Name:……Index No.:……

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P530/1

BIOLOGY

(Theory)

Paper 1

Jul/Aug 2019

2½ Hours

MUKONO EXAMINATION COUNCIL

Uganda Advanced Certificate of Education

BIOLOGY

(Theory)

Paper 1

2 Hours 30 Minutes

INSTRUCTIONS TO CANDIDATES

- *This paper consists of 40 questions in section **A** and **6** questions in section **B**.*
- *Answer **all** questions in both sections **A** and **B***
- *Section **A:** Answers to this section **must** be written in the boxes provided.*
- *Section **B:** Answers to this section should be written in the spaces provided and not anywhere else.*
- *No additional sheet(s) of paper should be inserted in this booklet.*

For Examiner's Use only		
SECTION	***MARKS***	***INITIALS***
Section A: 1-40		
Section B: 41		
42		
43		
44		
45		
TOTAL		

SECTION A (40 MARKS)

1. Which one of the following is NOT found in cartilage?

   A. Chondrin
   B. Chondroblast
   C. Collagen fibres
   D. Osteablast

2. The component of the water potential which is due to the presence of solute molecules is called

   A. Osmotic potential
   B. Osmotic pressure
   C. Turgor potential
   D. Turgor pressure

3. Figure 1 below shows a type of gland.

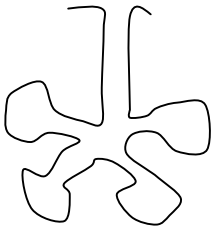

Fig. 1

The type of gland illustrated in figure 1 above is

   A. Simple branched tubular
   B. Simple branched saccular
   C. Compound tubular
   D. Compound saccular

4. Which one of the following is the general formula for a simple sugar?

   A. $(CH_2O)_n$
   B. $(C_2H_2O)_n$
   C. $(C_6H_{12}O)_n$
   D. $(C_6H_{12}O_6)_n$

5. Which one of the following pairs of enzymes are involved in the final steps in respiration?

   A. Transferases and Phosphokinases
   B. Dehydrogenases and Oxidases
   C. Isomerases and transaminases
   D. Decarboxylases and dehydrases

6. Which one of the following processes leads to high RQs in mammals?

   A. Oxidation of Carbohydrate
   B. Oxidation of fat
   C. Oxidation of protein
   D. Conversion of carbohydrates to fat

7. In the body of animals, phosphates groups for making ATP from ADP are stored in a compound called

   A. Phosphocreatine
   B. Phosphoglyceric acid
   C. Phosphoglyceraldehyde
   D. Phosphoric acid

8. The most important advantage of internal gills over external gills is that
   A. They are in close proximity with water rich in oxygen
   B. They are highly vascularised
   C. They possess very thin epithelia
   D. They are enclosed in cavities within the body hence protected.

9. The volume of air breathed in and out normally at rest during a respiratory cycle is called
   A. Tidal volume
   B. Vital capacity
   C. Residual volume
   D. Inspiratory reserve volume

10. Which one of the following constrictions of the gut mix up food?
   A. Localized constriction and peristaltic wave
   B. Pendular constrictions and Peristattic wave
   C. Pendular and localized constrictions
   D. Pendular and circular constrictions.

11. Which one of the following hormones causes secretion of non-enzymatic components of pancreatic juice?
   A. Enterogastrone
   B. Secretin
   C. Chlolecystokinin
   D. Gastrin

12. Which one of the following wave lengths of light is least absorbed by chlorophyll?
   A. Blue (450 -500nm)
   B. Orange (600 – 650nm)
   C. Green (500 -550nm)
   D. Red (650 – 700nm)

13. In non-cyclic photophosphorylation, stability of the Chlorophyll molecule is provided by
   A. Hydrogen ion
   B. Hydroxyl ion
   C. Oxygen molecule
   D. Photosystem II

14. Which one of the following Phytohormones is released by a plant under water stress?
   A. Abscisic acid
   B. Giberellin
   C. Ethene
   D. Cytokinin

15. A special property of cones in the retina which confers the eye the ability to resolve two or more stimuli separated spatially is that
   A. Numerous cones make synaptic contact with a single bipolar neurone.
   B. Each cone has its own bipolar neurone which connects with a single optic nerve fibre.
   C. They are concentrated in a small area called the fovea.

D. They show reciprocal inhibition which increases between immediately adjacent cones.

16. In insects, blood is propelled forward through the heart by

A. Contraction of alary muscles which leads to the expansion of the heart.
B. Opening of the valves that allow blood to enter the heart but not leave it.
C. Waves of contraction which commence at the rear and proceed towards anterior end.
D. Waves of contraction which commence at the anterior end and proceed towards the rear.

