Name ..... Adm No. .....

School.....Candidate's signature .....

Date .....

BIOLOGY

October/November 2015

Time 2 hours

KANDARA SUB COUNTY SECONDARY SCHOOLS
FORM TWO JOINT EVALUATION

Kenya Certificate of Secondary Education

BIOLOGY

Paper - 231

October/November 2015

Time: 2 hours

INSTRUCTIONS TO CANDIDATES

- This paper consists of two sections A and B
- Answer ALL the questions in both sections in the spaces provided.
- Check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing

EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	53	
B	47	
TOTAL	100	

This paper consists of 8 printed pages
Candidates should check the question paper to ensure that all the printed pages are printed as indicated and no questions are missing.

1. Suggest a biological tool that is most suitable for collecting each of the following organisms from the field

i) A scorpion. .....(1 mark)

ii) A rat.....(1 mark)

iii) Sea turtles..... (1 mark)

2. How do bile salts help in digestion. (1 mark)

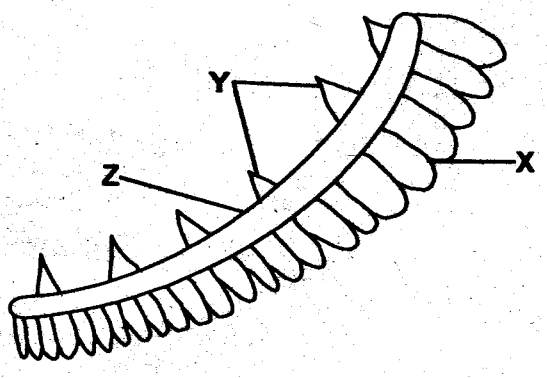
.....

3. Why is the wall of the left ventricle thicker than that of the right ventricle? (2 marks)

.....

.....

4. The figure below shows the gill of a fish.



a) Name the parts labelled X and Y. (2 marks)

X ..... Y .....

b) State the function of the part labelled Z. (1 mark)

.....

5.a) Why is it better to breathe through your nose than to breath through your mouth. (2 marks)

.....

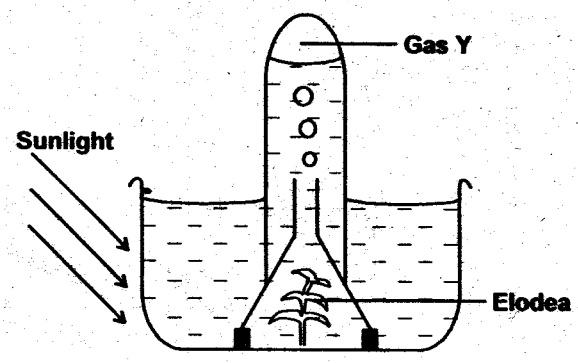
.....

b) Give two differences in composition between inhaled and exhaled air. (2 marks)

.....

.....

6. The diagram below represents a set up that was used to investigate a certain process in a plant.



a) Name the process that was being investigated. (1 mark)

.....

b) Identify gas Y. ..... (1 mark)

c) Other than the factors shown. State two factors that would affect the process named in (a) above. (2 marks)

.....

.....

7. State and explain the two types of respiration. (2 marks)

.....

.....

8. State two functions of the following hormones in homeostatsis.

a) Insulin. (1 mark)

.....

b) Antidiuretic hormone (ADH) (1 mark)

.....

c) Aldosterone (1 mark)

.....

9.a) State atleast three rules used in binomial nomeclature. (3 marks)

.....

.....

.....

b) The scientific name Lantana camara refers to a green herbaceous plant. From the name Lantana camara, which name represents the:

i) Genus name ?.....(1 mark)

ii) Specific name?.....(1 mark)

10. State two importance of the process of photosynthesis. (2 marks)

.....

.....

11. Outline four adaptation; of the mammalian lung to the process of gaseous exchange. (4 marks)

.....

.....

.....

.....

12. Explain the importance of the following procedures when preparing temporary slides for observation under light microscope.

a) Cutting very thin sections. (1 mark)

.....

b) Mounting the specimen on a drop of water. (1 mark)

.....

c) Heating slides gently after mounting the specimen. (1 mark)

.....

d) Staining the specimen. (1 mark)

.....

13. A student observing cells under low power lens of a microscope estimated the field of view to be 3.6mm. This length was occupied by 6 epithelium cells.

i) Convert 3.6mm to micrometers (μm) (1 mark)

.....

ii) Calculate the size of epithelium cells in micrometers show your working. (2 marks)

.....

.....

