

CANDIDATE'S NAME:		INDEX NO.:	
SCHOOL:		SIGNATURE:	

P530/1  
**BIOLOGY**  
**(THEORY)**  
**Paper 1**  
**August, 2022**  
**2½ Hrs**



## **UNNASE MOCK EXAMINATIONS**

*Uganda Advanced Certificate of Education*

**BIOLOGY (THEORY)**

**PAPER 1**

**2 HOURS 30 MINUTES**

**INSTRUCTIONS TO CANDIDATES:**

- The paper consists of two sections **A** and **B**.
- Answer **all** questions in both sections.
- Section **A**: consists of 40 questions. Write answers to this section in the boxes provided.
- Section **B**: consist of 6 questions. Write answers to this section in the space provided. No additional sheets of paper should be inserted in this section.

**FOR EXAMINER'S USE ONLY**

QUESTION	MARKS	Examiner's Initials
<b>SECTION A      1 - 40</b>		
<b>SECTION B      41</b>		
42		
43		
44		
45		
46		
<b>Total</b>		

**SECTION A (40 MARKS)**

1. Under which one of the following conditions does cyclic photophosphorylation occur in plants?
- A. At low temperature      C. During water stress  
B. During dark              D. At high light intensity
2. Which one of following structures is released from the ovary at ovulation?
- A. Oogonia                  C. Primary oocyte  
B. Ovum                    D. Secondary oocyte
3. When predators evolved more efficient hunting strategies, prey evolved more efficient defence mechanisms. This is an example of .....
- A. divergent evolution      C. parallel evolution  
B. coevolution              D. adaptive radiation
4. Which one of the following mineral deficiencies does not lead to leaf chlorosis?
- A. Calcium                  C. Iron  
B. Magnesium               D. Nitrogen
5. Which one of the following is **not** true about conditioned reflex actions?
- A. They are in born  
B. They are temporary  
C. They are reinforced by repetition  
D. Involve association of stimuli.
6. By which one of the following ways do marine fish solve their osmo-regulatory challenge?
- A. Actively taking up salts through their gills  
B. Producing hypotonic urine  
C. Maintain isotonic body fluids  
D. Producing isotonic urine
7. Which one of the following is true for plants that grow well under the shade?
- A. Low stomata density  
B. Thick leaves  
C. High light compensation point  
D. Low concentration of chlorophyll b.
8. Which one of the following pairs of extra-embryonic membranes is responsible for formation of the placenta?
- A. Chorion and yolk sac      C. Chorion and amnion  
B. Chorion and allantois      D. Allantois and amnion
9. Which one of the following hormones is important for metamorphosis in amphibians?
- A. Growth hormone  
B. Testosterone              C. Anti - diuretic hormone  
D. Thyroxine

0. Multicellular organisms with a large number of undifferentiated cells with good powers of regeneration mainly reproduce by.....

- A. Sporulation
- B. Budding
- C. fragmentation
- D. vegetative propagation

11. Which one of the following is the main importance of long refractory period to cardiac muscles?

- A. Reduces energy consumption
- B. Reduces fatigue
- C. Causes synchronous contraction of the muscle
- D. Increases force of contraction

12. Which one of the following is true about the last electron carrier during oxidative phosphorylations?

- A. Contains zinc
- B. It is a co-enzyme
- C. It is an enzyme
- D. Contains iron

13. Which one of the following is not transported in the blood of insects?

- A. Carbon dioxide
- B. Oxygen
- C. Hormones
- D. Wastes

14. By which one of the following processes do plants lose water during cold humid days?

- A. Diffusion
- B. Exedution
- C. Transpiration
- D. Guttation

15. Which one of the following best indicates the effects of substrate concentration on an enzyme controlled reaction?

- A. Temperature coefficient
- B. Turnover number
- C. Michaelis constant
- D. Saturation point.

16. The similarity between diapause and aestivation is that both,

- A. are response to cold
- B. involve fat oxidation
- C. involve reduction of metabolic rate
- D. occurs in plants

17. Which one of the following stimulates flowering in short day plants?

- A. Low concentration of phytochrome red
- B. High concentration of phytochrome red
- C. Low concentration of phytochrome far red
- D. High concentration of phytochrome far red.

