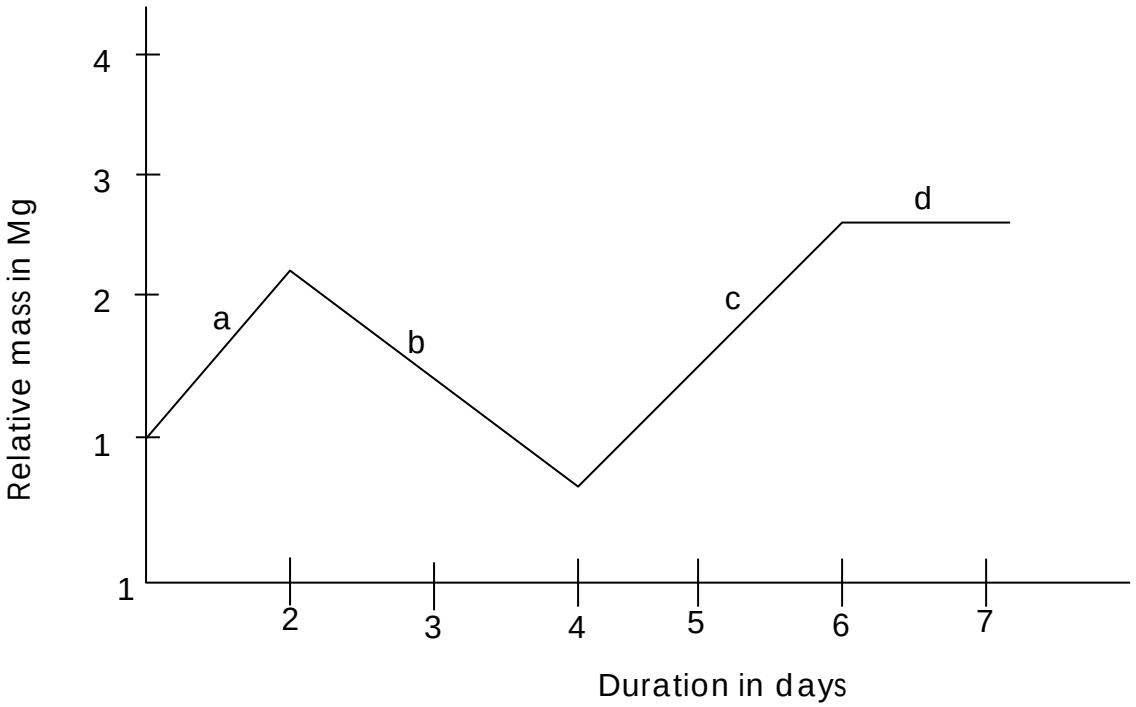
33. The figure below shows a growth curve of a bean seedling during germination. Study the curve and answer the questions which follow.



a) Describe how growth changes in seedling occur with time. (04 marks)

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b) What are the causes of growth differences shown by the graph? (04 marks)

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c) What two external conditions are essential for germination to successfully be completed? (02 marks)

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32. a) i) What is meant by the term soil degradation? (01 mark)

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ii. Outline four activities of man which lower soil fertility. (04 marks)

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b) Give five methods by which man is involved in conserving soil in Uganda. (05 marks)

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SECTION C

34. a) Using relevant examples, describe how asexual reproduction occurs naturally in different organisms. (10 marks)

b) What advantages are associated with asexual reproduction as opposed to sexual method?

