

Students Name:

School Name:..... Index Number

P530/1
BIOLOGY
PAPER 1
2 ½ HRS



HES MOCK EXAMINATIONS 2025

UGANDA ADVANCED CERTIFICATE OF EDUCATION

BIOLOGY
PAPER 1
2 ½ HOURS

INSTRUCTIONS TO CANDIDATES:

- Answer **all** questions.
- Answers for **section A** must be filled only in the answer sheet provided
- Write answers in the spaced provided.

ANSWER SHEET FOR SECTION A

Qns	Ans	Qns	Ans	Qns	Ans	Qns	Ans
1.		11.		21.		31.	
2.		12.		22.		32.	
3.		13.		23.		33.	
4.		14.		24.		34.	
5.		15.		25.		35.	
6.		16.		26.		36.	
7.		17.		27.		37.	
8.		18.		28.		38.	
9.		19.		29.		39.	
10.		20.		30.		40.	

SECTION A (40 marks)

- Which one of the following is correct arrangement of microtubules in a cross section of a flagellum?

A. 9 + 0

C. 9 + 2

B. 9 + 4

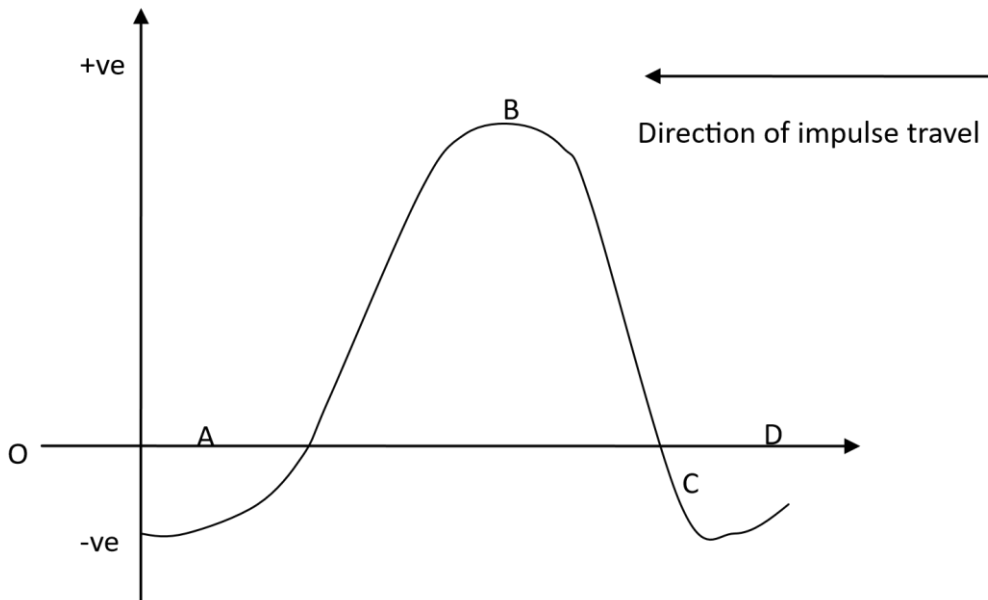
D. 2 + 9
- Lysosomes are submicroscopic organelles in the cytoplasm containing groups of digestive enzymes. The breakdown of the wall of lysosomes may lead to

- A. Active diffusion of molecules
B. Passive diffusion of molecules
- C. Autolysis
D. Cytolysis
3. In which of the following parts of the chloroplast structure are most enzymes to split water molecules located?
- A. Cytoplasm
B. Inter granal lamellae
- C. Stroma
D. Grana
4. The old DNA strand which serves as a guide for a new strand is called a
- A. Gene
B. Polymerase
- C. Anticodon
D. Template
5. Before the Krebs's cycle can begin, it requires preliminary in step which;
- A. Glucose is phosphorylated
B. Fructose is phosphorylated
- C. Two ATP molecules are used
D. Pyruvic acid is oxidized
6. Which one of the following cells is haploid?
- A. Germinal epithelial
B. Spermatogonium
C. Primary spermatocyte
D. Secondary spermatocyte
7. The starch component that forms blue-black color with iodine solution is
- A. Amylase
B. Amylopectin
- C. Amylase
D. Pectin
8. A ratio of 3:1 obtained among the off springs a dihybrid cross is a result of
- A. Crossing over
B. Gene linkage
- C. Dominance
D. Non-disjunction

