Name: ……..Index No……..

School: ……..signature……..

P530/1
Biology (Theory)
Paper 1
July/August 2019
2½ hours.

BUGANDA EXAMINATIONS COUNCIL MOCKS

Uganda Advanced Certificate of Education

BIOLOGY (Theory)

PAPER 1

2 HOURS 30 MINUTES

INSTRUCTIONS TO CANDIDATES

- Answer all questions in section **A** and **B**.
- Answers of section **A** should be written in the boxes provided.
- Answers of section **B** should be written in spaces provided.

For Examiners' use only

Section	**Marks**	**Examiner's signature**
A : 1 - 40		
B: 41		
42		
43		
44		
45		
46		
Total		

SECTION A (40 MARKS)

1. The primary function of hereditary material to a cell is to
   A. determine its characteristics
   B. transmitting characteristics
   C. control protein synthesis
   D. control formation of mRNA

2. Which of the following is not a function of endoplasmic reticulum?
   A. transport materials within a cell
   B. isolate and transport protein
   C. synthesis and transport lipid and steroids
   D. used in formation of glycoprotein

3. The surface area for re-absorption of materials in kidney tubule is increased by possession of
   A. long columnar cells
   B. ciliated columnar cell
   C. cuboid cells
   D. ciliated cuboid cell

4. Organisms in kingdom fungi is characterized by
   A. multinucleated cells
   B. cell wall made up of cellulose
   C. meiotic nuclear division
   D. possession of sporangium

5. The exchange of respiratory gases between blood capillaries and lungs by simple process of diffusion is due to
   A. presence of numerous blood capillaries
   B. membranes being fully permeable to gases
   C. presence of numerous alveoli
   D. continuous flow of blood away from lungs

6. A plant cell that is placed in very concentrated solution always has
   A. very high osmotic potential
   B. high water potential
   C. low osmotic potential
   D. low osmotic pressure

7. The structural properties of cellulose is attributed to possession of numerous
   A. helix chain of β glucose
   B. OH groups
   C. straight chain of β glucose
   D. glycosidic bonds

8. Which one of the following is not a molecular function of proteins?
   A. stopping blood clotting by fibrin
   B. controlling rate of metabolism
   C. maintain cellular structure
   D. prevent change in pH of a cell

9. The most effective way of increasing the frequency of collision of substance and enzyme molecules is by increasing
   A. substrate concentrate
   B. the temperature of medium
   C. concentration of enzyme
   D. concentration of enzyme cofactors

10. The process in plants is controlled by enzymes 1, 2, 3, and 4 as shown in equation below

$$A \xrightarrow{1} B \xrightarrow{2} C \xrightarrow{3} D \xrightarrow{4} E$$

The enzyme inhibited by accumulation of substance E is
   A. 1
   B. 2
   C. 3
   D. 4

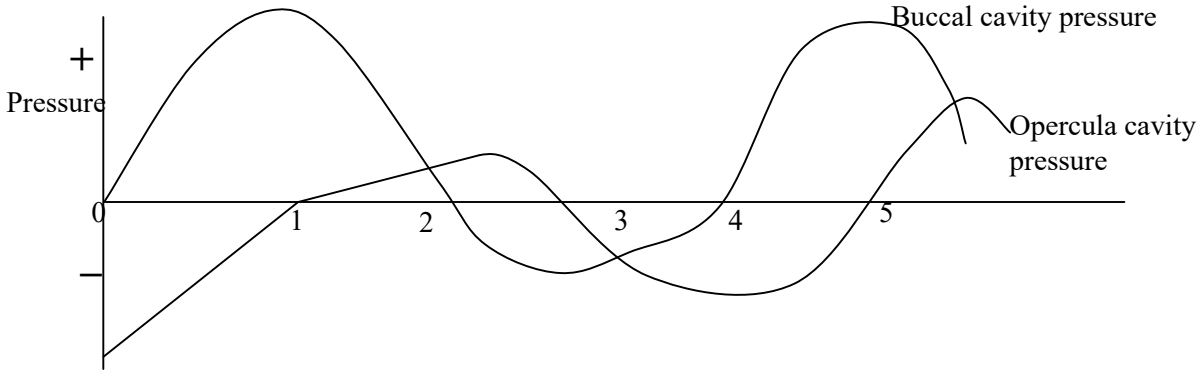
11. Few plants are complete anaerobes because
   A. most plants cannot survive without oxygen
   B. accumulation of ethanol is lethal
   C. accumulation of lactic acid is lethal
   D. absence of oxygen generates very few ATPs.

