NAME: .....COMB.....

P530/1
Biology 1
2½ Hours
June 2023

Uganda Advanced Certificate of Education
Mock examination
S.6 Biology P530/1 (Theory)
Paper 1
Time: 2 Hours 30 Minutes

INSTRUCTIONS TO CANDIDATES:

- *Answer all questions in both sections A and B*
- *Answers to Section A questions must be written in the boxes provided*
- *Answers to Section B should be written in spaces provided.*
- *No additional sheets of paper should be inserted in this booklet.*

FOR EXAMINERS USE ONLY

Section	Marks
A (1 – 40)	
B 41	
42	
43	
44	
45	
46	
Total	

SECTION A (40 Marks)

Which of the following are not likely to be found in the structure of a virus at the same time?

A. Proteins and DNA
B. RNA and proteins
C. Lipids and proteins
D. RNA and DNA

2. The primary reason of stratification in epithelial tissue is to increase its function in:
A. Protection
B. Secretion
C. Absorption
D. Thickening of the basement

3. In animal cells, permeability of the plasma membrane to most biological molecules is reduced by:
A. Proteins
B. Glycolipids
C. Phospholipids
D. Cholesterol

4. Which one of the following does not involve a positive feedback mechanism?
A. Birth
B. Propagation of a nerve impulse
C. Blood clotting
D. Ovulation

5. Which one of the following does not take part in physical methods of body temperature regulation in mammals?
A. Sweat glands
B. Brown fat
C. White fat
D. Arterioles

6. During depolarization of the membrane of an axon,
A. Sodium ions diffuse out of the neuron
B. Potassium ions diffuse out of the neuron
C. Sodium ions diffuse into the neuron
D. Organic ions diffuse into the neuron

7. In short day plants, flowering can be
A. stimulated by Pfr
B. stimulated by Pr
C. suppressed by Pfr
D. suppressed by Pr

8. During germination of a broad bean, the plumule thrusts upward, leaving cotyledons below the ground. This is due to:

A. elongation of the hypocotyl
B. Elongation of epicotyl
C. Rupturing of the seed coat
D. Small cotyledons of the broad bean

The total number of chromosomes in a diploid plant species is 12. What would be the number of chromosomes in its endosperm after fertilisation?

A. 6
B. 18
C. 12
D. 24

). A forest was cut down and was replaced by a sugar cane plantation. Which one of the following is the most likely negative consequence of this practice?

A. Increase in carbon dioxide level in the atmosphere
B. Increase in soil erosion
C. Decrease in biodiversity
D. Loss of nutrients by leaching

11. A man with an allele for normal colour vision marries a woman whose father was colour-blind. What proportion of offspring produced by the couple will be normal boys?

A. 25%
B. 33%
C. 50%
D. 75%

12. In teleosts, gaseous exchange is very efficient because

A. Blood meets water with a higher concentration of oxygen
B. Blood and water flow in the same direction
C. Blood and water move at the same speed
D. Blood and water move at different speed

13. Which one of the following is not formed during anaerobic break down of glucose by yeast?

A. ATP C.
B. Carbon dioxide
C. Water
D. Ethanol

14. Which one of the following is done by marine bony fish during osmoregulation to survive in the sea?

A. Loose water by osmosis
B. Swallow water and absorb the salts
C. Swallow water and extrude salts
D. Gain water by osmosis and extrude salts

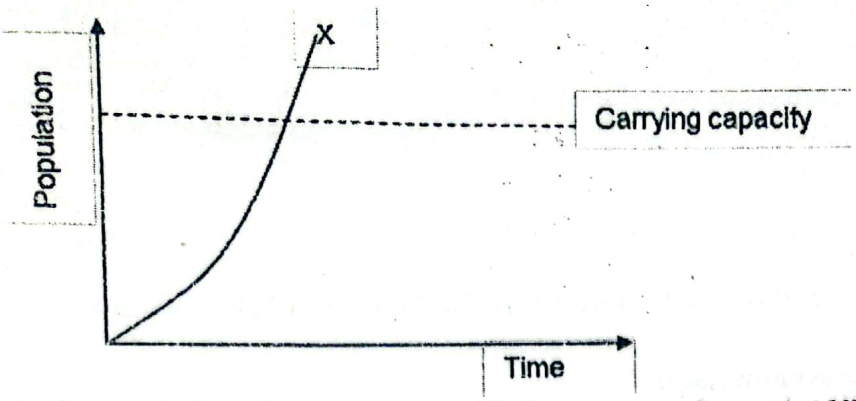
15. In which of the following does salutatory conduction occur?
A. Thin nerve fibres
B. Thick nerve fibres
C. Myelinated fibres
D. Non myelinated fibres

16. Hypothalamus secretions are conveyed to the posterior lobe of pituitary gland via one of the following.
A. Portal blood vessel
B. Capillary network
C. Nerve fibre
D. Pituitary stalk

17. Which one of the following is the best way of increasing chances of preserving species diversity?
A. Increasing the size of conservation area
B. Introducing new species in the conservation area
C. Reducing human interference in the conservation area.
D. Removing patches from the conservation area.