17. Which one of the following best explains a decrease in phosphorus levels in germinating seeds?

A. Phosphorus is needed for chlorophyll synthesis
B. Phosphorus is incorporated in embryo structure
C. Phosphorus forms plant hormones
D. Phosphorus is used to supply energy.

18. A heterozygous maize plant has a recessive defect which renders it incapable of producing viable seeds, was self – pollinated and gave size to 1200 seedlings. How many of the seedlings were heterozygous?

A. 600 B. 400 C. 800 D. 300

19. In the garden pea, which one of the following characteristics shows continuous variation?

A. Length of stem
B. Weight of pod
C. Position of flowers
D. Shape of ripe pod

20.

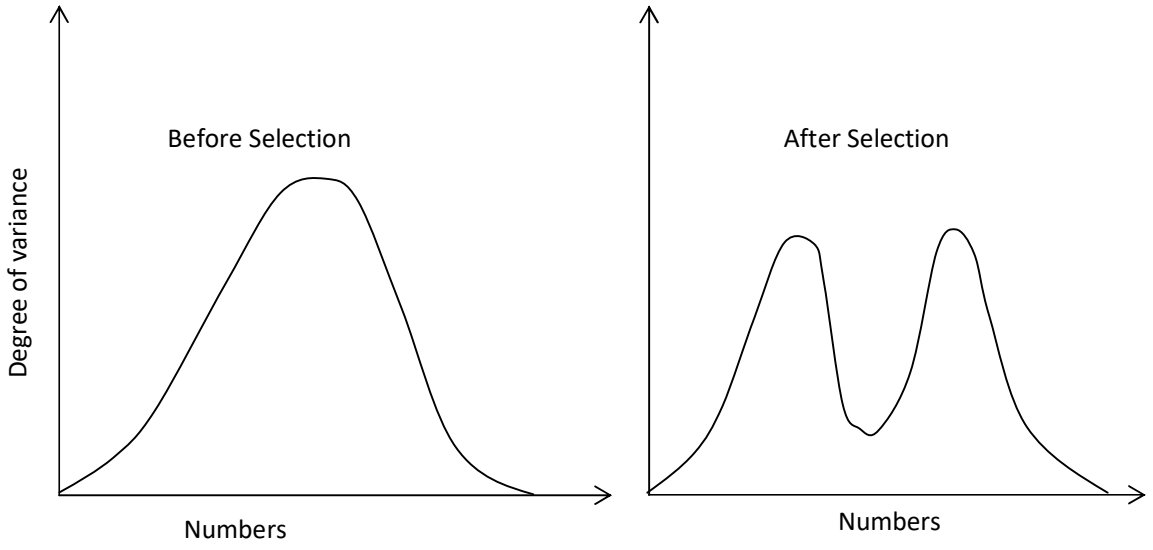

Figure 2 depicts a mode of selection operating on continuous phenotypic variation. Which one of the following situations does it illustrate?

A. Human – birth weight and the percentage mortality at different weights
B. Populations adapting to contrasting habitats
C. Response of peppered moth populations to polluted environments.
D. Predatory – prey relations.

21. Which one of the following chemical compounds is usually deposited in the outer walls of most epidermal cells of a leaf?
A. Suberin B. Cutin C. Lignin D. Mucin

22. Which one of the following cells is a result of the first meiotic division during spermatogenesis?
A. Primary spermatocytes
B. Spermatogonia
C. Spermatids
D. Secondary spermatocytes

23. The arising of new species due to geographical isolation is caused by the following mechanisms except.
A. When a new adaptation arises in a few members of an inbreeding population.
B. In larger populations if mating between individuals.
C. In small populations.
D. In organisms with very limited mobility.

24. Which one of the following is NOT related to temperature control?
A. Variation in ear size in hares
B. Regulation of metabolic rate
C. Reduction of water loss in desert plants.
D. Exhibiting nocturnal behaviour

25. In aquatic communities all free – swimming organisms are described as
A. Nekton B. Benthos C. Neuston D. Plankton

26. Which one of the following does NOT belong to the same phylum as others?
A. Squid
B. Snail
C. Water flea
D. Octopus

27. In secondary growth in woody plants, the first step is the formation of
A. Secondary Medullary rays
B. Cambium ring
C. Secondary vein
D. Secondary Phloem

28. Which one of the following veins is functionally similar to most arteries?

A. Venacava
B. Subclavian Vein
C. Pulmonary Vein
D. Renal Vein

29. A type of learning behaviour pattern characterized by a reward after accidental encounters is called

A. Operant conditioning
B. Pavlonian conditioning
C. Imprinting
D. Habituation

30. Osmoreceptores responsible for the detection of solute potential in the body are located in

A. Cerebrum
B. Cerebellum
C. Medulla oblongata
D. Hypothalamus

31. Which one of the following is NOT a density – dependent factor in natural populations?

A. Predation
B. Food shortage
C. Disease
D. Floods

32. A species is called endemic when

A. It has no representatives in other localities
B. It has been introduced into a new habitat
C. It is considered rare
D. It is on the verge of extinction.

