P530/1
BIOLOGY
Paper 1
APRIL, 2019
$2\frac{1}{2}$ *hours*

Uganda Advanced Certificate of Education
END OF TERM I EXAMINATIONS
S.5 BIOLOGY
–APRIL, 2019
Paper 1
2 hours 30 minutes

INSTRUCTIONS TO CANDIDATES

Answer **all** *questions in both sections* **A** *and* **B**.

SECTION A:
Answers to this section must be written in the answer sheet provided at the end of this section.

SECTION B:
Answers to this section should be written in the spaces provided and not anywhere else.

No additional sheets of paper should be inserted in this booklet.

For Examiner's Use Only

SECTION		MARKS
Section A:	1 – 40	
Section B:	41	
	42	
	43	
	44	
	45	
	46	
TOTAL		

SECTION A (40 marks)

1. If the water potential of a cell is slightly lower that the water potential of the surrounding solution. The solution is said to be
   A: Isotonic to the cell sap
   B: Hypertonic to the cell sap
   C: Hypotonic to the cell sap
   D: of the same concentration as that of the cell sap

2. Which of the following processes need protein carriers in movement of materials?
   A: Active transport and facilitated diffusion
   B: Active transport and Osmosis
   C: Osmosis and passive diffusion
   D: Active transport only

3. Which one of the following processes is commonly referred to as 'cell drinking'?
   A: pinocytosis
   B: phagocytosis
   C: Exocytosis
   D: Endocytosis

4. In water relations in which state of the cell is solute potential equal to pressure potential in magnitude.
   A: Full turgour
   B: Incipient plasmolysis
   C: Full plasmolysis
   D: Partial turgour

5. Which of the following structures is found in both xylem and phloem tissues?
   A: sieved tracheids
   B: parenchyma cells
   C: companion cells
   D: Hollow vessels
6. Which of the following have a sole function of offering support to the plant?
   A: Sclerenchyma and vessel elements
   B: Vessel elements and tracheids
   C: Sclerenchyma and collenchyma
   D: Parenchyma and collenchyma

7. The bacteria which converts nitrates to nitrites during the nitrogen cycle are an example of
   A: nitrogen fixing bacteria
   B: nitrifying bacteria
   C: Decomposing bacteria
   D: Denitrifying bacteria

8. Good drainage and ploughing of soil reduces the process of
   A: nitrification
   B: decomposition
   C: denitrification
   D: Nitrogen fixation

9. The cell structure lacking elaborate internal structure is the
   A. Mitochondrion
   B. Lysosome
   C. Centriole
   D. Endoplasmic reticulum

10. Which of the following classes is the most successful in a terrestrial?
   A. Diplopoda
   B. Arachnida
   C. Insecta
   D. Chilopoda

11. Which of the following limited the use of a light microscope?
   A: its magnifying power
   B: its size
   C: its resolving power
   D: inability to reveal natural colours

12. Which one of the following magnifications would enable you to see the largest surface area of a specimen under a microscope?
   A: X40
   B: X100
   C: X400
   D: X1000

13. The cell wall of nitrosomonas is made up of
   A: capsule B: peptidoglycan
   C: cellulose D: lignin

14. Autophagy refers to
   A: breakdown of cellular components
   B: breakdown of the whole cell
   C: self breakdown of lysosome
   D: removal of unwanted structures within the cell.

15. Which one of the following is the correct arrangement of microtubules in a cross section at the base of a flagellum
   A: 9 + 2 B: 9 + 0
   C: 9 + 4 D: 9 + 1

16. The cell organelle not bounded by a membrane is
   A: ribosome B: golgi apparatus
   C: endoplasmic reticulum D: mitochondrion

17. What is the actual length of a plant cell that appears 6mm long when viewed through a magnification of X600?
   A: 0.1μm B: 1.6μm
   C: 10μm D: 100μm

18. The tails of the phospholipids lie in the centre of the cell membrane due to their being
A: light B: hydrophilic
C: polar D: hydrophobic

19. Which one of the following cell organelles is associated with the final stage of most cell secretions?

A: smooth endoplasmic reticulum B: rough endoplasmic reticulum
C: Ribosome D: Golgi apparatus

20. Which one of the following structures plays an important role in the formation of primary cell walls?
A: Golgi body
B: Lysosome
C: Rough endoplasmic reticulum
D: Ribosomes

21. The main distinguishing character of an eukaryotic cell is
A: membraned organelles B: lack of nuclear membrane
C: presence of nucleus D: presence of DNA double strands.

