

**MUHANGA DISTRICT**  
**SUBJECT: BIOLOGY AND HEALTH SCIENCES**  
**SECOND TERM**  
**DURATION: 2 HOURS 30 MINUTES**

**CLASS: SENIOR THREE**  
**ACADEMIC YEAR:2025-2026**

**BIOLOGY AND HEALTH SCIENCES EXAMINATION/100 Marks**

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**INSTRUCTIONS TO CANDIDATES:**

1. This paper has THREE sections: A, B, and C.
2. Use only a blue or black pen. Pencil may be used for diagrams only.
3. Read each question carefully before writing your answer.
4. Write your answers clearly in the spaces provided

**SECTION A: ANSWER TO ALL QUESTIONS / 55marks**

**CIRCLE THE LETTER OF THE BEST ANSWER/15marks**

1. Energy is released from ATP when \_\_\_\_\_  
A. a phosphate group is added  
B. adenine bonds to ribose  
C. ATP is exposed to sunlight  
D. a phosphate group is removed
2. What does CNS refers to?  
A. The central nervous system consisting of the brain and spinal cord  
B. The cerebral nervous system consisting of the brain, spinal cord and retinas  
C. The central nervous system consisting of the brain and motor neurons  
D. The cerebral nervous system consisting solely of the brain
3. Which of the following is a component of acid rain?  
A. Ammonium  
B. denitrifying bacteria  
C. nitrogen oxides  
D. organic nitrogen
4. An enzyme found in the mouth (saliva) that digests starch is:  
A. Pepsin  
B. Salivary amylase  
C. Lipase  
D. Trypsin
5. The process by which nitrogen gas from the atmosphere is converted into Nitrate by bacteria is called:  
A. Nitrification  
B. Denitrification  
C. Nitrogen fixation  
D. Ammonification
6. Which of the following correctly describes the role of decomposers in the nitrogen cycle?  
A. They fix atmospheric nitrogen into ammonia  
B. They convert nitrates into nitrogen gas  
C. They break down organic matter releasing ammonium ions  
D. They convert ammonia into nitrites
7. During which phase of mitosis do chromosomes align at the equatorial plate?  
A. Prophase  
B. Anaphase  
C. Metaphase  
D. Telophase

8. The correct pathway of blood through the heart is:

- A. Right atrium → Right ventricle → Lungs → Left atrium → Left ventricle → Body
- B. Left atrium → Left ventricle → Lungs → Right atrium → Right ventricle → Body
- C. Right ventricle → Right atrium → Lungs → Left ventricle → Left atrium → Body
- D. Left ventricle → Left atrium → Lungs → Right ventricle → Right atrium → Body

9. Which layer of the skin contains melanin-producing cells (melanocytes)?

- A. Stratum corneum
- B. Malpighian layer
- C. Dermis
- D. Cornified layer

10. Which enzyme is responsible for the digestion of proteins in the stomach?

- A. Amylase
- B. Lipase
- C. Pepsin
- D. Trypsin

11. Eutrophication in water bodies is primarily caused by:

- A. Oil spills from ships
- B. Excessive runoff of fertilizers containing nitrates and phosphates
- C. Discharge of heavy metals from industries
- D. Introduction of invasive fish species

12. Bile salts produced by the liver aid in fat digestion by:

- A. Breaking down fat molecules chemically into fatty acids
- B. Emulsifying fats into smaller droplets to increase surface area for lipase
- C. Activating pancreatic lipase by lowering pH
- D. Absorbing fatty acids directly into the blood

13. A patient arrives at the hospital with a high fever of 40°C. Which of the following physiological responses would you expect to observe as the body attempts to reduce temperature?

- A. Vasoconstriction of skin blood vessels and shivering
- B. Vasodilation of skin blood vessels and increased sweating
- C. Reduction in metabolic rate and piloerection
- D. Reduced blood flow to the skin and cessation of sweating

14. A yeast culture is placed in a glucose solution without oxygen. After several hours, the solution smells of alcohol. Which metabolic process explains this observation and what gas is released?

