



Dr. Blosa Science

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SENIOR FOUR

553/1

BIOLOGY

PAPER 1

EXAM 7

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

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)

ANSWER SHEET

- | | | |
|-----|-----|-----|
| 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. |

1. What is the meaning of the term growth?
 - A. Increase in the number of organisms
 - B. Increase in amount of fat in the body
 - C. Permanent increase in size of an organism
 - D. Increase in form and complexity of an organism

2. Which one of the terms below describes the place where a plant or animal lives?
 - A. Habitat
 - B. Ecosystem
 - C. Population
 - D. Community

3. Which one of the following statements is not correct about some ways of reducing pollution?
 - A. Recycling materials
 - B. Cleaning up discharges to the environment
 - C. Make industrial processes less efficient.
 - D. Reducing the use of harmful substances and replacing them with “environmentally friendly” ones.

4. All the features below are examples of continuous variation except,
 - A. human blood groups
 - B. length of mouse tails
 - C. height of sweet pea plants
 - D. weight of people in a slimming club

5. Which one of the following is the site of production of the male gametes in plants?

- A. Testes
 - B. Ovaries
 - C. Anthers
 - D. Placenta
6. What is the expected genotypic ratio in a cross of two heterozygotes for a trait?
- A. 1:3
 - B. 1:1:2
 - C. 2:1:1
 - D. 1:2:1
7. Which one of the following describes secondary growth?
- A. Upward growth
 - B. Thickening of stem
 - C. Growth of side branches
 - D. Development after growth.
8.describes reproduction in which fertilized eggs are laid or spawned by the mother and hatch outside her body.
- A. Parity
 - B. Oviparity
 - C. Viviparity
 - D. Ovoviviparity
9. Which one of the following explains the main purpose of the larva stages in metamorphosis?
- A. Migration
 - B. Feeding and growth
 - C. Reproduction and movement
 - D. Survival during the rainy season.
10. Which one of the following terms describes the change from plant proteins to ammonium compounds?
- A. Combustion
 - B. Nitrification
 - C. Denitrification
 - D. Putrefaction
11. Which of the following occurs when a green plant carries out photosynthesis?
- A. Water is used up
 - B. Oxygen is required
 - C. Carbon dioxide is used up
 - D. Chlorophyll is broken down.

12. Which one of the following is characteristic of all living things?
- A. Feeding
 - B. Excretion
 - C. Breathing
 - D. Photosynthesis
13. The day's diet should always contain protein because it
- A. supplies all the energy
 - B. aids digestion of amino acids
 - C. cannot be stored in the body
 - D. prevents the deficiency disease of rickets
14. In the treatment of sewage the organic matter from the settlement tanks is made less harmful and unpleasant by the use of
- A. methane
 - B. filtration
 - C. sedimentation
 - D. aerobic microorganisms
15. Which one of the following is caused by the presence of an extra chromosome in the body nucleus?
- A. Haemoglobin
 - B. Tongue rolling
 - C. Down's syndrome
 - D. Sickle cell anaemia
16. The number of chromosomes in each ovum is
- A. twenty three pairs
 - B. the same as in a spermatozoon
 - C. one less than in a spermatozoon
 - D. one more than in a spermatozoon
17. Which of the following is concerned with the passage of sound waves from the outer ear to the inner ear?
- A. Pinna
 - B. Cochlea
 - C. Eustachian tube
 - D. The three ear bones
18. Which of the following bones are connected by a pivot joint?
- A. Atlas and axis
 - B. Femur and tibia
 - C. Carpals of the wrist
 - D. Humerus and scapula

19. Which one of the following occurs to the compounds remaining after deamination of amino acids in the liver?
- A. Passed out in urine
 - B. Converted to enzymes
 - C. Passed out with faeces
 - D. Converted to carbohydrates
20. What is the importance of the division of the lungs into alveoli? It.....
- A. increases the volume of air that can be taken in
 - B. increases the time that air is present in the lungs
 - C. increases the surface area for the exchange of gases
 - D. allows more blood to pass through the lung capillaries.
21. In a mark recapture study of Tilapia population in lake Victoria, 40 fish were captured, marked and released. In a second capture, 45 fish were captured; 9 of these were marked. What is the estimated number of fish in the lake population?
- A. 200
 - B. 360
 - C. 800
 - D. 1800
22. Which one of the following vitamins helps in normal calcium assimilation to make strong bones?
- A. Vitamin C
 - B. Vitamin D
 - C. Vitamin E
 - D. Vitamin K
23. Which one of the following is not a property of a fully turgid plant cell?
- A. The vacuole has maximum volume.
 - B. There is no more absorption of water by the cell.
 - C. The cell wall resists further expansion of the vacuole.
 - D. The cytoplasm is only slightly separated from the cell wall.
24. Which of the following pairs of cells does not have nuclei when mature?
- A. Erythrocytes and leucocytes
 - B. Companion cells and leucocytes
 - C. Sieve tube cells and erythrocytes
 - D. Sieve tube cells and companion cells
25. Which one of the following tissues has a protective function in plants?
- A. Xylem