35. a) i) What is blood? (1 mark)

ii) List down five constituents of blood and state their functions. (10 marks)

b) What are the differences in blood composition between the contents of blood in the hepatic artery and hepatic vein? (04 marks)

36. i) Define the following terms;

i) Mitosis (01 mark)

ii) meiosis (01 mark)

b) A plant with yellow flowers was crossed with another of purple flowers. The genes for yellow were recessive to that of purple.

i. What were the genotype and phenotype of F_1 off springs? (02 marks

ii. Explain the absence of yellow flowers in F_1 (02 marks)

c) Using relevant symbols, what percentage of F_2 off springs were purple? (09 marks)

37. Describe the digestive processes that occur in the stomach, duodenum and ileum, and explain what happens to each of the end products of digestion. (15 marks)

Answers for section C

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TEST PAPER 33

SECTION A

1. Which of the following is not a property of exoskeleton?
A Rigid to maintain the shape of the organism
B Hard to provide protection to the organism
C Flexible to ensure movement at the joint
D Hollow to keep the organism light for easy flight

2. Which of the following structures is unique to guard cells?
A Have thin inner walls
B Have chloroplasts
C Have large permanent vacuoles
D Have thin cytoplasm

3. The term which is used to describe the process of changes in the type of organisms in a given ecosystem is called.
A Competition
B Adaptation
C Succession
D Survival

4. Individuals with blood group O are said to be universal donors because they have:
A No antigens
B No antibodies
C Both antigens A and B
D Both antigens and antibodies

5. Which one of the following farming practices maintains soil fertility
A Bush fallowing
B Mixed farming
C Crop rotation
D Monoculture

6. The rate of glomerular filtration is lowest in
A Amphibians
B Desert animal
C Fresh water fishes
D Man

7. Seed dormancy due to embryo immaturity is overcome by:
A Dry storage at high temperatures
B By improving seed coat permeability
C Putting hydrated seeds in a cold room
D Allowing for an after ripening period

8. Which one of the following does not cause a decrease in human body temperature?
A Shivering
B Dilation of deeply lying blood capillaries
C Relaxation of erector pill muscles
D Opening of the skin pores

9. The following organisms belong to the same group except
A Trypanosoma
B Penicillium
C Plasmodia
D Amoeba

10. During the day, green plants produce less carbondioxide because
A Transpiration interferes with carbondioxide evolution by plant leaves
B Most stomata close due to strong heat during day
C Some of the carbondioxide produced is used up internally for photosynthesis
D The rate of respiration is low during the day

11. Which of the following feathers in birds is entirely used for keeping the birds warm?
A Covert feathers
B Contour feathers
C Quill feathers
D Down feathers

12. The element that is essential for formation of red blood cells in animals is
A Iron
B Phosphorous
C Calcium
D Nitrogen

13. Animal p has the following dentition $i\frac{0}{3}\ c\ \frac{0}{1}\ pm\ \frac{3}{3}\ m\frac{3}{3}$ what type of feeder is p?

A Omnivore
B Herbivore
C Carnivore
D Carrion eater

14. Which one of the following diseases is caused by a deficiency in hormones?

A Polio
B Rickets
C Diabetes
D Pellagra

15. Which one of the following description is of xylem vessels in plants?

A Dead cells and transport food
B Living cells and transports water
C Living cells and transports food
D Dead cells and transports water

16. Under which of the following conditions is ethanol likely to accumulate in plant cells

A Less carbondioxide
B Les oxygen
C More exercise
D More oxygen

17. A plant growth response to a stimulus from external environment is called

A Tropism
B Nastic response
C Tactic response
D Photoperiodism

18. In higher plant, the fusion of polar nuclei with male gamete forms

A Synergid nuclei
B Zygote
C Endospermic nuclei
D Secondary nucleus

19. Which of the following features cannot be used in the classification of plants?

A Seed types
B Leaf structure
C Flower structure
D Leaf color

20. The following are characteristics found in fish

I Overlapping scales from head to tail
ii Wider towards the anterior and narrower towards the tail
iii Possession of the lateral line
iv Possession of a long caudal fin

Which of the following characteristics are for increased propulsion in fish?

