NAME:…… ……**INDEX NO**……

P530/1
BIOLOGY
Jul/Aug, 2023
Paper 1
2½ hours

MATIGO MOCK EXAMINATIONS BOARD

Uganda Advanced Certificate of Education

BIOLOGY
Paper 1

2 Hours 30 Minutes

INSTRUCTIONS TO CANDIDATES:

This paper consists of sections A and B answer

All questions in both sections.

***SECTION A**: Write answers to this section in the boxes provided.*

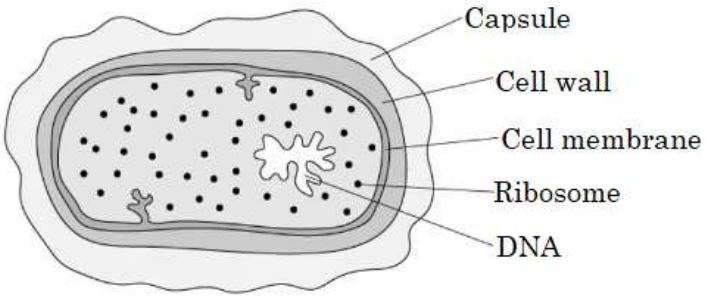
***SECTION B**: Answer to this section must be written in the spaces provided and not anywhere else. No additional sheets of paper should be inserted in this booklet.*

FOR EXAMINER' USE ONLY	
Section	***Marks***
A: 1-40	
B: 41	
42	
43	
44	
45	
46	
Total	

SECTION A (40 MARKS)

Write answers to the section in the box provided

1. The diagram shows a type of prokaryotic cell, a bacterium.



Which three structure are found in both an animal cell and this bacterium cell.

A. Cell membrane, cell wall and DNA
B. Cell membrane, DNA and ribosome
C. Capsule, DNA and ribosome
D. Capsule, Cell membrane, and cell wall.

2. Which of the following statements describes the function of a macrophage?

A. They circulate in the blood and produce antigens in response to infection
B. They are found in tissues and secrete cytokines in response to infection.
C. They can leave the blood and secrete cytotoxins when exposed to damaged cells.
D. They can leave the blood and accumulate at sites of inflammation

3. Which of the following is **NOT** true about both the blood circulatory system and tymphatic system in Mammal? The fluid in both systems contains.

A. Excretory products
B. Plasma proteins
C. Leucocytes
D. Dissolved food

4. In poultry, feather colour is controlled by two sets of alleles W (white) dominant over w(coloured) , and B(black) dominant over b(Brown). A fowl heterozygous for both alleles (WwBb) is white. This is an example of

A. Gene complementarity
B. Epistasis
C. Pleiotrophy
D. Incomplete dorminancy.

5. Predators in top trophic levels of a food chain are most severely affected by non-biodegradable pesticides because……

A. They have rapid reproductive rates
B. Their systems are highly sensitive to chemicals
C. They cannot store pesticides in their tissues
D. Such pesticides accumulate along the food chain

6. When the short apex of the growing plants is removed, lateral growth is encouraged because

A. Auxins are activated in buds
B. Growth of the lateral buds is stimulated by gibberellins
C. More abscisic acid is produced to promote lateral growth.
D. Cytokinins are activated in the absence of auxins from the apex

7. In a population that is in Hardy- Weinberg equilibrium 16% of the individuals show the recessive trait. What is the frequency of the dominant allele in the population?
A. 0.36 B. 0.4 C. 0.6 D. 0.84

8. Which one of the following is the best way of comparing the metabolic rate of mammals of different body sizes? By relating..
A. The oxygen consumed per unit body mass per unit time
B. The carbon dioxide released per unit body mass per unit time
C. The amount of food consumed per day
D. The percentage increase in body mass

9. Net primary productivity in C4 plants is higher than that in C3 plants because:
A. C4 plants have a higher turn-over rate
B. Photorespiration occurs in C3 plants
C. The rate of respiration is high in C3 plants
D. Energy accumulates at higher rate in C4 plants

10. How many times must a molecule of oxygen diffuse across a cell surface membrane in passing from alveolar air space to haemoglobin?
A. 2 B. 3 C. 5 D. 7

11. The unwinding of DNA double helix during transcription process requires the enzymes called
A. DNA Ligase B. DNA polymerase
C. RNA Polymerase D. Helicase

12. Compared to open grassland, the environment of a forest floor under a thick canopy
A. Experiences wider temperature fluctuation
B. Receives far red light
C. Develops denser plant growth
D. Experience heavier leaching of nutrient

13. One of the roles of the glycoprotein and glycolipids on the surface of the cell membrane is to
A. Increase the absorbing surface area
B. Provide receptor site for recognition of stimuli
C. Provides sites for various reaction pathways
D. Separates the contents of the cell from the surrounding environment

14. Which of the following plant growth hormones show Synergistic interaction?
A. Gibberellins and auxins B. Cytokinin and abscisic acid
C. Ethylene and abscisic acid D. Cytokinin and ethylene

15. An almost universal cost of " group living" in animals is
A. Increased risks of predation
B. Reduced access to mates
C. Interference with foraging
D. Higher exposure to diseases and parasites

16. Which one of the following is least likely to occur when organisms of related species compete for the same limited resource?

