

Candidate's Name.....

Index Number..... Signature .....

**P530/1**  
**BIOLOGY**  
**(Theory)**  
**Paper 1**  
**July/Aug 2025**  
**2½ hours**



**RWENZORI REGION SESEMAT AND ASSHU**  
**(RRSA) MOCK EXAMINATIONS**

**UGANDA ADVANCED CERTIFICATE OF EDUCATION**

**BIOLOGY**

**(THEORY)**

**PAPER 1**

**2 hours 30 minutes**

**INSTRUCTION TO CANDIDATES**

- ❖ This paper consists of sections A and B
- ❖ Answer **all** questions in both sections
- ❖ Write answers in section A in the boxes provided and answers to section B in the spaces provided.
- ❖ No additional sheets of paper should be inserted in this booklet

<b>For Examiner's use only</b>			
<b>Section</b>		<b>Marks</b>	<b>Examiner's signature and no</b>
<b>A</b>	1-40		
	41		
<b>B</b>	42		
	43		
	44		
	45		
	46		
<b>TOTAL</b>			

**SECTION A (40 MARKS)**

*Write the letter corresponding to the right answer in the box provided. Each question in this section carries one mark*

1. Which of the following is an example of an enzyme used in commercial fruit juice production?
- A. Catalase
  - B. Helicase
  - C. Pectinase
  - D. Polymerase
2. Which component of the plasma membrane gives it the fluidity quality?
- A. Glyco lipids
  - B. Phospho lipids
  - C. Integral proteins
  - D. Peripheral proteins
3. A cross is performed between two organisms with the genotypes AaBb and aabb. What genotypes in the offspring are the result of recombination?
- A. Aabb, AaBb
  - B. AaBb, aabb
  - C. aabb, Aabb
  - D. Aabb, aaBb
4. Which type of cell is responsible for secondary immune responses to a pathogen?
- A. Cytotoxic T- cells
  - B. Phagocytes
  - C. Macrophages
  - D. Memory cells
5. What are the effect(s) of changing levels of FSH in the human menstrual cycle?
- A. Cause ovulation
  - B. Stimulate follicle development and oestrogen secretion of the follicle
  - C. Stimulate follicle development and progesterone secretion of the follicle
  - D. Cause repair of the lining of the uterus

6. Which are the correct directions of the following processes?

	Replication	Transcription	Translation
A	5' to 3'	3' to 5'	3' to 5'
B	3' to 5'	5' to 3'	5' to 3'
C	5' to 3'	5' to 3'	5' to 3'
D	3' to 5'	3' to 5'	3' to 5'

7. After depolarization, what happens to restore the resting potential?

- A. Sodium channels open and sodium ions diffuse out of the neuron.
- B. Potassium channels open and potassium ions diffuse into the neuron.
- C. Potassium channels open and potassium ions diffuse out of the neuron.
- D. Sodium channels open and sodium ions diffuse into the neuron.

8. A plant has a waxy cuticle, reduced leaves, reduced number of stomata, and CAM physiology. What type of plant could this be?

- A. Hydrophyte
- B. filicinophyte
- C. Bryophyte
- D. Xerophyte

9. Which of the following accounts for the difference between chlorophyll a and b?

- A. Different porphyrin ring
- B. Difference in the central atom
- C. Difference in accessory pigments
- D. Substitution of aldehyde group for methyl (group)

10. Cleavage of succinyl-CoA into succinate during Krebs's cycle is attributed to

- A. Substrate level phosphorylation
- B. Dehydrogenation
- C. Decarboxylation
- D. Isomerisation

11. Which of the following microscopes can be used to resolve individual atoms of DNA molecule?
- A. Light microscope
  - B. Electron microscope
  - C. Scanning electron microscope
  - D. Transmission electron microscope
12. Prezygotic isolating mechanisms include all the following **EXCEPT**
- A. Hybrid sterility
  - B. Courtship rituals
  - C. Habitat separation
  - D. Seasonal reproduction
13. If the thoracic duct were tied off, which of these classes of nutrients would not enter the circulatory system at their normal rate?
- A. Amino acids
  - B. Glucose
  - C. Lipids
  - D. Fructose
14. The phosphorus cycle differs from other biogeochemical cycles in that:
- A. The reservoir for phosphate exists in mineral form in rocks rather than in the atmosphere.
  - B. Phosphorus is far more abundant than water, carbon and nitrogen
  - C. Phosphorus is less important to biological systems than water, carbon and nitrogen
  - D. Phosphorus once used by an organism does not cycle back to the environment.
15. Which of the following is the physiological value of the alcoholic fermentation pathway? It
- A. Produces lactate
  - B. Produce ADP for the ETC
  - C. Replenishes  $\text{CO}_2$  for the dark reaction
  - D. Replenishes  $\text{NAD}^+$  so that glycolysis can produce ATP

