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P530/1

Biology

Paper 1

July/August 2022

2½ hours

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**Community**

UNNASE MOCK EXAMINATIONS 2O22

*Uganda Advanced Certificate of Education*

BIOLOGY

PAPER 1

2HOURS 30 MINUTES

**INSTRUCTIONS TO CANDIDATES**

* *Answer all questions in both sections* ***A*** *and* ***B****.*
* *Answers to this section must be written in the boxes provided.*
* *Answers to section B should be written in the spaces provided and not anywhere else.*
* *No additional sheets of paper should be inserted in this booklet****.***

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| ***For Official use only*** | | |
| **Section** | **Marks** | **Examiner’s Signature** |
| **Section A: 1 - 40** |  |  |
| **Section B: 41** |  |  |
| **42** |  |  |
| **43** |  |  |
| **44** |  |  |
| **45** |  |  |
| **46** |  |  |
| **TOTAL** |  |  |

***Turn over***

**SECTION A (40 MARKS)**

1. Which one of the following is not a unique characteristic of insects?

A. three thoracic segments B. a pair of antennae

C. three main body segments D. three pairs of limbs

2. Plant viruses always have

A. DNA and RNA B. DNA

C. RNA D. no protein coat

3. The most abundant carbohydrate molecule on earth is

A. - glucose B. sucrose

C. β glucose D. starch

4. Cholesterol in a cell membrane increases its

A. impermeability B. permeability

C. rigidity D. flexibility

5. Low supply of oxygen always lowers the cell rate of

A. food vesicle formation

B. water uptake

C. facilitated up take of glucose molecules

D. simple uptake of ions.

6. In life cycle of peteridophytes, the gametophyle which develops from a spore produces haploid male gametes by

A. meiosis B. mitosis

C. oogenesis D. spermatogenesis

7. Which one of the following hormones directly increases heart beat?

A. thyroxine B. adrenaline

C. antidiuretic D. endothelin

8. The major advantage of C4 plants in photosynthesis is to

A. fix carbondioxide in the Calvin cycle

B. fix carbondioxide from the atmosphere into leaves

C. store carbondioxide in form of organic acids

D. concentrate carbondioxide in the cell of leaves

9. Which one of the following maintains blood pressure in diving mammals?

A. constriction of muscles B. increased heart rate

C. constriction of arteries D. increased red blood cells

10. An impulse crosses a synapse in

A. electric form B. electric-chemical form

C. chemical- electric form D. chemical form

11. In stretched arm calcium ions in biceps muscles are trapped by

A. sarcoplasmic reticulum B. Sarcoplasm

C. troponin D. tropomyosin

12. Which of the following increases the rate of photophorylation of hexose sugar during the normal respiration process?

A. an increase in concentration of hexose sugar

B. a decrease in concentration of phosphorylated sugar

C. an increase in ATP concentration

D. an increase in ADP concentration

13. Which of the following factors would contribute least to the development of new species?

A. Genetic mutation B. Geographical isolation

C. environmental unstability D. environmental stability

14. Flowers of dicotyledonous plant usually

A. lack sepals

B. possess superior ovaries

C. bear floral parts in groups of 3s.

D. bear floral parts in groups of 4s and 5s.

15. A flower must have

A. sepals and petals B. stamen and sepals

C. stamen D. petals and pistil

16. Which one of the following constitutes the most energy transferred?

A. praying mantis feeding on flies

B. aphids feeding on plant sap

C. cat feeding on small mammals

D. beetle larvae feeding on dung

17. Which one of the curves in figure below represents plants adapted for high light intensity?

**A**

**B**

**C**

**D**

Rate of photosynthesis

Rate of photosynthesis

18. During locomotion, bones of a tetrapod are subjected to the following forces except

A. shearing B. compression

C. tension D. expansion

19. Heat loss is most efficiently reduced in body extremities of endotherms by having

A. veins and arteries parallel and close to each other

B. thick fur

C. thick subcutaneous layer

D. few sweat gland

20. Which one of the following is likely to bring about evolution of new genes in a species?

A. crossing over B. migration

C. mutation D. genetic drift

21. Which one of the following forms of environmental hazards is attributed to application of CFCs?

A. green house effect B. acid rain

C. ozone layer depletion D. eutrophication

22. Which part of the vestibular apparatus responds to the vertical movement of the head?

A. vestibular canal B. ampulla

C. utricle D. semi-cirular canal

23. Which one of the following ecological pyramid may be used to determine productivity in an ecosystem?

A. pyramid of energy B. pyramid of biomass

C. pyramid of number D. pyramid of productivity

24. The following are trisomic conditions except?

A. Klinefelter’s syndrome B. Turner’s syndrome

C. Down’s syndrome D. XXX female

25. Which of the following refers to groups of individuals of atleast two species living together?

A. population B. habitat

C. ecosystem D. community

26. A biological advantage of a monoecious condition is that

A. many offspring results from each fertilization

B. every individual is capable of reproducing offspring

C. self fertilization is encouraged

D. male and female gametes mature at the same time

27. Which one of the following may occur to a community of organisms as a result of natural selection?

A. increase in the number of species

B. adapting to the environment by all the organisms

C. extinction of species

D. reduction in the level of mutation

28. When a lipid is combined with a phosphate group, it becomes

A. saturated B. a complex molecule

C. water soluble D. amphoteric

29. The following are adaptations for survival among animals during periods of water shortage

(i) tolerance to water loss

(ii) biochemical production of water

(iii) reduction in water loss

(iv) evasion of hot environment

Which one of the following is a correct set used by the camel?

