NAME: …… STREAM: ……

SIGNATURE: …….. COMBINATION: ……

P530/1

BIOLOGY PAPER 1

(THEORY)

TIME:$2\frac{1}{2}$ HOURS

MOT II EXAMINATION-2023

S.5 BIOLOGY PAPER ONE

(THEORY)

2HOURS 30 MINUTES

Instructions

- Attempt all questions in section A and B.
- Answers to section A must be filled in boxes on the right hand side.
- Answers to section B must be written in the spaces of the question paper provided.

SECTION A (40 MARKS)

1. Which one of the following cell structures can be seen with a light microscope?
   A. Mitochondrion
   B. Ribosome
   C. Rough endoplasmic reticulum
   D. Smooth endoplasmic reticulum
2. The actual diameter of a cell organelle which measures 0.4mm at a magnification of X400 is
   A. $0.01\mu m$
   B. $0.1\ \mu m$
   C. $1.0\ \mu m$
   D. $0.001\ \mu m$
3. A probable function of the endoplasmic reticulum is to
   A. Control the entry and exit of materials in cells
   B. Facilitate intracellular transport of materials
   C. Act as template in protein synthesis
   D. Enable substances to diffuse against concentration gradient

4. The main distinguishing character of eukaryotic cell is
   A. Membrane-bound organelles
   B. Lack of nuclear membrane
   C. Presence of nucleus
   D. Presence of DNA double strand
5. Which one 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
6. The flagellum and skeletal muscle are similar structurally in that they both have
   A. Microtubules
   B. Actin and myosin filaments
   C. A pattern of 9+2 microtubule arrangement
   D. Light and dark bands
7. The tails of the phospholipids lie in the centre of the cell membrane due to their being
   A. Light
   B. Polar
   C. Hydrophilic
   D. Hydrophobic
8. Rapid transport of materials within the cytoplasm of a cell is associated with the presence of
   A. Spindle fibre in the dividing. Cell
   B. An extensive endoplasmic reticulum.
   C. Many plasma membrane pores
   D. Extensive Golgi apparatus
9. Which of the following organelle does not always form part of a bacterium cell?
   A. Cell wall
   B. Flagellum
   C. Cytoplasm
   D. Ribosome
10. Which one of the following cell organelles would be most active at a site where substances move against diffusion gradient?
    A. Ribosome
    B. Lysosome
    C. Mitochondrion
    D. Golgi body
11. Which one of the following consists of globular proteins?
    A. Enzymes
    B. Keratin
    C. Elastin
    D. Collagen
12. Which one of the following is a true statement of essential fatty acids? They
    A. Are most abundant in animal tissues
    B. Cannot be synthesized in the body
    C. Are required in the body in large quantities
    D. Are the least energy providers in the body

13. The difference between one amino acid and another is in the
    A. Amino group
    B. Carboxyl group
    C. R-group
    D. Peptide bond
14. All the following are made up of glucose except
    A. Maltose
    B. Glycogen
    C. Starch
    D. Cellulase
15. The resolving power of a microscope is the
    A. Ability of the microscope to distinguish fine detail
    B. Clarity of the image formed by the microscope
    C. Number of times the image is magnified by the objective lens
    D. Power of the microscope to focus very small objects
16. Which of the following is not true of cells of a tissue?
    A. Are of one type
    B. Have the same origin
    C. Have same particular function
    D. Are physically linked
17. Which two of the following cell organelles have ribosomes within their structures?
    A. Endoplasmic reticulum and cell membrane
    B. Golgi complex and endoplasmic reticulum
    C. Cell membrane and lysosome
    D. Chloroplast and mitochondrion
18. Crossing over in meiosis takes place between
    A. Two centromeres of homologous chromosomes
    B. Two homologous chromosomes
    C. Two homologous chromatids
    D. Two non-homologous chromatids
19. At what stage in mitosis are spindle fibres formed?
    A. Prophase
    B. Interphase
    C. Metaphase
    D. Anaphase
20. Which organelle is not membrane bound?
    A. Golgi apparatus
    B. Lysosome
    C. Mitochondrion
    D. Ribosome
21. The general term for emptying of membrane-lined residues at the cell surface is
    A. Exosmosis
    B. Endosmosis
    C. Exocytosis
    D. Endocytosis
22. Of the following organelles found in a living cell, which one does NOT replicate?
    A. Mitochondrion
    B. Chromosome
    C. Ribosome
    D. Centriole

