

NAME : MARKING GUIDE

CLASS/NO

## INSTRUCTIONS

- Attempt all the questions in section *a*, *b* and ONE question in section *c*
- Answers to questions in section *a* and *b* must be in spaces provided and section *c* in the foolscap provided

## ANSWERS TO SECTION A

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

## SECTION A

1. Secretion and excretion occur at the same time in

- A. exhalation  
B. sweating  
C. defecation  
D. urination

2. Rabbits belong to class

- A. Chordata  
B. Eutheria  
C. Mammalia  
D. Vertebrata

3. Roots absorb mineral salts by process known as.

- A. Diffusion  
B. Osmosis  
C. Active transport  
D. Pinocytosis

4. The reason why urine of healthy person does not contain glucose is that

- A. the glomerulus is impermeable to glucose.  
B. glucose is used for respiration before reaching the collecting duct.  
C. glucose passes back into the blood stream.  
D. the kidney converts glucose to urea.

5. Which one of the following excretory products are removed from the body by the kidney?
  - A. Urea, excess water and excess salts.
  - B. Urea, excess water and carbon dioxide.
  - C. Carbon dioxide, excess water and excess salts.
  - D. Carbon dioxide, urea and excess salts.
6. Which one of the following stimulates the reabsorption of water in the kidneys?
 

A. Adrenaline	C. Thyroxine
B. Antidiuretic hormone	D. Insulin
7. Which one of these represents the route taken by urine in mammals?
  - A. Collecting tubule, ureter, bladder, urethra.
  - B. Bladder, ureter, collecting tubule, urethra.
  - C. Ureter, urethra, bladder, collecting tubule.
  - D. Urethra, bladder, collecting tubule, ureter.
8. Insects in the dry areas conserve water by passing waste in form of
 

A. Urea	C. Ammonia gas
B. Uric acid crystals.	D. Urine
9. A sample of urine from a man was boiled with Benedict's solution and the mixture turned orange in colour. Which of the following is the best deduction about the condition of this man?
  - A. There was a lot of glycogen in his blood.
  - B. He has a deficiency of insulin in his blood.
  - C. His diet has a lot of sugar.
  - D. His kidneys were damaged.
10. The immediate source of energy for cellular activities is
 

A. Glucose	C. Starch
B. Fat	D. Sucrose
11. Which one of the following is the gaseous exchange site in insects
 

A. Tracheoles	C. Spiracles
B. Alveoli	D. Fillaments
12. Which one of the following is absorbed in the lacteals of the villi
 

A. Amino acids	C. Glucose
B. Fatty acids and glycerol	D. Vitamins
13. Amoeba obtains oxygen from the surrounding water through its cell membrane by process known as
 

A. Active transport	C. Diffusion
B. Osmosis	D. Gaseous exchange
14. In which one of the following conditions would you expect a low rate of transpiration
 

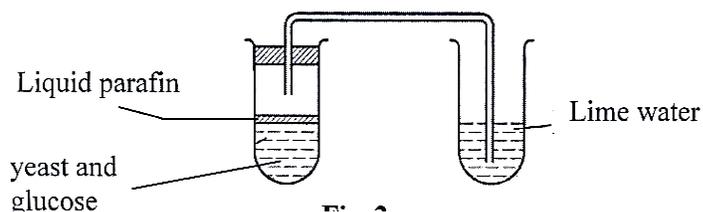
A. Low humidity and wind	C. High humidity and wind
B. High humidity and still air	D. Low humidity and still air
15. Most of the food is absorbed in the
 

A. Stomach	C. Colon
B. Ileum	D. Liver
16. Which one of the following organs performs the function of urine formation in the body
 

A. Kidneys	C. Lungs
B. Liver	D. Skin
17. In which of the following organisms doesn't blood perform the function of oxygen transport
 

A. Molluscs	C. Rabbits
B. Insects	D. Octopus

18. Glomerulus is present in  
 A. Renal cortex  
 B. Renal medulla  
 C. Renal pelvis  
 D. Renal pyramid
19. Enzymes differ from catalysts because enzymes  
 A. are required in small amounts.  
 B. respond to temperature changes.  
 C. are protein in nature.  
 D. speed up reactions.
20. Where in the mammalian skin is the melanin pigment found?  
 A. Malpighian layer.  
 B. Granular layer.  
 C. Cornified layer.  
 D. Subcutaneous layer.
21. Which one of the following explains the accumulation of lactic acid in muscles during a 400M run?  
 A. Carbohydrates is completely broken down  
 B. The oxygen supply to the muscles may not be enough.  
 C. Much of the stored glycogen is converted into glucose.  
 D. The blood vessels leading from the muscles are constricted.
22. Which one of the following is an excretory function of the liver  
 A. conversion of glycogen to glucose  
 B. conversion of amino acids to urea  
 C. conversion of fats to fatty acids and glycerols  
 D. production of vitamin B
23. Which one of the following is the correct response to increased carbon dioxide concentration in human blood? The rate of  
 A. Breathing is slowed  
 B. Heart beat is slowed down  
 C. Heart beat is increased  
 D. The pulse is slowed down
24. Figure below is an experimental set up to demonstrate anaerobic respiration in yeast.