22. Which of the following organelles would most likely be abundant in the tail of a tadpole at a time of its reabsorption during metamorphosis?
A: centrioles B: lysosomes
C: Golgi apparatus D: Endoplasmic reticulum

23. The flagellum and skeletal muscle are structurally similar in that they both have
A: microtubules
B: actin and myosin tubules
C: a pattern of 9 + 2 microtubules
D: light and dark bands

24. The following may be used to differentiate between a bacterium and a fungal cell.
A. Has a flagellum has no flagellum
B. Has a cell wall has no cell wall
C. Has no a cell wall has a cell wall
D. Has no flagellum has flagellum

25. Solution which causes cells immersed in it to plasmolyse is described as.
A. isotonic
B. Super-isotonic
C. hypotonic.
D. Hypertonic.

26. Four pairs of legs are distinguishing feature of arthropod class called
A. Insecta
B. Crustacea.
C. Arachnidan
D. Onycophora

27. A phospholipids consists of ……..
    A. phosphate, fat and oil.
    B. phosphoric acid, glycerol and fatty acids.
    C. Phosphoric acid, fats and oil.
    D. Phosphate, glycerol and fatty acids.

28. Which of the following is a physiological adaptation of terrestrial plants to minimize water loss?
    A. Leaf orientation
    B. Folding of plant leaves
    C. Periodic shedding of leaves
    D. Change of stomatal rhythm.

29. Which of these is a compound plant tissue?
    A. Parenchyma
    B. Xylem
    C. Epidermis
    D. Collenchyma

30. During water stress photosynthesis reduces in plants mainly due to the shortage of;
    A. carbon dioxide
    B. mineral salts
    C. water
    D. sunlight

31. Prokaryotic cells divide by;
    A. mitosis
    B. meiosis
    C. budding
    D. binary fission

32. Bacteria cell walls contain;
    A. Cellulose
    B. Lignin
    C. Peptidoglycan
    D. Chitin

33. The following are components of the cell surface membrane except;
    A. Proteins
    B. Carbohydrates
    C. Phospholipids
    D. Waxes

34. The part of the cell where ribosomes are manufactured is;
    A. Nucleus
    B. Endoplasmic reticulum

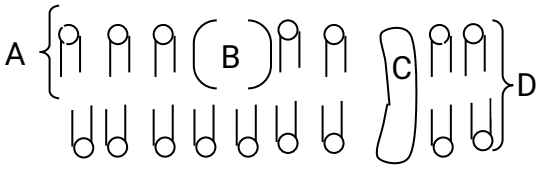
C. Golgi apparatus
D. Nucleolus

35. Cells which do not have nuclei die because they do not have;
A: Centrioies and cannot divide
B: Mitochondria and cannot release energy
C: mRNA and cannot transcribe DNA
D: Ribosomes and cannot synthesis proteins

36. Some viruses bind to the cell surface membrane before entering the host cell. The sequence of events would involve binding to:
A: A cholesterol molecule, followed by endocytosis
B: A glycoprotein receptor, followed by exocytosis
C: To a protein receptor, followed by endocytosis
D: The hydrophilic portion of a phospholipid, followed by exocytosis

37. Which of the following is true about the fluid mosaic model of the plasma membrane?
A: The less unsaturated the fatty acid tails of the phospholipid, the more fluid the membrane
B: The more unsaturated the fatty acid tails of the phopholipid, the more fluid the membrane
C: The higher the temperature, the less fluid the membrane
D: the lower the temperature, the more fluid the membrane

38. The diagram shows part of the structure of the cell membrane. Which of these parts carries out active transport?



38. Which one of the does not contribute to the selective permeability of a biological membrane?
A. Specificity of the carrier proteins in the membrane.
B. Selectivity of the channel proteins in the membrane.
C. Hydrogen bond formation between water and phosphate groups.
D. Hydrophobic barrier of the phospholipids bilayer.