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

21. In mammals, glucagon hormone;

A Stimulates body metabolism
B Stimulates conversion of glucose to fats
C Inhibits reabsorption of water by the kidney
D Stimulates the conversion of fats to glucose

22. Which of the following is true of animal cells and not plant cells?

A Peripherally positioned nuclei
B Thin cytoplasm surrounded by cell membrane
C Large permanent cell vacuole
D Food stored in form of glycogen

23. Which of the following features is typical of crustacean?

A 2 pairs of antennae
B Jointed legs
C Exoskeleton
D Two main body parts

24. Enzymes are said to be available in nature because they

A Act on a particular PH medium
B Act on one kind of substrate

C Remain unchanged at the end of the reaction D Are plenty in nature

25. The main function of progesterone hormone in the reproductive cycle of a mammal is
A Causes ovulation
B Prepares uterine wall for implantation
C Initiates growth of a Graafian follicle
D Prepares uterine wall in preparation for menstruation

26. Which of the following pairs of cells lack nuclei when mature
A Companion cells and leucocytes C Sieve tube cells and companion cells
B Erythrocytes and leucocytes D Sieve tube cells and erythrocytes

27. Which of the following structures represents the respiratory surface of a terrestrial insect
A Spiracle C Tracheole
B Longitudinal trachea D Trachea

28. Which of the following is a respiratory product in aerobic respiration?
A Energy C Carbondioxide
B Water D Lactic acid

29. Growth in unicellular plasmodium is caused by
A Cell differentiation C Mitosis
B Assimilation D Sporulation

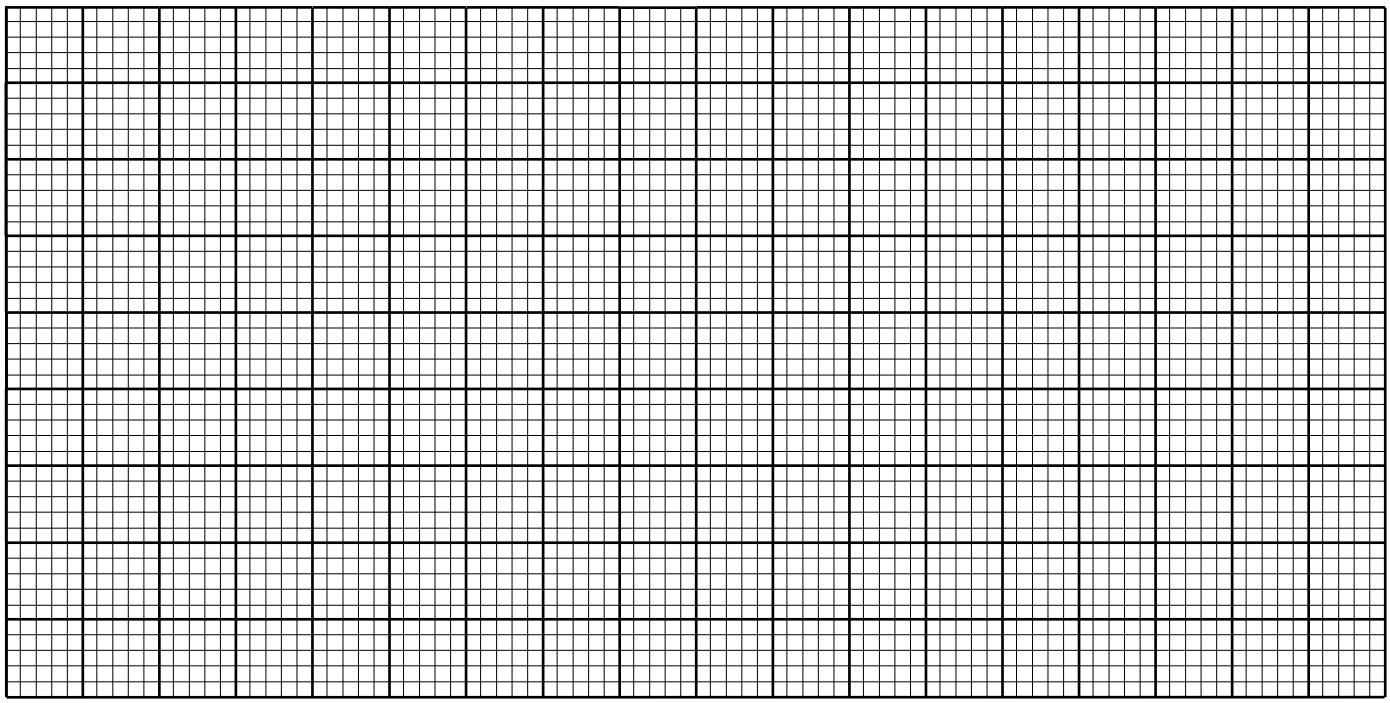
30. which of the following is associated with parasitic mode of nutrition
A Less developed digestive system C Production of many eggs
B Existence of more than one type of hosts D Complicated life cycles.