14. a) Define an enzyme. (1 mark)

.....

b) State two properties of enzymes. (2 marks)

.....

.....

15. State the significance of respiratory quotient. (2 marks)

.....

.....

16. Name the branch of biology that deals with

i) Study of cells. .....(1 mark)

ii) Study of relationships between organisms, their environment and with each other. (1 mark)

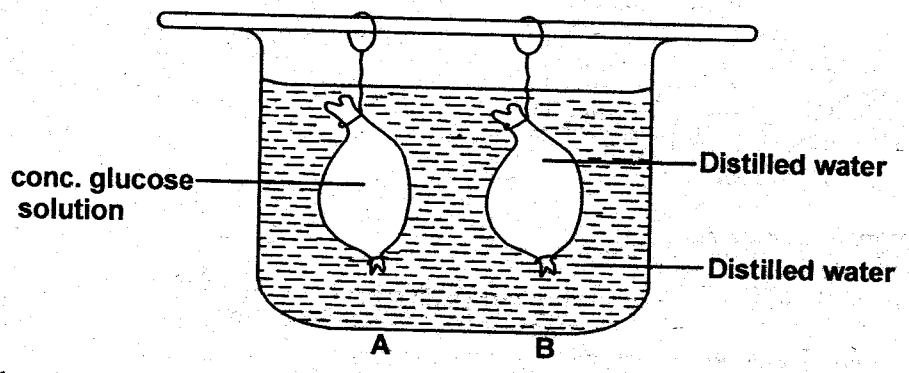
.....

17. Complete the table below by putting C for compatibility and an X for non-compatibility. (6 marks)

		DONOR			
		A	B	AB	O
RECIPIENT	A				
	B				
	AB			C	C
	O				C

SECTION B

18. An experiment to investigate osmosis was set up as shown below. Distilled water was put in a visking tube A and glucose solution in another visking tube B. Both visking tubes were then suspended in distilled water for six hours.



a) State the observations which were made at the end of the experiment in the following:

i) Visking tubing with glucose solution. (1 mark)

.....

ii) Visking tubing with distilled water. (1 mark)

.....

b) After six hours, the water in the beaker was tested for the presence of glucose. Describe the simple test for glucose. (4 marks)

.....

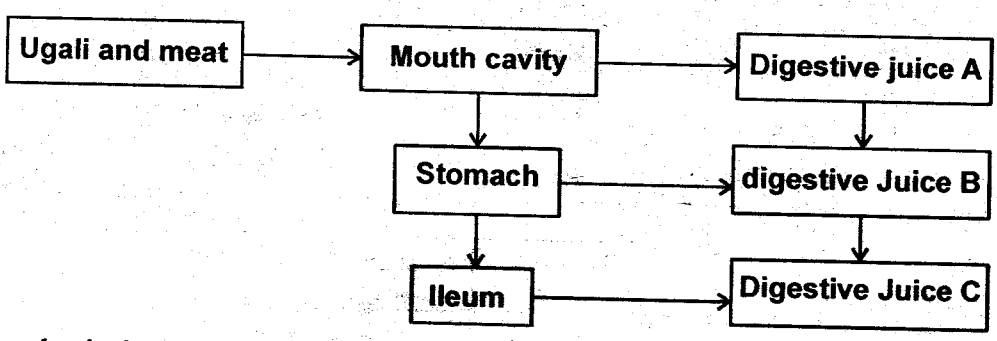
.....

.....

.....

.....

19. The flow diagram represents passage of a meal through the human digestive system. Study the diagram and answer the questions the follow.



a) Name the physical process that will occur in the mouth cavity. (1 mark)

.....

b) Name digestive juices B and C. (2 marks)

B .....

C .....

c) Explain two ways in which the digestive system is protected from corrosion of digestive juices. (2 marks)

.....

.....

.....

d) Name the hormone the stimulate secretion of juice B. (1 mark)

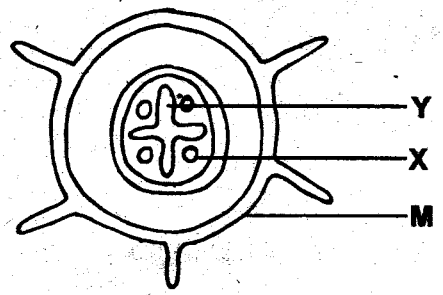
.....

c) Name two contents of digestive juice A. (2 marks)

.....

.....

