# FORM TWO HOLIDAYS KEYNOTE BIOLOGY 10 QUESTION PAPERS




# FORM 2 HOLIDAYS KEYNOTE BIOLOGY TEN QUESTION PAPERS

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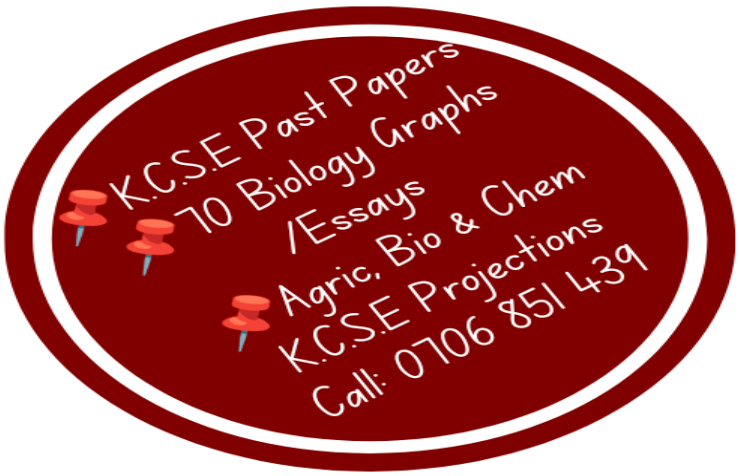





# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 01

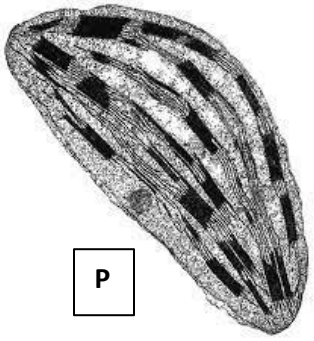
**1.** State the functions of the following vacuoles **(2mks**

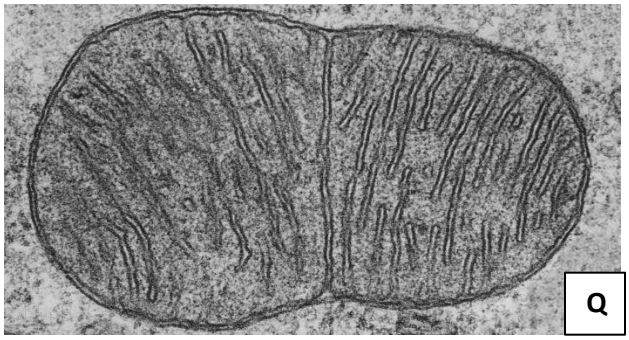
**i)** Sap vacuole **ii)** Contractile vacuole

**2. a)** State **TWO** reasons why in experiments to study photosynthesis, plants are placed near source of light **(2mks**

**b)** Explain how photosynthesis helps to ensure proper balance of components of air in the atmosphere **(2mks**

**3.** The following are photomicrographs of organelles from a living cell



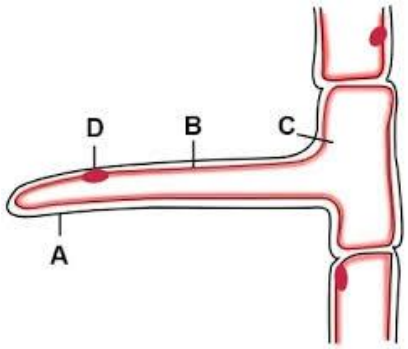

**a)** Identify organelle **Q** **(1mk**

**b)** Which letter represent an organelle that is abundant in the following cells: **(2mks**

**i)** Muscle **ii)** Palisade

**c)** How is organelle **P** important to metabolic reactions in organelle **Q**? **(2mks**

**4.** Use the diagram shown below to answer questions that follow




**a)** Name the specialized cell shown above **(1mk**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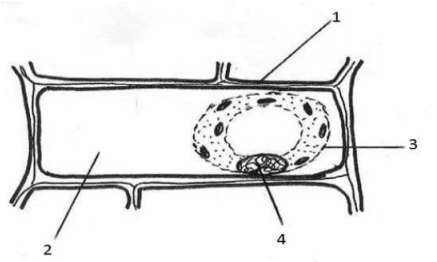
**b)** How do the following help the cell in its functions? **(2mks**

**i)** Components of part **C**

**ii)** Part **A** being elongated

**5.** The appearance of a plant cell after being placed in Solution **Q** is as shown below



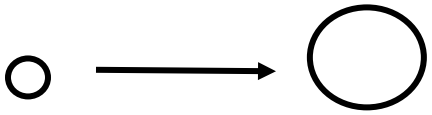

**a)** Solution **Q** was later found in part **2**. Name the process that allowed its entry? **(1mk**

**b)** Account for the appearance of the cell **(3mks**

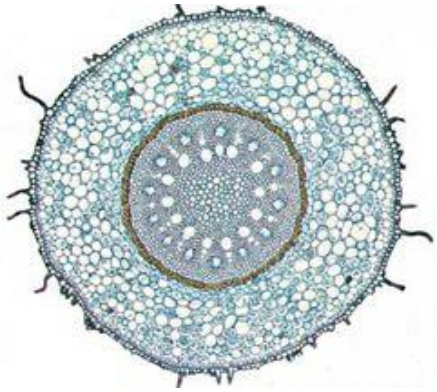
**c)** Explain how the cell shown can be made to resume its normal appearance **(1mk**

**6.** Identify the functions of a light microscope as shown by the following diagrams (**2mks**

**a)**  Function

**b)**  Function

**7.** The following is a cross-section of part of a plant





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Samwel observed that this diagram represents a monocot root. Give a reason why

**i)** It is a root **(1mk**

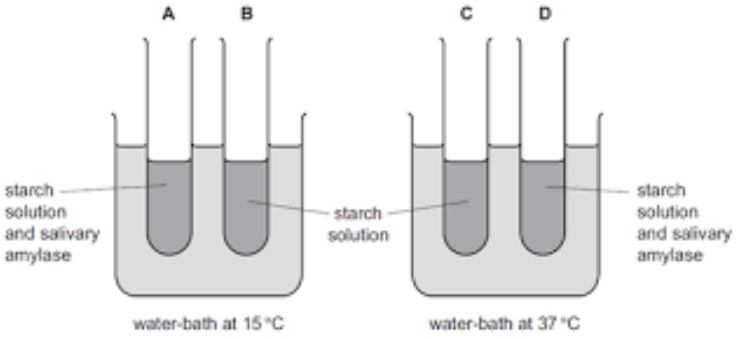
**ii)** It is from a monocot plant **(1mk**

**8.** a) Outile **TWO** properties of the plasma membrane **(2mks**

**a)** Arrange the following from the most complex to the simplest: Organ, Organism, Cell, Organ system, Organelle, Tissue **(1mk**

**9.** Give **TWO** functions of Hydrochloric acid in the stomach **(2mks**

**10.** The experimental set up shown below was left to stand for 1 hour

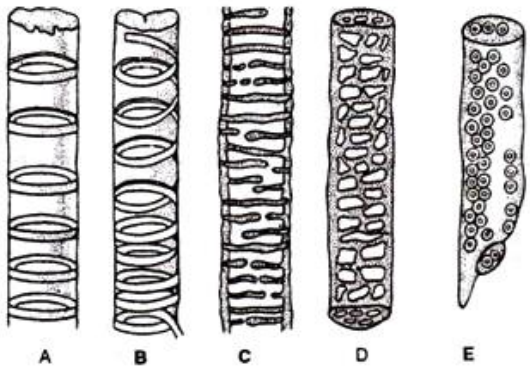



**a)** What was the aim of the experiment? **(1mk**

**b)** Which two test tubes acted as control experiments? **(1mk**

**c)** Account for the results when Iodine test is carried out on test tube **D** **(2mks**

**11.** The following are patterns of lignification of a tissue found in flowering plants





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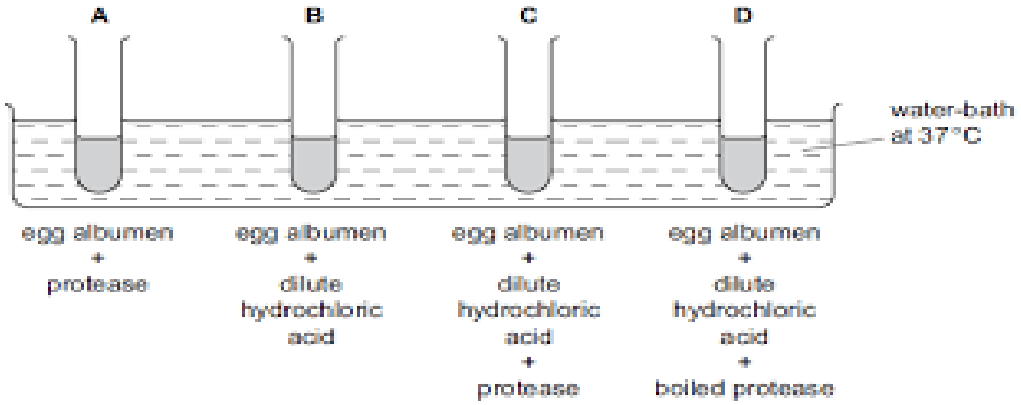
**a)** Identify the patterns labelled **A** & **C** **(2 mk**

**b)** Give a non-transport function of the tissues shown above? **(1mk**

**c)** Give **TWO** adaptations of the tissues above to their transport function **(2mks**

**12.** An experiment was carried out as shown below to study enzymatic reactions. After 30minutes, Biuret's test was carried out on contents of each test tube to get results. Fill in the table below to offer explanation for the results obtained **(4mks**




| Test Tube | Result | Explanation |
|---|---|---|
| **C** | Blue | |
| **D** | Purple | |

**13.** Explain the following **(4mks**

**a)** The stomach lining is made of protein but is not digested by protein-digesting enzymes

**b)** Digestion of starch does not continue in the stomach

**c)** One easily suffers nose bleeding when climbing mountain

**d)** A camel can stay for 60 days without drinking water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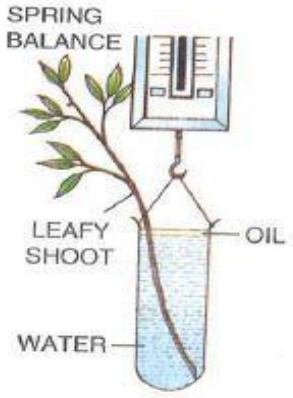
**14.** Give functions of each component of saliva **(3mks**

**15.** The following set up was placed in the sunshine for 1 hour to study a physiological process




**a)** What was the role of oil in the set up? **(1mk**

**b)** Account for observation made after 1 hour **(2mks**

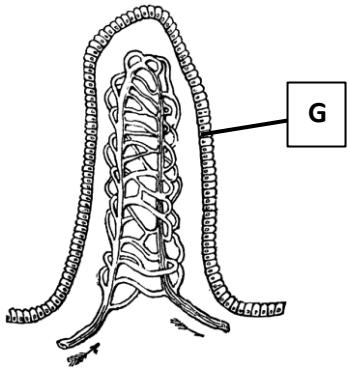
**16.** Distinguish between Systemic circulation and Pulmonary circulation **(2mks**