33. Which one of the following does NOT happen when a sarcomere contracts?

A. H band becomes longer
B. H band becomes shorter
C. I band becomes shorter
D. A band remains the same length.

34. Which one of the following ecosystems shows the highest gross productivity?

A. An ocean
B. A forest
C. A grassland
D. An estuary

35. Which of the following parts of fins provides the lifting force in a dog fish?

A. Pectoral and anal fins
B. Pelvic and dorsal fins
C. Pectoral and pelvic fins
D. Dorsal and anal fins

36. Which one of the following is NOT true about linked genes?

A. They do not show independent assortment
B. They are inherited together
C. They affect the same phenotypic expressions.

D. They affect different phenotypic expressions.

37. The arrangement of bivalents on the equator of the cell during cell division is characteristic of

A. Metaphase I
B. Metaphase II
C. Anaphase I
D. Anaphase II

38. Which one of the following respiratory pigments contains copper?

A. Haemoglobin
B. Haemerythrin
C. Haemocyanin
D.Chlorocruorin

39. In which of the following plants will flowering be interrupted if a dark period is introduced into the light period?

A. Short day plants
B. Long day plants
C. Day neutral plants
D. Plants requiring both short and long days.

40. The infective form of malarial parasite in man is

A. Merozoite
B. Sporozoite
C. schizent
D. Trophozoite

SECTION B (60 MARKS)

41. The graph in figure3 below shows the effect of oxygen concentration on the rates of respiration and bromide ion uptake in carrot root discs placed in a culture solution.

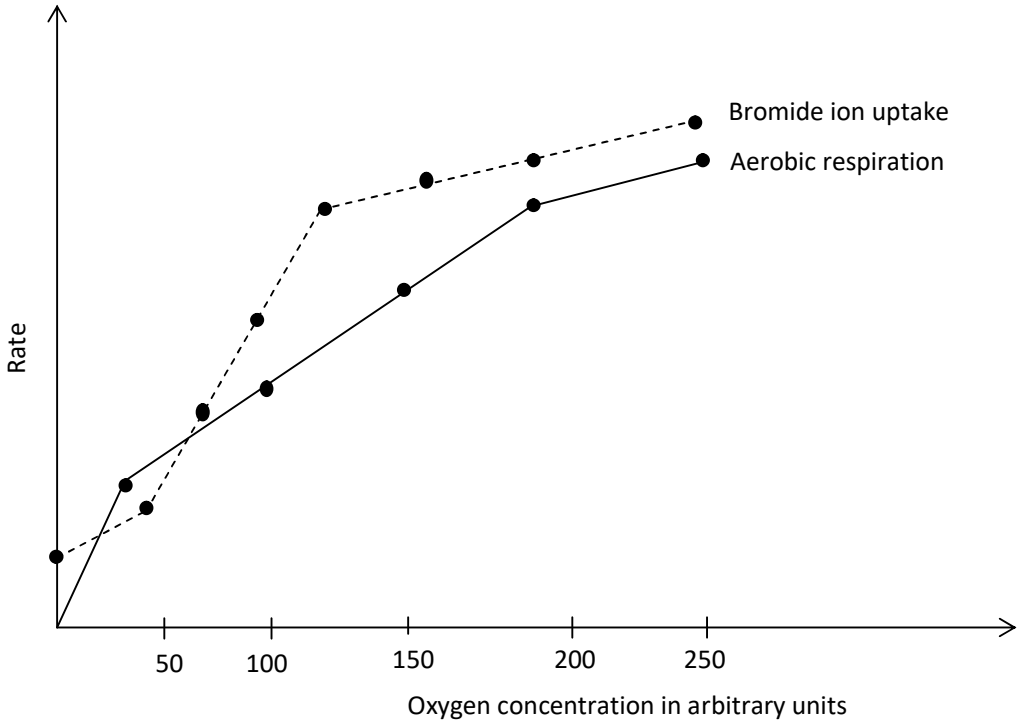

Fig. 3

a. From the data above, explain ways in which

i) In the absence of oxygen ***(02 marks)***

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_____

_____

ii) At higher concentrations of Oxygen ***(03 marks)***

_____

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b. (i) On the same graph, Sketch a curve to show the rate of bromide ion uptake in presence of cyanide. ***(01 mark)***

ii) Give a reason for answer in b(i) above ***(02 marks)***

_____

_____

c. A plant cell, after being immersed in pure water for several hours had a solute potential of ⁻800KPa. With reason, state the water potential of the cell ***(02 marks)***

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42. (a) Outline the roles of the following hormones in digestion of food in mammalian alimentary canal.

