NAME: ……

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P530/1

S.6 BIOLOGY

PAPER 1

2 ½ HOURS

RENA COLLEGE MAYUGE

BIOLOGY (THEORY)

S.6 Paper 1

BEGINNING OF TERM ONE 2024

2 HOURS 30 MINUTES

INSTRUCTIONS

- ✓ *This paper consists of sections **A** and **B***
- ✓ *Answer all questions in both sections*
- ✓ *All answers **MUST** be written in the spaces provided*

Section	Marks	Examiner's signature and initials
A		
B		
Totals		

SECTION A (40 MARKS)

1. Which of these statements is part of the cell theory?
   A. Cells are composed of organic molecules
   B. Cells have DNA as their genetic material
   C. Cells have cytoplasm surrounded by a membrane
   D. Cells come from pre-existing cells

2. The organisms known as *Zeryntha rumina* and *Zerynthia polyxena*. Which taxon could the above organisms share in common?
   A. Genus but not the same family
   B. Species but not the same class
   C. Class but not the same genus
   D. Genus but not the same species

3. Which of these organelles is not associated with the production of protein in a cell?
   A. Ribosomes
   B. Smooth endoplasmic reticulum
   C. Rough endoplasmic reticulum
   D. Golgi apparatus

4. The main function of lysosomes in cells is to
   A. Carry protein to the surface of the cells
   B. Add short chain carbohydrate to make glycoprotein
   C. Breakdown organelles, proteins and nucleic acids
   D. Remove electrons and hydrogen atoms from hydrogen peroxide

5. Which one of the following body organs would be lined by a ciliated pseudo stratified columnar epithelium?
   A. Nephron
   B. Ileum
   C. Urinary bladder
   D. Trachea

6. The description of the plasma membrane as being a fluid mosaic is due to the observation that
   A. Water molecules make up part of the membrane
   B. The membrane consists of phospholipids and proteins capable of wave-like movement
   C. The phospholipids that make up the membrane can move about
   D. Membranes are made up of proteins and lipids that can move freely

7. Which of the following 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. Hydrophobic barrier of the phospholipid bilayer