18. Which one of the following is not an adaptation for successful reproduction on land?

- A. Production of many gametes
- B. Internal fertilisation
- C. Being monoecious
- D. Production of motile gametes

19. Which one of the following forms of learning occurs when an animal solves problems at first encounter?

- A. Habituation
- B. Operant conditioning
- C. Latent learning
- D. Insight learning

20. Which one of the following structures is used for excretion and osmoregulation in flat worms?
- A. Contractile vacuole
  - B. Flame cells
  - C. Nephridia
  - D. Malpighian tubules
21. Which one of the following occurs during exercise?
- A. Vital capacity increase
  - B. Residual volume increases
  - C. Inspiratory reserve volume decreases
  - D. Tidal volume does not change.
22. If blood is transfused from a person of blood group A to a person of blood group B, agglutination occurs due to interaction between,
- A. antigen A and antigen B
  - B. antigen A and antibody A
  - C. antigen A and antibody b
  - D. antigen B and antibody a
23. Which one of the following is not a green-house gas?
- A. Carbon dioxide
  - B. Nitrous oxide
  - C. Methane
  - D. Sulphur dioxide
24. Which one of the following occurs in neurons at the start of repolarization?
- A. Interior of the membrane becomes more negative
  - B. Interior of the membrane becomes less positive
  - C. Interior of the membrane becomes more positive
  - D. Interior of the membrane becomes less negative
25. When photorespiration occurs in C<sub>3</sub> plants, it has an advantage of;
- A. Producing 3 – PGA
  - B. Producing carbon dioxide
  - C. Producing ATP
  - D. Regenerating RUBP
26. Which one of the following represents a period of short delay between the application of the stimulus and onset of the muscular contraction?
- A. Refractory period
  - B. Twitch
  - C. Latent period
  - D. Tetanus.
27. Which one of the following has the least effect on light phase of photosynthesis?
- A. Light intensity
  - B. Temperature
  - C. Chlorophyll concentration
  - D. Leaf surface area
28. The table below shows percentage composition of the different nitrogenous bases in each of the two strands of a single DNA molecule.

<b>Bases</b>	<b>A</b>	<b>G</b>	<b>C</b>	<b>T</b>
Strand 1	16	.....	22	.....
Strand 2	.....	.....	32	.....

The percentage of adenine in strand 2 and guanine in strand 1 respectively are;

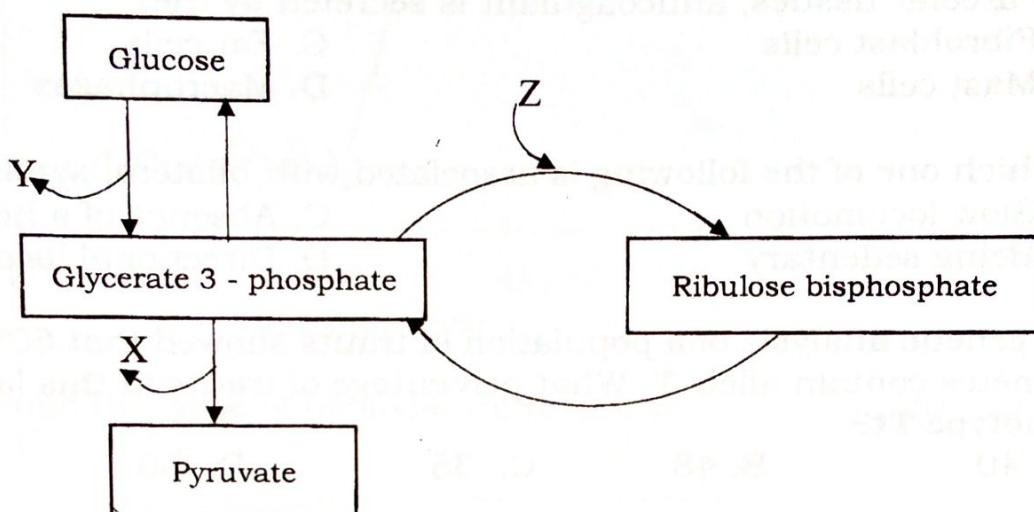
- A. 32 and 30
- B. 16 and 22

- C. 32 and 16
- D. 30 and 32

29. Which one of the following conditions does not affect sex chromosomes?

- A. Down's syndrome
- B. Klinefelter's syndrome
- C. Turner's syndrome
- D. Haemophilia

30. The diagram below shows chemical pathways in respiration and photosynthesis.



Which one of the following represents the identity of molecules X, Y and Z respectively?

- A. ADP, NAD<sup>+</sup>, NADP<sup>+</sup>
- B. NADPH, NADH, ATP
- C. FADH, ATP, CO<sub>2</sub>
- D. ATP, NADH, NADPH.

