Candidates Name:.....

Signature:.....

Random No.					Personal No		

(Do not write your school/ centre name or number anywere on this booklet.)

P530/1
BIOLOGY
(Theory)
Paper 1
Jul/ Aug 2022
2 ½ hours

TORORO ARCHDIOCESE EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

MOCK EXAMINATIONS 2022

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 plant cell is magnified x2000 and the length of one chloroplast is 16mm. What is the actual length of the chloroplast in micrometer?

   A. 16
   B. 8
   C. 1600
   D. 32000

2. Which of the following is true about the fluid mosaic model of the plasma membrane.

   A. The less saturated the fatty acid tails of the phospholipids, the more fluid the membrane.
   B. The less saturated the fatty acid tails of the phospholipids, the less fluid the membrane
   C. The higher the temperature the less fluid the membrane.
   D. The lower the temperature, the more fluid the membrane

3. Dogs have 78 chromosomes in their diploid cells, if a dog's cell enters meiosis how many chromosomes and chromatids are present in each daughter cell.

   A. 39 chromosomes and 39 chromatids.
   B. 39 chromosomes and 78 chromatids
   C. 78 chromosomes and 78 chromatids
   D. 78 chromosomes and 156 chromatids

4. Cell division without a corresponding increase in cytoplasm is called?
   A. Cleavage
   B. Gastrulation
   C. Organogenesis
   D. Induction.

5. Rigidity of herbaceous plants results from?

   A. Osmotic pressure
   B. Root pressure
   C. Capillarity
   D. Turgor pressure

6. Which of the following is the advantage of breathing air over breathing water?

A. Air is less than water, so it takes less energy during ventilation.
B. Oxygen diffuses faster in air than water .
C. The oxygen content of air is greater than that of an equal volume of water.
D. Air breathing leads to high evaporation rate from the respiratory surface.

7. Oxygen diffuses into blood in the lungs because relative to alveolar air the;

A. Carbon dioxide concentration in the blood is high.
B. Carbon dixide concentration in blood is low.
C. Oxygen concentration in the blood is high.
D. Oxygen concentration in the blood is low.

8. Which of the following structures contains transitional epithelium?

A. Stomach
B. Ligaments
C. Urinary bladder
D. Skin

9. The source of oxygen produced during photosynthesis is.

A. Carbon dioxide
B. Glucose
C. Water
D. Spongy mesophyll

10. In dog fish, which of these fins **does not** counteract yawing and rolling?

A. Anterior dorsal fin
B. Posterior ventral fin
C. Pectoral fins
D. Posterior dorsal fin

11. Birds reared by a foster mother of another species later attempt to mate with birds of a foster mother species. This is an example of.

A Simple reflex.
B. Conditioned reflex.
C. Imprinting
D. Trial and error learning

12. The final hydrogen acceptor in aerobic respiration in animals is.

A. Ethanol
B. Pyruvate
C. NAD
D. Lactate

13. Continuous variation is as a result of.

A. Dominant genes
B. Codominant genes
C. Polygenes
D. Recessive genes.

14. Which of these tissues is most lignified?

A. Metaxylem
B. Primary phloem
C. Cambium
D. Protoxylem

15. Which of the following may lead to genetic death in a population?

A. Haemopilia
B. Sickle cell trait
C. Infertile males
D. Albinism

16. An example of intracellular endoparasite is?

A. Schistosoma mansoni
B. Fasciola hepatica
C. Trypanosoma gambiense
D. Plasmodium falciparum

17. Brightly coloured plumage in male birds and its absence in female counterparts is an example of.

A. Polmorphism
B. Sexual dimorphism
C. Mimicry
D. Industrial melanism.

18. When leaves wilt photosynthesis stops due to;

A. Break down of chlorophyll
B. Flaccidity of mesophyll cells
C. Closure of the stomata
D. Deficiency of water.

19. If a long-day plant has a critical length of 9 hours, which one of these in a 24 hour cycle would prevent flowering in such a plant.