A. Range restriction B. Resource portioning

C. Extinction D. Migration

17. A shark fish and a porpoise mammal are both adapted to swimming. This is an example of

A. Adaptive radiation B. Convergent evolution

C. Divergent evolution D. Speciation

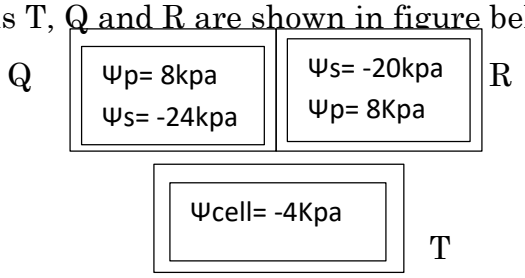
18. Which one of the following is **not** compatible with Darwin's theory?

A. All organisms have a risen by descent with modification
B. Evolution has diversified and altered the ancestral species
C. Natural selection eliminates unsuccessful variations
D. Evolution occurs in individuals rather in groups

19. In what aspect are the photosynthesis adaptations of C4 plants and CAM plants similar

A. In both the stomata close during day
B. In both, an enzyme other than RUBISCO carries out the first step in Carbon fixation
C. Both types of plants make most of their sugar in the dark
D. Neither C4 nor CAM plants have grana in their chloroplast

20. The water potential (Ψcell), pressure potential (Ψp) and solute potential (Ψs) of three adjacent cells T, Q and R are shown in figure below.



The cells that experience the least and highest influx of water respectively are?

A. R and Q B. T and R

C. T and Q D. Q and T

21. The following events occur in a seedling during germination

(i) Rapid cell division and cell enlargement
(ii) Production of hydrolytic enzymes
(iii) Secretion of gibberellic acid
(iv) Reduction in dry mass of the endosperm
The correct sequence of occurrence is

A. (i), (ii), (iii),(iv) B. (iii), (ii),(iv),(i)

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

22. The process of ripening in Unripe fruits is enhanced when they are enclosed with ripe ones because

A. IAA is produced by the ripe fruits to initiate ripening to others
B. Ripe fruits produce ethane, which facilitates ripening of the others.
C. Ripening fruits increase the temperature, which enhances ripening
D. The unripe fruits absorb moisture from ripe fruits which speed up ripening

23. Which one of the following processes would continue to take place in a living plant cell whose Golgi apparatus has been destroyed?
A. Formation of polypeptides
B. Autolysis of reluctant organelles
C. Formation of primary cell wall
D. Production of extra cellular enzymes

24. Which one of the following would decrease the cardiac rate in mammal?
A. Increase in the carbon dioxide content in blood
B. Increase in partial pressure of oxygen in blood
C. Accumulation of lactic acid in the issue
D. Secretion of adrenaline into the blood

25. The transport of photosynthesis products in a plant from the photosynthetic cell to adjacent transfer cells occurs by
A. Active transport
B. Osmotic movement
C. Mass flow
D. Cytoplasmic streaming

26. After an action potential, depolarization of the Membrane begins by:
A. Entry of sodium ions into the cell
B. Sodium diffusing out of the cell
C. Entry of potassium ions into the cell
D. Potassium ions diffusing out the cell

27. The internal solute concentration of a plant cells is about 0.8M. To demonstrate plasmolysis it would be necessary to suspend the cells in external solution with solute concentration of
A. 0.0 M B. O.4M C. O.8M D.1.0M

28. Which one of the following processes in the body does **NOT** involve acascade of reactions?
A. Blood clotting
B. Conversion of glycogen to glucose by Adrenaline
C. Regulation of blood sugar of cortisol hormone
D. Conduction of an impulse along the nerve fiber

29. In HIV virus, the role of enzyme ' reverse transcriptase is to:
A. Make DNA from RNA
B. Unite Viral DNA with host's DNA
C. Release viral RNA to make proteins
D. Transfer DNA from the host into the Virus

30. Plant species **M** has a diploid number of 12. Plant species **N** has a diploid number of 16. A new species **P** arises as an allopolyploidy of hybridization of **M** and **N**. The diploid number of **P** would be

A. 12 B. 16 C.28 D.56

31. Which of the following parts of a muscle fibre remains same length in both a contracted and relaxed muscle?

A. Sarcomeres C. The H. Zones

B. Light bands D. Dark bands

32. In which one of the following processes does calcium play a metabolic role?

A. Muscle contraction B. Blood clotting

C. Endochondral ossification D. Teeth and bone formation.

33. The ability of a police dog to trace accurately the route taken by a suspect is an example of:

A. Habituation B. Latent learning

C. Imprinting D. Insight learning

34. In ferns, gametes are produced by the

A. Gametophytes through mitosis
B. Sporophytes through meiosis
C. Sporophytes through Mitosis
D. Gametophytes through Meiosis

