0NAME:……STREAM:……

BISHOP'S SENIOR SCHOOL MUKONO

S.3 BIOLOGY.

TIME: 2 ½ HOURS.

INSTRUCTIONS:-

- Answer all questions in Section A and B plus any two questions in Section C.
- Answers for section A must be written in the answer grid provided.

Answer grid for section A:

1.	2.	3.	4.	5.	6.	7.	8.	9.
10.	11.	12.	13.	14.	15.	16.	17.	18.
19.	20.	21.	22.	23.	24.	25.	26.	27.
28.	29.	30.						

SECTION A:

1. Which one of the following cells has a cell wall?
A. guard cell. B. root hair cell. C. nerve cell. D. blood cell.

2. Which of the following is an example of a drupe?
A. Jack fruit. B. Mango. C. Bidens pilosa. D. Passion fruit.

3. In the laboratory, the chemical reagent used to test for the presence of starch is;
A. Benedict's. B. DCPIP. C. Iodine. D. millions.

4. Controlled feeding on food which is rich in vitamin A may improve;
A. Healing of wounds. B. Beri Beri. C. Rickets. D. Poor Night vision.

5. Which one of the following has no effect on the rate of diffusion?
A. Density of the medium. B. length of the diffusion path way.
C. size of diffusion molecule. D. concentration gradient.

6. Termites are able to eat wood because;
A. they have strong mandibles. B. they work as a team.
C. they produce the enzyme cellulose.
D. they possess microscopic fungi living in their gut.

7. Which one of the following can increase the accumulation of water vapour

released by plants around the leaves?
A. wind. B. Light. C. Rain fall. D. Humidity.

8. The specimen represented in the figure below is dispersed by;

A. wind. B. Animals
C. water. D. explosive mechanism.

9. Which of the following substances is a bi-product of the process photosynthesis?
A. Water. B. carbon- dioxide. C. starch. D. oxygen.

10. Which one of the following characteristics of a plant leaf is important in ensuring maximum absorption of light energy?
A. waxy cuticle on the upper epidermis.
B. numerous stomata on the lower epidermis.
C. compact palisade cells. D. well-spaced spongy mesophyll cells.

11. Which one of the following does not belong to the same group?
A. pepsin. B. Insulin. C. ptyalin. D. maltase.

12. The following results were obtained from an experiment;
- Volume of soil added to the measuring cylinder = 40cm^3.
- Volume of water added into the measuring cylinder = 40cm^3.
- Volume of soil + water after stirring …. = 75cm^3.

Therefore, the percentage of air in the soil was;
A. 5.0. B. 6.7 C. 12.5. D. 53.3.

13. The development of a worker bee from the larva depends on;
A. diet. B. fertilization. C. metamorphosis. D. weather.

14. Which one of the following is a correct set;
A. Glucose + galactose $\longrightarrow$ sucrose. B. Glucose + glucose $\longrightarrow$ Sucrose.
C. Glucose + fructose $\longrightarrow$ Sucrose. D. Fructose + galactose $\longrightarrow$ Sucrose.

15. The dental formula of an animal is given below;
$\mathrm{I}\,\frac{3}{3}$, $C\,\frac{1}{1}$, $Pm\,\frac{4}{4}$, $M\,\frac{2}{3}$.
How many premolars does the animal possess?
A. 16. B. 10. C. 8. D. 21.

16. A microscope with an eyepiece of X5 gave a magnification of X40. The size of the objective lens used is;
A. X50. B. X8. C. X45. D.X35.

17. The dry fruit which splits along more than two lines of weakness is a;

A. follicle. B. legume. C. capsule. D. cypsela.

18. The relationship which exist between the ruminant animal and the bacteria in their gut is;
A. parasitism. B. commensalism. C. mutualism. D. saprophytism.

19. Which of the following terms describes all the living parts of the cell?
A. cytology. B. protoplasm. C. bios. D.None.

20. Which one of the diseases is not transmitted by the housefly?
A. Anaemia. B. trachoma. C. dysentery. D. diarrhea.

21. Numerous villi in the Ileum ensures;
A. more enzymes released. B. faster digestion.
C. large surface area. D. faster absorption.

22. Absorption of mineral salts by the root hair is by the process;
A. osmosis. B. diffusion. C. root pressure. D. active transport.

23. Which of the following blood vessels has the highest level of nutrients?
A. mesenteric artery. B. hepatic portal artery.
C. renal artery. D. hepatic vein.

24. A male cockroach differs from the female cockroach by having;
A. styles . B. cercus. C. more abdominal segments. D. longer antennae.