A. 16 hours light / 8 hours dark
B. 14 hours light/ 10 hours dark
C. 15.5 hours light / 8.5 hours dark
D. 8 hours light / 8 hours dark / flash of light / 8 hours dark.

20. The table below shows the rate of breathing and volume of air exchanged with each breath for a person at rest and during exercise.

State of individual	Breaths per minute	Volume of each breath(cm^3)
At rest	12	500
During exercise	24	1000

The increase in volume of air exchanged per minute when an individual does exercise from rest is.

A. $500cm^3$
B. $6000cm^3$
C. $1500cm^3$
D. $1800cm^3$

21. In the alternation of generations in the life cycle of plants;

A. the sporophyte is always dominant
B. Gametophyte is always short lived
C. Gametes are produced by meiosis
D. Spores are always haploid

22. Following depolarization, repolarisation begins by.

A. Diffusion of potassium out of the cell.
B. Diffusion of sodium ions out of the cell
C. Entry of potassium ions into the cell
D. Entry of sodium ions into the cell.

23. Which one of the following phyla has aceolomate organisms?

A. Platyhelminthes.
B. Nematoda
C. Annelida
D. Arthropoda.

24. The organ of Corti is composed of.

A. Tectorial membrane , basilar membrane auditory nerve.
B. Tectorial membrane , endolymph, Reissners membrane
C. Tectorial membrane , basilar membrane, sensory hair cells.
D. Tectorial membrane, median canal, basilar membrane.

25. In animal cells, permeability of the plasma membrane to most biological molecules is reduced by.

A. Proteins
B. Phospholipids
C. Glycolipids
D. Cholesterol

26. During water stress, the rate of photosynthesis is reduced due to shortage of.

A. Cabon dioxide
B. Mineral salts
C. Water
D. Sunlight

27. Notochord is absent in the following organisms **except**.

A. Amphioxus
B. Hydra
C. Cockroach
D. Earth worm

28. The best cell for studying lysosomes would be.

A. Nerve cell
B. Muscle cell
C. White blood cell
D. Mesophyll cell

29. Which of the following cells would posses the largest number of mitochondria?

A. Muscle cell
B. Alveolar cell
C. Hepatocyte
D. Osteoblasts.

30. Which of the following cells is affected by corona virus?

A. Alveolar cells.
B. Hepatocytes
C. Myocytes
D. Chondroblasts

31. An efficient homeostatic system should have the following characteristics **except.**

A. High sensitivity to deviations
B. Minimum deviations from the set point
C. Immediate correction of a deviation
D. Wide deviations from the set point.

32. Which of the following mammals is most likely to have a high number of juxtamedullary nephrones.

A. Man
B. Beaver
C. Camel
D. Cow

33. Eutrophic lakes are characterized by.

A. High oxygen concentration
B. Low rate of photosynthesis
C. High concentration of nutrients
D. Low concentration of nutrients

34. Food chains are sometimes short because.

A. Each plant species is fed on by a single species of herbivore
B. Most of the energy is lost during transfer to the next trophic level
C. Predators are diverse and less abundant than prey
D. Most species are inedible