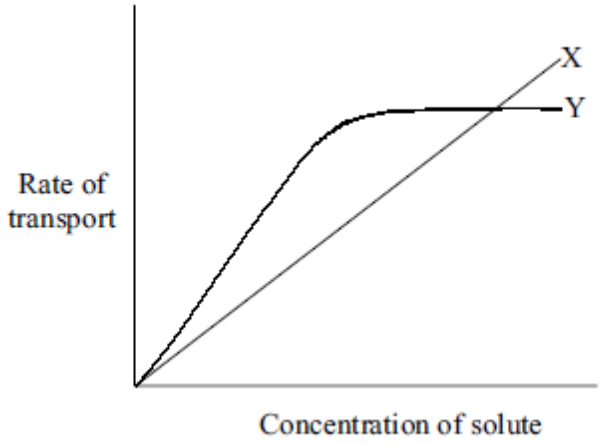
39. Which of the following is true about cholesterol?
A: makes the membrane less fluid at lower temperatures
B: makes the membrane more fluid at lower temperatures
C: makes the membrane less fluid at all temperatures
D: makes the membrane more fluid at all temperatures

40. Which one of the following structures can be seen with a light microscope?
A: mitochondria
B: ribosomes
C: rough endoplasmic reticulum
D: smooth endoplasmic reticulum

SECTION B (60 marks)

Answer all questions in this section. Answers to this section must be written in spaces provided.

41. The graph below shows the rate of movement of solute molecules across a plasma membrane by simple diffusion and facilitated diffusion.



a) Which type of uptake is shown by line Y. Explain your answer. **(03 marks)**

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b) State four factors which may limit the rate of simple diffusion. **(04 marks)**

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c) Explain how the concentration of ions such as sodium and chloride are kept at high levels outside cells but low levels within.
(03 marks)

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42. a) What are the advantages of an electron microscope over a light microscope?
(02 marks)

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b) Distinguish between resolving power and magnification of a microscope. **(03 marks)**

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c) An optical microscope has a medium power objective lens whose diameter is 4mm. if a student
used this lens to study cells of a tissue and found that the field of view had 80cells. Determine the
average diameter of each cell. **(03 marks)**

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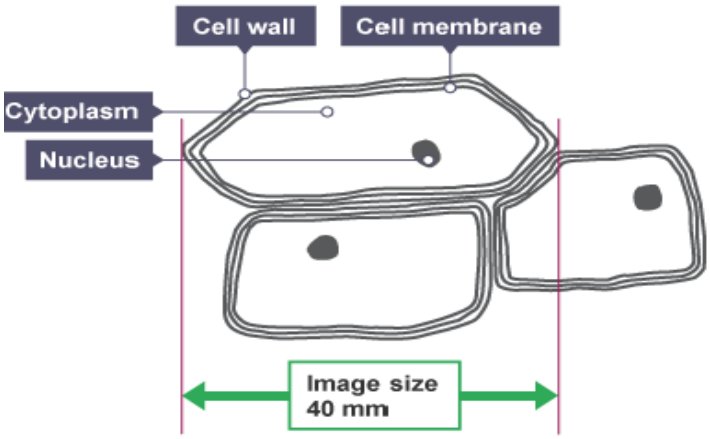
d. The student's drawing of one cell is as shown below.