31. Which one of the following is true about juxamedullary nephron?

- A. Are most abundant in human kidneys
- B. Have long loops of Henle
- C. Produce dilute urine
- D. Have short loops of Henle

32. Which one of the following is true about carnivores?

- A. Lateral movement of the lower jaw is possible
- B. Have elongated caecum
- C. Have shorter gut
- D. May have stomach divided into chambers.

33. Which one of the following is not true about the pith of the stem?

- A. It may lack cells
- B. It mainly consist of parenchyma cells
- C. Found at the centre of the stem
- D. Its cells may be lignified.

34. Which one of the following is found in both primary and secondary cell walls?

- A. Hemicelluloses
- B. Lignin
- C. Suberin
- D. Cutin

35. Which one of the following classes of enzymes catalyses non-hydrolytic addition or removal of parts of substrate molecules?

A. Ligases      C. Oxido-reductase  
B. Lyases      D. Isomerases

36. The following are true about Platyhelminthes except;

A. Flat body  
B. Possession of a gut with no anus  
C. Metameric segmentation  
D. Being hermaphroditic

37. In areolar tissues, anticoagulant is secreted by the;

A. Fibroblast cells      C. Fat cells  
B. Mast cells      D. Macrophages

38. Which one of the following is associated with bilateral symmetry?

A. Slow locomotion      C. Absence of a head  
B. Being sedentary      D. Directional locomotion

39. A genetic analysis of a population of trouts showed that 60% of their gametes contain allele **T**. What percentage of trouts in this lake have genotype **Tt**?

A. 40      B. 48      C. 36      D. 60

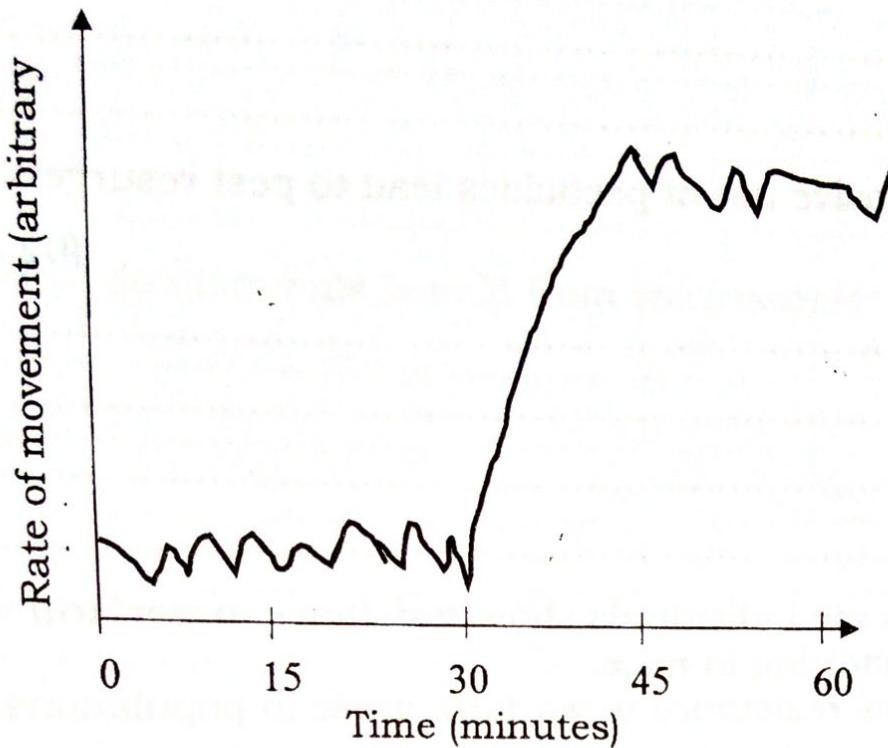
40. Compared to open grassland, the environment of a forest floor under thick canopy.....

A. experiences wider temperature fluctuations  
B. develops denser plant growth  
C. experiences higher rate of leaching of nutrients  
D. receives mainly far red light.

**SECTION B (60 MARKS)**

41. (a) State **three** differences between instinctive and learned behaviours. (03 marks)

- (b) The graph below shows the effect of light on locomotion of a free-living flatworm. The organism was transferred from dark to light at 30 minutes.



- (i) Name this type of behavioural response (01 mark)
- .....
- (ii) State **two** characteristics of this behavioural response shown by free-living flat worms. (02 marks)
- .....
- .....
- (iii) Describe the effect of light on the locomotion of the flatworm (01 mark)
- .....
- .....
- (iv) Explain how the pattern of behaviour shown on the graph is important for survival of this flatworm in its natural environment. (03 marks)
- .....
- .....
- .....
- .....