25. Which one of the following organisms has the largest surface area to volume ratio?
A. Dog. B. frog. C. elephant. D. amoeba.

26. Which one of the following is the role of bile in food digestion?
A. providing suitable PH for enzyme action. B. digesting fats.
C. Activating enzymes. D. catalyzing the action of enzymes.

27. The following are all autotrophs except;
A. amoeba. B. spirogyra. C. A moss. D. ferns.

28. The most effective way of reducing soil erosion on a hilly place is by;
A. contour ploughing. B. Bush fallowing. C. strip cropping. D. Bush burning

29. Charity of the specimen under a microscope is function of;
A. coarse adjustment knob. B. fine adjustment knob.
C. eye piece lens. D. objective lens.

30. Which of the following is NOT true of plant and animal cells? They both;

A. synthesize starch. B. synthesize proteins.
C. absorb water. D. respire.

SECTION B:

31. The table below shows the changes in mass of two potted plants transpiring when put in 2 different environmental conditions.

Time in Hours	Rate of transpiration	
	Sunny and open place	Sunny but shadily place.
8.00 am	15.0	5.0
9.00 am	17.5	6.5
10.00 am	21.0	9.0
11.00 am	23.5	19.5
12.00 pm	28.5	13.5
1.00 pm	31.0	14.5
2.00 pm	33.5	16.0

31.a) Using the same axis, to represent the information given in the table above graphically. (8mks)

b) Describe the shape of the curve presently the rate of transpiration in a shady place. (2mks)

……
……
……

c) Basing on the curves or results shown above, how is the rate of transpiration of the two potted plants;

i) Similar; (1mk)

……
……

ii) Different; (1mk)

……
……

d.i) Name the processes by which the water lost from the plant is absorbed from the soil till it is lost during transpiration. (4mks)

……
……

……
……

ii) List down any 4 importances of water to plants. (4mks)

a)……

b)……

c)……

d)……

32.a) Define the term; (1mk @)

i) A habitat; ……..

……

ii) An ecosystem;……

……

b) Given the list of the below;

Aquatic water plant, large fish, mosqoite larva, small fish, man.

i) Construct a food chain using the above organism. (2mks)

……

……

ii) With reasons, state what will happen to the members in the aquatic habitat if the following organisms have been removed. (4mks)

- Small fish;
- ……

  ……

- Aquatic water plant;
- ……

  ……

-

33. The diagram below shows a transverse section of a plant part. Use it to answer the questions below;-

a) Give a little of the section shown above. (1mk)

……

……

b) Name the parts represented as; 1, 2, 3 and 4 on the diagram above. (2mks)

c) Give a function of each of the parts labeled; (3mks)
1.……
3.……
4.……
.
d. State four adaptations of the root hair cells to their transport function. (4mks)
i)……
ii)……
iii)……
iv)……

SECTION C:

34.a) Define the terms;-
i) weathering. (1 ½ mks)
ii) leaching. (1 ½ mks)

b) List down the different types of weathering. (2mks)

c) Explain the importance of the various compounds of soil. (10mks)

35.a) Describe an experiment you would carry out to test a leaf for the presence of starch. (10mks)

b) How is the structure of a dicotyledonous leaf suited to absorb sunlight. (5mks)

36.a) Define the term air pollution. (5mks)

b) Explain the effect of the various air pollutant to the living organisms.(10mks)

37.a) What is meant by the term <u>cell differentiation?</u> (1mk)

b) Using diagrams, show four plant cells and three animal cells which have been modified for a particular function. In each case state the function performed. (14mks)

- **END -**

BISHOP'S SENIOR SCHOOL MUKONO
S.3 BIOLOGY PAPER 1 (553/1)
TIME: 2 HOURS

NAME: …… **STREAM**: ……

INSTRUCTIONS

Answer all questions in **sections A**, **B** and **C**.

Answers to sections A and B should be written in the spaces provided.

Answers to section C should be written on the answer sheet(s)/booklet(s) provided.

Read all instructions and questions carefully before answering.

SECTION A (30 MARKS)

1. Amino acids are to proteins as …….. is/are to starch.

   A. Sucrose B. Maltose

   C. Glucose D. Fatty acids

2. Red blood cells placed in a hypotonic solution may undergo

   A. Plasmolysis. B. Haemolysis.

   C.Turgidity. D. Crenation.