35. The most efficient method of determining the commonest plant species in a large habitat can be by……..

A. Using the quadrant B. Using line tansect

C. Aerial photography D. Direct counting

36. Which of the following sets of hormones is produced from the pituitary gland?

A. ACTH, TSH, FSH and LH
B. ADH, FSH, TSH and LH
C. ADH, GH, TSH and FSH
D. ACTH, GH, Oxytocin and thyroxine

37. The guts of carnivores are relatively shorter than those of other mammals of the same size because.

A. Their diet is mainly rich in proteins
B. Protein digestion begins and ends in the stomach
C. Their protein diet is easier to digest
D. They have to maintain a lower gut content for swift hunting practices

38. Which one of the following is NOT true of a recessive sex-linked character in humans?

A. It occurs more commonly in males than in females
B. It occurs in females only if it also occurred in her paternal parent
C. It rarely appear in both the father and the son, except when the maternal parent is heterozygous
D. It is found more frequently in the females than in males

39. Which one of the following does **NOT** occur during the opening of the stomata?

A. Conversation of sugar into starch
B. Conversion of starch into malic acid
C. Water enters by osmosis into the guard cells
D. K^+ ions diffuse into the guard cells from the adjacent cells.

40. A plant cells is magnified X2000 and the length of one chloroplast is 16mm. What is the actual length of the chloroplast in Micrometers

A. 0.16 B. 8.0 C. 1600 D. 3200

SECTION B (60 MARKS)

Write answers to the spaces provided

41. (a) (i). Outline any two characteristics of the plasma membrane. (2 marks)

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(ii) Describer three unique features of cells where active transport occurs. (3 marks)

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(b) Explain how endocytosis occurs across the plasma membrane. (5 marks)

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42.(a) (i). Explain what is meant by hair pin counter current multiplier effect.(3 marks)

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(ii) Explain how the structure of the loop of henle is suited for water retention. (5 marks)

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(b) What is the importance osmoregulation in animals? (2 marks)

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43.(a) Define a food chain (1 mark)

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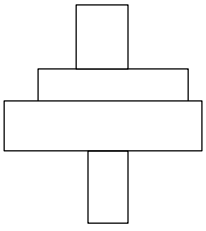
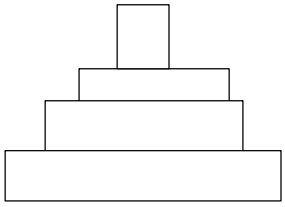
A study of a deciduous woodland food chain produced the following ecological pyramids

Pyramid of numbers

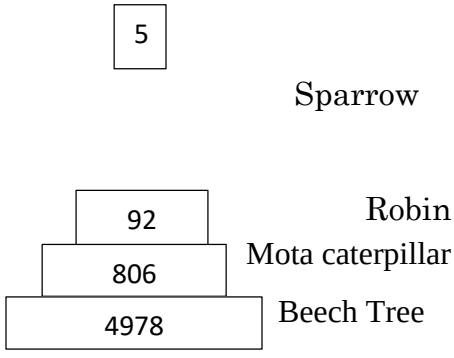
hawk



pyramid of biomass



Pyramid of energy



(b) (i)Which organisms are primary consumers? (1mark)

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(ii) Calculate the percentage efficiency with which energy is transferred from moth caterpillars to robins show you working. (1 mark)

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(iii) Suggest suitable units for the figures shown in the pyramid of energy. (1 mark)

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(c) In the pyramid of numbers, the block representing beech tree is smaller than that of caterpillars. In other pyramids it is larger. Explain this difference. (4 marks)

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(d) State two ways in which energy is lost between the rob in and the sparrow hawk. (2 marks)

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44.(a).What is meant by organic evolution? (2 marks)

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(b). Explain how each of the following maybe used to support the theory of evolution.

(i). Human beings possess an appendix which seems to have no function. (3 marks)

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(ii) Marine sharks retain urea in their blood, thus maintaining their osmotic pressure close to that of the surrounding sea water. Fresh water sharks show the same phenomenon. (3 marks)

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(iii) Viral DNA has the same basic structure as Human DNA. (2 marks)

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45.(a).What is mass flow in relation to transport in plants. (1 mark)

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(b) State three conditions under which mass flow can occur (3 marks)

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(c) Explain two differences between mass flow and cytoplasm streaming. (02 marks)

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(ii) Describe the loading of organic solutes into the phloem tissues in the leaves.
(4 marks)

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46.(a) (i). Describe the role of dietary fibres during digestion in humans. (4 marks)

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(b) Explain why digestive enzymes especially proteases are secreted in an inactive state
(2 marks)

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(c) What role is played by each of the following hormones during digestion in man?

(i) Secretin (2 marks)

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(ii) Cholecystokinin (2 marks)

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END

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