**17.** How do the following factors increase rate of diffusion? **(2mks**

**a)** Larger surface area to volume ratio

**b)** High temperature

**18.** Use the structure shown below to answer questions that follow




**a)** Give the name and function of the structure shown above **(2mks**

**b)** How does part **G** adapt the structure to its function? **(1mk**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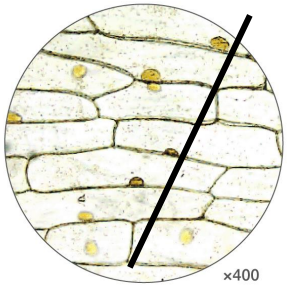
**19.** State the importance of the following parts to the functioning of the heart **(2mks**

**a)** Interventricular septum

**b)** Tricuspid valves

**20.** Give **THREE** importance of transpiration to plants **(3mks**

**21.** The diagram below shows onion cells in a field of view of a light microscope




**X400**

Using the dark line as diameter of field of view, determine the actual diameter of one cell **(4mks**

**22.** Why do the following have a higher energy demand? **(2mks**

**a)** Children

**b)** Males

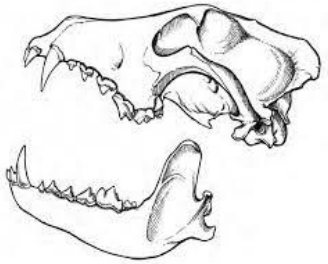
**23.** **a)** Name the following that are required during the process of blood clotting **(2mks**

**i)** Mineral Ion

**ii)** Vitamin

**b)** State **TWO** ways in which blood clotting is important to the human body **(2mks**

**24.** Use the diagram shown to answer the questions that follow



**a)** Identify the mode of feeding for the animal with the dentition shown above **(1mk**

**b)** Why do such animals with the dentition shown have a shorter alimentary canal? **(2mks**



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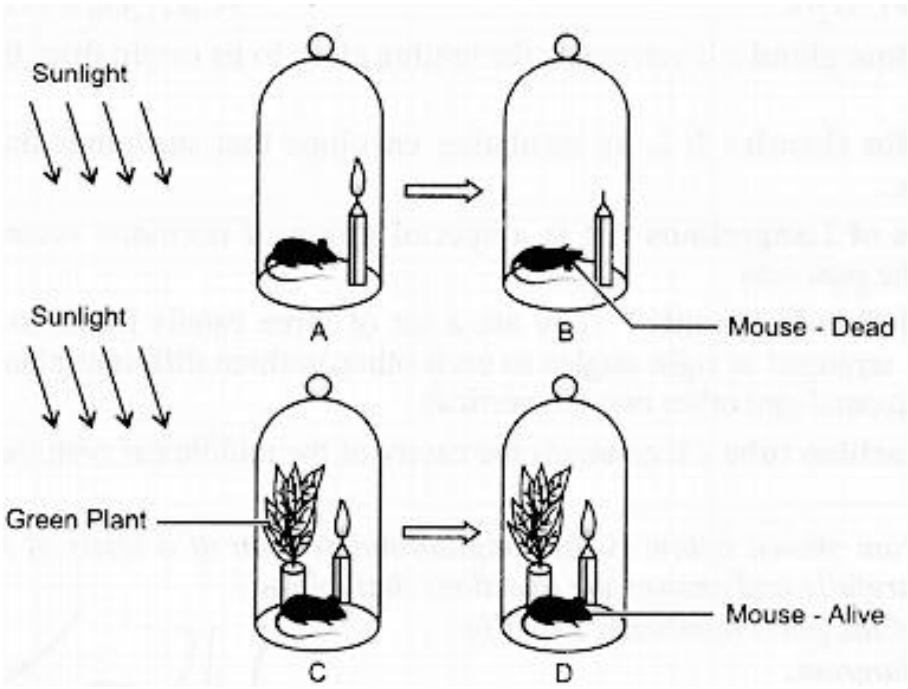
**25.** Consider the set ups shown below where **B** and **D** are results of the experiment **A** and **C** respectively which had been placed in the sunshine for **3 hours**




Explain why:

i) The Mouse died in **B** **(2mks**

ii) The Mouse was alive in **D** **(2mks**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# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 02

**1.** State the importance of each of the following in living organisms

**a)** Nutrition **(1mk)**

**b)** Excretion **(1mk)**

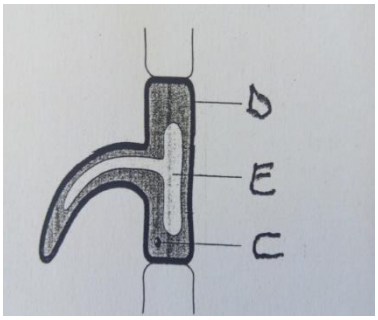
**2.** State two functions of cell sap **(2mks)**

**3.** Which organelle would be abundant in: **(2mks)**

a) Skeletal muscle cell

b) Palisade cell

**4.** The diagram below shows a specified plant cell




**i.** Name the cell **(1mk)**

**ii.** Name the parts labelled D and E **(2mks)**

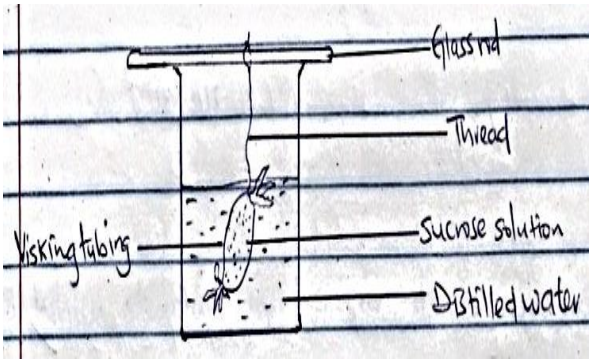
**5.** State the functions of the following parts of alight microscope. **(2mks)**

**a)** Objective lens **b)** Diaphragm

**6.** Using a microscope, a student counted 55 cells across a field of view whose diameter was 6000$\mu$m. Calculate the average length of cells. Show your working. **(2mks)**

**7(a)** Distinguish between diffusion and osmosis **(2mks)**

**b)** An experiment was set as shown below



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The set up was left for 30 minutes.

**(i)** State the expected results **(1mk)**

**(ii)** Explain your answer in b(i) above **(3mks)**

**8.** State four factors that increase the rate of diffusion **(4mks)**

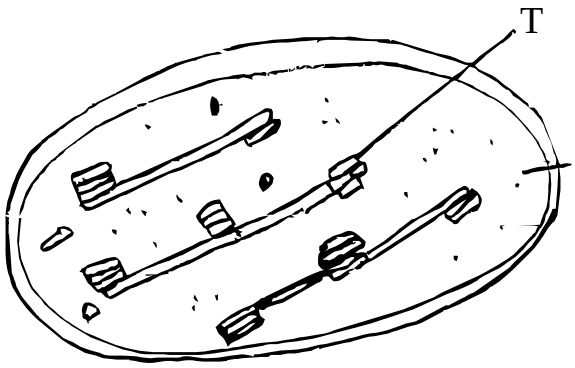
9.What is meant by the following terms?

**(i)** Crenated cell **(1mk)**

**(ii)** Flaccid cell **(1mk)**

**10.** Distinguish between heterotrophism and autotrophism **(2mks)**

**11.** Study the diagram below




**a)** Name the process which takes place in the organelle **(1mk)**

**b)** Name the pigment in the structure labelled T and state its function **(2mks)**

Pigment

Function

**c)** Name three cells of a leaf where the above structure is found **(3mks)**

**12.** State four external factors that affect the rate of photosynthesis **(4mks)**

**13.** State three properties of monosaccharide **(3mks)**

**14.** Discuss four adaptations of the carnivores to their mode of feeding **(4mks)**

**15**

**a)** What is the importance of mastication during digestion? **(1mk)**

**b)** State three roles of saliva during digestion **(3mks)**



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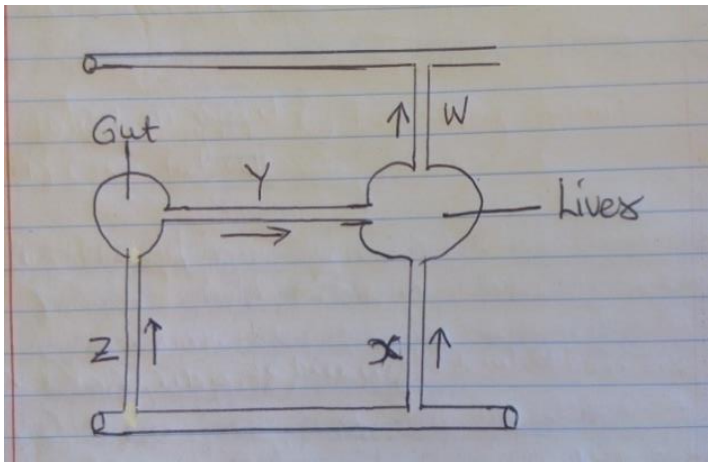
**16.** The diagram below shows part of a mammalian circulatory system




**a.** Name the blood vessels marked Y and Z **(2mks)**

**b.** A student took a meal rich in proteins and carbohydrates. It was found that the glucose level in blood vessel W was lower than blood vessel Y. Explain **(1mk)**

**17.**

**a)** What is active transport? **(1mk)**

**b)** Give four roles of active transport **(4mks)**

**18.** During a Biology practical lesson, the teacher provided students with the following apparatus; a porter, a scalpel, specimen bottle, a pair of forceps, sweep net and chloroform.

**a)** Give four precaution that a biology teacher gave the students before the practical when collection of specimen began **(4mks)**

**b)** What was the function of the following apparatus **(4mks)**

**i.** Pooter

**ii.** Sweep net

**iii.** Chloroform

**iv.** A pair of forceps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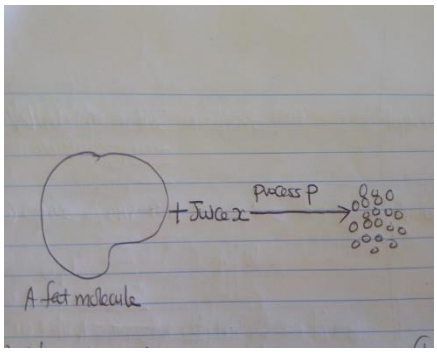
**19.** The following is an illustration of a certain process that occurs in mammals.