16. Which of the following shows the effect of a single gene having more than one expression in the phenotype?

A. Pleiotropy

B. Epistasis

C. Polygenic

D. Linked genes

17. Which of the following ground tissues in plants has the most diverse functions?

A. Parenchyma

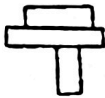
B. Collenchyma

C. Sclerenchyma

D. Chlorenchyma

18. Thousands of primary producers are eaten by a few primary consumers which in turn are infested with hundreds of parasites. The most appropriate pyramid of numbers illustrating this information is

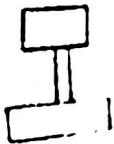
A.



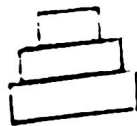
B.



C.



D.




19. A grasshopper whose head is completely immersed in water for one hour may not die because;

A. It does not drink the water

B. Water contains enough nutrients on which it feeds

C. It continues absorbing oxygen required for its respiratory process from the water

D. The spiracles are still in a position to perform their function

20. Colchicine is a chemical that stops chromatids from separating during mitosis. Which phase will the cell reach and the stop dividing?

A. Anaphase

B. Interphase

C. Metaphase

D. Telophase

21. Which of these conditions reduced filtration pressure in the glomerulus?
- A. Elevated blood pressure
  - B. Constriction of the afferent arterioles
  - C. Decreased plasma protein in the glomerulus
  - D. Dilation of the afferent arterioles
22. Which of the following physiological process does not occur in a mature red blood cell?
- A. Synthesis of ATP
  - B. Transportation of oxygen
  - C. Synthesis of new protein
  - D. Use of glucose as a nutrient
23. Which of the following bonds are least likely to be affected by change in PH?
- A. Sulphur bridge
  - B. Ionic bond
  - C. Hydrogen bond
  - D. Covalent bond
24. Stinging worker bee, dies soon after using their sting. This is an example of
- A. Territorial behaviour
  - B. Survival of the fittest
  - C. Kin selection
  - D. Sexual selection
25. The physiological process during germination, which increases thousand fold is:
- A. Imbibition
  - B. Hydrolysis
  - C. Photosynthesis
  - D. Respiration
26. Chitin is a polysaccharide found in the exoskeleton of insects. It's made of
- A. Amino acid and glucose
  - B. Glucose and maltose
  - C. Amylose and glucose
  - D. Glycogen and glucose

27. Which one of the following properties of water is important in the dispersal of spores?
- A. High tensile strength
  - B. High surface strength
  - C. High relative density
  - D. Incompressibility.
28. Which one of the following determines the number of map units between two genes on a chromosome?
- A. Frequency of parentals
  - B. Frequency of recombinants
  - C. Number of linkage groups
  - D. Size of the chromosomes
29. Which one of the following features is not common to both arthropods and annelids?
- A. Metameric segmentation
  - B. Bilateral symmetry
  - C. Triploblastic coelomate
  - D. Jointed appendages
30. Which one of the following may limit an organism from colonizing a terrestrial habitat?
- A. Development of pollen tube
  - B. Shelled eggs
  - C. Internal fertilization
  - D. Flagellated gametes
31. Which one of the following is correct about the venous end of a capillary bed?
- A. Blood pressure is high
  - B. Water moves out of the capillaries
  - C. Solute potential of plasma protein decreases
  - D. Solutes are actively transported into the capillaries