35. Which of the following protozoa lack locomotory structures?

A. Euglena
B Plasmodium
C. Ameoba
D. Paramecium

36. Which of the following statements are correct for both enzymes and proteins?

A. Both catalyse reactions
B. Both require receptors
C. Both initate reactions
D. Both are proteins

37. Which of the following is not a secondary messenger for hormones?

A. Cyclic Adenosine Monophosphate (cAMP)
B. Cyclic Guanosine Monophosphate (cGMP)
C. Calcium
D. Adenylate cyclase

38. Which of the following factors can cause a change in the gene pool of a small population?

A. Random mating
B. Migration
C. Genetic drift
D. Mutation

39. Which of the following is true for a resting muscle fibre.

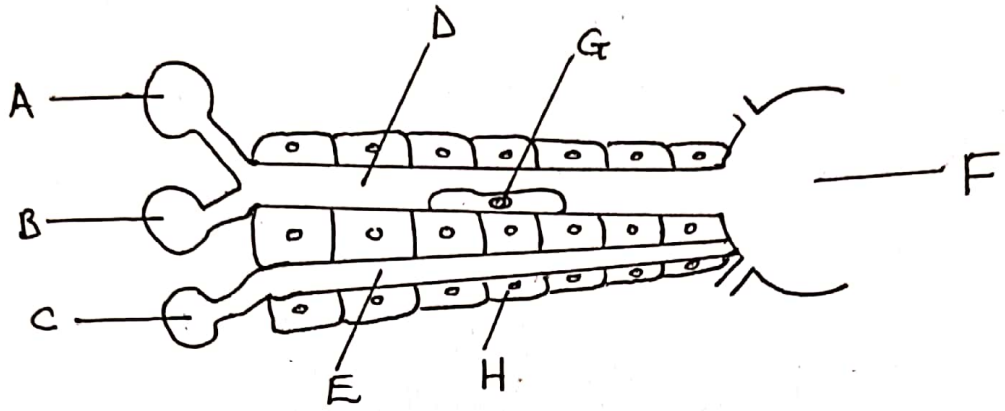
A. Sarcomere are regions between two **H** zones
B. **M** line proteins called **A** band separate the thick filament.
C. Dark **A** bands contain overlapping thick and thin filaments with a central thin **H** zone composed of only thick filaments.
D. **I** band are composed of the same thick filaments as seen in **A** bands.

40. Which of the following organelles is associated with the final stage of most cell secretions?

A. Smooth endoplasmic reticulum
B. Rorgh endoplasmic reticulum
C. Ribosome
D. Giolgi apparatus.

SECTION B.

41. The figure below shows the microscopic structure of a liver lobule.



(a) Name the structures. *(3marks)*

A.....

B.....

C.....

D.....

E.....

F.....

(b) State one way in which the following structures are suited to their functions. *(2 marks)*

(i) D.....

(ii) G.....

(c) (i) State the roles of cell **H** in glucose metabolism. *(2marks)*

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(ii) How is cell **H** adapted to its functions? *(3 marks)*

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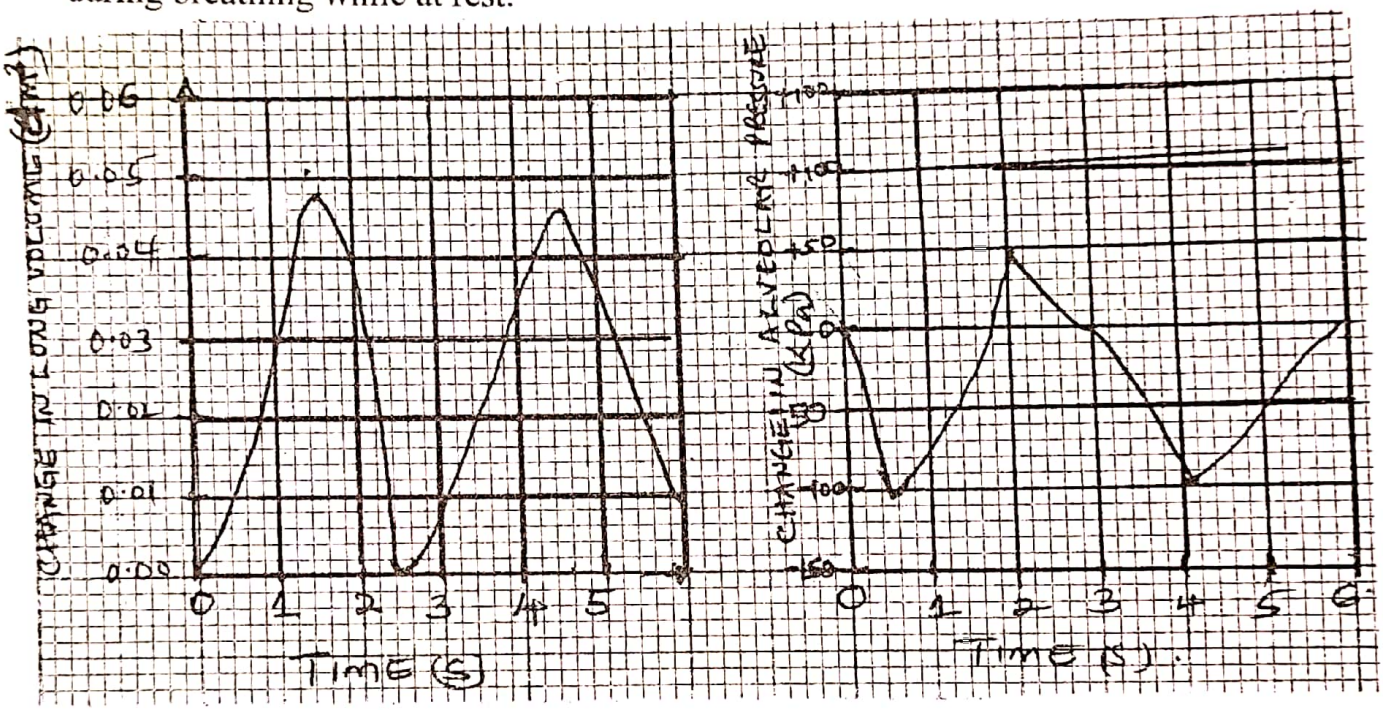
42. The figure below shows volume and pressure changes in the lungs of a person during breathing while at rest.