42. (a) What is pest resurgence?

(01 mark)

(b) How does excessive use of pesticides lead to pest resurgence?

(02 marks)

(c) In wild mice, some individuals show resistance to warfarin which prevent blood clotting in mice.

(i) Suggest how resistance to warfarin arose in populations of wild mice.

(02 marks)

(ii) How does resistance to warfarin spread in natural populations of wild mice?

(03 marks)

(d) State **two** (2) advantages of biological pest control over chemical pest Control. (2)

(02 marks)

43. (a) Distinguish between receptor adaptation and generator potential.

1 potential  
(02 marks)

(b) Describe the **physiological** behaviour of a rod cell in dim light

(05 marks)

(c) How do mammals benefit from stereoscopic vision? (02 marks)

(02 marks)

44. (a) Suggest **two** ways how knowledge of genetics is applied in agriculture. (02 marks)

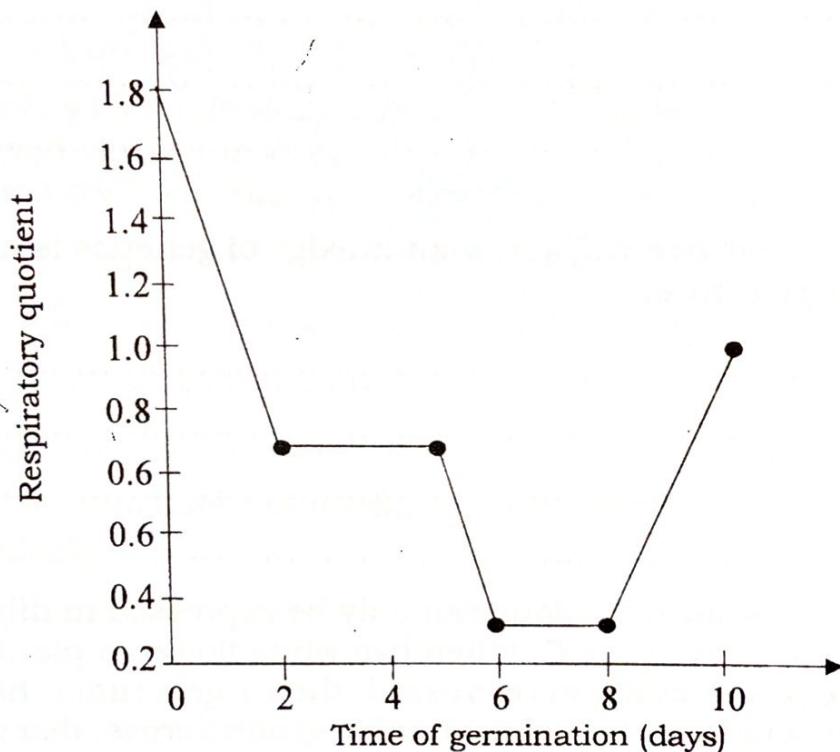
(02 marks)

(b) Gene **R** for red colour can only be expressed in dihybrid cross in presence of gene **C**. When two white flowered plants of genotypes **CCrr** and **ccRR** were crossed, the F<sub>1</sub> generation had only red flowered plants. Using suitable genetic cross, determine the genotypes and phenotypic ratio of the F<sub>2</sub> when F<sub>1</sub> progeny are selfed. (05 marks)

(05 marks)

- (c) Explain why deletion of a single base in DNA normally results into more lethal effects than substitution of a single base in DNA. (03 marks)
- .....  
.....  
.....

45. The graph below shows changes in respiratory quotient (R.Q) of a seedling during germination. Use it to answer the questions that follow.



- (a) Explain why respiratory quotient was high at the onset of germination. (03 marks)
- .....  
.....  
.....

- (b) Suggest reasons for changes in respiratory quotient between;  
(i) 3 – 6 days (02 marks)
- .....  
.....

(ii)

8 - 10 days

(02 marks)

- .....  
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(c) From the results, identify the major food storage form in this seedling. (01 mark)

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(d) Why are theoretical values of respiratory quotient not realistic? (02 marks)

46. (a) Describe the role of dietary fibres during food digestion in humans. (04 marks)

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(b) Explain the role of bile during absorption of lipids. (02 marks)

(c) What is the importance of the following during digestion of food in humans?

(i) Cholecystokinin.

(02 marks)

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(ii) Chemical control of digestion in the ileum.

(02 marks)

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**END**