9. The latent heat of evaporation of sweat is 3.5KJcm^3 . What is the percentage of energy lost by sweating from a manual work who loses 2dms^3 per day of sweat and has a daily energy in take of 40000KJ ?
- A. 6.30
B. 7.88
C. 8.25
D. 15.75
10. In humans the hormone which stimulates the maturation of germ cells is
- A. Leutinishing
B. Progesterone
C. Oestrogen
D. Follicle stimulating
11. In short day plants,.....will induce flowering
- A. Period of light longer than C
B. Period of darkness longer than critical length
C. Period of light shorter than the critical length
D. D. Period of darkness shorter than D
12. What would encourage most variation in plants?
- A. Stigma higher than anthers
B. Stamens and pistils mature at the same time
C. Flower remain closed for some time when mature
D. Plants pollen can germinate on its own stigmas
13. An area between two Z lines forms
- A. A-Band
B. I-Band
C. H-band
D. Sarcomere
14. Which one of the following describes the chloride shift during transportation of carbon dioxide in mammals?
- A. HCO_3^- enter the lungs as Cl^- leave the erythrocytes

- B. Cl^- enter the lungs as HCO_3^- leave erythrocytes
- C. HCO_3^- leaves the erythrocytes as Cl^- from tissue enter
- D. Cl^- leave the erythrocytes as HCO_3^- from tissues enter
15. If the mRNA triplet is AAG, What is the complementary triplet of the bases on the tRNA molecule?
- A. TTC
- B. UUC D. CCU
- C. CCT
16. Which one of the following is the ultimate hydrogen acceptor during anaerobic respiration in mammals?
- A. Lactic acid C. NAD
- B. Pyruvic acid D. Acetylaldehyde
17. Which one of the following is a characteristic of a depolarizing axon membrane?
- A. Less permeable to K^+
- B. More permeable to Na^+
- C. More permeable to both K^+ and Na^+
- D. Less permeable to both K^+ and Na^+
18. Which of these is a correct path taken by electrons during cyclic photo phosphorylation?
- A. Chlorophyll – NADP – electron acceptor – chlorophyll
- B. Electron acceptor – chlorophyll – electron carries – chlorophyll
- C. Chlorophyll – electron acceptor – electron carries – chlorophyll
- D. Chlorophyll – electron acceptor – chlorophyll
19. Sexual reproduction is important for evolution because
- A. It introduces new genotypes in a population
- B. It brings about population explosion

- C. More offsprings are produced and survive to adulthood
- D. More offsprings are produced to replace the old
20. Which of the following is the role of the bile salts in fat digestion and absorption?
- A. Breakdown fats in fatty acids and glycerol
- B. Activate lipase enzyme duodenum
- C. Are involved in formation of micells in the duodenum
- D. Stimulate pancreas to secrete its enzyme lipase
21. A person of blood group O may donate blood to another person of blood group A but not the reverse because,
- A. Group O is dominant over group A
- B. Group O has no antigens to be attacked by antibodies in group A
- C. Group O has no antibodies to attack antigens in group A
- D. The effect of antibody in the small volume of blood is diluted in the recipient's blood
22. An active cell gets more oxygen than an inactive cell from oxyhaemoglobin because of its;
- A. Low PCO_2
- B. Low PO_2
- C. High PCO_2
- D. High PO_2
23. Which one of the following correctly describes the state of muscles in an earthworm in a region of the body that is being moved forward?
- A. Longitudinal muscles contracted and circular relaxed
- B. Longitudinal muscles and circular are contracted
- C. Both circular and longitudinal muscles are relaxed
- D. Circular muscles are contracted and longitudinal relaxed
24. Below is the transmission of the impulse along the axon



At what stage of the electrical potential marked is the axon most permeable to sodium ions?