SECTION B

31. The table below shows the effect of PH on action of active substance x. use the information obtained on the table to answer the questions which follow:

pH	6.0	6.5	7.0	7.5	8.0	8.5
Rate of reaction in mg/cm^3	0	4	12	20	14	10

a) (i) Use the information to construct a graph to show the relationship above *(08 marks)*



ii. Describe how pH affects state of reaction *(03 marks)*

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……
……
……
……

iii. Explain how change in pH influences activity of the active substance x. *(02 marks)*

……
……
……
……

b) Suggest, with reasons how any other four factors could affect the activity of substance *(04 marks)*

……
……
……
……
……

32. The table below shows concentration of different substances in the glomerular filtrate and urine. Use the table to answer the questions which follow

Substances	**Glomerular filtrate**	**Urine**
Urea	0.003	2.0
Glucose	0.2	0.0
Proteins	0.0	0.0
Water	90.0	97.0
Sodium	0.5	0.55

a) i).What differences are there between the concentration of substances in urine and glomerular filtrate. (*02marks)*

……
……

ii. Give any one reason for the differences in the concentration of substances in the glomerular filtrate and in urine. *(05 mark)*

……
……
……
……
……
……
……
……

b) Which substance is reabsorbed with the lowest efficiency and why? *(02 marks*

……
……

ii).By what factor is urea more concentrated in urine than in the glomerular filtrate. *(01 mark)*

……

c) i). Under what circumstances would urine being investigated give a green colouration with Benedict's solution? (*01 mark)*

…….

ii. Name the organ whose failure would contribute to c (i) above. *(01 marks)*

……

iii. How is such a condition corrected? *(01 marks)*

……..

33. a). The organisms below are obtained from a given ecosystem. Use them to answer the questions which follow;

Green plants, cow, hyena, lion, bacteria

i. Using the organisms above construct three food chains of at least 3 different trophic levels below. *(03 marks)*

……

……

ii. Using the organisms, construct a food web. *(04 marks)*

b) What are the niches of the following organisms in the relationship above? *(1½ marks)*

- Green plants

  ……..
- Cow

  …….
- Bacteria and fungi

  …….

iii. What would happen if the cows were removed from the feeding relationship?

……

…….

SECTION C

34. a) (i) Define the term metamorphosis *(01 mark)*

(ii) Describe the changes which occur during metamorphosis in a housefly. *(06 marks)*

b) i) How is a housefly important to man? (*04 marks)*

ii) How is it adapted to the above functions in b(i) above? *(04 marks)*

35. a) What is irritability? *(01 mark)*

b) Describe an experiment to show that plant shoots are positively phototropic *(13 marks)*

c) How the response described above useful to plants *(01 mark)*

36. a) i) Define meiosis and state where it occurs in plants and animals *(02 marks)*

ii) How is meiosis important in reproduction? *(02 marks)*

b) In a breeding experiment, plants which are homozygous for white flowers, are crossed with those homozygous for red flowers, all the F_1 generation resembled neither of the above

i) What type of inheritance is exhibited above? *(01 mark)*

ii) Explain the absence of both white and red flowers *(02 marks)*

c) Using suitable symbols, show the results in F_2 generation after selfing F_1 generation.

