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**BIOLOGY
THEORY**

Paper 1

2½ hours

**Uganda Certificate of Education
PRE REGISTRATION EXAMINATIONS 2019
BIOLOGY THEORY
Paper 1
2 hours 30 minutes**

INSTRUCTIONS TO CANDIDATES

Answer **ALL** questions in section **A** and **B**, plus any **TWO** questions in section **C**.
Answers to sections **A** and **B** must be written in the spaces provided in the question paper

SECTION A ANSWER GRID

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

For Examiner's Use Only

SECTION	MARKS
A: 1-30:	
B: No. 31:	
No. 32:	
No. 33:	
C: No.	
No.	
TOTAL	

SECTION A (30 marks)

1. Some plants produce large quantities of pollen grains while others **do not** produce much. Those which produce large quantities do so because:
 - A. Some of the pollen grains do not mature
 - B. Most of the pollen grains never reach the stigma
 - C. The pollen is needed by the bees
 - D. The pollen gives the plant a nice smell.
2. Which of the following soils has the smallest particle size?
 - A. Silt from a river
 - B. Loam from a field
 - C. Clay from a swamp
 - D. Humus from the forest
3. The products of photosynthesis are
 - A. Glucose and carbondioxide
 - B. Oxygen and starch
 - C. Oxygen and glucose
 - D. Carbondioxide and water
4. Which one of the following is most correct? Diffusion is the movement of molecules of a liquid or gas from a region of
 - A. High to low concentration through an impermeable membrane
 - B. High to low concentration
 - C. Low to high concentration
 - D. High to low concentration through a semi-permeable membrane.
5. In one experiment in which alcohol is produced using yeast, a suspension of yeast in glucose solution is placed in a flask and a thin layer of oil is put on the surface of the mixture. The reason for putting oil in the mixture is
 - A. To prevent the evaporation of water
 - B. To absorb oxygen from the air and pass it on to the yeast
 - C. To make the yeast respire anaerobically
 - D. To confine the oxygen in the mixture for yeast to respire
6. Which one of the following represents the correct route taken by a molecule of oxygen from the lungs to the liver?
 - A. Pulmonary artery, bicuspid valve, aorta, hepatic vein
 - B. Pulmonary artery, tricuspid valve, aorta, hepatic artery
 - C. Pulmonary vein, bicuspid valve, aorta, hepatic artery
 - D. Pulmonary vein, tricuspid valve, aorta, hepatic vein
7. Which one of the following organ systems is the most essential for the survival of a species?
 - A. Digestive
 - B. Reproductive
 - C. Excretory
 - D. Circulatory
8. A certain species of rat produces a small volume of highly concentrated urine. It is reasonable to suggest that the most likely habitat of the rat is
 - A. Savanna
 - B. Rain forest
 - C. High mountain
 - D. Desert

9. What is the effect of more auxin concentration on one side of a radicle as a result of gravity?

- A. More growth of that side
- B. Less growth of that side
- C. Uniform growth
- D. Bending of radicle away from stimulus

10. Which one of the following is the phylum of segmented worms?

- A. Arthropoda
- B. Nematoda
- C. Annelida
- D. Platyhelminthes

11. A student was given a dry sample of soil and asked to determine the percentage of humus in it. He recorded the following results from his experiment

- i) Weight of empty crucible = 50g
- ii) Weight of crucible + soil before heating = 56g
- iii) Weight of crucible + soil after heating = 54.5g

which of the following is the answer to the calculation?

- A. 20%
- B. 25%
- C. 40%
- D. 15%

12. Which of the following pairs of vessels would have the highest concentration of sugar?

- A. Xylem and hepatic vein
- B. Phloem and hepatic vein
- C. Xylem and hepatic portal vein
- D. Phloem and hepatic portal vein

13. Which one of the following is the main function of stomata?

- A. To allow gases to enter and leave the leaf
- B. To regulate the amount of water leaving a leaf
- C. To regulate photosynthesis
- D. To regulate the flow of gases into the leaf

14. Which one of the following **does not** need a diaphragm when breathing?

- A. Whale
- B. Lion
- C. Dove
- D. Rat

15. Which one of the following is the major value of sweating in animals?

- A. To get rid of excess water
- B. To stop tiredness
- C. To get rid of excess salts
- D. To regulate temperature

16. When a housefly moves towards the smell of rotting meat, then it is showing

- A. Positive phototropism
- B. Negative chemotaxis
- C. Positive chemotaxis
- D. Negative phototaxis

17. The stage in the life cycle of an insect in which **no** growth takes place but there is drastic reorganization of tissues is the

- A. Pupa
- B. Instar
- C. Egg
- D. Imago

18. Some green grass was covered with a light proof sheet of paper. After a few days the grass in the covered area turned yellowish white. On exposure to light for a few days the grass regained their colour. Which of the following could be the best conclusion?