- A. Aerobic respiration; carbon dioxide and water
- B. Anaerobic respiration (fermentation); carbon dioxide
- C. Photosynthesis; oxygen
- D. Aerobic respiration; oxygen

15. Which of the following pairs is correctly matched?

- A. Ear-Taste
- B. Eye-Touch
- C. Nose-Smell
- D. Skin-Hearing

**16. MATCH COLUMN A WITH COLUMN B/5marks**

Column A	Column B
I. Ovule	A. Receives pollen grains
II. Stigma	B. Develops into seed
III. Anther	C. Produces pollen grains
IV. Pollen tube	D. Develops into fruit
V. Ovary	E. Transports male gametes to ovule

**17. WRITE TRUE OR FALSE./5 marks**

- I. In a mutualistic relationship, one organism benefits and the other is harmed. -----
- II. Deforestation can lead to increased soil erosion, reduced rainfall and loss of biodiversity-----
- III. Bile is an enzyme produced by the pancreas that chemically breaks down fat molecules.-----
- IV. Aerobic respiration produces much more ATP per glucose molecule than anaerobic respiration.-----
- V. During pregnancy, the placenta allows the direct mixing of maternal and foetal blood to exchange oxygen and nutrients-----

**GIVE SHORT ANSWERS TO THESE QUESTIONS [30MARKS]**

18. A. Using the diagram of mitosis stages, describe what happens to chromosomes during ANAPHASE. /2 marks

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B. Compare mitosis and meiosis by completing the table below. /4 marks

Feature	Mitosis	Meiosis
Number of daughter cells produced		
Chromosome number in daughter cells		
Type of cells produced (somatic/gametes)		
Importance		

19. A. Write the BALANCED chemical equation for aerobic cellular respiration. /3 marks

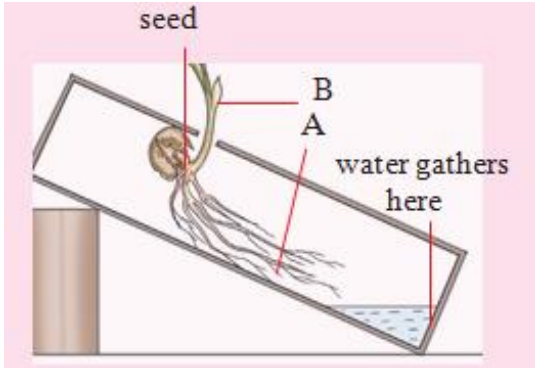
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B. Distinguish between aerobic and anaerobic respiration by giving TWO differences. /2 marks