12. The following are evolutionary strategies for solving the problem of gaseous exchange except
   A. flattering of the body
   B. small body size
   C. inactive body muscles

D. highly active body muscles

13. Which one of the following decreases with increased exercise in man?
A. tidal volume
B. vital capacity
C. inspiratory capacity
D. inspired reserve volume

14. The figure below represents changes in buccal cavity and opercular cavity pressures during a single respiratory cycle of a bony fish



Between what numbers plotted along zero pressure does continuous flow of water from buccal cavity to opercules cavity stop
A. 1 to 2
B. 2 to 3
C. 3 to 4
D. 4 to 5

15. Cutting of vagus nerve that connect stretch receptors in lungs to respiratory centers in hind brain in man leads to
A. ceasetion of inspiration
B. slow and deeper breathing rare
C. increased inspiration
D. fast and normal breathing rate

16. Which one of the following is not common to both exidative phosphorylatia and cyclic photophosphorelation?
A. generation of ATP
B. carrier system involve cytochrom
C. electron donor is not the ultimate electron acceptor
D. electron donor is the ultimate election acceptor

17. C4 pants have a higher rate of photosynthesis in dense tropical vegetation because
    A. PEP carboxylase has low optimum temperature
    B. PEP carboxylase has a higher affinity for carbon dioxide
    C. PEP carboxylase and RUBP carboxylase have high affinity for carbondioxide
    D. PEP carboxylase and RUBP have low optimum temperature

18. Stomach prevents autolysis of gut walls by
    A. secreting mucus during absorption of digested food
    B. secreting hydrochloric acid to activate enzymes
    C. separate acid secreting cells from enzymes secretary cells
    D. secreting mucus before arrival of food

19. The prime function of red blood cells in man is to easily
    A. release oxygen
    B. release carbon dioxide
    C. transport carbon dioxide to respiratory organ from the tissues
    D. transport oxygen to the tissues from respiratory organ

20. The following increases efficiency of a red blood cell to carry respiratory gases except
    A. high concentration of haemoglobin
    B. very thin cell membrane
    C. lack of a nucleus
    D. being numerous

21. The function of sino a trial node is to
    A. initiate heart contraction
    B. regulates heart contraction
    C. set rate of heart contraction
    D. regulate rate of heart contraction

22. Blood pressure in vein is increased by
    A. relative muscle contraction
    B. possession of values
    C. large lumen
    D. inspiration cavity

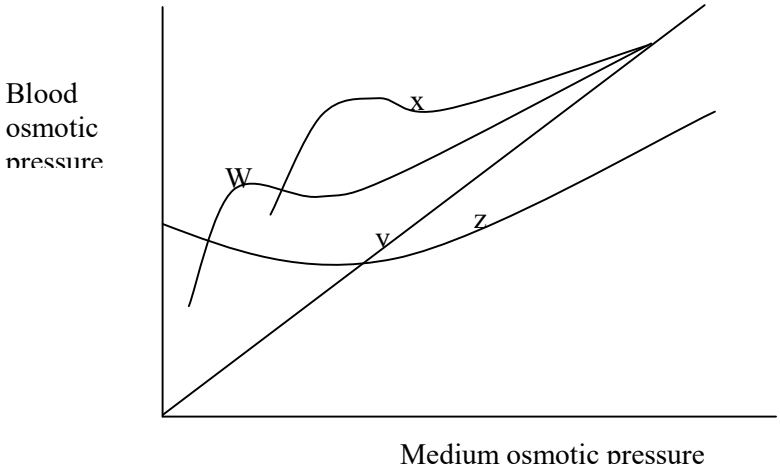
23. Which one of the following directly causes closure of stomata in plants?
    A. high carbon dioxide concentration
    B. high evaporation of water
    C. low contraction of carbon dioxide
    D. cutting of light supply