25. In which one of the following compounds would a radioactive carbon show first in a photosynthesizing algae
- | | |
|--------------------------|-------------------------|
| A. Glucose | C. Phosphoglyceric acid |
| B. Ribulose bi phosphate | D. Triose phosphate |
26. The bacteria which convert nitrates to nitrites during nitrogen cycle are an example of
- | | |
|--------------------------|-----------------------------|
| A. Denitrifying bacteria | C. Nitrifying bacteria |
| B. Decomposing bacteria | D. Nitrogen fixing bacteria |
27. Why do C_2 plants do better than C_3 plants in hot dry climates where stomata are often closed? C_7 plants;
- | |
|--|
| A. Cantrap CO_2 inside their leaves by closing their stomata |
| B. Have a steeper CO_2 gradient between the inside and outside of the leaf |
| C. Have a higher CO_2 concentration outside their leaves than C_3 |

- D. Synthesize carbohydrates at low CO_2 concentration
28. The similarities of the skeleton structure of moles, monkeys and whales lead to the conclusion that they;
- Belong to the same class
 - Evolve convergingly
 - Originate from the one environment
 - Descend from a common ancestor
29. If the cross over frequency of genes A, B and C are as given A to B = 10%, B to C = 5% and A to C = 5.5%. What would be the sequence of genes on the chromosome?
- ABC
 - ACB
 - CAB
 - BAC
30. A mixture of more cytokinin and less auxin when sprayed on callus induces the formation of
- Both shoot and root
 - Mitotic division but no differentiation
 - Shoot
 - Root
31. Which one of the following plasma proteins acts as an antibody?
- Serum albumins
 - Prothrombin
 - α globulin
 - γ globulin
32. In which of the following groups do the heart pump only de oxygenated blood?
- Amphibians
 - Fishes
 - Birds
 - Reptiles
33. Which of the following is totally reabsorbed from glomerular filtrate by active absorption?

- A. Proteins
B. Glucose
- C. Na^+
D. Cl^-
34. The tubular structures which help in the formation of cell plate are;
A. Micro bodies
B. Micro tubules
C. Golgi complex
D. Endoplasmic reticulum
35. In an electron transport chain, one molecule of NADH_2 yields
A. 6ATP
B. 2ATP
C. 3ATP
D. 1FADH₂
36. Which one of the following is correct about the sympathetic nervous system?
A. Ganglia are embedded in the walls of the effector organs
B. Preganglionic fibres are long and post ganglia are short
C. Nerve endings produce acetylcholine
D. Nerve endings produce noradrenaline
37. Removal of terminal buds in woody plants stimulates branching because
A. Source of auxin is removed
B. Source of gibberellins is removed
C. Phototropism is facilitated
D. Competition for mineral salts and water is reduced
38. In the inter conversion of fats, carbohydrates and proteins, the common metabolic pathway is
A. Glycolysis
B. Krebs cycle
C. Lactic acid fermentation
D. Alcoholic fermentation
39. Which one of the following is mainly associated with maintenance of posture?
A. Cerebrum
B. Cerebellum
C. Thalamus
D. Pons
40. In the dihybrid ratio, the heterozygous dominant individuals represent

A. $\frac{1}{16}$ of the total

C. $\frac{3}{8}$ of the total

B. $\frac{9}{16}$ of the total

D. $\frac{3}{16}$ of the total

SECTION B (60 MARKS)

Answer all questions by putting the answers in the provided spaces

41. a. Explain the role of temperature regulation in organisms? (3marks)

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B. Explain the advantages of endothermy over ectothermy (4marks)

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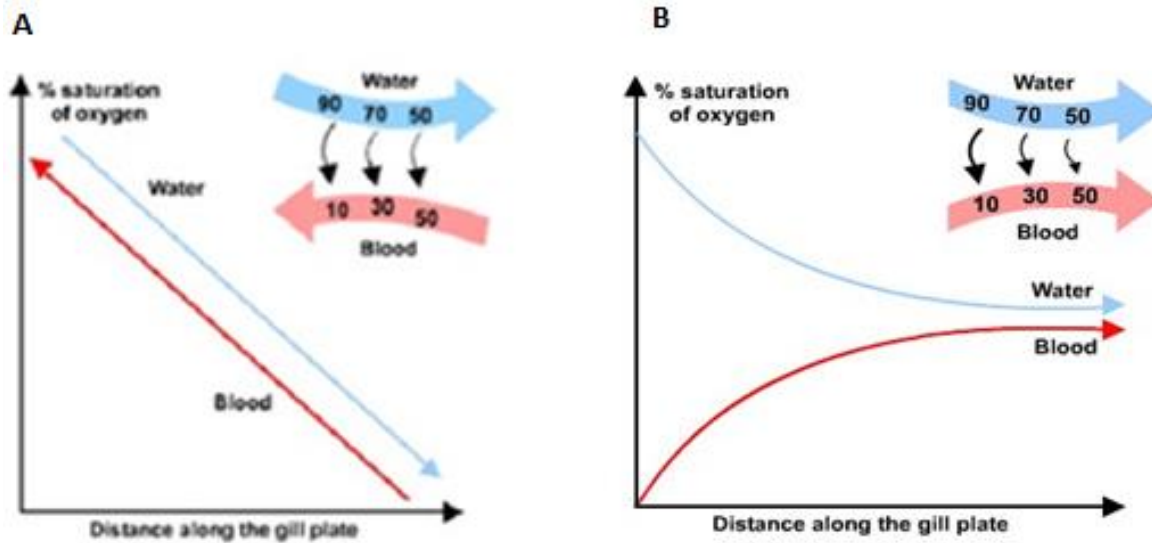
C. Explain the meaning of partial ectothermy and it's use in some organisms living desert animals.(3marks)