3. The major limiting factor of photosynthesis for a plant receiving high light intensity is

   A. Water. B. Chlorophyll.

   C. Carbon dioxide. C. Suitable temperature.

4. Which of the following environmental factors **least affects** the rate of photosynthesis?

   A. Carbon dioxide concentration. B. Intensity of light.

   C. Amount of humidity. D. Presence of water.

5. The ecological relationship which benefits two different species living together is termed

   A. Mutualism. B. Commensalism.

   C. Parasitism. D. Symbiosis.

6. In which of the following organisms is food digested exclusively outside the body?

   A. Bacteria B. Rhizopus

   C. Amoeba D. Mosquito

7. The following take place during swallowing **except**
    A. Closing of the soft palate.
    B. Closing of the epiglottis.
    C. Breathing momentarily stops.
    D. Oesophagus opens.
8. When two monosaccharides combine to form a disaccharide, they do so in a reaction which involves
    A. Loss of a water molecule.
    B. Gain of water of a water molecule.
    C. Loss of a hydrogen molecule.
    D. Gain of a hydrogen molecule.
9. Digestion of proteins in mammals starts from the
    A. Small intestine.
    B. Duodenum.
    C. Stomach.
    D. Mouth.
10. The following are the result of transpiration in plants **except**
    A. Absorption of mineral salts from the soil by the plant.
    B. Absorption of water from the soil by the plant.
    C. Movement of water up the plant stem.
    D. Cooling of the plant.
11. When testing for non-reducing sugars in a solution, hydrochloric acid is added in order to
    A. Provide a suitable pH.
    B. Kill any bacteria present.
    C. Catalyse the reaction.
    D. Hydrolyse the non-reducing sugars.
12. The aim of the experimental set up in figure 1 below was to

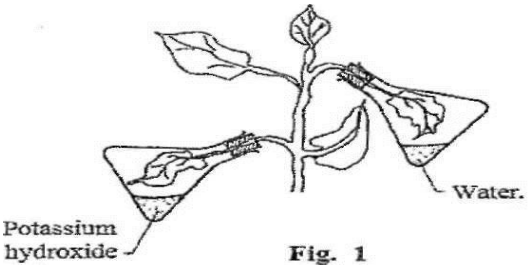

Fig. 1

A. Carbon dioxide is necessary for the process of photosynthesis to occur.
B. Light is necessary for the process of photosynthesis to occur.
C. Oxygen is given off during the process of photosynthesis
D. Chlorophyll is necessary for the process of photosynthesis to occur.

13. The following are functions of bile and pancreatic secretions **except**
    A. Contain water which softens food.
    B. Contain bicarbonate ions which neutralize acidic contents of chyme.
    C. Contain bile salts that emulsify fats.
    D. Pancreatic enzymes.
14. The yellowing of plant leaves is an indication of a lack of
    A. Ca^{2+} ions
    B. Mg^{2+} ions
    C. Fe^{2+} ions
    D. Zn^{2+} ions
15. Which of the following mechanisms of transport occurs against a concentration gradient?
    A. Osmosis
    B. Simple diffusion
    C. Facilitated diffusion
    D. Active transport
16. Plants with needle shaped leaves are well adapted to inhabiting hot environments because they lose little water by
    A. Exposing a small surface area for water loss.
    B. Having a small surface area to volume ratio.
    C. Having a large surface area to volume ratio.
    D. Exposing a large surface area for water gain.
17. A certain species of animals, A, has a total of 42 teeth, identify which of the dental formulae below represents the formula for A.

A. Incisors 2/2, Canines 1/1, Premolars 2/2, Molars 3/3

B. Incisors 3/3, Canines 1/1, Premolars 4/4, Molars 2/3

C. Incisors 3/3, Canines 1/1, Premolars 4/4, Molars 3/3

D. Incisors 0/1, Canines 0/1, Premolars 3/3, Molars 3/3

18. A semi-permeable membrane works on the principle of

A. Surface area of particle to be exchanged.

B. Distance of region crossed by particles.

C. Size of particles being exchanged.

D. Energy required to exchange particles.

19. The arteries are adapted to transporting blood at a very pressure by having

A. Thin and wide lumen.

B. Thick and narrow lumen.

C. Having only oxygenated blood.

D. Blood flowing in pulses.

20. Below are **arbitrary values** for surface area to volume ratio of different organisms **A**, **B**, **C** and **D**, the organism in which diffusion alone is expected to be enough for exchange of substances is