**a)** Name process P **(1mk)**

**b)** Name the juice involved in process P **(1mk)**

**c)** Give a reason why liver damage leads to impaired digestion of fats **(1mk)**

**d)** What would be likely effect on digestion if the small intestine of a human being is reduced in an operation **(1mk)**

**20.** Name two specialized tissue in mammals **(2mks)**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## SECTION B: 40 marks

**Question 21 is compulsory**

**Answer question 21 and either question 22 or 23**

21. An experiment was carried out to investigate the effect of temperature on the rate of reaction catalyzed by an enzyme. The results are shown in the table below.

| TEMPERATURE ($^{O}C$) | RATE OF REACTION IN MG OF PRODUCTS PER UNIT TIME |
|---|---|
| **5** | **0.2** |
| **10** | **0.5** |
| **15** | **0.8** |
| **20** | **1.1** |
| **25** | **1.5** |
| **30** | **2.1** |
| **35** | **3.0** |
| **40** | **3.7** |
| **45** | **3.4** |
| **50** | **2.8** |
| 55 | 2.1 |
| 60 | 1.1 |

**a.** On the grid provided below draw a graph of rate of reaction against temperature. **6mks**

**(PROVIDE A GRAPH PAPER)**


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**b.** When was the rate of reaction 2.6 mg of product per unit time? **2mks**

**c.** Account for the shape of the graph between

**(i)** $5^oc$ and $40^oc$ **2mks**

**(ii)** $45^oc$ and $60^oc$ **3mks**

**d.** Other than temperature name two ways in which the rate of reaction between $5^oc$ and $40^oc$ could be increased. **2mks**

**e.**

**(i)** Name one digestive enzyme in the human body which works best in acidic condition. **1mk**

**(ii)** How is the acidic condition for the enzyme named in (e) (i) above attained? **2mks**

**f.** The acidic conditions (e) (ii) above are later neutralized.

**i.** Where does the neutralization take place? **(1mk)**

**ii.** Name the substance responsible for neutralization. **(1mk)**

**22.** Describe how water moves from the soil to the leaves of a tree **(10mks)**

**23.**

**i.** Explain how the mammalian intestines are adapted to perform their function **(5 mks)**

**ii.** Describe how environmental factors increase the rate of transpiration in terrestrial plants **(5 mks)**



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# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 03

**1.** State the function of the following organelles. **(2mks)**

**a.** Lysosomes

**b.** Ribosomes

**2.** A student observed a row of 16 epidermal cells in a microscopic field that was 8mm in diameter. Calculate the average length of one cell in micrometres. Show your working.

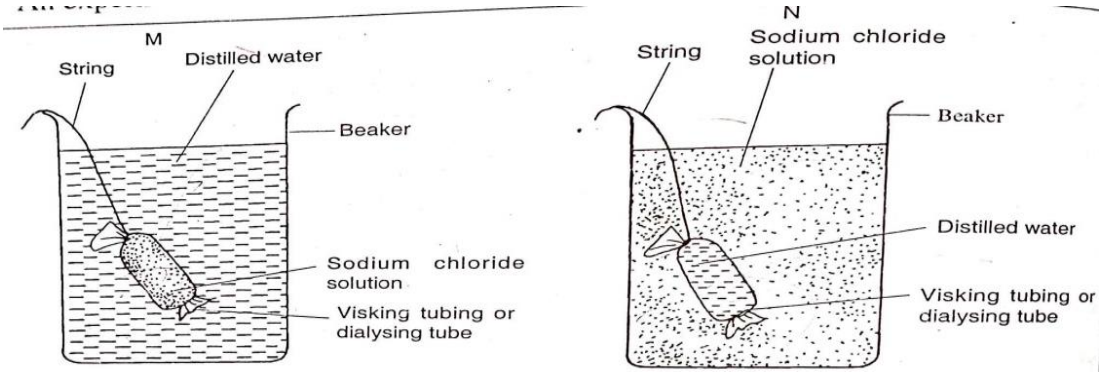
**(3mks)**

**3.** A student drew a 6cm diagram of a plant flower if the actual length of the flower was 12cm. calculate the magnification of the drawing made by the student. Show your working.

**(3mks)**

**4.** State three factors that affect the rate of diffusion. **(3mks)**

**5.** An experiment was set-up in a laboratory as shown below.




**i.** What will happen to visking tubing in M and N after two hours. **(2mks)**

**ii.** Explain the observations made in M. **(2mks)**

**iii.** What does visking tubing represent in a living organism? **(1mk)**

**6.** Distinguish between autotrophism and heterotrophism modes of nutrition. **(2mks)**

**7.** State three properties of monosaccharides. **(3mks)**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**8.** The equation below shows formation of a disaccharide.

Glucose + Glucose $\xrightarrow{\text{process p}}$ Q + water

**i.** Name process P. **(1mk)**

**ii.** Product Q. **(1mk)**

**iii.** Other than product Q named above name other two examples of disaccharides. **(2mks)**

**9.** List four factors which affect enzyme controlled reaction. **(4mks)**

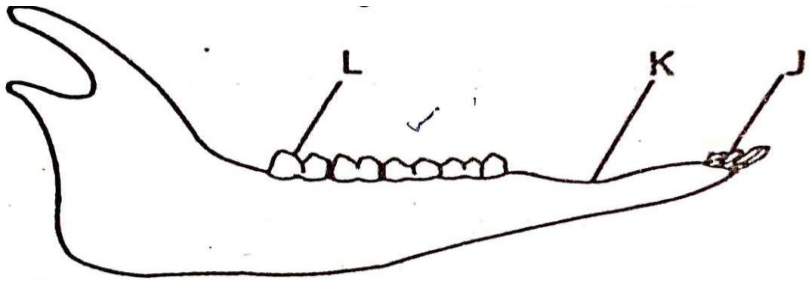
**10.** Name two nutrients that are absorbed without being digested by the enzymes in humans. **(2mks)**

**11.** List three types of salivary glands. **(3mks)**

**12.** Give two roles of saliva in the process of digestion. **(2mks)**

**13.** Differentiate between homodonts and heterodonts. **(2mks)**

**14.** The diagram below represents the lower jaw of a mammal.




**a.** Name the mode of nutrition of the animal whose jaw is shown above. **(1mk)**

**b.** Mode of feeding. **(1mk)**

**c.** Give a reason for your answer in (b) above. **(1mk)**

**d.** Diet of the animal. **(1mk)**

**e.** Name the toothless gap labeled K. **(1mk)**

**f.** Name the substance that is responsible for hardening of teeth. **(1mk)**

**15.** State the roles of the structures found within a tooth:

**a.** Blood vessels. **(1mk)**

**b.** Nerves. **(1mk)**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**16.** List two major types of dental diseases. **(2mks)**

**17.** Give two roles played by bile salts in the process of digestion. **(2mks)**

**18.** Explain five ways in which the illume is adapted to its functions. **(5mks)**

**19.** The following is a dental formula of a certain mammal.

$$I^{0}/_{3}\ C^{0}/_{1}\ Pm^{3}/_{3}\ m^{3}/_{3}$$

**i.** Calculate the total number of teeth of the mammal. **(2mks)**

**ii.** Give the likely mode of feeding. **(1mk)**

**iii.** Give a reason for your answer in (ii) above. **(1mk)**

**20.** Name the disease in humans caused by deficiency the following: **(5mks)**

**i.** Vitamin A

**ii.** Vitamin D

**iii.** Vitamin C

**iv.** Iodine

**v.** Iron

**b.** State one function of water in the diet. **(1mk)**

c. State five factors that determine energy requirements in human beings. **(5mks)**



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# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 04

**1.** The scientific name of the cat is *Felis catus* classify the cat into; **(3mks)**

**i)** Kingdom

**ii)** Genus

**iii)** Species

**2.** Define the following branches of biology.

**a)** Ecology **(1mk)**

**b)** Anatomy **(1mk)**

**3.** State the functions of each of the following organelles.

**a)** Centrioles **(1mk)**

**b)** Ribosomes **(1mk)**

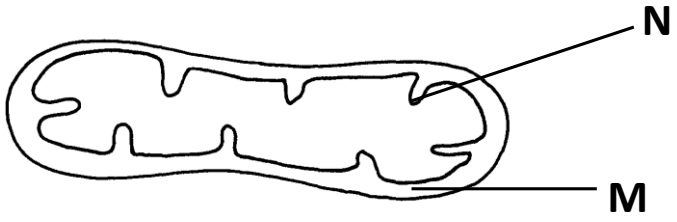
4. Name the Kingdom to which each of the following belong.

**a)** Spirogyra **(1mk)**

**b)** *Vibrio cholerae* **(1mk)**

**c)** Maize **(1mk)**

**5.** The diagram below represents a cell organelle.




**a)** Identify the organelle. **(1mk)**

**b)** Name the part labeled M. **(1mk)**

**c)** State the function of the part labeled N. **(1mk)**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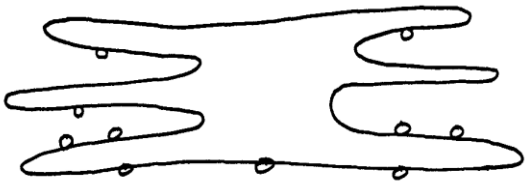
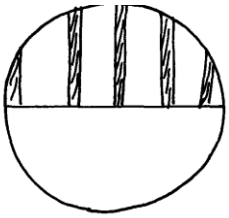
**6.** The organelle below was observed in a cell using a microscope.



**a)** Identify the organelle above. **(1mk)**

**b)** On the diagram, label the part where protein synthesis occurs. **(1mk)**

**7.** A form two students trying to estimate the size of onion epidermal cells observed the following on the microscope's field of view.

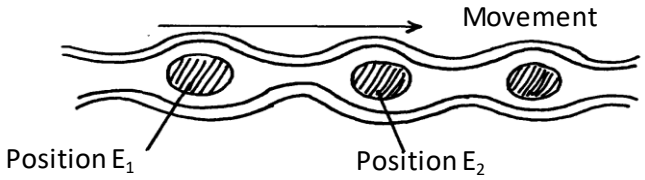


He counted 20 cells across the diameter of the field of view. Calculate the size of one cell in micrometers. **(3mks)**

**8.** Explain the differences between turgor pressure and wall pressure. **(4mks)**

**9.** Distinguish between haemolysis and plasmolysis **(4mks)**

**10.** The diagram below shows how food moves along the human oesophagus and intestines




**a)** Identify the process illustrated in the diagram. **(1mk)**

**b)** Explain the movement of the food bolus from position $E_1$ to position $E_2$. **(1mk)**

**c)** Name **one** component of the human diet that assist in the movement in (b) above. **(1mk)**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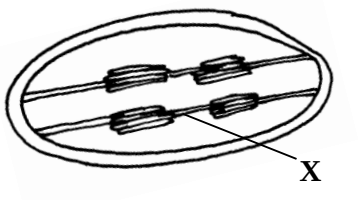
**11**. Below is the structure of an organelle found in a plant.