(a) From the graph in figure above determine the breathing rate of this person give your answer in breaths per minute. *(2 marks)*

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(b) If the volume of air in the lungs when the person inhaled was $3000cm^3$. Calculate the volume of air in the lungs after the person has exhaled, show your working. *(2marks)*

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(c) Explain how the muscles create the change in pressure in the alveoli over 0 to 0.5 seconds. *(3 marks)*

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(d) Suggest how each of the following features contribute to the efficiency of gaseous exchange in the alveoli.

(i) The wall of each alveolus is not more than 0.3 micrometers thick. *(1mark)*

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(ii) There are 300 million alveoli in each lung. *(1 mark)*

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(iii) Each pulmonary capillary is very narrow. *(1 mark)*

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43. (a)(i) State three differences between the life cycle of a Bryophyte and that of a Pteridophyte. *(3 marks)*

Bryophyte	Pteridophyte
(i)	
(ii)	
(iii)	

(ii) State **two** features which indicate evolutionary advancement of Spermatophytes over Bryophytes and Pteridophytes. *(2marks)*

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(b) Explain how plants overcome the following challenges during colonization of land. *(2 marks)*

(i) Dessication.

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(ii) Nutrition.

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(c) Explain how evolution of flowers led to success of angiosperms on land.

(3 marks)

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44. (a)(i) What is meant by a pest . *(2 marks)*

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(ii) Outline some problems which may arise from use of chemicals to control pests on plants. *(3 marks)*

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(b) Explain the effects of the following pollutants on the ecosystem.

(i) Chloro flouro carbons. *(2marks)*

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(ii) Discharge of hot water into a water body *(2marks)*

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(iii) Artificial light. *(1 mark)*

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45. (a) Explain why two sister chromatids are genetically identical before crossing over while a pair of homologous chromosomes are not. *(4 marks)*

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(b) In cats, males are **XY** and females are **XX.** A gene on **X** chromosome controls fur colour in cats. The alleles **G** codes for ginger fur while allele **B** codes for black fur. These alleles are codominant. Heterozygous females have ginger and black patches of fur and their phenotype is described as tortoise shell.

(a) Explain what is meant by codominant alleles. *(1 mark)*

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(b) (i) Explain why male cats with a tortoise shell donot usually occur. *(2 marks)*

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(ii) A tortoise shell female was crossed with a black male. Use a genetic diagram to show all the possible genotypes and the expected offspring phenotype ratio from this cross. *(3 marks)*

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46. (a)(i) Describe how a mature sperm cell is produced from a primary Spermatocyte. *(4 marks)*

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(b) Explain importance of the following reactions during fertilization

(4 marks)

(i) Acrosome reaction.

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(ii) Cortical reaction.

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(c) State **two** differences between fertilization in flowering plants and in mammals. *(2 marks)*

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END