A. (i) and (ii) only B. (i), (ii) and (iii)

C. (i), (ii) and (iv) D. (iii) and (iv) only

30. When same response is given to same stimulus on different occasions, the behavior is said to be

A. instinctive B. conditioned

C. imprinted D. stereotyped

31. Which one of the following representations of genotypes is homo gametic?

A. TtHh B. ttHh

C. TTHh D. tthh

32. Which one of the following characteristics of a parasite is not a means of ensuring continuity of the species of the parasite?

A. degeneration of redundant body structures

B. means of penetrating another organism

C. protection against host enzyme

D. means of dispersing offsprings

33. Which one of the following processes does not involve osmosis?

A. movement of water into guard cells

B. movement of water through the xylem

C. entry of water into the vacuole

D. passage of water across the endodermis

34. The biomass of consumers is always less than that of producers because

A. producers have to support consumers

B. consumers have a low productive rate

C. energy is lost through body processes of consumers

D. consumers are small in size

35. Analysis of a sample of DNA showed that 35% of the bases are adenine. The percentage of cytosine bases in the sample was

A. 35 B. 70

C. 30 D. 15

36. A cell whose cell membrane is almost touching its cell wall has solute potential of

-573kp. Its water potential is

A. +573kpa B. -573kpa

C. zero D. the same as pressure potential

37. Which one of the following conditions reduces affinity of haemoglobin for oxygen?

A. high oxygen concentration B. high carbondioxide concentration

C. low carbondioxide concentration D. low body temperature

38. A good pesticide is one which

A. kills a wide range of organism

B. persists for a long time after its application

C. kills pests at different trophic levels

D. easily transforms to non-toxic form

39. Which one of the following is not used to describe a population of organism?

A. density B. biodiversity

C. size D. distribution

40. The figure below represents the structure of

CH2OH

C O H

H

C

H

C OH H OH

OH C C

H OH

A. β- glucose B. α - glucose

C. hexose sugar D. monosaccharide

**SECTION B (60MRKS)**

41. The graph below represents the variation in hydrostatic pressure of blood and osmotic potential of plasma protein along the capillary network from point A to B.

Pressure changes in arbitrary units

Osmotic potential of plasma protein.

Hydrostatic pressure of blood

Point B

Point A

Point C

**Distance along capillary network.**

(a) Explain the changes in pressure along capillary network.

Osmotic potential of plasma protein. (*3marks*)

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Hydrostatic pressure of blood *(3marks*)

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(b)(i) What point represents the arteriole end of the capillary network? (*1mark*)

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Give a reason for your answer. (*1mark*)

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(ii) With a reason state the type of substances that diffuse between tissues and blood capillary at the point given in b(i) above. (*2marks*)

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42. The graphs below drawn on different scales show how skin temperature (ST) and hypothalamic temperature (HT) of man exposed to environmental temperature controlled at 45oC man was given ice at point A.

**A**

**ST**

**HP**

Temperature (oC)

Rate of sweating in arbitrary units

Time of exposure in minutes

(a)(i) Explain the changes in skin temperature before point A. (*2marks)*

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(ii) On the graph above sketch a graph showing how sweating rate would vary with time of exposure. (*2marks*)

(iii) Explain your sketch in b(i) above. (*2marks*)

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(iv) Explain why skin temperature rises shortly after point A. (*3marks*)

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(c) With a reason suggest how rate of metabolism of that man would vary if he was not given ice. (*2marks*)

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43. The figure below represents a common compound found in animal and plant cells

H

H2N C COOH

H

a) With a reason give the name of the compound. (*2marks*)

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(b) Explain what would;

(i) happen to the above compound if it is added to water. (*3marks*)

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(ii) happen to PH of solution of the compound above if excess acidic solution is added.

(*2marks*)

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(c) Explain molecular functions of proteins in animal cells. (*4marks)*

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44(a) Differentiate between generator potential and action potential. (*2marks*)

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(b) Explain how the size of action potential varies with stimulus intensity. (*3marks*)

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(c)(i) Explain why it is impossible to transmit an impulse immediately after the other.

(*3marks*)

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(ii) What is the importance of inability for an axon to transmit an impulse immediately after the other? (*2marks*)

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45(a) What is immunity? (*1mark)*

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(b)(i) List three passive mechanisms of preventing infections in mammals. (*3marks*)

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(ii) Explain how vaccination prevents infection. (*3marks*)

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(c) Why is it important to give a Rhesus negative mother anti D-infection upon delivering a Rhesus positive baby? (*3marks*)

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46. In Drosophila, the genes for body colour and eye colour are linked. When pure breeds of grey body with normal eye colour and black body with purple eyes drosophila were crossed, all FIg. were grey body and normal eyed.

But when FIg. females were crossed with black body with purple eyes male drosophila, 250 grey and normal eyed, 234 black body and purple eyed, 15 black body and normal eyed and 16 prey body and purple eyed young ones were produced.

(a) With symbols show the crossings for the above crosses. (*8marks*)

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(b) How apart were the linked genes? Show your working. (*2marks*)

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