i) \_\_\_\_\_

ii) \_\_\_\_\_

20. The diagram shows a young plant growing in a tilted seed box.

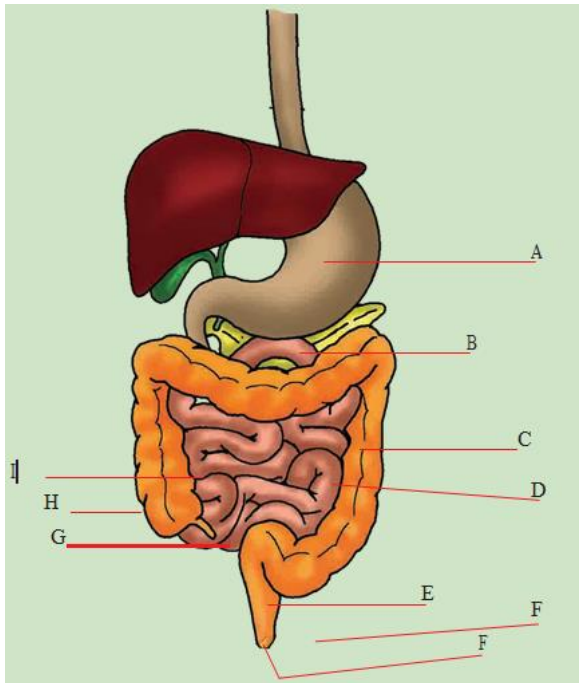


A. Name the growth response shown by A. -----/1mark

B. Name the growth response shown by B. -----/1mark

C. Suggest the benefit to the plant of the growth response shown by B. -----/2mark

21. Name the parts A, B, C, D and H in the diagram below. /5marks



B. Identify:

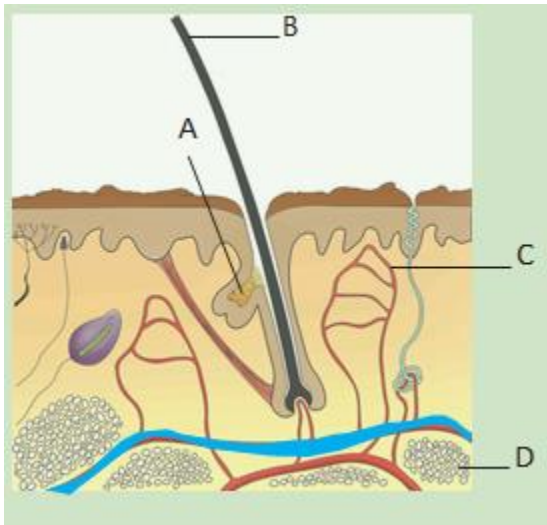
i. The largest gland in the body. \_\_\_\_\_/1mark

ii. The organ where protein digestion begins. \_\_\_\_\_/1mark

iii. The organ that releases digestive juice into the small intestine. \_\_\_\_\_/1mark

iv. The organ where bile juice is stored-----/1mark

22.The diagram below shows an organ of a mammal.



- A. Identify the organ.-----/1mark  
 B. Give the importance of the organ.-----/1mark  
 C. Name the parts labeled A,B,C and D.-----/4mark

**SECTION B :ATTEMPT ANY THREE QUESTIONS./30marks**

23.A human becomes infected with Taenia by eating infected pork. The Taenia larvae therefore enters the body through the mouth with food.

- A. Identify the type of nutrition that Taenia displays. ----- /1mark  
 B. Which part of alimentary canal do the larvae need to reach and why?-----  
 -----/2marks  
 C. In their journey from the mouth, suggest one danger faced by taenia larva. -----  
 -----/1mark  
 D. Give a dental formula for an adult person. -----  
 -----  
 ----- (3marks)  
 E. Suggest any three health practices for digestive system. -----  
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 -----  
 ----- (3marks)

24. Using a table, give the difference between asexual and sexual reproduction

- -----  
 -----  
 -----/10marks

25.A.)i.what is endangered species? -----  
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-----/2marks

ii. why is it importance to protect endangered species?-----  
-----  
----- . /2marks

B.Mention the activities done at your school for environmental protection.-----  
-----  
----- /3marks

C.What are the disadvantages of environmental degradation -----  
-----  
-----/3marks

26.A.Why is it important to determine the blood types of the donor and the recipient in transfusions? -----  
-----/1mark

B.What are universal donors and universal recipients in the ABO blood system?-----  
----- /1mark

C.Using your knowledge on blood transfusion, fill the table below, ticking where transfusion is possible and crossing where it is not. Fill in all **16** squares./8marks

RECIPIENT \ DONOR	A	B	AB	O
A				
B				
AB				
O				

27. a. Differentiate a physical digestion from chemical digestion. -----  
-----  
----- /2marks

d. Give two digestive glands that produce amylase in human body. -----  
----- /2marks

e. What is the role of amylase in digestion of food.

-----/2marks

(iii) In an experiment with salivary amylase, a student investigated the effect of increasing the temperature from 0°C to 60°C. How would you expect the activity of the salivary amylase to change over this range of temperature?

----- /1mark

(c) Explain why most food eaten by humans needs to be digested before it can be absorbed

----- /1mark

f. Describe any two features of small intestine helping in its function.

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-----/2marks

**SECTION C: This question is compulsory./15marks**

28. (a) Describe the composition of blood.

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----- /4marks

(b) Explain how blood cells transport oxygen.

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----- /4marks

(c) How are blood cells adapted to the transport of oxygen?

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----- /2marks

(d) Describe how the circulation in man carries out its function of: /2marks

i) Transport-----

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ii) Defence-----

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(e) Explain why animal cells burst when in water but plant cell do not burst. -----

-----/3marks

**END!!!!!!!!!!!!!!!!!!!!!!**