18. The pentadactyl limb of mammals modified to become adapted to different modes of life is an illustration of
A. Homologous structures
B. Analogous structures
C. Convergent evolution
D. Comparative anatomy

19. The figure below shows changes in population of animal species.



Which one of the following is most likely to occur after point X? The population

A. Increases exponentially
B. Drops to carrying capacity
C. Becomes constant
D. Decreases below carrying capacity

20. Which one of the following groups of plants does not contain phloem tissues?

A. Tracheophytes
B. Angiosperms
C. Bryophytes
D. Pteridophytes

21. Which one of the following processes in plants would be most affected if it takes up a metabolic poison?

A. Movement of water through the xylem
B. Evaporation of water from the leaf
C. Movement of water with in the leaf
D. Movement of food from leaves to roots

22. The chemical reaction that converts carbon dioxide to bicarbonate ions takes place in the:

A. Blood plasma
B. Alveolus
C. Red blood cells
D. Heamoglobin molecule

23. The common method of reproduction in organisms which have a large number of undifferentiated cells is:

A. Conjugation
B. Sporulation
C. Fragmentation
D. Fission

24. Miscarriage due to premature birth can be caused by insufficient levels of

A. Progesterone
B. Oxytocin
C. Oestrogen
D. Prolactin

25. Which one of the following statements is true only for the sympathetic nervous system?
A. Nerve endings produce noradrenalin
B. Preganglionic fibres are short
C. Nerve endings produce acetylcholine
D. Preganglionic fibres are long

26. Stomatal closure occurs in plant leaves when .....
A. Turgor in guard cells rises
B. PH in guard cells rises
C. Water potential in guard cells is more than surrounding cells
D. Starch in guard cells is converted to sugar

27. Which one of the following conditions is most likely to increase the risk of the fetus being harmed by the mother's immune system?

	Pregnancy	Blood type of mother	Blood type of fetus
A.	First	Rhesus negative	Rhesus positive
B.	Second	Rhesus positive	Rhesus negative
C.	First	Rhesus positive	Rhesus negative
D.	Second	Rhesus negative	Rhesus positive

28. Members of a plant species suddenly begin to flower earlier than the average and fail to attract pollinating insects leaving fewer of their offspring in the next generation. This is an example of,

A. Stabilizing selection
B. Disruptive selection
C. Directional selection
D. Polymorphism

29. Which one of the following is most likely to occur when a plant is allowed to photosynthesize under very low carbon dioxide levels?
A. glycerate-3-phosphate accumulates

B. Ribulose biphoshate acccumulates
C. Both ribulose biphosphate and glycerate-3-phosphate accumulate
D. Both ribulose bi-phosphate and glycerate-3-phosphate reduce

30. By which one of the following processes are hormones and enzymes released from glands which produce them?

A. Exocytosis
B. Osmosis
C. Endocytosis
D. Phagocytosis

31. Which one of the following characteristics is not suitable for use in classification of insects?
A. Number of segments
B. Number of hairs
C. Length of wings
D. Body colour

32. Worker bee and queen bee are polymorphic forms of bees in a bee colony. The difference in their fertility is due to:
A. Mutation
B. Fertilization
C. Environment
D. Meiosis

33. The purpose of intercalated discs in cardiac muscles into cells is to:
A. Separate individual muscle cells
B. Stop diffusion of ions from one cell to another
C. Facilitate rapid spread of action potential
D. Prevent the muscle from fatigue

34. The oxygen dissociation curve of the fetus lies to left of that of its mother because:
A. The fetus is less active
B. The fetus uses less oxygen
C. Fetal hemoglobin has higher affinity for oxygen
D. Mothers hemoglobin has higher affinity for oxygen

35. Which one of the following forms of non disjunction occurs in non sex chromosomes?
A. Klinefelters syndrome
B. Down's syndrome

C. Turners syndrome

D. Jacob's syndrome

36. Three counts of 103, 46, 20 of a plant species were made using quadrant of $25cm^2$.The density of plants per m^2 is.