- The importance of liquid paraffin in the experiment is to  
 A. React with yeast and glucose  
 B. Speed up the reaction between yeast and glucose  
 C. Exclude atmospheric oxygen from the yeast – glucose mixture  
 D. Expel all the oxygen in the solution

25. Removal of a ring of bark from a tree trunk interferes with the movement of
- A. Water to the leaves
  - B. Mineral salts to the leaves
  - C. Food to the leaves
  - D. Food to the roots
26. In plants, efficient gaseous exchange due to large surface area to volume ratio is achieved by
- A. Many stomata on leaves
  - B. Flatness of leaves
  - C. Large sized lenticels
  - D. Numerous root hairs
27. The following are results of an experiment to determine percentage of water within a sample of soil.
- Mass of crucible = 15 g  
 Mass of crucible + soil = 30 g  
 Mass of crucible + soil after drying = 25 g  
 The percentage of water in the soil is
- A. 18.7
  - B. 20.0
  - C. 33.3
  - D. 66.

28. Strips W, X, Y and Z of same size and shape were cut from, a raw pawpaw, whose sap had a sugar concentration of 28%. The strips were then placed in sugar solution of different concentrations as shown in table 1.

Table 1

Strip	Sugar concentration Of solution (%)
W	15
X	25
Y	28.5
Z	48

Which strip would be longest after 4 hours?

- A. X
  - B. W
  - C. Y
  - D. Z
29. In the mammalian heart, the thick muscular walls of the left ventricle are vital for
- A. Resisting pressure of the blood coming into the ventricles.
  - B. Maintaining the shape of the heart
  - C. Producing enough pressure to pump blood to all parts of the body
  - D. Resisting back flow of blood from the aorta
30. Which one of the following plant organs has a scattered arrangement of vascular bundles?
- A. Root of a monocotyledonous plant
  - B. Stem of a monocotyledonous plant
  - C. Stem of a dicotyledonous plant

D. Root of a dicotyledonous plant

**SECTION B**

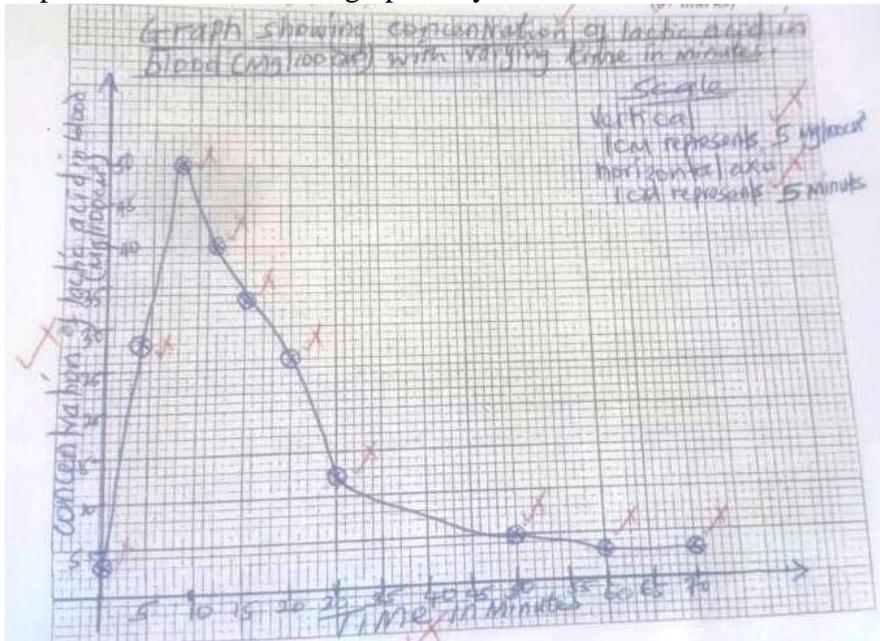
31. A biologist collected data from an athlete during and after a period running for 6 minutes.

The data is shown in the table below:

<b>Time/minutes</b>	0	4	8	12	16	20	30	50	60	70
<b>Concentration of lactic acid in blood (mg/100 cm<sup>3</sup>)</b>	3	28	50	40	33	26	12	5	3	3

(a) Represent the information graphically.

