Candidates Name:.....

Signature:.....

Centre No.					Personal No		

P530/1
BIOLOGY
(Theory)
Paper 1
Jul/ Aug 2023
2 ½ hours

TORORO ARCHDIOCESE EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS 2023

BIOLOGY

(THEORY)

Paper 1

2 hours 30 minutes.

INSTRUCTIONS TO CANDIDATES.

*This paper consists of sections **A** and **B**.*

*Answer **all** questions in both sections.*

*Write answers To section **A** in boxes provided and answers to Section **B** in the spaces provided.*

No additional sheets of paper should be inserted in this booklet..

	For Examiners' Use Only		
Section	**Question**	**Marks**	**Examiner's Sign & No.**
A	**1 -40**		
B	**41**		
	42		
	43		
	44		
	45		
	46		
	Total		

Turnover

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. A zygote with three copies of chromosome 21 is known to manifest symptoms of
   A. Sickle cell anaemia
   B. Klinefelter's syndrome
   C. Turner's syndrome
   D. Down's syndrome

2. Which one of the following is the role of cholesterol in a plasma membrane?.
   A. Reduces escape or entry of non-polar molecules
   B. Reduces escape or entry of polar molecules
   C. Reduce escape or entry of organic molecules
   D. Prevents drying up of the membrane

3. Which of the following ia an example of positive feedback?
   A. Regulation of glucose.
   B. End product inhibition
   C. Secretion of oxytocin during labour
   D. Regulation in concentration of thyroxine in blood

4. The phenotype resulting from a cross between pink eyed locusts and blue eyed locusts depends on which locusts is pink eyed. This means that the gene for eye colour is.
   A. sex determined
   B. sex linked
   C. sex limited
   D. epistatic

5. Since the formation of sperms requires a temperature below the body temperature,
   A. the testes lie in scrotal sacs.
   B. more water intake is advised for mature males
   C. scrotal sac are pouch-like hanging extensions
   D. scrotal sacs are between the thighs

6. Which one of the following leads to an influx of water in a freshwater teleost?

A. Many, large glomeruli and salt reabsorption from the renal fluid.
B. Many, small glomeruli and salt extrusion from the body
C. Few, large glomeruli and salt uptake
D. Many, small glomeruli and salt uptake

7. Why are certain exotic species considered "**invasive**"? They

A. are found in areas where they are not native.
B. were introduced by humans – often accidentally.
C. spread aggressively and displace native species.
D. benefit from being in a new environment.

8. Which of the following changes in a cell is true as its water potential becomes less negative?

A. Decrease in turgor pressure
B. Decrease in osmotic potential
C. Increase in solute potential
D. Decrease in pressure potential

9. The major similarity between active transport and facilitated diffusion is that in both;

A. energy is used
B. materials are transported against a concentration gradient
C. carrier proteins are involved
D. movement of polar molecules is involved.

10. Which one of the following would be a result of increased carbon dioxide concentration in tissues?

A. Increase in affinity for oxygen by haemoglobin
B. Increase in the loading tendency of haemoglobin
C. Lowering of affinity for Oxygen by haemoglobin
D. Shifting of the oxygen dissociation curve to the left.

11. Which one of the following justifies the statement that "mutation is the ultimate source of variability"?

A DNA polymerase is remarkably accurate
B. "Mutation proposes and selection disposes"
C. Mutation is the only source of new alleles
D. Mutation occurs in response to natural selection

12. At what stage of cell division would the cell stop when colchicines is added?

A. Metaphase
B. Anaphase
C. Prophase
D. Telophase

13. When a lipid is combined with a phosphate group, it becomes
A. saturated.
B. water soluble.
C. amphipathic.
D. amphoteric.