**i)** Name the organelle **(1mk)**

**ii)** State the functions of the organelle named above. **(1mk)**

**iii)** Name the part labeled **X**. **(1mk)**

**12.** Suggest **two** functions of mucus secreted along the walls of the alimentary canal. **(2mks)**

**13.** Name **three** aspects of light that are important during photosynthesis. **(3mks)**

**14.** The equation below shows a chemical reaction that takes place in green plants under certain conditions.

Carbon (IV) oxide + Water $\longrightarrow$ glucose + **X**

Name the;

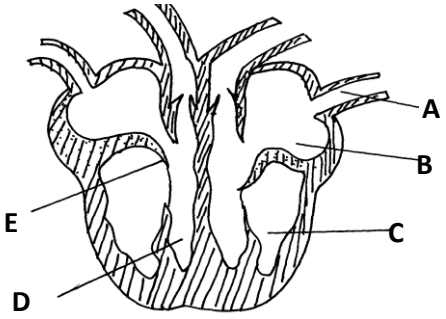
**i)** Substance represented by **X** **(1mk)**

**ii)** Process represented by the equation **(1mk)**

**15. a)** Define the term symbiosis . **(1mk)**

**b)** What are the final products of digestion of fats. **(2mks)**

**16.** The diagram below shows a vertical section through amammalian heart.




**a)** Name the parts labeled **A** to **E** **(5mks)**

**b)** Give a reason why the wall of chamber C is thicker than chamber D. **(2mk)**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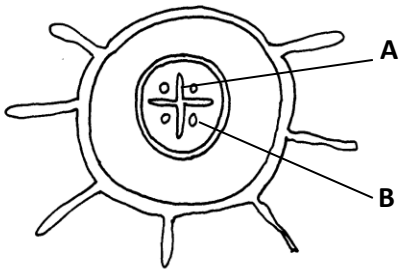
17. The figure below represents a transverse section of a young root.

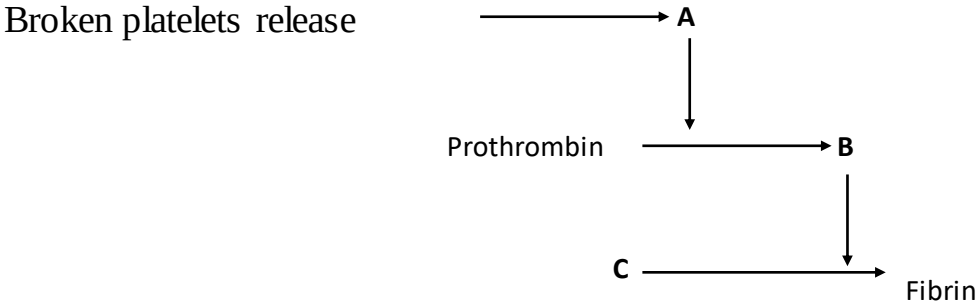



**a)** Name parts labeled **A** and **B** **(2mks)**

**b)** State the functions of parts labeled A and B **(2mks)**

**18.** List **three** structural modifications of a leaf which enable plants to reduce water loss. **(3mks)**

**19.**The following schematic diagram represents the main stages in the blood clotting process.




**a)** Name the Substances **A** and **C**. **(2mks)**

**20.** State **two** ways in which the leaf is suited to gaseous exchange. **(2mks)**

**21.** Name **two** structures for gaseous exchange in amphibians **(2mks)**

**22.**The progress that occurs in plants is represented by the equation below:

$$C_6H_{12}O_6 \longrightarrow 2C_2H_5OH + 2CO_2 + \text{Energy.}$$

**a)** Name the process **(1mk)**

**b)** State **three** economic importance of the named process in (a) above. **(3mks)**

**23.** State **one** role that is played by osmosis in;

**i)** Plants **(1mk)**

**ii)** Animals **(1mk)**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**24.a)** State **three** structural differences between arteries and veins in mammals . **(3mks)**

**b)** Name a disease that causes thickening and hardening of arteries. **(1mk)**

**25** Name the deficiency diseases of each of the following nutrients . **(7mks)**

i) Vitamin A iii) Vitamin $B_2$ v) Vitamin D vii) Iodine

ii) Vitamin B iv) Vitamin C vi) Calcium

**26.** Explain how the red blood cells of mammals are adapted for efficient transport of oxygen. **(2mks)**

**27**.a) What is the importance of gaseous exchange in plants. **(2mks)**

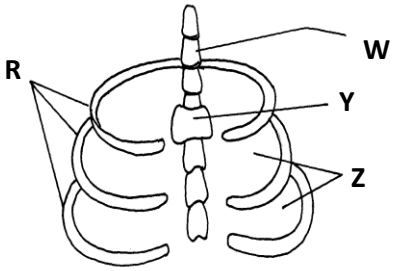
**b)** Name the **three** gaseous exchange structures in plants. **(3mks)**

**28.** What are the respiratory structures in the following organisms. **(5mks)**

i. Mammals iii. Fish v. Insects

ii. Amoeba iv. Tadpoles

**29.** The diagram below represents apart of the rib cage.




**a)** Name the bones labeled **W,Y** and **R** **(3mks)**

**b)** How does the part labeled **Z** facilitate breathing in? **(3mks)**

**c)** State **two** characteristics of respiratory surfaces. **(2mks)**



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# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 05

**1. (i)** What is respiration? **(1mk)**

**(ii)** State any **two** importance of respiration. **(2mks)**

**2. (a) (i)** Name the blood vessel that supplies the cardiac muscles with its requirements. **(1mk)**

**(ii)** State the corgenical defect of the above blood vessel resulting from prolonged large intake of cholesterol in the blood. **(1mk)**

**(b)** What is the importance of the thicker muscular wall of the left ventricle of a mammalian heart? **(2mks)**

**3. (a) (i)** Name the respiratory surface in insects. **(1mk)**

**(ii)** State any **one** feature that adapts the structured named in a (i) above to its functions. **(1mk)**

**(b)** Why are the fish gills highly vascularized? **(1mk)**

**4. a) (i)** what would happen if a person secreted less A.D.H? **(1mk)**

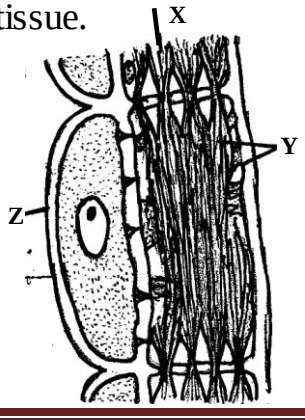
**(ii)** Name the condition described in a(i) above. **(1mk)**

**(b)**What is the role of the loop of Henle in homeostasis? **(1mk)**

**5. (a)** Name the products of anaerobic respiration in plants. **(1mk)**

**(b)** Give any **two** economic importance of the products named in (a) above. **(2mks)**

**6.** The diagram below illustrates part of phloem tissue.



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**(a)** Name the parts labeled. **X & Y** **(2mks)**

**(b)** State the function of the part labeled **Z** **(1mk)**

**7.** Name the monosaccharides that make up the disaccharides below

**(a)** Sucrose **(1mk)** **(b)** Lactose **(1mk)** **(c)** Maltose **(1mk)**

**8.** State **one** use of the following excretory products of plants **(2mks)**

**(i)** Latex **(ii)** Colchicine

**9.** (a) Define respiratory quotient **(1mk)**

**(b)** Given the equation below, calculate the respiratory quotient (RQ) **(2mks)**

$$C_6H_{12}O_6+6O_2 \longrightarrow 6H_2O+6CO_2+2880kJ$$

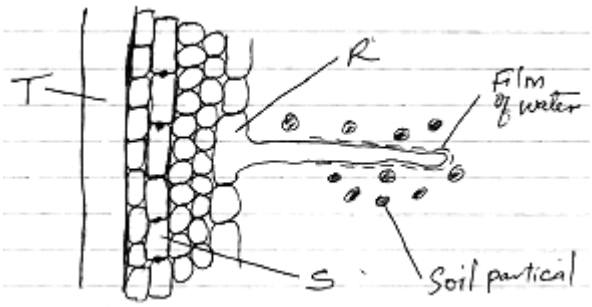
**10.** State the importance of the following

**(i)** Reversed stomatal rhythm to desert plants **(1mk)**

**(ii)** Closing of stomata on a hot dry sunny day **(1mk)**

**(iii)** How does wind affect transpiration rate? **(1mk)**

**11.** The diagram below represents the pathway of water from soil into the plant.




**i.** Name the structures labeled T and S. **(2 mk)**

**ii.** State **<u>two</u>** ways in which the structure labeled R is adapted to its functions. **(2mks)**



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**12.** A student added equal amounts of blood to equal volumes of salt of different concentrations. She observed and counted the red blood cells at the beginning of the experiment and at end of the experiment. The results were as shown:-

| **Set up** | **Concentration of sal** | **Beginning** | **After 30 mins** |
|---|---|---|---|
| A | 0.1mol | 500 | 500 |
| B | 0.01mol | 500 | 250 |

Account for the results in:

**(a)** Set up A **(2mks)**

**(b)** Set up B **(2mks)**

**13.** Below is a dental formula of certain organisms. Use it to answer the questions that follow.

**$I\ ^{0}/_{3}$, $C\ ^{0}/_{1}$, $PM\ ^{3}/_{2}$, $M\ ^{3}/_{3}$**

**(i)** Calculate the total number of teeth in the mouth of the organisms. **(2mks)**

**(ii)** Name the organisms. **(1mk)**

**(iii)** Identify the mode of nutrition of the organisms. **(1mk)**

**14.(a)** Give a reason why glucose does not normally appear in urine even though it is filtered in mammalian Bowman's capsule. **(2mks)**

**(b)** Which hormones are involved in the salt-water balance in human body? **(2mks)**

**15. a)** State **two** functions of the blood other than transport. **(2mks)**

**(b)** Name **one** defect of the circulatory system in humans. **(1mk)**

**16. (a)** State **two** ways in which human body is naturally protected against harmful bacteria. **(2mks)**

**(b)** State **one** way in which the composition of blood in the pulmonary artery and that of pulmonary vein differ. **(1mk)**

**17.** Describe the path taken by Carbon (IV) Oxide released from the tissues of a cockroach into the atmosphere. **(2mks)**



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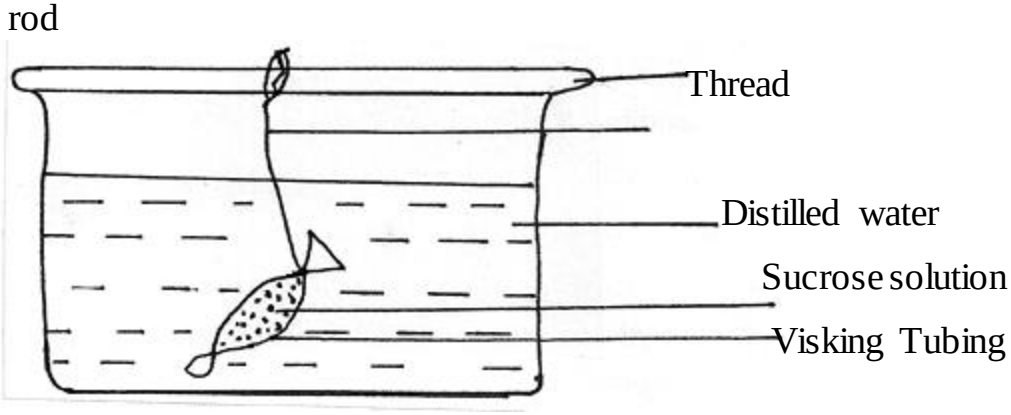
**18.** Form One student set up an experiment shown below to investigate a certain physiological process. The set up was left for 30 minutes.