**(08 marks)**



(b) Describe the change in concentration of lactic acid over the 70 minutes. **(04 marks)**

From 0 to 8 minutes the concentration of lactic acid in blood increases rapidly; from 8 minutes to 20 minutes the concentration of lactic acid reduces rapidly; from 20 minutes to 50 minutes the lactic acid concentration reduces gradually and from 60 minutes to 70 minutes the concentration of lactic acid remained constant

(c) Explain the change in lactic acid concentration in blood between:

(i) 2-6 minutes **(02 marks)**

The concentration of lactic acid increased rapidly; because the muscle cells were respiring without oxygen and that led to incomplete breakdown of glucose leading to formation of lactic acid

.....

(ii) 10-20 minutes **(02 marks)**

Lactic acid concentration reduced rapidly as the exercise was complete and the athlete was resting and recovering; the lactic acid was being broken down further to liberate carbon dioxide, water and energy

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(d) What are the effects of excessive accumulation of lactic acid in the body? **(01 marks)**  
It causes muscle fatigue and muscle pains/ cramps.

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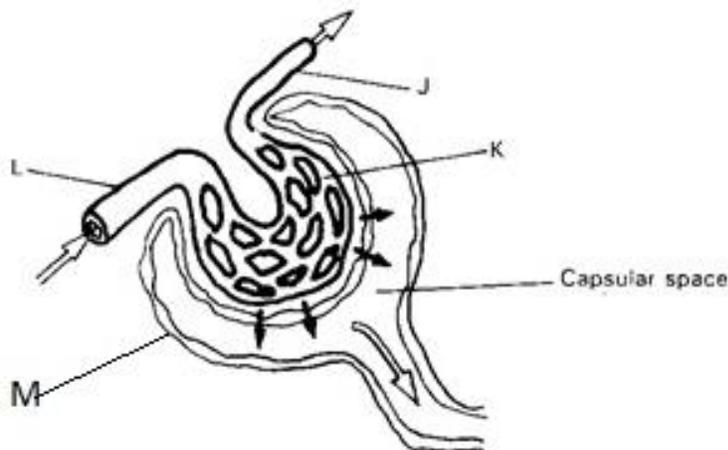
(e) Give any three applications of the type of respiration that happened in the body of the athlete (3 marks)

- The process is used in beer brewing to produce alcohol.
- It is also used in baking of bread to raise dough.
- Anaerobic bacteria are used in making cheese and yoghurt.
- Anaerobic bacteria are used in leather and skin tanning.
- Anaerobic bacteria are used in sewage treatment.
- Anaerobic respiration is used in making and preserving animal feeds like silage and hay.
- Anaerobic bacteria are used in biogas production.

(f) Give any two applications of the process (2 marks).....ignore

.....

32. The diagram below shows the bowman’s capsule of a mammalian kidney nephron



(a) Name the parts labelled J,K and L (2 marks)

J.. Efferent arteriole

K.. Glomerulus

L..Afferent Arteriole

M..Bowmans Capsule

(b) Vessel J is narrower than vessel L, what effect does this have on blood in K (2 marks)

This creates higher pressure in the glomerulus, which forces the liquid part of blood with dissolved substances out through the pores in the glomerulus into the cavity of Bowman's capsule forming glomerular filtrate.

(c) (i) Name two components of blood that will not diffuse into the capsular space (2 marks)

- Blood proteins and
- cells (RBC and WBC, platelets)

(ii). Give a reason for your answer in c (i) above (2 marks)

Because of their large size and they cannot pass through the pores of the glomerular capillaries

(d) What name is given to the fluid in the capsular space and state how it is formed (2 mark)

Glomerular filtrate and formed by ultra filtration

(e) Name the nitrogenous substance that is present in urine but absent from vessel J (1 mark)

Urea

33 (a) What is an artery? (1 mark)

Blood vessel that carries blood away from the heart

.....

(b) State three structural differences between an artery and a vein (3 marks)

<b>Artery</b>	<b>Veins</b>
<i>Have thick walls with smooth muscles</i>	<i>Have thin walls with smooth muscles</i>
<i>have more elastic fibres</i>	<i>Have few elastic fibres</i>
<i>Have smaller lumen relative to diameter</i>	<i>Have a wider lumen relative to diameter</i>
<i>Have no valves except at the base of aorta</i>	<i>Have valves throughout their length</i>

(c) Name the main artery and vein which serve the parts of the body listed below. (4 marks)

		<b>Main artery</b>	<b>Main vein</b>
(i)	Lungs	<i>Pulmonary artery</i>	<i>Pulmonary vein</i>
(ii)	Liver	<i>Hepatic artery</i>	<i>Hepatic vein</i>

(iii)	Kidney	<i>Renal artery</i>	<i>Renal vein</i>
(iv)	Heart	<i>Aorta</i>	<i>Vena cava</i>

(d) Give any two adaptations of the arteries to their functions (2 marks)