D. Hydrogen bond formation between water and phosphate groups

8. Which chemical property characterizes the interior of the phospholipid bilayer? It is

A. Hydrophobic

B. Hydrophilic

C. Polar

D. Saturated

9. Which of the following is not a mechanism for bringing material into a cell?

A. Exocytosis

B. Endocytosis

C. Pinocytosis

D. Phagocytosis

10. Which of these is the reason accessory pigments are important in photosynthesis? They absorb light of

A. higher wavelength than chlorophyll

B. shorter wavelengths than chlorophyll

C. different wavelengths hence increases the range from which plants can obtain energy

D. the same wavelength as chlorophyll thereby increases energy fixed for Photosynthesis

11. Which of the following respiratory systems is not closely associated with a blood supply?

A. Vertebrate lungs

B. Fish gills

C. Tracheal system

D. The outer skin of an annelids

12. Which one of the following stages of the cell cycle involves formation of histone proteins?

A. G_2 substage.

B. G_1 substage

C. S Substage

D. Nuclear division

13. Which one of the following processes occurs in the cytoplasm of the mesophyll cells in C_4 plants?

A. Fixation of carbon dioxide by RuBP

B. Fixation of carbon dioxide by PEP.

C. Decarboxylation of malate.

D. Formation of pyruvate.

14. Which one of the following characteristics of enzymes distinguishes them from inorganic catalysts? They

A. Initiate and speed up the rate of reactions.

B. Remain the same at the end of the reaction.

C. May promote reversible reactions.

D. Exert their effects when present even in small amounts.

15. The cavities in which bone secreting cells are housed are termed as

A. Lamellae. B. Lacunae

C. Canaliculi D. Haversian canals

16. Active chondrin secreting cells are called

A. Oesteoblasts B. Fibroblasts

C. Chondrocytes D. Chondroblasts

17. Which of the following is a function of the Golgi complex?

A. Protein synthesis

B. Ribosome synthesis

C. DNA replication

D. Packaging proteins

18. Which one of the mineral elements forms the central part of chlorophyll in green plants?

A. Manganese B. Magnesium

C. Nitrogen D. Calcium

19. Which one of the following is a conjugated protein?

A. Keratin

B. Haemoglobin

C. Pepsinogen

D. Collagen

20. Transcription refers to

A. DNA copying. B. Reading RNA strand.

C. Formation of mRNA D. The coding of tRNA.

21. The most predominant component of biological membranes is

A. Lipids

B. Sugars

C. Nucleic acids

D. Starches

22. The following parts have ciliated epithelium except

A. Ventricles of the brain. B. Oviduct

C. Spiral canal D. Kidney duct

23. A reaction that breaks down compounds by the addition of water is known as a

A. Lysis reaction

B. Endergonic reaction

C. Hydrolysis reaction

D. Exergonic reaction

24. Which of the following is a pair of structural carbohydrates?

A. Starch and glycogen

B. Starch and cellulose

C. Glycogen and cellulose

D. Cellulose and chitin

25. The figure below shows a system of two cells separated by a semi-permeable membrane.

Cell A	**Cell B**
$\Psi s = -600kPa$ $\Psi p = 400kPa$	$\Psi s = -800kPa$ $\Psi p = 400kPa$

Which one of the following statements is correct about the movement of water in the system?

A. Water moves out of both cells A and B

B. Water moves from cell B to A

C. There is no net movement of water

D. Water moves from A to B

26. What does a protein loose when it denatures?

A. Its primary structure.

B. It's tertiary Structure.

C. Its peptide bonds.

D. Its sequence of amino acids.

27. Which of these represents the water potential of pure water

A. -1MPa

B. +10MPa

C. 0 Mpa

D. -10 Mpa

28. What name is given to a chemical reaction in which two hexose sugars combine?

A. Condensation
B. Isomerization
C. Hydrolysis
D. Dehydrgenation

29. Which of the following sugars is not reducing?

A. Maltose
B. Fructose
C. Galactose
D. Sucrose

30. Which of the following would speed up the process of diffusion?

A. Reducing the concentration gradient
B. Increasing the distance across which diffusion occurs
C. Increasing the area over which diffusion occurs
D. Lowering the temperature of the medium

31. One disadvantage of multicellular state is that the individual cells

A. Lose independence
B. Are always small in size
C. Become less functional
D. Become less specialized

32. In alternation of generation life cycle, the

A. Sporophyte generation is always dominant
B. Gametophyte generation produces spores
C. Spores develop into sporophyte generation
D. Gametophyte generation is haploid

33. Which of the following organelles "tags" proteins so that they can go to the correct destination during development?

A. Ribosome
B. Endoplasmic Reticulum
C. Golgi body
D. Nucleus

34. Which of the following phyla consists of organisms that are entirely marine?

A. Echinodermata
B. Mollusca
C. Protozoa
D. Arthropoda

35. In order for mimicry to be effective in protecting a species from predation, it must

A. Occur in a palatable species that looks like a distasteful species
B. Have cryptic colouration
C. Occur such that mimics look and act like models
D. Occur only in poisonous or dangerous species

36. An almost universal cost of group living in animals is

A. Increased risk of predation
B. Interference with foraging

C. Higher exposure to diseases and parasites

D. Poor access to mates

37. Which of these best describes why a new community is able to replace a resident community during succession?

A. Species in the resident community die of old age

B. Species extinction is inevitable

C. Influence of the resident community changes the habitat

D. Species in the resident community die of diseases that eventually disappear

38. Which of the following is likely to cause a decrease in the greenhouse effect?

A. reduction in the earth's ozone layer

B. increase in green house temperature

C. increase in the CO_2 level of the atmosphere

D. decrease in the CO_2 level of the atmosphere

39. The least ecologically damaging method of controlling the spread of malaria is by

A. Spraying swamps with DDT

B. Draining swamps where mosquitoes breed

C. Spraying oil over swamps

D. Introducing fish to the swamps where mosquitoes breed

40. The number of organisms the environment can successfully sustain is it's

A. biomass B. Carrying capacity

C. biotic potential D. trophic efficiency

SECTION B (50 MARKS)

41.