**(a)** Name the process under study. **(1mk)**

**(b)** State the expected results after 30 minutes. **(1mk)**

**(c)** Explain your answer in (b) above. **(3mks)**

**19.** Explain why it is important to stain specimen to be observed under a light microscope. **(2mks)**

**20.** What is wilting? **(2mks)**

**21.** State the significance of the following steps while testing for disaccharides in food sample. **(2mks)**

**(a)** Addition of dilute hydrochloric acid

**(b)** Addition of sodium bicarbonate.

**22.** a) (i) Name the fluid produced by sebaceous gland. **(1mk)**

(ii) State **two** function of the fluid named in 5 a) (i) above. **(2mks)**

b) Explain malpighian layer of the skin is adapted to perform its function. **(1mk)**

**23.** Outline **three** functions of colon. **(3mks)**

**24.** Explain four reasons why the study of biology is important **(4mks)**

**25.** Define the term physiology **(1mk)**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# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 06

## SECTION A

**1.** **(a)** Biologically, what is a cell? **(1 mk)**

**b]** Define the following term

**I.** Entomology **(1 mk)**

**II.** Genetics **(1 mk)**

**2.** State the characteristics of life that is demonstrated when seeds produce heat during germination **(1 mark)**

**3.** State three structural differences between arteries and veins. **(3 mks)**

**4.** State **two** factors that denature enzymes. **(2mks)**

**5.** Name **two** major branches of Biology. **(2mks)**

**6. (a)** Name the organelles that perform each of the following functions in a cell.

**(i)** Synthesis of proteins **(1mk)**

**(ii)** Transport cell secretions **(1mk)**

**(iii)** Destroy old and worn out organelles or even the entire cell. **(1mk)**

**(iv)** Package and transport glycoproteins. **(1mk)**

**(b)** Using a light microscope, a student counted 55 cells across a field of view whose diameter was 6000µm. Calculate the average length of the cells. Show your working. **(3 marks)**

**(c)** Why is it recommended to keep the stage of the microscope dry. **(1 mark)**

**7.** State the functions of the following apparatus.

**i.**Bait trap **(1mk)**

**ii.**Pooter **(1mk)**

**8.** In which two structural ways in which organelles chloroplast and mitochondria similar. **(2mks)**

**9.** State two functions of centrioles. **(2mks)**



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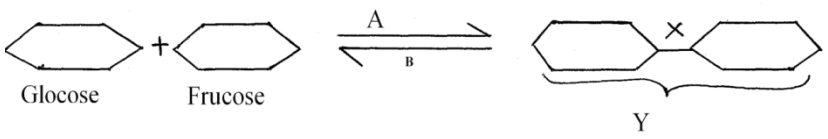
**10.** What is the effect of extreme temperatures on proteins? **(2mks)**

**11.** Study the reaction below and answer the questions that follow.



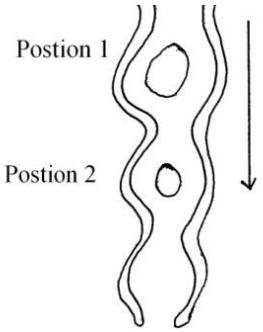

**i)** State the biological process that takes place represented by A **(1mk)**

**ii)** What Biological process is represented by B **(1mk)**

**iii)** State the product Y **(1mk)**

**iv)** State the bond represented by X **(1mk)**

**12.** The diagram below show how food bolus moves along the human oesophagus and the intestines.




**a)** Identify the process illustrated above **(1mk)**

**b)** Briefly state how the movement of the bolus from position 1 to position 2 is achieved. **(2mks)**

**13.** State **two** reasons why the stomach wall cannot be digested by the proteolytic enzymes. **(2 marks)**

**14.** **(a) Define** the term balanced diet. **(2marks)**

**(b) State** the importance of roughage in a diet. **(1mark)**

**15.** State ONE role played by the following substance in digestion.

**(i)** Hydrochloric acid **(2mks)**

**(ii)** Bile salts **(2mks)**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**16.** State the role of the following chemicals in a test for non-reducing sugar.

**(i)** Hydrochloric acid **(1mk)**

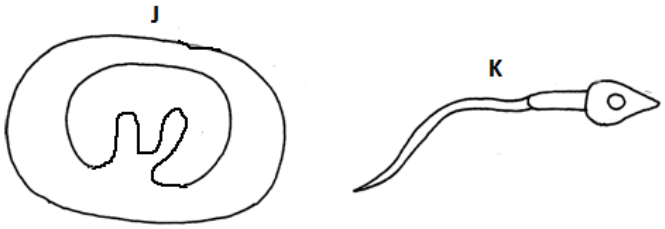
**(ii)** Sodium hydrogen carbonate **(1mk)**

**17. (a)** Why is blood group AB described as universal recipient? **(2mks)**

**(b)** Suggest why blood does not clot in blood vessels of a healthy person. **(lmk)**

**18. State three** ways in which the vessels that link arterioles with venules are suited to carrying out their functions. **(3marks)**

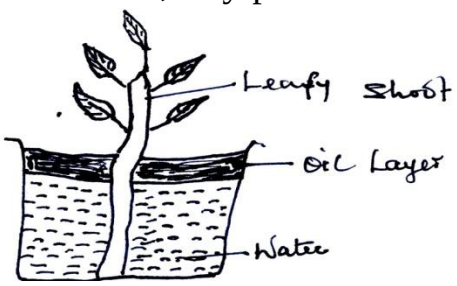
**19.** Below are diagrams of specialised cells in mammals




**(a)** Identify each of the cells **J & K** **(2mks)**

**(b)** Explain how cell specialization has enabled cell K to be effective in its functions **(2mks)**

**20.** Some students set-up the experiment shown below to investigate a certain physiological process in plants. After one hour, they placed cobalt chloride paper on the leaf surface.




**a)** What process was being investigated? **(1mk)**

**b)** State the role of the oil layer in the experiment **(1mk)**

**c)** Suggest one precautionary measure that the students were supposed to observe during the preparation and setting up of the experiment **(1mk)**

**d)** Suggest changes observed on the cobalt chloride paper after one hour. **(1mk)**

**21.** Explain why water logged soil does not support plant growth. **(3mks)**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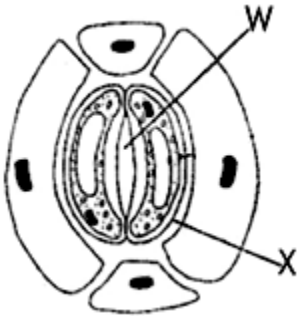
## Section B

**22.** The diagram **below** shows part of plant tissue.




**i.** Name the cell labelled **X** and part labelled **W**. **(2mks)**

**ii.** State **<u>two</u>** adaptations of cell labelled X to its functions. **(2mks)**

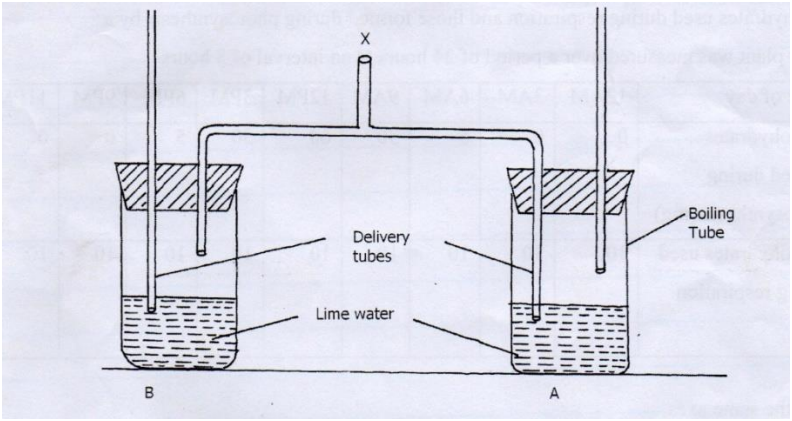
**23.** The number of stomata on the lower and upper surface of two leaves form plant X and Y were counted under the field of view of a light microscope. The results were show below.

| | **Number of stomata** | |
|---|---|---|
| **Leaf** | **Upper surface** | **Lower surface** |
| **X** | 4 | 12 |
| **Y** | 20 | 23 |

**a)** Which of the leaves would be expected to have lower rate of transpiration **(1mk)**

**(b)** Give a reason for your answer in [a] above **(1mk)**

**24.** An experiment was set up as show below.





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**(a)** A student blew air in and out through point X. Using arrows indicate how air gets in and out of the set up **(2mks)**

**(b)** (i) In which of the tube would lime water turn milky first. **(1mk)**

ii) Give a reason. **(1mk)**

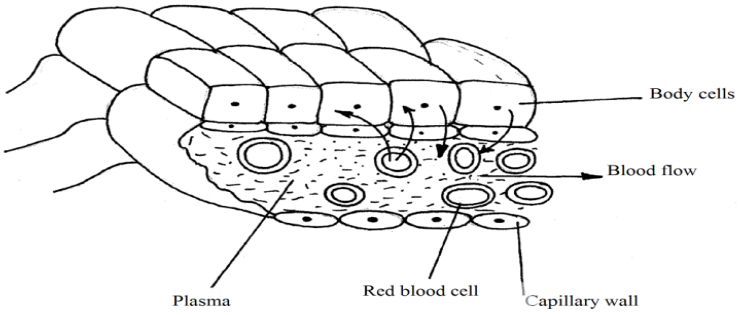
**25.(a)** Name the type of circulatory system found in members of the class insecta **(1mk)**

**(b)** Name the blood vessels that transport blood from:

(i) Small intestines to the liver **(1mk)**

(ii) Lungs to the heart **(1mk)**

**(c)** The diagram below shows gaseous exchange in tissues




**(i)** Name the gas that diffuses

**(I)** To the body cells **(1mk)**

**(II)** From the body cells **(1mk)**

**(ii)** Which compound dissociates to release the gas named in (a)(i) above **(1mk)**

**(d)** What is tissue fluid? **(2mks)**

**26.** Describe the opening of the stomata using the potassium ion theory **(10mks)**

**27.** **(a)** Name the respiratory surface in human beings. **(1mk)**

**b)** Describe exhalation mechanism in human being. **(9mks)**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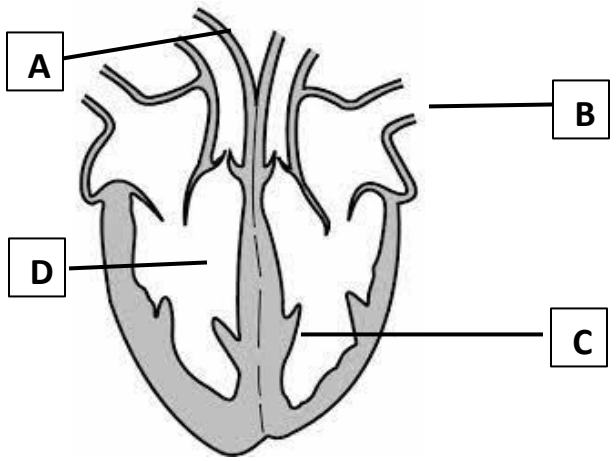
# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 07