24. Which one of the following does not reduce exudation of water from cut stem surface of a potted plant?
    A. treating its roots with respiratory poison
    B. depriving its roots of oxygen
    C. lowering the temperature of the roots
    D. increasing the temperature of its roots

25. Secretion of glucagon hormone by cells of islets of Langerhans is decreased by
    A. increased permeability of body cells to glucose
    B. increased respiratory rate of body cells
    C. decreased permeability of body cells to glucose
    D. decreased conversion of glycogen to glucose

26. Production of urine decreases in man with mainly
    A. decreasing hydrostatic pressure of blood
    B. increasing hydrostatic pressure of blood
    C. decreasing osmotic pressure of blood
    D. increasing osmotic potential of blood

27. The graphs below represent blood osmotic pressure (op) of four marine animals placed in medium of different osmotic pressure



The animal that can successfully migrate to rivers is represented by

A. W B. x
C. y D. z

28. Subjection of a mammal to constantly high temperatures leads to
A. increased lower critical point
B. increased upper critical point
C. wide efficiency range
D. decrease in upper critical part

29. Which one of the following reduces speed of nerve transmission in nervous system?
A. numerous synapses
B. myelination of exon
C. large exon
D. few synapses

30. House fly can perceive flashes of very high frequency because its ommatidia have
A. retinal convergence
B. no retinal convergence
C. short recovery period
D. long recovery period

31. Which part of basilar membrane perceives sound of a low pitch?
A. base
B. middle
C. apex
D. whole membrane

32. The strength of muscle contraction is independent of
A. intensity of stimulation
B. frequency of stimulation
C. size of the muscle
D. duration of stimulation

33. Pitching of tilapia fish during swimming is mainly caused by loss of
A. pelvic fins
B. pectoral fins
C. caudal fin
D. anal fin

34. Which one of the following may lead to loss of depth in fish?
A. gas glands secrete oxygen into swim bladder
B. gas glands secrete oxygen out of swim bladder
C. permeability of swim bladder to oxygen increases
D. permeability of swim bladder to oxygen decreases

35. Which one of the following is a resultant negative feedback of increased secretion of luteinizing hormone?
A. increased progesterone reduces secretion of follicle stimulating hormones
B. increased oestrogen reduces secretion of luteinizing hormone
C. increased oestrogen increases secretion of luteinizing hormone
D. increased progesterone reduces secretion of luteinizing hormone

36. Variation in flowering plants is reduced by
A. stigma being above the stamen
B. a flower remains closed
C. a plant being dioecious
D. stamen mature before pistil

37. Larval stage in life cycle of an organism sufficiently reduce competition in a population by
A. having different mouth parts
B. being so motile
C. multiplying a sexually
D. being immobile

38. Interaction of two pairs of genes, **Pp** and **Rr** determines the shapes of the comb poultry. Allele **P** alone with **R** forms pea comb, **R** alone without P forms rose comb, presence of **P** and **R** forms walnut comb and absence of **P** and **R** form single comb. The percentage of walnut chicks produced when a single combed is crossed with heterozygote for both genes is
A. 50% B. 45%
C. 25% D. 100%

39. Which one of the following is not an advantage of imprinting?
A. increasing parental care to young ones
B. increasing intra specific courting
C. reducing response to harmless stimuli in young ones
D. reduces predation to young ones

40. Some saprophytes contain a mixture of haploid, diploid and triploid cells at some point. This condition only occurs in
A. mosses
B. ferns
C. conifers
D. flowering plants

SECTION B (60 MARKS)

41(a) What is crossing over? (2marks)

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(b)(i) Describe how crossing over causes genetic variation. (4marks)

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(ii) Explain how the significance of crossing over is different from that of a mutation in evolution. (3marks)

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(iii) State one condition that can limit crossing over of linked genes. (01mark)

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42a(i) What is a twitch? (2marks)

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(ii) Describe functional differences between a nerve cell and skeletal muscle.(04marks)

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(b) Explain how strength of skeletal muscle contraction varies with frequency and intensity of stimulation.