37. a) i) What is environmental degradation? *(02 mark)*

ii) Describe how human activities lead to wet land destruction *(08 mark)*

c) What strategies are currently being employed in Uganda to control wetland destruction?

Answers for section C

TEST PAPER 34

SECTION A

1. Which one of the following Phyla consists of human parasites?
A. Nematoda
B. Coelenterata
C. Mollusca
D. Echinodermata

2. Slow rate of repair of the uterine wall after menstruation in a mammal due to menstruation in a mammal may be due to deficiency in
A. Luteinising hormone
B. Progesterone
C. Oestrogen
D. Follicle Stimulating Hormone

3. Which one of the following plant organs can be used in vegetative reproduction?
A. root tuber of cassava
B. leaves of an anion
C. tap root of a carrot
D. Stem tuber of Irish potato

4. What is likely to happen if a maize coleoptile whose tip has been removed is illuminated from only one side? The coleoptile would
A. Curve towards the direction of light
B. Curve away from the direction of light
C. Not show any further growth
D. Grow upright

5. Which one of the following sets of joints consists of only the hinge type?
A. Hip, wrist and elbow
B. Elbow, knee and finger joints
C. Neck, shoulder and elbow
D. Knee, wrist and ankle

6. In a certain plant, offspring of crosses between round –seeded and long seeded plants were found always to be oval seeded. Which one of the results would be most likely to occur if oval seeded plants were self pollinated?
A. 100% oval seeded
B. 25% oval seeded, 50% long seeded, 25% round seeded
C. 67% oval seeded, 33% long seeded
D. 25% long seeded, 50% oval seeded, 25% round seeded

7. Which of the following parts of a flower are essential for fertilization?
A. Filament, style and petal
B. petal, receptacle and sepals
C. Ovary, anther and stigma
D. Filament, sepal and receptacle

8. Which one of the following structures of the ear equalizes pressure on both sides of the ear drum?
A. oval window
B. semi-circular canal
C. Eustachian tube
D. Round window

9. Which one of the following is **not** affected by environmental factors?
A. Height
B. Skin colour
C. Albinism
D. Intelligence

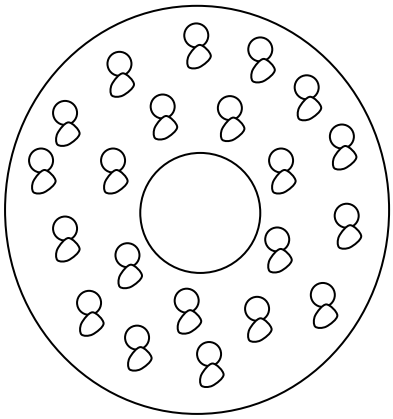
10. In which region of the mammalian vertebral column do the vertebrae have long neural spines and short transverse processes?
A. Sacral
B. Lumbar
C. Thoracic
D. Neck

11. A man of blood group A marries a woman of Blood group B and produces a child of Blood group AB. Which one of the following statements is true about his family?
A. The mother could donate blood to the father but not to the child.
B. The child could donate blood to the father and mother
C. No blood transfusions between members of the family are possible
D. The child could receive blood from the father and the mother

12. In which of the following animals does expired air take a different route from that of inhaled air?

A. Bony fish
B. Birds
C. Reptiles
D. Mammals

13. The figure below is a cross section of part of a plant.



From which one of the following was the section obtained?