Calculate the magnification of the drawing. **(02 marks)**

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43. (a) Describe briefly the structure of a ribosome.
(03marks)
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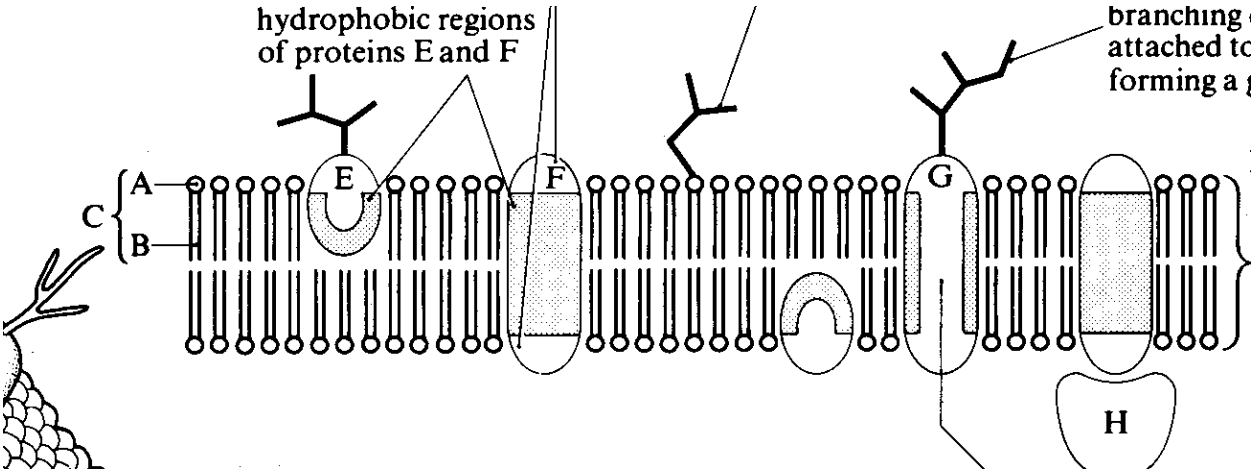
(b) Below is a drawing of the proposed model of the cell membrane, study it and answer the questions that follow.



(i) Name the labeled structures.
(5marks)
A. ……
B. ……
C. ……
D. ……
E. ……

(ii) What is the importance of the structure labeled G?
(1mark)
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(iii) State the role of cholesterol as a structure in the cell membrane.
(1 mark)
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44. (a) (i) What is meant by the term water potential? ***(1 mark)***

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(ii) A plant cell with a water potential of -700Kpa is immersed in a sucrose solution whose water potential is -350KPa. In which direction will water flow? Explain your answer. **(2 marks)**

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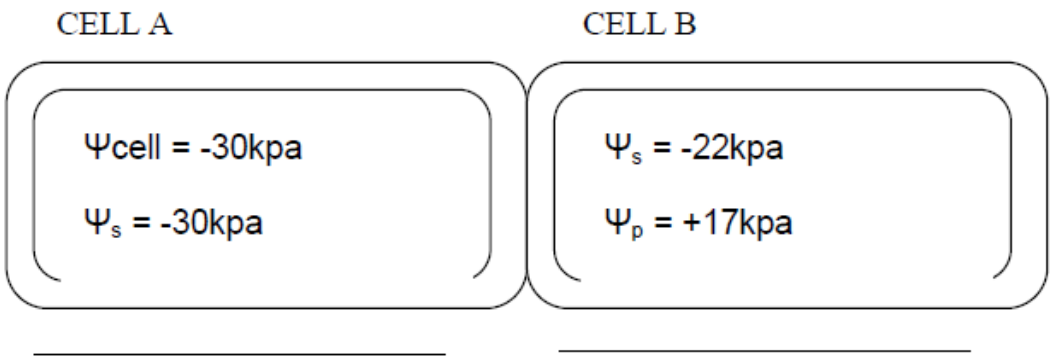
(b) Diagram below shows 2 adjacent plant cells A and B.



(i) Calculate the water potential of Cell B **(1 mark)**

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(ii) Draw an arrow on the diagram to show the direction of flow of water, explain how you arrive at your direction. **(1 mark)**

(c) Briefly describe how water moves across the plasma membrane by diffusion. ***(2 marks)***

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d) Give 3 roles of osmosis in living organisms. **(03 marks)**

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45. a) State the general characteristics of fungi members. **(04 marks)**

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b) State six differences between algae and fungi. **(06 marks)**

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46. a) What is meant by the term endocytosis? **(03 marks)**

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b) How is endocytosis of importance in living organisms? **(03 marks)**

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c) Why is transport across the cell surface membrane of importance to living organisms? **(04 marks)**

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END
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