14. Which one of the following has the greatest biomass?
A. Primary consumers
B. Secondary producers
C. Primary producers
D. Tertiary consumers

15. Which one of the following is the major role of T – helper cells in cell mediated response?
A. Stimulation of B cells to make antibodies
B. Suppress activity of other T cells
C. Helps to kill body cells infected by viruses
D. Gradually destroy transplanted organs

16. The respiratory pigment found in some arthropods is.

A. haemoerythrin
B. haemoglobin
C. chlorocruorin
D. haemocyanin

17. Which one of the following determines the biological role of proteins?

A. Sequence of amino acids in them
B. Pattern of folding of the polypeptide chain
C. Other organic molecules with which it is associated
D. The specific three dimensional shape

18. To which kingdom do multicellular, nucleated heterotrophs that always obtain food by absorbing nutrients from the environment?

A. Plantae
B. Fungi
C. Monera
D. Animalia

19. In which part of the chloroplast are complex carbohydrates are made?

A. Internmembrane space
B. Stroma
C. Inner membrane
D. Thylakoid

20. Which of the following polysaccharides contain amino acid group?
A. Murein
B. Cellulose
C. Chitin
D. Glycogen

21. Skin colour is an example of inheritance through.

A. Systematic genes
B. Polygenes
C. Sex linkage
D. Multiple alleles

22. Which of the following is not a role of the larval stage in animal development?

A. Dispersion
B. Feeding
C. Asexual reproduction
D. Sexual reproduction.

23. Which of the following occurs at the maximum ventricular pressure?

A. Semilunar valves close while atrioventricular valves open
B. Both semilunar valves and artiventricular valves open
C. Both semilunar valves and atrioventricular valves close
D. Semilunar valves open while atrioventricular valves close

24. A certain gene of a bacterium codes for a protein; 40 amino acids long. How many nucleotides are needed to code for this polypeptide?

A. 40
B. 80
C. 120
D. 1600

25. In which of the following responses do auxins and gibberellins show synergism in their roles?

A. Fruit growth
B. Root growth
C. Apical dominance
D. Stomatal opening

26. The "lub" sound is produced after the;

A. ventricles are fully contracted
B. bicuspid and tricuspid valves suddenly close.
C. semilunar valves are closed
D. ventricles start to relax

27. The association of white egrets with herds of cattle can be described as .

A. Mutualism
B. Commensalism
C. Parasitism
D. Co - evolution

28. In which of the following processes is osmosis least involved?

A. Long distance transport of xylem sap
B. Swelling of guard cells
C. root pressure
D. Water movement between neighbouring cells of the root cortex

29. Which of the following blood proteins becomes the threads of a clot?

A. Prothrombin
B. Thromboplastin
C. Thrombin
D. Fibrinogen

30. Why does the absorption spectrum for chlorophyll and the action spectrum for photosynthesis coincide?

A. Photosystems I and II are activated by different wavelengths of light.
B. Wavelengths of light that are absorbed by chlorophyll trigger light capturing reactions.
C. Energy from wavelengths absorbed by carotenoids is passed on to chlorophyll.
D. The rate of photosynthesis depends on the amount of light received.

31. Which one of the following is the significance of the radical to emerge as a first step in germination?

A. Its hoot protects the shoot that emerges later
B. It carries out photosynthesis to supply the embryo with food.
C. It establishes a supply of water to the growing embryo
D. It is necessary to break the seed coat

32. During an action potential in a neuron,

A. Potassium ions diffuse into the axon
B. Sodium ions diffuse out of the axon
C. Sodium ions diffuse into the axon
D. Both the sodium and potassium ions diffuse into the axon

33. Which one of the following would be the effect injecting thyroxine into a laboratory mammal?

A. Increase in oxygen consumption
B. Decrease in metabolic rate
C. Increase conversion of glucose into glycogen
D. Thyroid gland becomes more active.