23. Which of the following types of epithelia experiences the highest rate of wearing?
    A. Ciliated
    B. Columnar
    C. Glandular
    D. Stratified
24. Which of the following is not a structural component of the ecosystem?
    A. Green plants
    B. Decomposers
    C. Solar system
    D. Predators
25. Which of the following is true about first division of meiosis but untrue of mitosis?
    A. The chromosomes separate to opposite poles
    B. The chromosome number remains the same as the parent cell
    C. The chromosome divide to form daughter chromatids
    D. The chromatids separate to opposite poles
26. The channels of endoplasmic reticulum are important for
    A. Intracellular storage and transportation of proteins
    B. Synthesis of cell wall material and secretion of enzymes
    C. Regulation of water content of the cell
    D. Protection of the cell from self digestion
27. Which action that has man taken in an attempt to solve an ecological problem had the most negative effect?
    A. Seeking better means of birth control in human population
    B. Reclaiming the swamps for agricultural purposes
    C. Producing stronger and more effective pesticides and insecticides
    D. Developing new techniques for the disposal of sewage, industrial and chemical wastes.
28. The least ecological damaging method of controlling the spread of malaria is by
    A. Draining swamps where mosquitoes breed
    B. Spraying swamps with DDT
    C. Spreading oil over swamps
    D. Introducing fish into swamps where mosquitoes breed.
29. Any ecosystem requires continual input of energy because
    A. Biological succession occurs very slowly
    B. Matter is used repeatedly in metabolic processes
    C. Energy is lost each time it is transferred between organisms
    D. Local populations tend to evolve into new forms which lose energy
30. Which one of the following groups of terrestrial animals conserves body water most efficiently?
    A. Mammals
    B. Insects
    C. Birds
    D. Reptiles
31. The most serious possible effect of *Ascaris lumbricus* in man is that they
    A. May increase in number leading to blockage of the gut
    B. Utilize vast quantities of digested food
    C. Produce toxic waste products that are harmful to man
    D. Bore through the gut wall thereby destroying the enzyme producing cells

32. Which of the following would be a characteristic of a poorly adapted parasite?
    A. Employing vectors
    B. Inflicting mild harm to the host
    C. Having a dormant stage during the life cycle
    D. Inflicting severe harm to the host
33. Which of the following glands is compound saccular?
    A. Mammary gland
    B. Sebaceous gland
    C. Sweat gland
    D. Gastric gland
34. The living community and non-living environment function together as
    A. A population
    B. A kingdom
    C. An ecosystem
    D. A community
35. Which of the following consists of structural compounds only?
    A. Keratin, collagen and sucrose
    B. Starch, actin and glucose
    C. Keratin, glycogen and haemoglobin
    D. Keratin, collagen and cellulose
36. A distinguishing characteristic of prokaryotic organism is that the
    A. Genetic material is not enclosed by a membrane
    B. Genetic material is in the form of linear DNA
    C. Cytoplasm shows protoplasmic streaming
    D. Cells contain a pro-nucleus
37. Which one of the following adaptations would be most essential in animals living in desert environments?
    A. Possession of large number of sweat glands
    B. Use of metabolic water
    C. Possession of light fur
    D. Possession of long intestines
38. Which one of the following epithelial tissues may be found in the wall of mammalian alveoli?
    A. Columnar
    B. Cuboidal
    C. Stratified
    D. Squamous
39. Which of the following events take place during the interphase of cell division?
    A. Formation of new organelles
    B. Division of the cytoplasm into two
    C. Duplication of the centromeres
    D. Formation of spindle fibres
40. Which one of the following would you expect to increase at successive levels in a food chain?
    A. Concentration of pollutants in organisms
    B. Total number of consumers
    C. Total energy content
    D. Biomass

SECTION B (60 MARKS)

41.