## SECTION A (40 MARKS)

**1.** The diagram shown below represents a mammalian heart. Use it to answer the questions that follow




**a)** State the differences between vessel **A** and **B** in terms of the following: **(2mks)**

| Vessel | Diameter of Lumen | Concentration of Oxygen in the blood |
|---|---|---|
| **A** | | |
| **B** | | |

**b) i)** Name the part labelled **C** **(1mk**

**ii)** How is part **C** important in the functioning of the heart? **(1mk**

**c) i)** Which chamber of the heart is represented by letter **D** **(1mk**

**ii)** Give a reason for your answer in ci) above **(1mk**

**d)** Explain why animals with the heart shown above are more active than the rest **(2mks**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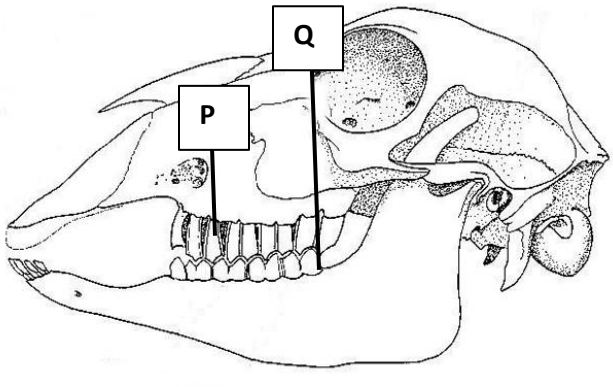
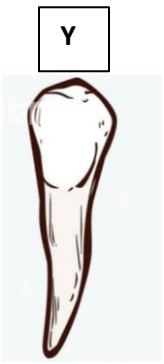
**2.** The diagrams shown below were used to study nutrition in a particular animal










**a)** i) Name the mode of nutrition of the animal whose skull is shown above **(1mk**

ii) Give a reason for your answer in ai) above **(1mk**

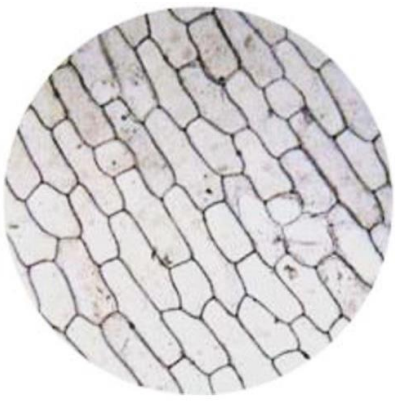
iii) Why do animals with the skull shown above have a longer alimentary canal **(2mks**

**b)** State the significance of parts **P** and **Q** to the nutrition of the animal whose skull is represented above **(2mks**

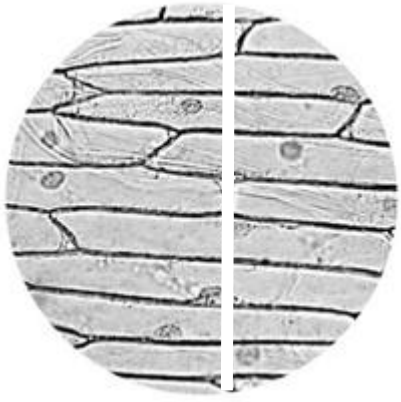
**c) i)** Identify the tooth represented by **X** **(1mk**

**ii)** Give a reason for your answer in ci) above **(1mk**

**3.** The diagram shown below the same cells in the same field of view of light microscope under different microscopy conditions



**Before**



**After**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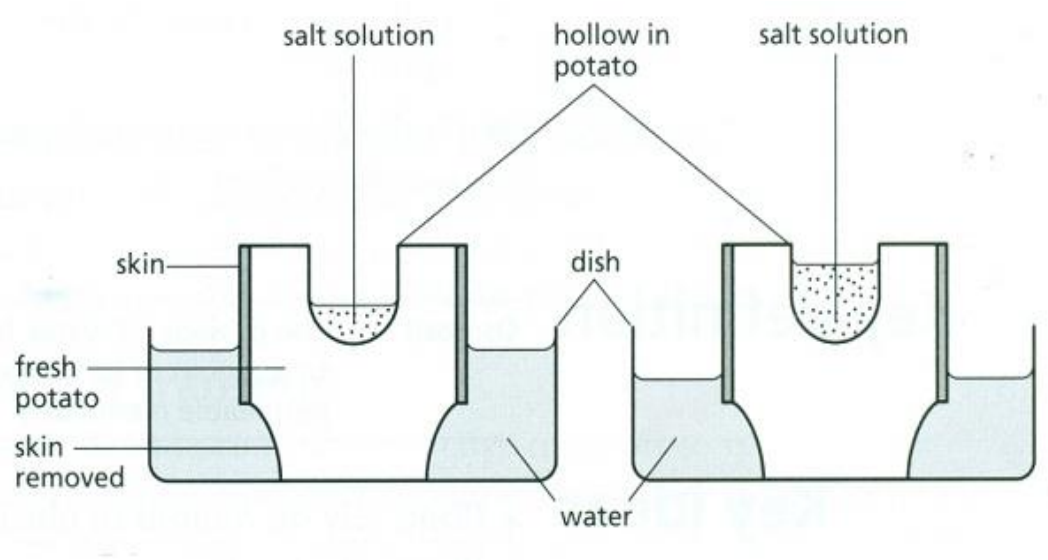
**a)** From the changes observed in the cells after adjustment of the microscope conditions, give **TWO** advantages of using a microscope over using a hand lens **(2mks**

**b) i)** Determine the number of cells along the diameter of the field of view represented by the white line in the second diagram **(1mk**

**ii)** If the diameter of field of view is 5mm, determine the diameter of one cell in micrometers **(3mks**

**c)** If the actual diameter of a single cell is 0.55micrometers, determine the total magnification used to observe the cells in the second diagram **(2mks**

**4.** The diagram shown below was used by Form One students to investigate a physiological process and observations made 30 minutes later.




**Before** **After**

**a)** Which physiological process was being investigated? **(1mk)**

**b)** Give **TWO** ways the physiological process mentioned in a) above is beneficial to animals **(2mk**

**c)** Account for the changes observed after the experiment **(3mks**

**d)** Explain the observation made if boiled potato was used in the experiment **(2mks**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**5.** The table below shows changes in the heart beat, concentration of oxygen and lactic acid in the blood during different levels of physical activity of a healthy athlete.

| Level of Physical activity | Heartbeat (Beats per minute) | Oxygen Concentration(%) | Lactic acid concentration(mol) |
|---|---|---|---|
| Resting | 60 | 100 | 0 |
| Easy | 80 | 95 | 0.5 |
| Moderate | 100 | 90 | 2 |
| Difficult | 120 | 85 | 4 |
| Very Difficult | 140 | 80 | 10 |

**a)** Account for the change observed in the concentration of lactic acid **(3mks**

**b)** Give **TWO** reasons why the increase in heart beat with increase in physical activity is important to the body. **(2mks**

**c)** State **TWO** ways the body deals with excess lactic acid accumulated during physical body exercise **(2mks**

**d)** Explain why during intense exercise the athlete will breathe faster **(1mk**

## SECTION B (40 MARKS)

Answer **Question 6** which is **Compulsory;** then Choose either Question **7** or **8**

**6.** The table below shows the rate of product formation for an enzyme over a range of pH values.

| pH | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 |
|---|---|---|---|---|---|---|---|---|
| Rate of product formation for enzyme (mg/hr) | 34.5 | 40.5 | 33.5 | 15.0 | 2.50 | 0.0 | 0.0 | 0.0 |

**a)** Plot a graph of rate of product formation against pH for the enzyme **(6mks**

**b)** Account for the changes in the rate of product formation at

**c)** i) pH of **1.0** to **2.0** **(2mks**

ii) pH of **3.0** to **5.0** **(2mks**


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**d)** From the graph, determine the following:

**i)** Optimum pH for the enzyme **(1mk**

**ii)** The rate of product formation at pH of **3.5** **(1mk**

**e)** With a reason, name the part of the alimentary canal where the enzyme above is found **(2mks**

**f)** Give **THREE** variables that may increase the maximum rate of product formation of the enzyme above **(3mks**

**g) i)** State **TWO** factors that may cause irreversible change in structure of enzymes **(2mks**

**ii)** State one way of reversing competitive enzyme inhibition **(1mk**

**7. a)** Describe how red blood cells are adapted to their functions **(8mks**

**b)** Describe how the various environmental factors increase the rate of transpiration in plants **(12mks**

**8. a)** Explain how various physiological mechanisms work to raise temperature back to normal in mammals on a cold day **(10mks**

**b)** Describe how various factors influence energy requirements in human beings. **(10mks**



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# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 08

**1.** Name the branches of biology that deal with study of

**(a)** Inheritance and variations **(1mk)**

**(b)** Chemical changes inside living organisms **(1mk)**

**(c)** The relationship between organisms and their environment **(1mk)**

**(d)** Insects **(1mk)**

**2. (a)** State two functions of cell membrane **(2mk)**

**(b)** Name the cell organelles that would be abundant in

**(i)** Skeletal muscles **(1mk)**

**(ii)** Palisade cells **(1mk)**

**(iii)** Fat cells **(1mk)**

**3.** Explain the importance of each of the following during the process of digestion in human beings

**(a)** Teeth **(1mk)**

**(b)** Saliva **(2mks)**

**4.** State two ways in which active transports differs from diffusion **(2mks)**

**5.** Name two important stages of photosynthesis and state where in the chloroplasts, each takes places. **(4mks)**

**(b)** Explain how the following factors affect the rate of photosynthesis

**(i)** Concentration of carbon (1v) Oxide **(1mk)**

**(ii)** Light intensity **(1mk)**


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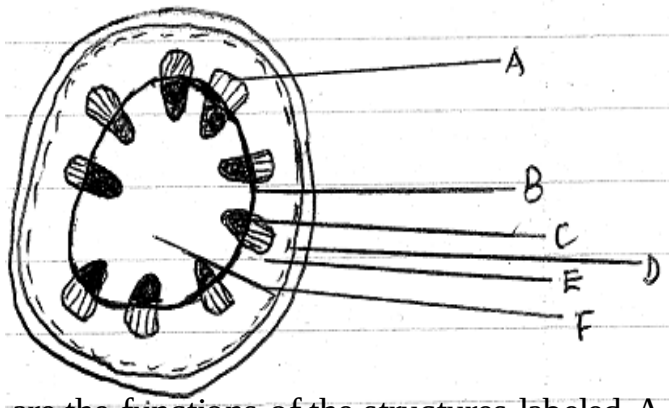
**6.** The diagram below shows the transverse section of a young stem




**(a)** What are the functions of the structures labeled A, B, C and D **(4mks)**

**(b)** What type of cell are found in the part labeled E and F **(1mk**

**(c) (i)** If the shoot from which this section was obtained had been immersed in red coloured water for one hour, what part on the diagram would be stained **(1mk)**