A. 169
B. 2253
C. 56.3
D. 676

37. If 10% of bases in DNA are adenine. What is the ratio of adenine to guanine in the same molecule?

A. 1:1
B. 1:3
C. 1:2
D. 1:4

38. Which one of the following is not true during hormonal control of breathing?

A. Cerebral cortex allows voluntary control over breathing
B. Impulses move from the respiratory centre to stretch receptors via Vagus nerve
C. Stretch receptors in bronchioles and bronchi monitor the amount of inflation.
D. Impulses from aortic and carotid bodies stimulate increased inspiration rate

39. A non-competitive inhibitor affects the rate of enzyme action by

A. Binding to the active site
B. Altering the substrate
C. Altering the active site
D. Acting as coenzymes

40. The starch component that forms the blue-black colour with iodine solution is?

A. Amylose
B. Amylopectin
C. Amylase
D. Pectin

SECTION B (60MARKS)

41. The levels of ant diuretic hormone in the blood rise during strenuous exercise

(a) Explain;

(i) The cause of this increase *(03 marks)*

.....

.....

.....

.....

.....

(ii) The effect it has on kidney function *(04 marks)*

.....

.....

.....

.....

.....

(b) Suggest how mammals adapted to life in dry deserts benefit from a longer loop of Henle *(04 marks)*

.....

.....

.....

.....

.....

42. a)Describe the effect following on short day plants

i) Far red light (02mark)

.....

.....

.....

.....

.....

ii) Gibberellins (01mark)

.....

.....

.....

.....

.....

.....

b) Explain the role played by gibberellins in seed germination. (03marks)

.....

.....

.....

.....

.....

c) How can plant growth substances be used to improve agriculture. (04marks)

.....

.....

.....

.....

.....

.....

43. a) Give the meaning of the following terms

i) Epistasis

(01mark) .....

.....

.....

.....

ii) Dihybrid inheritance (01mark)

.....

.....

.....

(b) In oats, the grain is enclosed by a hull (remains of the flower). The colour of the hull is controlled by two pairs of alleles which interact. In a cross between two pure breeding varieti of oats, one with black hulled grains the other with white hulled grains, the offspring (F1) all l black hulled grains. Allowing F1 to self-fertilize gave F2 with the phenotypes below

Black hulled grain	418
Grey hulled grains	106
White hulled grains	36

i) What genetic ratio is suggested from the figures given (01marks)

.....

.....

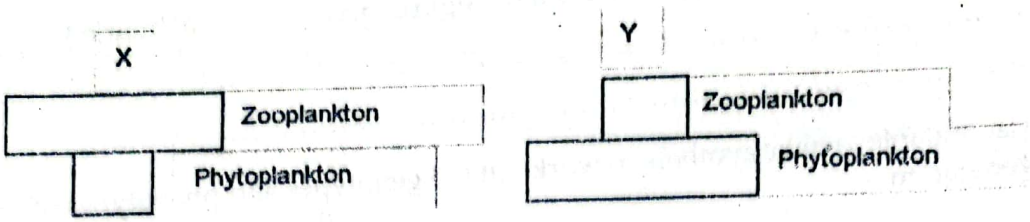
ii) Use suitable genetic symbols to work out the genotypes and phenotypes of each generation. (07marks)

44. a) State any two human activities which cause eutrophication. (2mark)

.....

.....

b) The figure below shows plankton biomass of a lake measured during onset of eutrophicalation and before. The results are represented in pyramid of biomass X and Y.



i) Identify which of the pyramid represents the lake:

During onset of eutrophication (½ mark)

.....

Before eutrophication (½ mark)

.....

ii) Suggest the explanation for the difference in the pyramids X and Y. (3 marks)

.....

.....

.....

.....

iii) Explain how the phytoplanktons in X are able to support the zooplanktons.

(2marks)

.....

.....

.....

.....

) State two ways of reducing water pollution. (2marks)

.....

.....

.....

5. a) Distinguish between genetic drift and genetic load. (2marks)

.....

.....

.....

.....

b) Explain how natural selection maintains recessive alleles in a population.

(04marks)

.....

.....

.....

.....

.....

.....

c) How does geographical isolation lead to changes in the gene pool? (04marks)

.....

.....

.....

.....

.....

.....

46. According to the fluid –mosaic model of cell membrane structure, the unit membrane is a dynamic structure compose of several components:

(a) Name the component of the membrane

(i) Which is fluid in consistency. (01 mark)

.....

.....

(ii) That forms a mosaic (01 mark)

.....

.....

(iii) The accounts for its specificity (01mark)

.....

.....

(b) State two major functions of the cell membrane to the cell.
(02 marks)

.....

.....

.....

.....

c) List three ways in which active transport is different from the process of diffusion across a cell membrane. (03 marks)

.....

.....

.....

.....

.....

.....

d) State two ways in which facilitated transported differ from active transport across a cell membrane. (02 marks)

.....

.....

.....

.....

END *