(i) Cholecystokinin ***(02 marks)***

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(ii) Secretin ***(01 mark)***

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b.(i) Explain the role of bile in fat digestion ***(03 marks)***

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(ii) Describe how the products of fat digestion are modified in order to reach the blood stream in mammals. ***(03 marks)***_____

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43. a)(i) What is meant by positive feedback? ***(02 marks)***

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(ii) State 2 characteristics of an inefficient homeostatic system ***(02 marks)***

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b) Describe the role of the liver in the metabolism of proteins and amino acids.

(04 marks)

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c) Explain the ecological advantage of possessing two homeostatic mechanisms to an animal. ***(02 marks)***

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44. The graph in figure 4 below shows changes in amylase activity of germinating barley grains for the first 12 days.

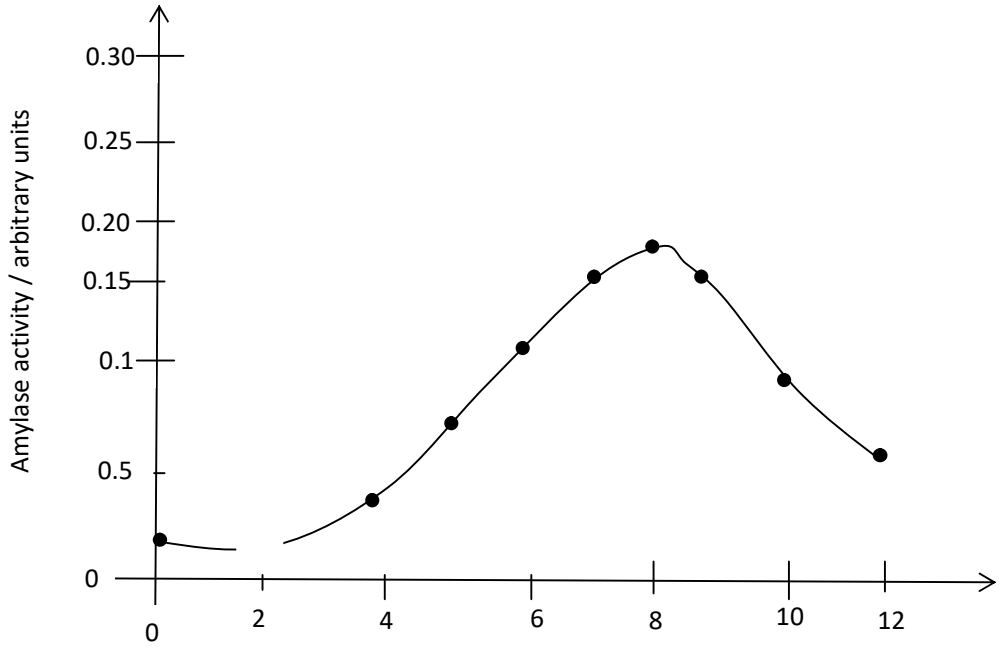

Fig. 4

a. (i) Explain the changes in amylase activity from day 0 to day 8 ***(05 marks)***

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(ii) Suggest the cause for the change in amylase activity between day 8 and day 12 ***(02 marks)***

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b. Outline the three phases of growth in a flowering plant. ***(03 marks)***

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45. (a) Define the term symbiosis ***(01 mark)***

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(b) State three physiological adaptations of endoparasites ***(03 marks)***

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(c) Giving an example in each case describes other types of symbiotic associations apart from parasitism. ***(03 marks)***

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(d) Outline three major effects of loss of Biodiversity in a given area. ***(03 marks)***

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46. The genetic code contains punctuation codons to mark the start and end of synthesis of polypeptide chains on ribosome.

(a) State the codes for the:

(i) Start codon ***(01 mark)***

_____

(ii) Stop codons ***(02 marks)***

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(b) (i) Give the meaning of the term genetic code ***(01 mark)***

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(ii) Outline any four basic features of a genetic code ***(04 marks)***

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(c) Explain why the genetic code for an amino acid is a 3 base coderather than a 2 base code. ***(03 marks)***

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End -