20. Study the transverse section of the stem below then answer the questions that follow.



a) Name the parts labelled X, Y and M and state their functions. (6 marks)

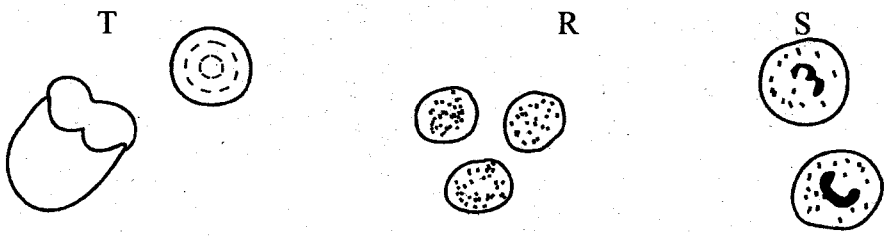
Part	Function
X	
Y	
M	

21. Study the different types of teeth below then answer the questions that follow.

Name teeth G, H and K and sate their functions. (6 marks)

Teeth	Name of tooth	Function
G		
H		
K		

22. The figures below represent mammalian tissue seen under a light microscope.



a) Name the structures marked R, S and T. (3 marks)

R .....

S .....

T .....

b) Give a region in the body where T is formed. (1 mark)

.....

c) i) Give the function of S and R. (2 marks)

.....

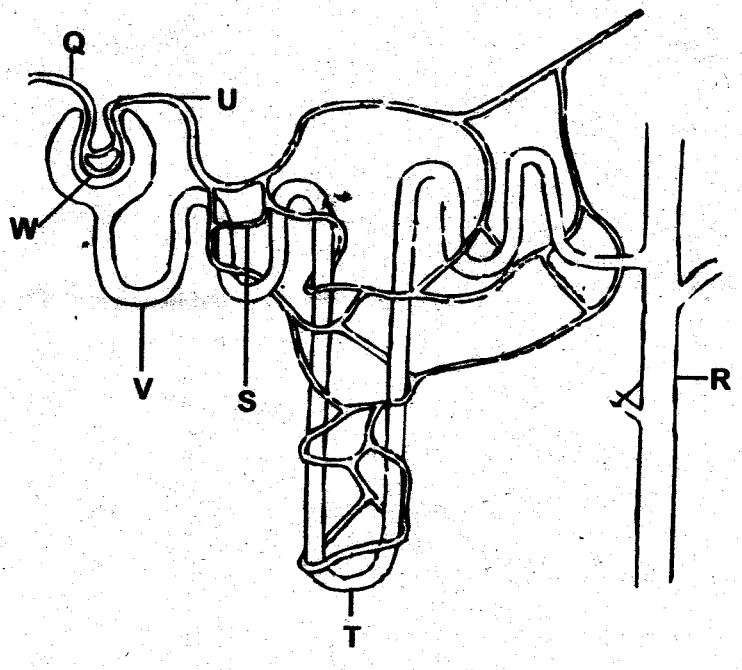
.....

ii) Explain how T is adapted to its functions. (2 marks)

.....

.....

23. Study the diagram below then answer the questions that follow.



a) Name the structures marked Q, S, V and T. (3 marks)

Q .....

S .....

V .....

T .....

b) When some pressure is applied at W, a fluid appears at V. Name the fluid and state its contents. (2 marks)

.....

.....

24. Discuss the adaptations of mammalian skin to its functions. **(8 marks)**

KANDARA SUB COUNTY SECONDARY SCHOOLS FORM TWO JOINT EVALUATION

Kenya Certificate of Secondary Education

BIOLOGY

Paper - 231

October / November 2015

Marking Scheme

---

1. i) A pair of forcepts
ii) Bait trap
iii) Trawling net; fishing nets.

2. They emulsify fats creating a large surface area for digestion of lipase.

3. The right ventricle pumps blood to the lungs which are next to the heart whereas the left ventricle pumps blood to the rest of the body which are further away from the heart.

4. a) X - Gill filament
Y - Gill rakers.

b) Attachment of the gill filaments and gill rakers.

5. a) Your nose has hair and mucus membranes lining it which trap micro-organisms and dust and prevent them from getting into the lungs and infecting them.

b) Inhaled air has more oxygen than exhaled air. Inhaled air has less carbon (IV) oxide than exhaled air.

6. a) Photosynthesis.

b) Oxygen gas.

c) Carbon (IV) oxide concentration.
Temperature
Amount of chlorophyll

7. Aerobic respiration - Type of respiration that requires oxygen for oxidation of the food substances.
Anaerobic respiration - Type of respiration that doesn't require oxygen for it to take place.

8.
a) Regulation of blood sugar level
b) Controls the amount of water in body fluid.
c) Regulation of sodium ions ; / controls the amount of salts.