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42. The figures A and B show the variations in oxygen concentration of blood and water as they pass across a gill lamella



a) Explain how systems A and B maintain a high oxygen saturation of blood (6marks)

(i) A

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(ii) B

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b) What is the advantage of system A in exchange of oxygen and carbon dioxide in fish?

(2marks)

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c) Outline 2 ways others than gas exchange mechanism how counter-current exchange is beneficial to organisms (2marks)

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43. a) Differentiate between transient polymorphism and balanced polymorphism. (2 marks)

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b) State two factors that can lead to balanced polymorphism in a population. (2 marks)

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c) Explain the role of frequency-dependent selection in ensuring a balanced polymorphism in a population.

(4 marks)

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d) Give any two examples of polymorphism in human beings. (2 marks)

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44.a. State the law of segregation (2marks)

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b. Two mice a male with black eyes and along tail and a female with red eyes and a short tail were bred together several times producing the following offsprings.

- Black eyes, long tail 610
- Black eyes short tail 341
- Red eyes long tail 349
- Red eyes short tail 607

(i) Assuming that the allele for black eye B is dominant to allele for red eye b and the allele for long tail T is dominant to the allele for short tail t, draw a genetic diagram to explain these results. (6marks)

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[illegible]

(ii) Calculate the cross over value between the genes for eye colour and tail length using these results. (2marks)

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45a Explain the meaning of ecological niche. (2marks)

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b. Explain how organisms with closely related ecological niche can coexist . (6marks)

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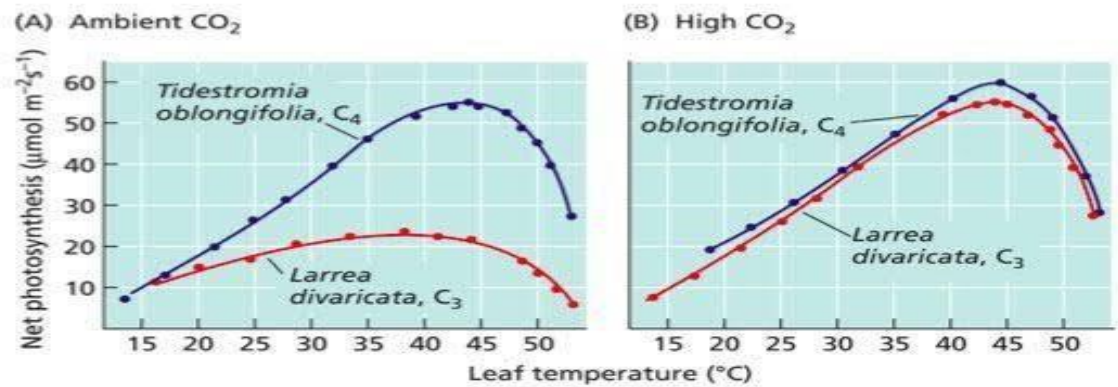
c. What is the evolutionary significance of the above mechanisms in (b) (02marks)

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46.Study the figure below and answer the questions that follow.



a. Compare the rate of photosynthesis in C_3 and C_4 plants in ambient and high CO_2 concentrations. (4mks)

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b. Explain the differences in the rate of photosynthesis in C_3 and C_4 in ambient CO_2 concentration.(5mks)

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D. State two other factors that would have affected the process being investigated. (1mk).

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End.