Frequency of stimulation (2marks)

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Intensity of stimulation (2marks)

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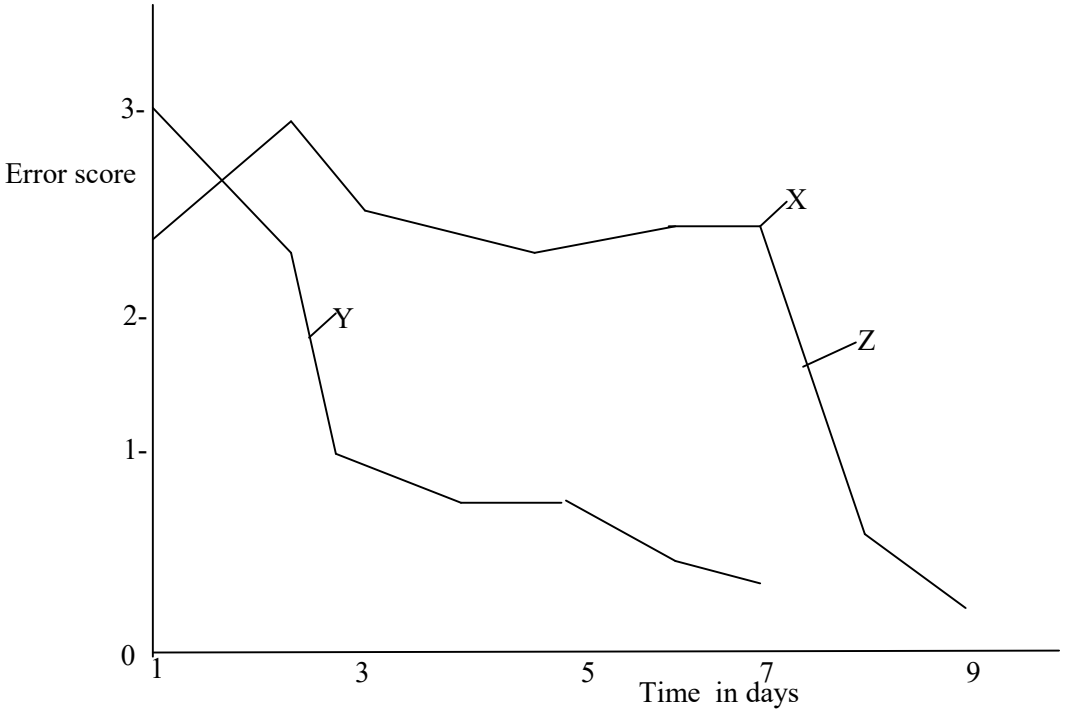
43. The graphs below represent the error score of each rate before it successfully runs to the end of the maze.

Rat **Z** was given food at the end of each run from the start of the experiment.

Rat **Y** was given food at point marked **x**.



(a)(i) Compare error score in rat **Y** with that of rat **Z**. (04marks)

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(ii) Explain the differences in error score given above. (03marks)

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(b) What conclusion can you make from the experiment above? (3marks)