A. Root of dicotyledonous plant
B. Stem of monocotyledonous plant
C. Root of monocotyledonous plant
D. Stem of dicotyledonous plant

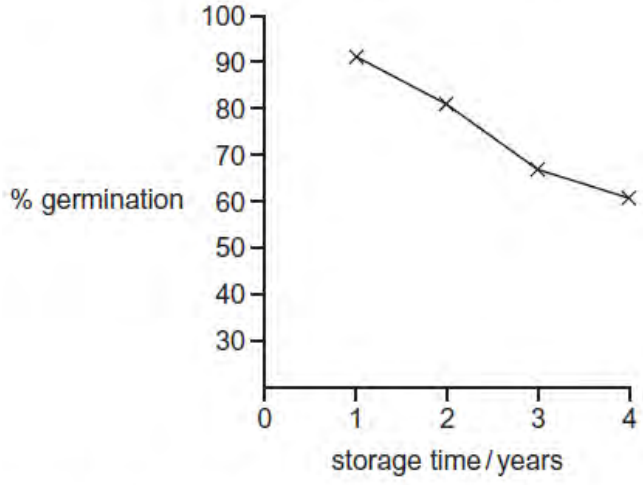
14. To identify a substance Y, a student performed the following experiment.

Test	**Observation**
i) Heated Y with Benedict's solution	Solution remained blue
ii) Heated Y with HCl, cooled, added $NaHCO_3$. Added Benedict's solution and then boiled	Solution turned from Blue to Orange

From the observations, the most likely food substance Y is

A. Starch
B. Maltose
C. Sucrose
D. Glucose

15. The graph shows the effect of storage time on the germination of some seeds



What can be concluded from this graph?

A. Younger seeds germinate better than older seeds
B. Younger seeds always germinate
C. Older seeds do not germinate
D. Older seeds germinate better than younger seeds

16. What happens when the ciliary muscles of a mammalian eye contract? The lens becomes
A. Thicker and eyes see far objects
B. Thinner and eyes see near objects
C. Thicker and eyes see near objects
D. Thinner and eyes see far objects

17. Which one of the following sets contains only characteristics of continuous variation?
A. Tongue rolling, Blood groups, skin colour
B. Height, Body weight, Intelligence
C. Sex, Haemophilia, Height
D. Finger prints, Intelligence, Albinism

18. The tapeworm Taenia solium has a primary and a secondary host. Which of the following are the Primary and secondary hosts in that order?
A. Pig and man
B. Cow and man
C. man and cow
D. man and pig

19. Which one of the following is the correct response to increased carbondioxide in human blood? The rate of
A. Breathing is slowed
B. Heart is increased
C. Heart beat is slowed down
D. Pulse is slowed down

20. Mucor undergoes asexual reproduction to produce
A. spores
B. Zygospores
C. Zoospores
D. sporangia

21. The blood constituents that help in the formation of a blood clot at the site of an injury are:-
A. Platelets and erythrocytes
B. platelets and leucocytes
C. Hormones and plasma
D. platelets and fibrinogen

22. What happens to insect wings when depressor muscles are relaxed? The wings
A. move down wards
B. Rotate freely
C. move upwards
D. move in three directions

23. The scheme below shows a food chain with corresponding concentrations of organic chloride in milligrams.

Green plants	→	Herbivorous bug	→	predatory bug	→	lizard
0.01		0.9		2.3		2.8

Why does the tissue of the lizard contain the highest concentration of the organic chloride? Because the
A. Lizard eats all the organisms in the food chain
B. Organic chloride remains persistent in the food chain
C. Organic chloride is cumulative in the tissues of the organisms
D. Organic chloride is not toxic to the lizard

24. An unknown sample of blood was found to agglutinate with blood of group AB but not with blood of O. What was the blood group of the unknown sample?
A. O
B. AB
C. A
D. B

25. Which one of the following is a diploid cell?
A. Pollen grain
B. Spermatozoan
C. Ovum
D. Alveolus

26. Which of the following are characteristics of sandy soil?
A. Poor aeration and poor drainage
B. Good water retention and poor drainage
C. sticky wet and poor drainage
D. Good aeration and good drainage

27. A heterozygous red flowered plant is crossed with a homozygous white flowered plant. If red is dominant over white, what will be the phenotypes of the offsprings?
A. All red
B. All white
C. Pink and white
D. Red and white