(a) What is meant by allosteric inhibition? (03 marks)

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(b) State the role of active site in enzyme activity. (02 marks)

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(c) Explain each of the following characteristics of enzymes in relation to their structure.

(i) Specificity (03 marks)

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(ii) Denaturation (02 marks)

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42.

(a) How does a bacterial cell differ from a higher plant? (05 marks)

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(b) State two important differences that can be recognized under light microscope between plant and animal cells. (02 marks)

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(c)

(i) Name the membrane-bound channels which form a network and almost fill the cytoplasm of most cells and are only recognizable under the electron microscope. (01 mark)

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(ii) What are the "small granules" associated with the channels mentioned in (i) above and what is their function? (02 marks)

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43. The graph in figure 1.0 below shows the rate at which sodium ions, lipids and glucose are transported across the plasma membrane of living cells. Study it carefully and answer the questions that follow:-

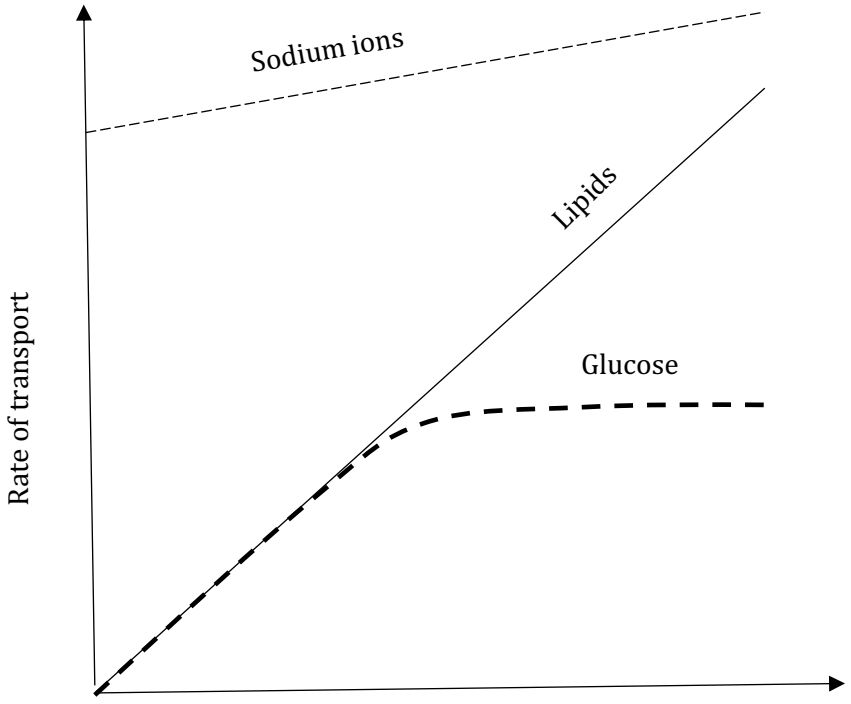

Fig 1.0

(a) Describe the changes in movement of the materials across the plasma membrane.

(i) Sodium ions (01 mark)

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(ii) Lipids (01 mark)

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(iii) Glucose (02 marks)

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(a) Account of the changes in the movement of the different materials across the plasma membrane.

(i) Sodium ions ($01\frac{1}{2}$ marks)

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(ii) Lipids ($01\frac{1}{2}$ marks)

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(iii) Glucose (03 marks)

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44.

(a) State the importance of each of the following molecules in the plasma membrane.

(i) Phospholipids (02 marks)

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(ii) Glycoproteins (02 marks)

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(iii) Cholesterol (03 marks)

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(b) Explain the role of membranes found inside the chloroplasts. (03 marks)

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45. Name five types of epithelial tissue. (In each case, name, draw and give the part of the body where it is found). (10 marks)

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46.

(a) What is meant by the term photophosphorylation? (02 marks)

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(b) With illustrations, describe the Z-scheme of photophosphorylation. (05 marks)

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(c) State three adaptations of leaves to obtain maximum sunlight. (03 marks)

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END