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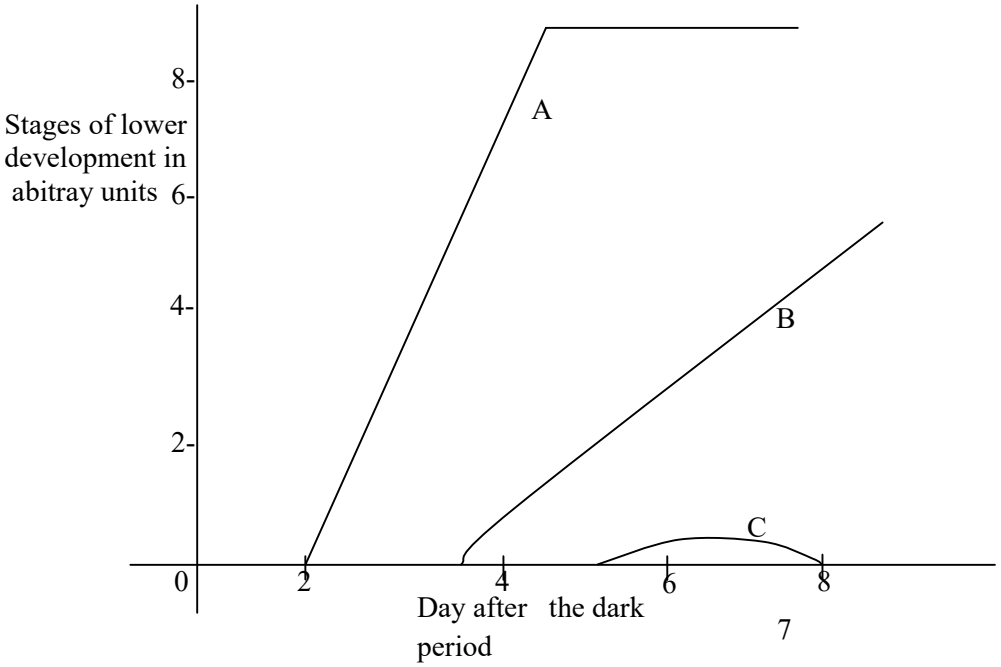
44. The graph below show how different periods of darkness affect flower development in three groups of plants of same species.
Group A was exposed to darkness for 16 hours, **B** for 10 hours and **C** for 9 hours.
Stages of flowed development ranges from 0(no growth) to 8 (full development)



(a)(i) Describe flower development in plant group **A**, **B** and **C**. (3marks)

Plant group **A**

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Plant group B

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Plant group C

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(ii) Explain the description of flower development for plant groups **A** and **B** above.

Plant group **A** (2marks)

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Plant group **B** (2marks)

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(b) With a reason from the graph, suggest

(i) The critical period of darkness for that plant species to flower. (01mark)

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(ii) Whether flowering would ever reach maximum in plant group **B**. (02marks)

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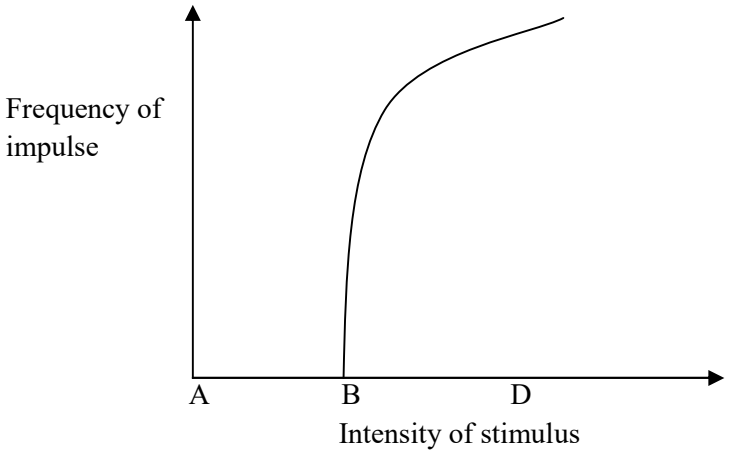
45. The graph below shows how frequency of impulse of a receptor varies with intensity of a stimulus.



(a) Explain the impulse frequency at stimulus intensity

(i) Below point **B** (2marks)

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(ii) Between **A** and **D**. (4marks)

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(b)(i) What is the significance of refractory period in conductance of impulse? (3marks)

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(ii) Explain why threshold of a receptor increases with its stimulation. (01mark)

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46(a) What is productivity in plants? (01mark)

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(b) Explain physiological means of surviving in

(i) Desert conditions with high productivity by cactus plants. (05marks)

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(ii) Tropical rain forest by under canopy plants. (04marks)

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END