**(ii)** Give a reason for your answer in c (i) above **(1mk)**

**(d)** Is this a monocot or a dicot stem? Give at least three reasons to support your answer **(4mks)**

**7** The table below shows the percentage composition by volume of inhaled and exhaled air.

| Gas | Inhaled air (%) | Exhaled air(%) |
|---|---|---|
| Oxygen | 21 | 16 |
| Carbon(IV) oxide | 0.04 | 4.0 |
| Nitrogen | 78 | 78 |

**(a)** By what percentage is

**(i)** Carbon dioxide concentration in exhaled air higher than inhaled air? **1mk)**

**(ii)** Oxygen concentration in the exhaled air lower than the inhaled air. **(1mk)**

**(b)**Explain the difference in the composition of the gases between inhaled and exhaled air. **(3mks)**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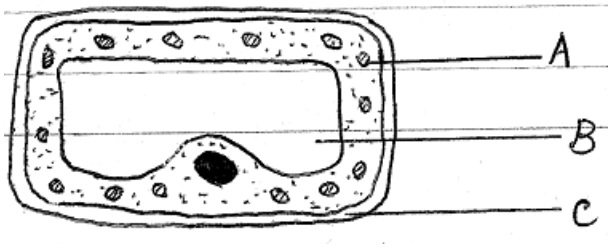
8 In an investigation, a student extracted three pieces of pawpaw cylinders using a cork borer. The cylinders were cut back top 50mm length and placed in a beaker containing a solution. The results after 40 minutes were as shown in the table below.

| Feature | Result |
|---|---|
| Average length of cylinders(mm) | 56mm |
| Stiffness of cylinders | Stiff |

**(a)** Account for the results in the table above **(3mks)**

**(b)** What would be a suitable control set up for the investigation? **(2mks)**

9 The figure below is a diagram of a cell as seen under the light microscope.




**(a)** Name three structures that shows this is a plant cell and not an animal cell. **(3mks)**

**b)** Name one chemical compound that is only found in the structure labeled A and state its function. **(2mks)**

**c)** Name the fluid in the part labeled B and state its functions. **(3mks)**

**d)** What is the main chemical compound found in the structure labeled C? **(1mk)**

**e)** Suggest why the structures labeled A would more on one side than the other side. **(2mks)**

**10(a)** Name the structural units of lipids. **(1mk)**

**b)** State three important functions of lipids in living organisms. **(2mks)**

**c)** Other than through enzymatic action, how else can a disaccharide be hydrolyzed to its constituent monosaccharides. **(1mk)**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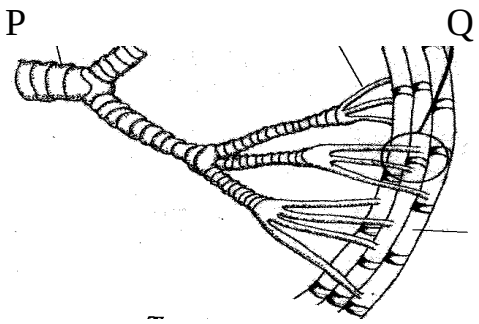
11.The diagram below represents part of a geasous system in a grasshopper.




**a)** Name the structures labeled P and Q **(2 mks)**

**b)** State the function of the structure labeled P **(1 mk)**

**c)** Describe the path taken by carbon (IV) oxide from the tissues of the insect the atmosphere **(3 mks)**

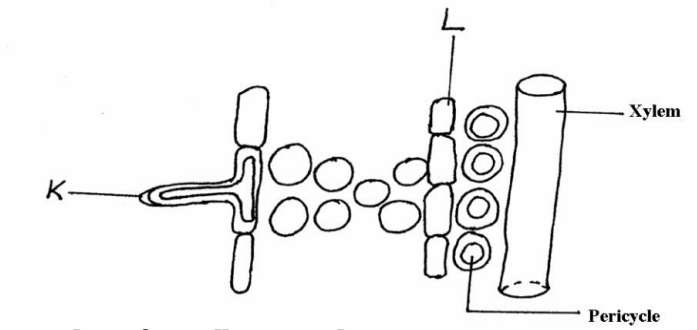
**d)** How is the structure labeled Q adapted to its functions **(2 mks)**

**12.**State five differences between aerobic and anaerobic respiration. **(5mks)**

**13.(a)**State four characteristics of gaseous exchange or respiratory surfaces. **(4mks)**

**(b)** Describe the mechanism of breathing in a mammal under the following subheadings.**(16mks)**

**14.** The diagram below shows part of a longitudinal section of a root: -




**(a)** Identify cells K and L :- **(2 mks)**

**(b)** State two adaptations of Cell K to its functions :- **(2 mks)**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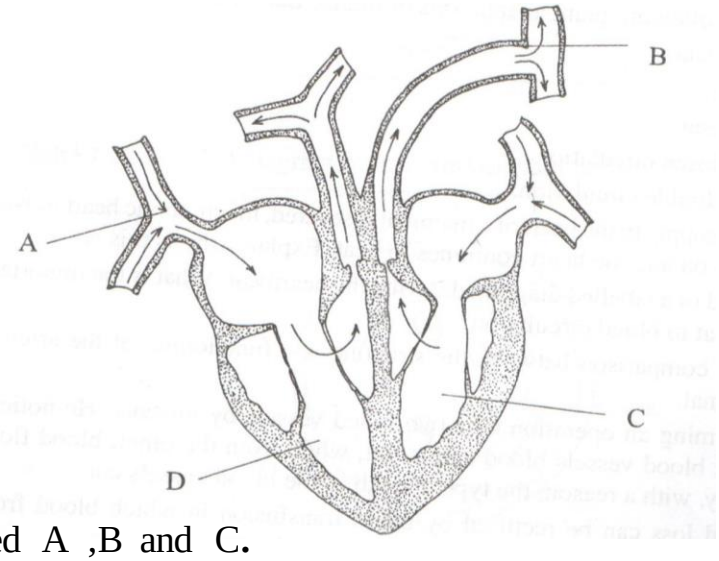
**15.** The diagram below represents a section through a mammalian heart.




**a.** Label the parts marked A ,B and C**.** **(2 mks)**

**b.** State the structural differences between blood vessels labeled A and B**.** **(3 mks)**

**c.** Explain why chamber C has thicker walls than the chamber labeled D**.** **(2 mks)**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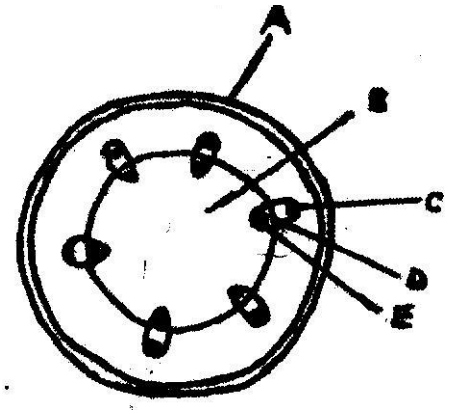
# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 09

**1.** The diagram below represents a transverse.

Section of a young stem.




**a)** Name the parts labeled A and B **(2mks)**

**b)** State functions of the part labeled C, D, E. **(3mks)**

**2. a)** Why are people with blood group O universal donors. **(2mks)**

**b)** A person with blood group AB requires blood transfusion. Name blood groups of the donor. **(2mks)**

**3. a)** Name the type of circulatory system found in insects **(1mk)**

**b)** Name the blood vessel that transports blood from

**i.** Small intestine to the liver. **(1mk)**

**ii.** Lungs to the heart. **(1mk)**

**c)** In what form is oxygen transported from the lungs to the body tissues? **(1mk)**

**4.** Distinguish between natural and acquired immunity. **(2mks)**

**5.** State four functions of blood other than transport. **(4mk)**

**6.** Name the antigens that determine human blood groups. **(2mks)**

**7.** State structural differences between arteries and veins. **(6mks)**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**8.** Give reasons for carrying out the following procedure when making temporary slides.

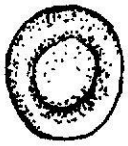
**(a)** Making thin sections. **(1mk)**

**(b)** Adding water to the sections. **(1mk)**

**(c)** Placing coverslip over the plant section. **(1mk)**

**9.** a) Distinguish between diffusion and osmosis. **(2mks)**

b) The diagram below show a red blood cell that was subjected to certain treatment.



***At start***



***At end***

Account for the shape of the cell. **(2mks)**

**10.** **a)** Name the material that strengthens xylem vessels. **(1mk)**

**b)** Name the tissue that is removed when the bark of the dicotyledonous stem is ringed **(1mk)**

**11.** **a)** State what happens during light stage of photosynthesis. **(4mks)**

**b).** What are the end products light stage. **(2mks**

**12.** State 2 factors affecting enzymatic activities. **(4mks**

**13.** How does the following affect the rate of diffusion:

**(a)** Diffusion gradient. **(2 mk)**

**(b)** Size of the molecules **(2 mk)**

**(c)** Thickness of the membrane. **(2 mk)**

**(d)** Temperature **(2mks)**

**(e)** Surface area to volume ration. **(2mks)**



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**14.** Explain how the following factors determine the daily energy requirements

i. Age **(2mks)**

ii. Occupation **(2mks)**

**iii.** Sex **(2mks)**

**15.** Name the appropriate food substances for each of the following enzymes.

**i.** Ptyalin. **(2mks)**

**ii.** Pepsin. **(2mks)**

**b).** State the two roles of mucus in the stomach. **(2mks)**

**16. a)** State 3 adaption of xylem to its function. **(3mks)**

**b)** Describe how 4 environment factors affect the rate of transportation. **(8mks)**

**17.a)** State the difference between closed and open circulatory system. **(2mk)**

**b)**.State two ways in which the heart muscles are adapted to their functions. **(2mks)**

**18.** State the role of the following organelles. **(6mks)**

**a.** Golgi apparatus

**b.** Ribosomes

**c.** Golgi apparatus

**d.** Lysosomes

**e.** Mitochondrion

**f.** Chloroplasts

**g.** Centrioles


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# FORM TWO HOLIDAYS KEYNOTE
# BIOLOGY QUESTION PAPER NO: 10

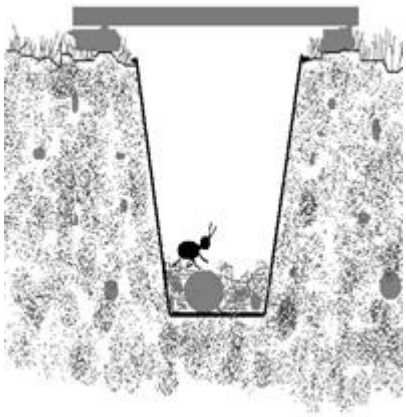
**1.** Name the branch of Biology that deals with the study of the following:

**a)** Classification of living organisms **(1mk)**

**b)** Internal structure of an organism **(1mk)**

**2.** Explain why an insect needs to undertake gaseous exchange **(2mks)**

**3.** Identify and state the function of each of the following apparatus **(4mks)**

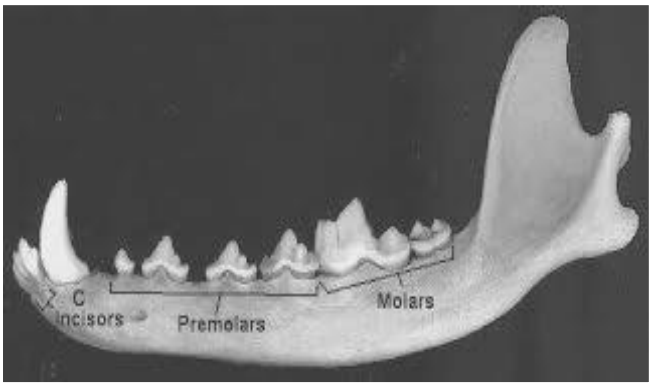




**4. a)** Write down the formula for calculating magnification when using a light microscope to observe specimen **(1mk)**

**b)** Sam drew the rear leg of a grasshopper which measured 45mm on the insect. If he used a magnification of X0.5, calculate the length of the leg drawn in centimeters. **(3mks)**

**5.** Use the diagram shown to answer the questions that follow





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**a)** Name the mode of feeding for the animal whose lower jaw is shown above **(1mk)**

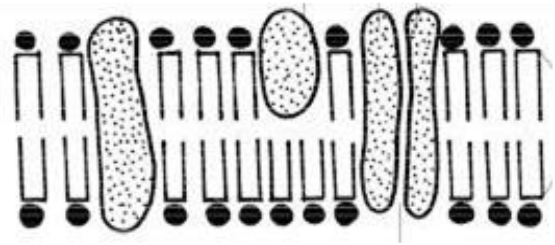
**b)** Give **TWO** reasons for your answer in a) above **(2mks)**

**6.** Account for the following observations

**a)** A mountain climber has more red blood cells than a person of the same size, age and gender living in low lands **(2mks)**

**b)** A baby has higher energy requirement than an adult **(2mks)**

**7.** The diagram shown below is of a structure found in cells



**a)** Label the following parts: Phospholipid layer; a pore **(2mks)**

**b)** State **TWO** properties of the structure above **(2mks)**

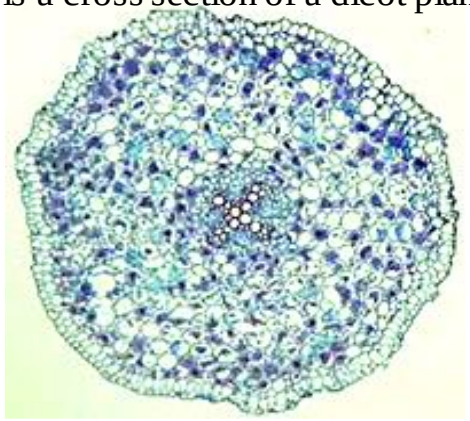
**8.** a) Define the term 'active transport' **(1mk)**

**b)** Give **TWO** ways in which active transport and diffusion are different **(2mks)**

**9.** State the economic importance of the following excretory products from plants **(3mks)**

**a)** Papain:. **b)** Quinine: **c)** Colchicine:

**10.** The following diagram is a cross section of a dicot plant



**a)** From which organ of the plant was the cross section above obtained? **(1mk)**

**b)** Give a reason for your answer in a) above **(1mk)**



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**11.**a) How is large surface area achieved in red blood cells in order to enable them be efficient at their function. **(2mks**

**b)** Give **TWO** advantages of Carbon (IV) Oxide transportation by the red blood cells **(2mks**

**12.** Distinguish between the following terms:

**i)** Allograft and isografts **(2mks**

**ii)** Guttation and Transpiration **(2mks**

**13.** a) Explain how the following antibodies defend the body against pathogens

i)Lysins **(1mk**

ii)Agglutinins **(1mk**

**b)** Which other way do White Blood Cells defend the body against pathogens in addition to use of antibodies? **1mk**

**14. a)** What is the role of proximal convoluted tubule in the kidney? **(1mk**

**b)** Give **TWO** adaptations of proximal convoluted tubule to its function **(2mks**

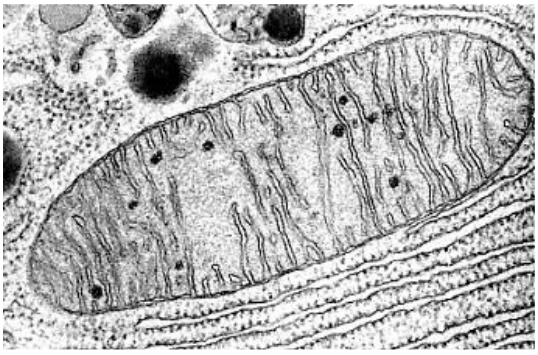
**15.** Name the organelles that form the following: **(2mks**

i) Ribosomes

ii) Lysosomes:

**16.** State **THREE** structural differences between arteries and veins **(3mks**

**17.** Study the diagram shown below





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**a)** State the adaptation of the organelle shown above to its function **(1mk**

**b)** Name **TWO** products from the process that takes place in the organelle shown above which are useful in the physiological process that occurs in the chloroplast of plant cells **(2mks**

**c)** Why do Red Blood Cells lack the organelle shown above? **(1mk**

**18. a)** What is an enzyme? **(1mk**

**b)** Give **THREE** factors that increase rate of enzymatic reactions **(3mks**

**19.** The table below shows the number of various teeth in the jaws of an animal

| | **Canines** | **Molars** | **Incisors** | **Premolars** |
|---|---|---|---|---|
| **Lower Jaw** | 2 | 6 | 4 | 4 |
| **Upper Jaw** | 2 | 6 | 0 | 4 |

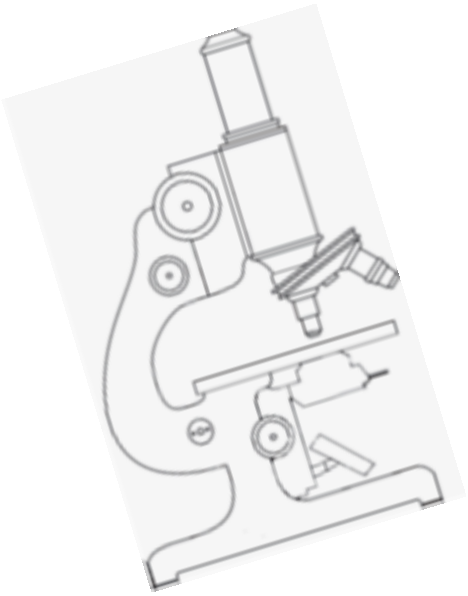
**a)** Determine the total number of teeth the animal has **(1mk**

**b)** Write down the dental formula of the animal whose teeth are shown on the table above **(1mk**

**c)** With a reason, determine the mode of feeding of the animal represented above **(2mks**

**20.** a) Label the following parts of the light microscope on the diagram shown below **(4mks**

Coarse Adjustment Knob; Revolving Nose Piece; Mirror; Objective lens



**b)** State **TWO** precautions observed before storage of the light microscope **(2mks**



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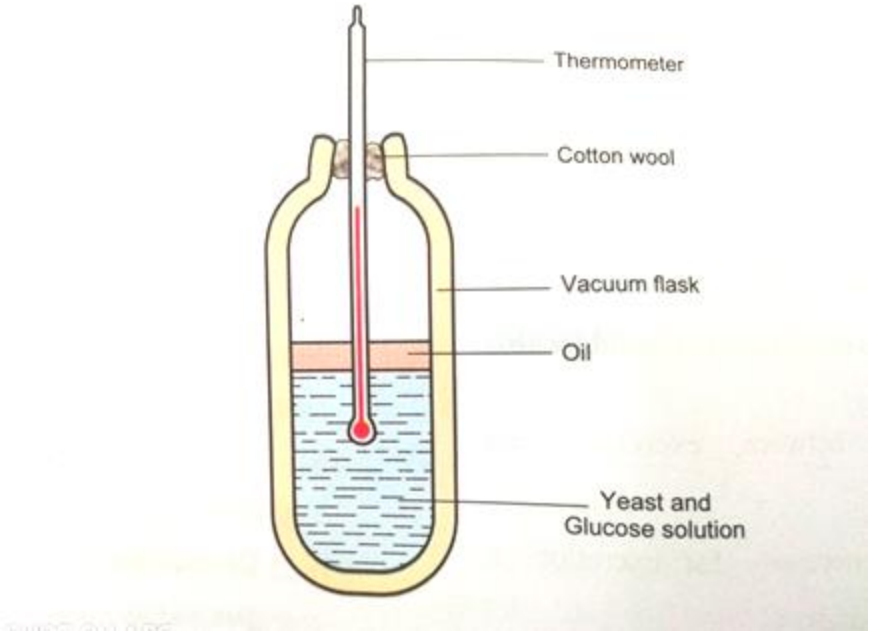
**21.** Consider the following experimental set up used to investigate a physiological process

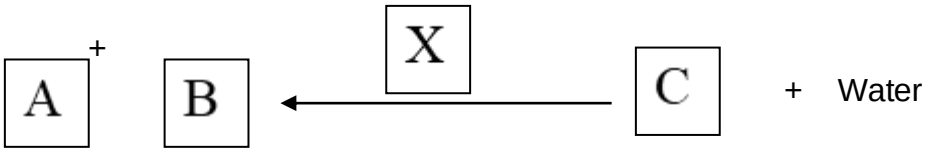



**a)** What was the aim of the experiment? **(1mk**

**b)** Account for the change that will take place in the thermometer **(2mks**

**c)** Suggest a control for the experiment shown above **(1mk**

**22.** Consider the following equation of a chemical equation




If **A** is glucose and **C** is Lactose, Name the Following

**a)** Enzyme **X** **(1mk**

**b)** Compound **B** **(1mk**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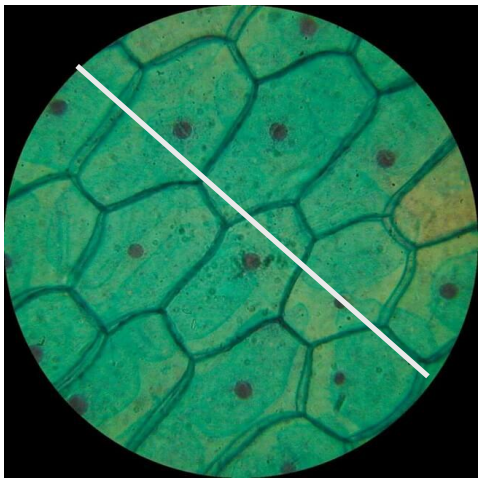
**23.** The following diagram shows onions cells captured in a field of view of a light microscope



**a)** Measure the length of the white line to determine the diameter of the field of view in millimeters **(1mk**

**b)** How many cells are found along the diameter represented by the white line? **(1mk**

**c)** Determine the actual diameter of one cell if a magnification of X1000 was used to observe the cells above **(3mks**

**d)** State a weakness of the process above of estimating cell size **(1mk**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