- A. Chlorophyll is needed in photosynthesis
- B. Light is necessary for the manufacture of chlorophyll
- C. Light is necessary for photosynthesis
- D. Chloroplasts die when light is absent

19. In most plants, the large surface: volume ratio that is necessary for obtaining its water is achieved by possession of

- A. Root hairs
- B. Xylem tissue
- C. Guard cells
- D. Flat leaves

20. Which one of the following structures in the mammalian urinary system is more important in water reabsorption?

- A. Glomerulus
- B. Urinary bladder
- C. Loop of Henle
- D. Bowman's capsule

21. Four test tubes A to D were set up with contents as follows;

Tube	Contents
A	Starch solution + Dilute HCl + Saliva
B	Starch solution + distilled water + dilute HCl
C	Starch solution + dilute sodium bicarbonate solution + Saliva
D	Starch solution + Dilute sodium bicarbonate solution + Distilled water

The four test tubes were kept in a water bath at about 37°C for about 15 minutes. In which of the test tubes would you expect an orange precipitate after heating with some drops of Benedict's solution?

22. A habitat is

- A. An area surrounding an organism
- B. Locality most frequented by organisms
- C. A place where a plant or animal gets food
- D. A locality in which an organism successfully survives

23. Which one of the following gases increases significantly as a result of placing green algae in bright light?

- A. Nitrogen
- B. Oxygen
- C. Hydrogen
- D. Carbondioxide

24. Grass —————> Termites —————> Birds —————> Wild cats

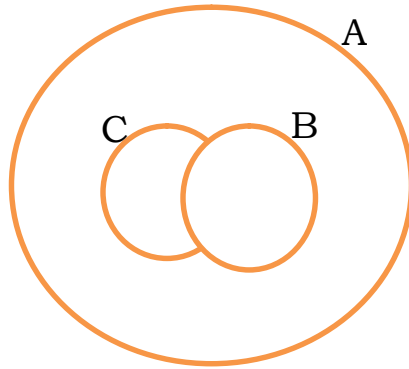
The above represents a food chain. If the birds were destroyed, which one of the following would be a likely outcome?

- A. Grass in the area will be reduced
- B. Wild cats will become plentiful
- C. Wild cats will feed on grass
- D. The termites will decrease

25. Which one of the following is a waste product of both animals and plants?

- A. Ethanol B. Oxygen C. Lactic acid D. Nicotine

26.



In the diagram above,

- i) A is the set of all holozoic animals
- ii) B is the set of all flesh feeding organisms
- iii) C is the set of all vegetable feeding organisms

Which one of the following is a member of the shaded organisms?

- A. Carnivore B. Herbivore
C. Omnivore D. Saprophyte

27. Man must conserve the living species

- A. Because they are not harmful
B. So as to keep balance in the ecosystem
C. So as to promote evolutionary processes
D. So as to increase animal and plant populations

28. Which one of the following would be the most effective method when making a sample collection of a grasshopper population in long grass?

- A. Aerial photograph B. A sweep net
C. A pit trap D. A metre quadrat

29. The end product of the process of digestion in man are

- A. Glucose maltose, glycerol, water and fructose
B. Fatty acids, glycerol, amino acids, faeces and glucose
C. Amino acids, glucose, fatty acids, glycerol and fructose
D. Maltose, undigested food, glucose, amino acids and fatty acids

30. In the process of blood clotting, thrombin acts as an enzyme to bring about conversion of

- A. Fibrinogen to fibrin B. Fibrin to fibrinogen
C. Prothrombin to thrombokinase D. Thrombokinase to prothrombin

SECTION B(40 marks)

31. Data below shows results of red blood cells counts carried out on blood of a mountain climber.

Increase in altitude in metres	Red blood cells X 10¹² per litre of blood
0	4
1000	4.2
2000	5.2
3000	6.4
4000	7.6
5000	8.8

- a) Draw a graph to present the information in the table above. (6 marks)
- b) What is the effect of the increase in altitude on the number of Red blood cells of the climber? (1 mark)

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- ii) Why is one required to climb to higher altitude gradually over a number of days rather than in a few days? (3 marks)

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- iii) Describe how the body deals with worn –out and old Red blood cells. (6 marks)

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- d) i) On the graph above, indicate how the number of White blood cells would vary with an increase in altitude. (1 mark)
- ii) Explain the variation above. (1 mark)

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e) State structural differences between Red blood cells and White blood cells.
(2 marks)

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22. Figure below shows an experiment on a biological process.

a) What would you observe in the cavities of the potato cups after 1 day?
(3 marks)

A:

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B:

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C:

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b) Explain your observations in experiments A and C. (4 marks)

A:

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C:

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c) State the importance in plants of the process being investigated. (3 marks)

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33. a) State the different trophic levels in an ecosystem. (4 marks)

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b) Describe the role of green plants in energy flow in a terrestrial ecosystem. (4 marks)

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c) State four ways energy continually decreases along a food chain from lower to higher trophic levels along a food chain. (2 marks)

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SECTION C (30 marks)

Attempt only 2 questions from this section.

34. a) State functions performed by the digestive system in man. (4 marks)
- b) Describe the role of each of the following structures in the digestion of food in man;
- i) Pancreas (4 marks)
- ii) Stomach (4 marks)
- c) What is the fate of absorbed amino acids in the body? (3 marks)
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35. a) Describe processes in the Bowman's capsule and the proximal convoluted tubule that contribute to urine formation. (10 marks)
- b) How is the proximal convoluted tubule adapted for its function? (5 marks)
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36. a) Describe the process of inhalation in man. (4 marks)
- b) Describe the process of gaseous exchange in man. (9 marks)
- c) State **four** differences between inhaled and exhaled air in man. (2 marks)
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37. What is meant by tropism? (2 marks)
- b) Describe the importance of the different types of tropisms in plants. (13 marks)

END