- *Has three layered wall. These are strong to withstand the higher pressure as resulting from the pumping action of the heart.*
- *They have fibrous outer wall so as to withstand high pressure*
- *Their walls are elastic to allow stretching due to high blood pressure.*
- *They have narrow lumen which maintains blood flow at high pressure.*

## SECTION C

**Attempt any one questions from this section**

(a)35. (a) what is meant by the term excretion (1 mark)

*Removal of waste products of metabolism from the body of an organism.*

(b) Discuss the importance of excretion (2 marks)

*Metabolic waste if left to accumulate in the body would become toxic to the body cells and may lead to death of the organism.*

(c) Discuss why plants do not have complex excretory organs (12 marks)

- *Plants are less active, and so have a low metabolic rate, hence very little accumulation of toxic waste in their bodies.*
- *Some plants waste products are utilized by plant e.g. carbon dioxide for photosynthesis, oxygen for aerobic respiration, and nitrogenous waste products are used to synthesize proteins*
- *Excess gaseous waste is removed from plants by simple diffusion via stomata and lenticels.*
- *Most waste substances formed are stored in the tissue in less harmful forms; e.g. Resins.*
- *Excess water and dissolved gases are removed through transpiration process via stomata and lenticels*
- *Plant convert toxic substances into harmless substances and store them in petals, Leaves, fruits and seeds that mature and fall off.*
- *Plants synthesize all their organic requirements according to demand hence no excess is always produced.*
- *Plant tissues are more tolerant to toxic wastes than animal tissues.*

36. (a) Explain how a plant benefits from transpiration. (04 marks)

- *Results in the absorption of water and its movement up the plant to aid processes like photosynthesis.*
- *Contribution to maintenance of continuous stream of water throughout the plant.*
- *Transported water keeps the plant cells turgid and cools the plant.*
- *Results in the movement of mineral salts up the plants to where they are needed.*

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

- *Shedding off of leaves in deciduous plants to reduce transpirations since most of it occur from the leaves*
- *Reducing the number, size and distribution of the stomata and only on lower epidermis*
- *Structural adjustments in stomata i.e. some plants have sunken stomata and others have hairy stomata which reduces evaporation from them.*
- *Reduction in leaf structure i.e. some plant leaf are reduced to narrow or thorny / spines structures that reduce surface area over which transpiration occurs.*
- *Rolling of leaves to create a humid atmosphere around the stomata in order to reduce water loss.*
- *Possession to thick cuticle of the leaves to prevent water loss through it.*
- *Thick leaves that store water*
- *Changes in the rhythm of stomata opening i.e. they close during day and open at night when temperatures are very low.*
- *They shed off their leaves in extremely hot environment to cut down water loss.*
- *Reversed opening and closing of stomata. Stomata open at night and close during the day when its rate of transpiration is likely to be higher.*

## **PRACTICAL**

(1) You are provided with specimen P (irish potato) and Q (Bougainvillea stem) which are plant parts

(a) Identify the plant parts (1 mark)

Stems

(b) Give any two reasons for your answer in (a) above (2 marks)

Have Nodes

Have internodes

Have buds

(c) State any two functions of the plant parts to the plant giving a reason in each case (4 marks)

Function	Reasons
<i>Vegetative propagation</i>	<i>Presence of buds</i>
<i>For storage</i>	<i>Specimen P is swollen</i>

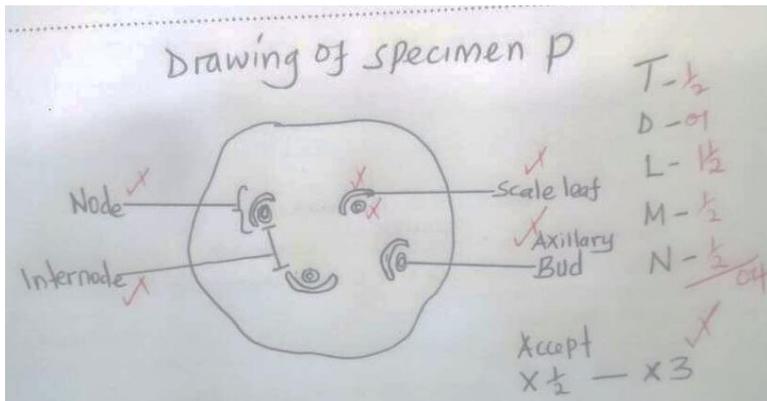
(d) Give any three differences of specimens P and Q (3 marks)

P	Q
<i>It is swollen</i>	<i>Not swollen</i>
<i>It is round and short</i>	<i>It is long</i>
<i>No visible leaves</i>	<i>Has leaves</i>

(e) What is the functional difference between specimen P and Q (1 mark)

*Specimen P stores water and food where as specimen Q does not store*

(f) Make a labelled drawing of the specimen P (4 marks)



**END**