32. Which one of the following is true about meiosis? It involves
- A. Two divisions and two rounds of DNA replication
  - B. Two divisions and one round of DNA replication
  - C. One division and two rounds of DNA replication
  - D. One division and one round of DNA replication
33. The organelles within a cell responsible for detoxification are
- A. Smooth endoplasmic reticulum
  - B. Rough endoplasmic reticulum
  - C. Golgi apparatus
  - D. Ribosomes
34. The transport mechanism which involves substances too large to pass through channels and too polar to dissolve in the lipid bilayer is
- A. Endocytosis
  - B. Exocytosis
  - C. Active transport
  - D. Diffusion
35. Which of the following is NOT a second messenger?
- A. Adenylyl cyclase
  - B. Cyclic AMP
  - C. Calcium ions
  - D. AMP
36. A Scientist chemically analysed the plasma membrane of a cell. He determined that it is an animal cell because he finds that it contains.
- A. Cholesterol
  - B. Phospholipid
  - C. Protein
  - D. Cellulose
37. What are the components of a eukaryotic chromosome?
- A. One DNA molecule and one large protein
  - B. Many DNA molecules and many proteins
  - C. One DNA molecule and many proteins
  - D. Many DNA molecules and one large protein

38. Which one of the following monohybrid inheritance in man is caused by a dominant allele?

- A. Albinism
- B. Cystic fibrosis
- C. Eye colour
- D. Achondroplasia

39. Which one of the following organisms illustrates that not all active animals require that the circulatory system transports gases?

- A. Mammals
- B. Insects
- C. Fish
- D. Birds

40. Which of these terms has the same meaning as natural selection?

- A. Adaptive radiation
- B. Convergent evolution
- C. Survival of the fittest
- D. Divergent evolution

**SECTION B: (60 MARKS)**

*Write your answers in the spaces provided*

41. (a) Name the process by which vesicles release their contents at the presynaptic membrane. (01 mark)

.....  
.....

- (b) Describe the role of acetylcholinesterase (03 marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

- (c) Suggest why;

- (i) Impulses travel in only one direction at synapses? (02 marks)

.....  
.....  
.....  
.....  
.....  
.....

- (ii) If action potentials arrive repeatedly at a synapse, the synapse eventually becomes unable to transmit the impulse to the next neurone. (04 marks)

.....  
.....  
.....  
.....  
.....



43. In most people, the first six amino acids on their  $\beta$ -globin polypeptide chains are Val – His – Leu – Thr – Pro – Glu

The DNA triplet Coding for the sixth amino acid (Glu) in most people is CTT. In some people, this DNA triplet is CAT.

a) (i) What type of mutation is the change from CTT to CAT? (01 mark)

.....  
.....

(ii) Identify the amino acid in the  $\beta$ -globin polypeptide chain of people with this mutation. (01 mark)

.....  
.....

(iii) State the consequences for a person of having two copies of the mutate gene. (02 marks)

.....  
.....  
.....  
.....

b) Draw a simple flow diagram to illustrate the important stages in the formation of a polypeptide. (06 marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

44. (a) Define the term a territory in a biological sense. (02 marks)

.....  
.....  
.....

(b) State three ways how animals defend their territories. (03 marks)

.....  
.....  
.....  
.....  
.....  
.....

(c) Explain three biological significances of territorial behaviour. (03 marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(d) Give an example of an animal that

(i) shows territorial behaviour. (01 mark)

.....  
.....

(ii) does not display territorial behaviour. (01 mark)

.....  
.....



(c) Briefly explain why the pyramid of energy cannot be inverted. (02 marks)

.....  
.....  
.....  
.....  
.....

46. (a) Write down the two equations which are incorporated in coming out with Hardy – Weinberg Principle, under the following.

(i) Gene pool. (01 mark)

.....  
.....  
.....

(ii) Total population. (01 mark)

.....  
.....  
.....

(b) State four criteria which must be satisfied before applying the Hardy-Weinberg Principle. (02 marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(c) In a population of 160 small mammals, some had a dark brown coat and the others had a light brown coat. Dark brown (B) is dominant over Light brown (b). In the population, there were 48 Light brown individuals.

Using the Hardy- Weinberg equation, calculate;

(i) the frequency of homozygous dominant individual. (2½ marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(ii) the frequency of heterozygous individuals in the population. (02 marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(iii) how many of each of the genotypes (BB, Bb, bb) would there be in a future population of 10,000 individuals. (1½ marks)

.....  
.....  
.....  
.....  
.....  
.....  
.....

**END**