34. Production of hypertonic urine is mainly due to high levels of:

A. Aldosterone
B. Vasopressin
C. Adrenaline
D. Insulin

35. In which of the following areas is columnar epithelium with microvilli is most likely to be found?

A. Colon
B Duodenum
C. Ileum
D. Stomach

36. Which of the following are reabsorbed in the Malphian tubules excretion in insects?

A. KHU , carbon dioxide and water
B. K^+ *and* Na^+
C. KHC_3, water and carbon dioxide
D. KHU, water and $KHCO_3$

37. The streamlined shape of a shark, penguin and whale is an example of:

A. Convergent evolution
B. Divergent evolution
C. Parallel evolution
D. Co- evolution

38. Which of the following summarizes Mendel's law of segregation?

A. Pairs of factors are inherited independent of each other.
B. The two homologous chromosomes with a pair of genes and end up separately.
C. Unlike chromosome pair separate at the spindle equatorial region
D. Adjacent genes on a chromosome are never found in the same gamete.

39. If the code for an amino acid is ATG on DNA molecule this code on the transfer RNA molecule may be written as:

A. TAC
B. UAC.
C. AUG
D. GUC

40. Which one of the following would take place after implantation of a zygote in the uterine wall of a human female?

A. Breakdown of the endometrium
B. Development of ovarian follicles
C. Continued development of the corpus luteum
D. Increased secretion of luteinizing hormone.

SECTION B (60 MARKS)

41. (a) Viruses are considered to be at the boundary of living and non- living suggest why they are considered .

(i) Living (1mark)

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(ii) Non living (1 mark)

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(b) Describe the significance of following events in the lytic cycle of a virus.

(i) Latent period (3 marks)

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(2marks)

(ii) Cell lysis

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(c) Outline the economic importance of virus to humans. (3 marks)

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42. (a) Explain why the structure of the plasma membrane according to fluid masai mode is said to be.

(i) Fluid in nature (2 marks)

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(ii) Mosaic in nature. (2 marks)

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(b) Explain how the following factors affect the fluidity of the membrane.

(i) Increase in temperature. (2 marks)

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(ii) Cholesterol at high temperatures. (2marks)

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(c) Explain how the plasma membrane is adapted for transport of substance.

(2 marks)

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43. (a) What is meant by biochemical oxygen demand? (2 marks)

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(b) The table below shows typial values of biochemical oxygen demand (BOD) of a clean river during pollution events.

Condition	**BOD/mgdm^{-3}O$_2$**
Clean	0.5 – 7.0
Treated sewage	3.0 – 50 .0
Untreated sewage	200.0 – 800.0
Silage/liquor from decomposing grass	60,000

Explain the:

(i) Difference in B.O.D of treated and untreated sewage. (3 marks)

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(ii) Consequence of sewage liquor into a river. (3 marks)

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(c) Explain how any two aquatic organism which can be used as indicators of the health of water bodies. (2 marks)

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44. Suggest explanations for the following

(a) The oxygen dissociation curve for the rat heamoglobin is found to the right of human haemoglobin. (3marks)

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(b) Chloride shift occurs during carbon dioxide transport. (2 marks)

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(c) Cardiac output increase when an individual engages in physical exercise. (2marks)

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(d) Translocation in the phloem may be stopped by metabolic poisons. (3 marks)

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45. (a) Distinguish between photophosphorylation and photorespiration. (2marks)

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(b) State the differences between cyclic and non cyclic photophosphorylation. (3 marks)

Cycli photophosphorylation	Non –cyclic photophosphorylation

(c) (i) Describe two evidences that show that oxygen produced during photosynthesis is from splitting of water. (2marks)

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(iii) State two importance of photosynthesis in nature. (2 marks)

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46 (a) What is meant by counter current multiplier in reference to the nephron .

(2 marks)

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(b) Briefly describe how counter current multiplier effect is achieved in the loop of hence. (4 marks)

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(c) Outline the possible structural differences between the nephron of a beaver and that of a camel. (3marks)

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(d) Suggest one complication in the body that can arise from kidney failure. (1mark)

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END