A. 15:3

B. 64:16

C. 48:24

D. 36:6

21. Cellular components that circulate in blood do not rupture due to excessive solvent uptake because

A. They have a semi-permeable membrane.

B. The blood is isotonic to cell contents.

C. The cells are protected by cell wall.

D. The cells are elastic.

22. During ventricular systole

A. Volume of ventricles reduces.

B. Volume of ventricles increases.

C. Pressure in ventricles reduces.

D. Pressure in ventricles remains constant.

23. At high pH, the enzyme pepsin may be

A. Inactivated

B. Destroyed

C. Denatured

D. Inhibited

24. Carnassial teeth are characteristic of

A. Omnivores

B. Herbivores

C. Parasites

D. Carnivores

25. Which one of the following would **not** increase rate of absorption of nutrients by a gut parasite?

A. Large surface area to volume ratio.

B. Loss of accessory parts of alimentary canal.

C. Thin and flat body wall.

D. A well-developed digestive system.

26. The thin blades of most terrestrial leaves are an adaptation to

A. Increase surface area.

B. Shorten distance.

C. Reduce transpiration

D. Reduce surface area

27. Xylem tissue is made up of dead hollow cells an adaptation for

A. Continuous flow

B. High pressure flow

C. Uninterrupted flow

D. Lateral flow

28. Wilting results to drooping of the leaves due to loss of

A. Turgor pressure

B. Osmotic pressure

C. Wall pressure

D. Osmotic potential

29. Which of the following is **not true** about red blood cells?

A. Do not have a nucleus when old

B. Are bi-concave shaped

C. Have mitochondria when old

D. Contain an oxygen carrying protein

30. Little amylase enzymes were added to a large volume of starch solution and after a few minutes dilute hydrochloric acid was added. Which of the following observations is expected?

A. The solution remained brown when tested for starch.

B. The solution turned from blue to green when tested for reducing sugars.

C. The solution remained blue when tested for non-reducing sugars.

D. The solution turned from blue to green when tested for non-reducing sugars.

WRITE ANSWERS TO SECTION A IN THE TABLE BELOW

1		**6**		**11**		**16**		**21**		**26**	
2		**7**		**12**		**17**		**22**		**27**	
3		**8**		**13**		**18**		**23**		**28**	
4		**9**		**14**		**19**		**24**		**29**	
5		**10**		**15**		**20**		**25**		**30**	

SECTION B (40 MARKS)

31. The table below shows results of an experiment to determine the percentage of onion epidermal cells plasmolysed in different concentrations of sucrose solutions. In each case, the total number of cells that were observed was eighty (80).

Concentration of solution (mol/dm^3)	Number of cells plasmolysed	Percentage of cells plasmolysed
0.10	0	
0.20	0	
0.30	2	

0.40	3	
0.45	10	
0.50	60	
0.55	80	
0.60	80	

a) Complete the table by working out the percentage of cells plasmolysed. (06 marks)

b) What is meant by the term plasmolysis? (02 marks)

……

……

c) (i) Plot a graph to show the relationship between percentage of plasmolysed cells and sucrose concentration. (06 marks)

(ii) What physiological process was being investigated? (01 mark)

……

(iii) At what concentration(s) of sucrose solution was there no net gain or loss of water? (01 mark)

……

……

(iv) Briefly explain how you arrived at the conclusion/answer in c) (iii) above. (04 marks)

……

……

……

32. a) Giving an example in each case, mention two ways how plants obtain the raw materials for photosynthesis. (03 marks)

……

……

b) Give the different ways how plant leaves are adapted to obtaining the raw materials for the process of photosynthesis. (05 marks)

……..

……

……

c) Outline any four importances of photosynthesis to industrial towns. (04 marks)

……

……

33. a) Define the following terms as used in nutrition;

(i) Balanced diet (01 mark)

……....

……

(ii) Mal-nutrition (01 mark)

……

……

b) (i) State two importance of a balanced diet to the growth and development of children below the age of 12 years. (02 marks)

……....

……

(ii) State two dangerous outcomes of mal-nutrition to children below the age of 12 years. (02 marks)

……

……

(iii) Increase in environmental temperatures has led to mal-nutrition in Uganda since it leads to low or no photosynthetic production, if you had an opportunity, state any two suggestions you would put forward for improving photosynthetic production in the hot areas of Uganda. (02 marks)

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SECTION C (30 MARKS)

Answer all questions from this section.

33. a) Outline **five** factors that affect the rate at which materials are transported across

exchange surfaces.

(05 marks)

b) Explain briefly how each of the factors in a) above affect the rate at which materials are transported.

(10 marks)

35. a) Give **six** factors that affect the rate of photosynthesis. (06 marks)

b) Explain how **any three** of the factors mentioned in a) above affect the rate of photosynthesis. (09 marks)

END