(a) What is meant by the term water potential? ***(01 mark)***

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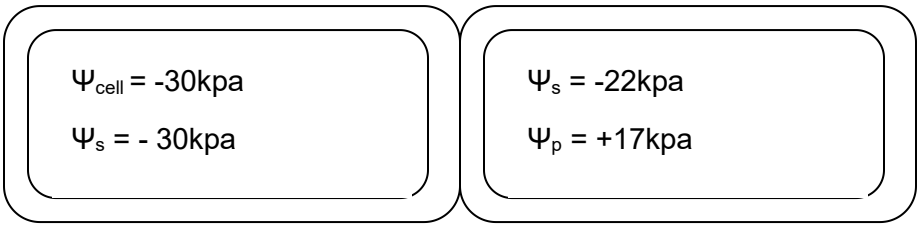
(b) Diagram below shows 2 adjacent plant cells A and B.

CELL A CELL B



(i) Calculate the water potential of Cell B ***(01½ mark)***

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(ii) Draw an arrow on the diagram above to show the direction of flow of water ***(0½ mark)***

(c) Give any ***three (3)*** importance of osmosis in organisms. ***(03 marks)***

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(d) How is movement of materials across the plasma membrane important to body cells? ***(04 marks)***

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42.

(a) State the events that occur in a cell during interphase. ***(02 Marks)***

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(b) Discuss the significance of **Mitosis** in living things. ***(02 Marks)***

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(c) Stating how it is adapted to its function, describe the contribution of the **mitochondrion** to the process of **mitosis**. ***(03 Marks)***

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(d) Describe the structure of **squamous** epithelium. State the importance of Squamous epithelium in a specific part of the mammalian body ***(03 marks)***

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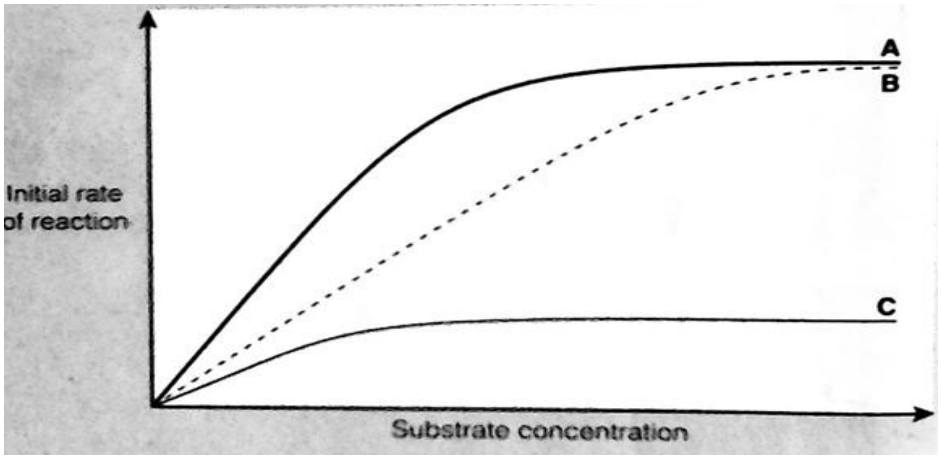
43. The figure below shows the effect of increasing the substrate concentration on the rate of enzyme-controlled reaction in presence and absence of substances B and C



(a) Suggest the identity of substances B and C **(02 marks)**

Substance B ……..

Substance C ……..

(b) Describe the effect of B on the rate of reaction **(03 marks)**

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(c) Explain the shape of graph A **(03 marks)**

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(d) State the difference in the effect of B and C on the rates of reaction **(02 marks)**

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44.

(a) State the fluid-mosaic model of a cell membrane **(03 marks)**

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(b) Define Osmosis and Diffusion. **(4 marks)**

Osmosis ……
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Diffusion

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(c) Outline the importance of **Proteins** in a cell membrane **(03 marks)**

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45.

(a) Give any two **compound plant tissues** and state the specific function of each **(04 marks)** ……
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(b) Describe the structure of a **tracheid** **(04 marks)** ……
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(c) State any **two examples** of modified Parenchyma tissues**(02marks)**

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END