9. Should have two names; the first name is the genetic name and the second the specific name.
- Generic name should start with a capital letter; specific name starts with a small letter.
- Both names should be underlined separately or italicised; The names should be Latinised.

b) i) Lantana
ii) Camara

10. Source of energy for both plants and animals.
- Replenishes oxygen in the air.
- Prevents accumulation of carbon (IV) oxide in air, preventing global warming.
- Responsible for carbon present in plant and animal tissues.
- Important in formation of fossil fuels.

11. Elastic, able to stretch to accommodate a lot of air.
- Have numerous alveoli to create a large surface are of gaseous exchange.
- Dense capillary network for rapid transportation of gases.
- Alveoli have thin membrane for rapid diffusion of gases.
- Have mucus secreting cells that keep the lungs moist.
- Lungs are surrounded by pleural membrane that secretes pleural fluid which reduces abrasion between the lungs and ribcage.
- Trachea and bronchi have rings of cartilage to keep them open.
- It is lined with ciliated cells that trap dust particles and bacteria coming in with air.
- Alveoli are always moist and absorb / dissolve oxygen.

12. To allow light to pass through the specimen.
- To allow the specimen not to dry up and stick on the slide.
- To fix the specimen on the microscope slide.
- To improve contrast highlighting structures to make them distinct.

13. a) 3.6mm × 1000μm
= 3600μm

b) Cell size
= Diameter of the field of view
Number of cells across the field of view

= 3600μm
6 cells

= 600μm

14.a) An organic catalyst which is protein in nature and affects the rate of chemical reaction without itself being changed.

b) Specific in action.
- Most enzyme controlled reactions are reversible.
- Enzymes are efficient.
- Are protein in nature and thus are denatured by excess heat.

15. Can be used to determine the type of respiration that occurs; to determine the type of respiratory substrate broken-down.

16. i) Cytology
ii) Ecology

17.

RECIPIENT \ DONOR	A	B	AB	O
A	C	X	X	C
B	X	C	X	C
AB	C	C	C	C
O	X	X	X	C

18. a) i) It increase in size or swells.

ii) No change in the size of the visking tubing with distilled water.

b) put glucose solution in a test-tube; add equal amount of Benedict's solution and ; heat to boil. If glucose present; colour changes to yellow / orange.

19. a) Mastication / chewing / grinding.

b) B - Gastric juice
C - Intestinal juice / sucks entericus.

c) - Produces mucus
- Enzymes produced in inactive form i.e. pepsinogen and trypsinogen.

d) Gastrin

e) Enzyme salivary amylase / ptyalin
- Mucin / mucus.
- Water.

20. Part
X Phloem - transports food substances / translocation of soluble products of photosynthesis.
Y Xylem - transports water and mineral salts in the plant.
M - Cortex
- Stores food for the plant (mainly starch)
- Transports water and mineral salts to conducting tissues in the centre of the root.

21. G - Incisor - For cutting / bitting.
H - Canine - tearing flesh ; holding prey
K - Molar - Grinding and chewing.

22. a) R - Platelets
S - White blood cells
T - Red blood cells.

b) Bone marrow of short bones

c) i) S - Engulfs and destroys foreign micro -organisms.
R - involved in blood clotting.

c) Biconcave disc to create a large surface area through which oxygen diffuses into the cell.
- Non - nucleated to create more space for haemoglobin.
- Contains haemoglobin which has a high affinity for oxygen.
- Has a thin membrane to reduce the diffusion distance.

23. Q - Afferent arteriole
S - Proximal convluted tubule
V - Bowman's capsule
T - Loop of henle

b) Glomerular filtrate.

Water, glucose, Amino acids, mineral salts and hormone.

24. Cornified Layer is made up of dead cells and strengthened with Keratin; to reduce water loss; protect inner cells from mechanical damage and act as a barrier to entry of micro-organisms. Granulary layer made up of living cells that forms the cornified layer.

- Malphigian layer contains Melanin; a pigment that protects cells beneath it from ultra violet rays from the sun;
- Has sweat glands that release sweat for regulation of body temperature; excretion of excess water and minerals salts. Has blood capillaries that supply the skin with oxygen and nutrients and take away carbon (IV) oxide and wastes.
- Sebaceous glands produce oily secretion, sebum, which gives the skin water repelling property; moistens the skin and acts as antiseptic against micro-organisms.
- Adipose tissue is a fatty layer that acts as a food storage tissue and also an insulator hence controlling body temperature.
- Nerve endings and sensory receptors perceive change in the external environment, hence protecting the body against harm.