28. Which one of the following organisms is **not** a heterotroph?

A. Mushroom
B. Algae
C. Tick
D. Grasshopper

29. Which one of the following is true about the nervous system of a mammal?

A. Cell bodies of the sensory neurons are found in the ganglia
B. cell bodies of the sensory neurones are found in the grey matter
C. sensory neurons transmit impulses from the central nervous system to receptors
D. Cell bodies of sensory neurons are found in the receptors

30. Short sightedness is caused by the

A. lens becoming thicker
B. suspensory ligament becoming shorter
C. Contraction of the ciliary muscles
D. Expansion of the Iris muscles.

SECTION B

31. A study was carried out in the preservation of foods in an industry during which it was discovered that the characteristic smell associated with decaying fish is caused by the production of a nitrogeneous compound called trimethylamine and its breakdown into ammonia gas. Both the trimethylamine and ammonia are produced by the action of bacteria on the fish protein and for every molecule of Trimethylamine, two molecules of ammonia are produced. The data is given in the table below.

Days	**Number of bacteria in thousands**	**Amount of ammonia produced in milligrams per 100 grams of fish protein**
0	5	10
5	10	20
10	15	30
15	23	50
22	80	90
31	100	110
35	90	100
40	76	90
50	50	55

a) Plot a graph to show the growth of bacteria population with ammonia over a period of 50 days. **(next page)**

b) Describe the pattern of growth of bacteria population during the period of investigation

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c) Explain the growth pattern described above.

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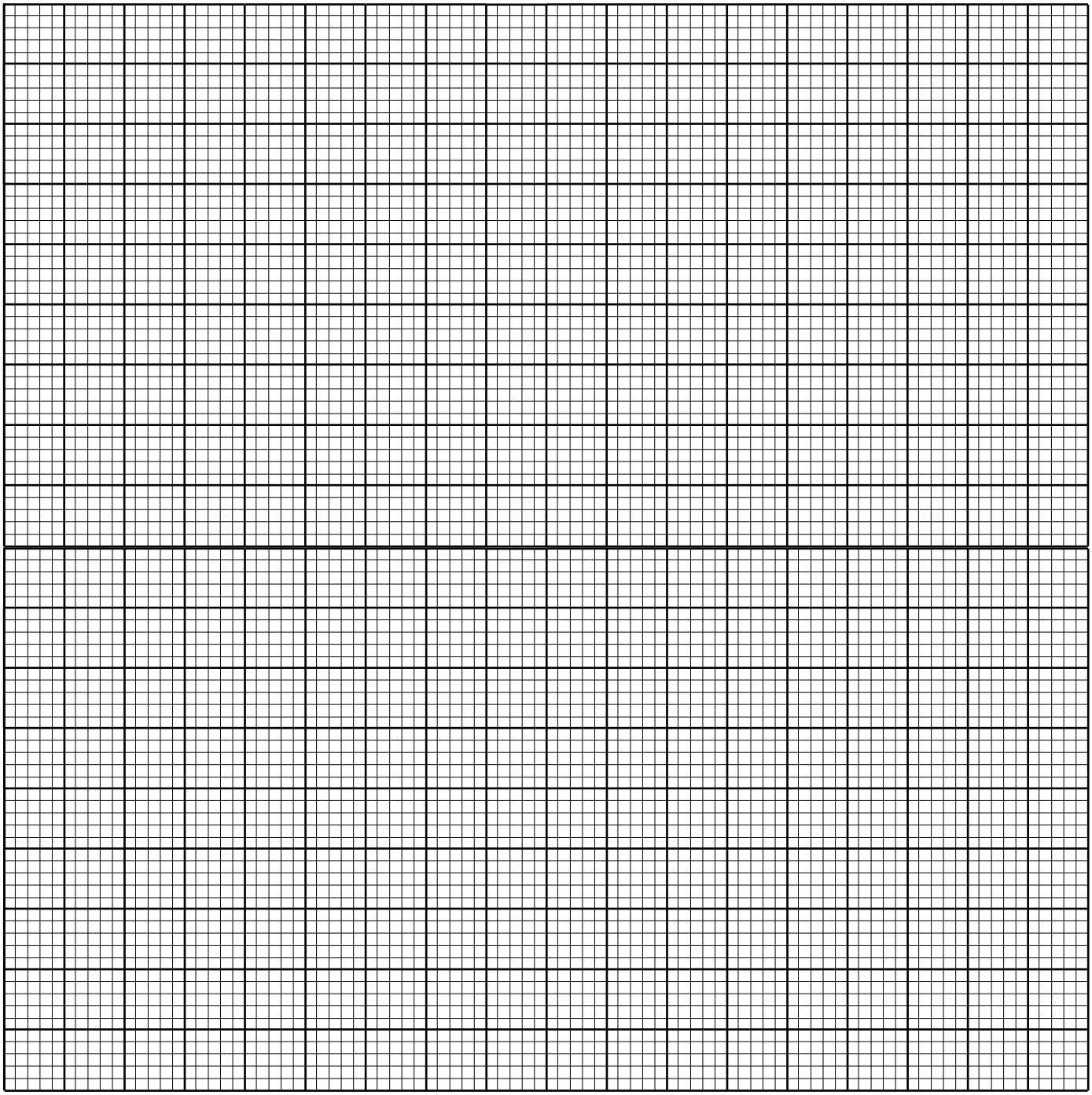