- B. Phloem
C. Cambium
D. Epidermis
26. Which of the following groups of insects all have similar feeding habits?
A. Bee, butterfly, bedbug
B. Bee, mosquito, caterpillar
C. Tsetse fly, housefly, caterpillar
D. Housefly, cockroach, praying mantis
27. Which one of the following events does not occur following the contraction of the ventricles?
A. Arterial valves open
B. Atrio-ventricular valves open
C. Blood pressure increases in the aorta.
D. Blood flows from ventricles into arteries
28. The results below were obtained from an experiment done to determine the percentage of air in a soil sample:
Volume of water used = 20cm^3
Volume of soil + water = 50cm^3
Volume of soil + water after stirring = 47cm^3
What was the percentage of air in the soil sample used above?
A. 7.5
B. 8.1
C. 10
D. 23.3
29. Plants can often be propagated from stems but rarely from roots because stems
A. have more vascular bundles than roots
B. often have buds which can easily sprout
C. have thicker epidermis which prevents water loss
D. are stronger than roots and can withstand adverse conditions.
30. By which means are impulses transmitted across synapses?
A. Nuclear means
B. Electrical means
C. Chemical means
D. Mechanical means

SECTION B: (40 MARKS)

Answer all questions in this section

Answers must be written in the spaces provided.

31. The table below shows daily values for some of the substances filtered from the blood and finally excreted in the urine.

Substance	1 amount filtered	2 amount excreted	3 amount reabsorbed
Urea	55g	44g	
Water	190dm ³	1.9dm ³	
Glucose	190g	Nil	
Sodium	550g	11g	
Calcium	6g	0.3g	
Potassium	87g	4g	

- (a) Fill in the third column of the table to show the amount of each substance reabsorbed. (3 marks)
- (b) Identify substances in the table that would be excreted in large amounts as a result of the following environmental conditions. (3 marks)
 - (i) low external temperatures,
.....
 - (ii) Consumption of large amounts of beef,
.....
 - (iii) Failure of insulin production,
.....
- (c) Name the;
 - (i) hormone which affects the amount of water reabsorbed in the kidneys,
.....
 - (ii) process by which water is reabsorbed in the nephrons,
.....
 - (iii) gland which secretes the hormone named in c.i above. (3 marks)
.....
- (d) Briefly describe how homeostasis is applicable to kidney function. (5 marks)
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(ii) Fertilization:

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(b) Outline four characteristics of:

(i) Wind pollinated flowers:

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(ii) Insect pollinated flowers:

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SECTION C: (30 MARKS)

Answer two questions from this section

Answers are to be written in the answer sheets provided.

34. (a)(i) What is a neuron? (2 marks)
(ii) Describe the structure of a motor neuron. (7 marks)
(iii) State 4 differences between a motor neuron and a sensory neuron (4 marks)
(b) Give the difference in meaning of a reflex action and a voluntary action. (2 marks)
35. (a)(i) Define the term metamorphosis (1 mark)
(ii) Differentiate between incomplete and complete metamorphosis and in each case give two examples of insects. (4 marks)
(b) Describe the life cycle of a butterfly. (7 marks)
(c) How are the larva, pupa and adult of the butterfly suited to their functions?(3 marks)
36. (a)(i) In what part of the body do enzymes begin to digest fat? (1 mark)
(ii) Name two substances that act on fat when digestion commences. (2 marks)
(b) Describe the changes undergone by a protein molecule from the time it is swallowed until its structural molecules are used in a cell of the skin. (10 marks)
37. (a)(i) What is meant by transpiration and translocation? (2 marks)
(ii) What is the role of the potometer as an apparatus? (1 mark)
(iii) Outline four precautions undertaken when assembling the potometer for use in a laboratory. (2 marks)
(b) Describe an experiment to demonstrate transpiration using cobalt chloride paper. (10 marks)