d) From the graph, state how many days it would take to produce 60mg of ammonia.
……

e) What is the relationship between bacteria count and ammonia production?
……
……
……
……

f) What is the effect of deep freezing fish on the production of Trimethlamine and its preservation of food?

……
……

32. a) Distinguish between Endocrine and Exocrine glands giving one example in each case. (03 marks)

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……
……
……

b) Below is a diagram of a human female showing the location of two endocrine glands

c) Name the glands A and B and one hormone produced by each.

Gland A…….. (1 mark)
Hormone…… (1 mark)
Gland B…….. (1 mark)
Hormone…… (1 mark)

d) Give 3 effects of adrenaline in the body. (3 marks)

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……
……
…….

33. What do you understand by the following terms?

i. Habitat (1 mark)

……
……..

ii. Ecosystem (1 mark)

……
……

b) The information below is on a feeding relationship in an ecosystem. Lizards feed on praying mantis, butterflies and herbivorous bugs. Preying mantis feed on butterflies and herbivorous bugs. Butterflies and herbivorous bugs feed on grass.
Using a suitable method, show the feeding relationship between

i. All the organisms (03 marks)

ii. The preying mantis, herbivorous bugs, lizards and grass. (01 mark)
……
……

c) State the role of lizards in the feeding relationship. (01 mark)
……

d) How would the population of the organisms in b (i) above be affected if the Preying mantis were removed from the ecosystem? (03 marks)
……
……
……

e) i) State one group of important organisms that have not been included in the ecosystem.
……

ii. Why are the organisms named in e (i) above important in an ecosystem? (01 mark)
……..

SECTION C

34. a) Describe the structure of a motor neurone. (Diagram not required)
b) i) What is meant by reflex action?
ii) By means of a diagram, show the path followed by a nerve impulse during a reflex action.

35. a) Explain how the small size of soil particles in a soil type affects the soil's suitability for plant growth.
b) Describe an experiment to compare the rate of drainage between sand and clay soils.

36. What is the genotype of
i. Human male (½ mark)
ii. Human female (½ marks)

b) In humans, haemophilia is caused by a sex linked gene.
i) What do you understand by the term Haemophilia? (1mark)
ii) Sex linked gene? (1mark)

c) A hemophilic man married a carrier woman. Using appropriate symbols, show what percentage of their children would be normal boys. (7marks)

37. Describe;
a. The blood supply to the liver (03 marks)
b. The functions of the liver (12 marks)

Answers for section C