

SET II TERM III EXAMINATIONS 2022
S.5BIOLOGY / 1

Time: 2 hours 30 minutes

Instructions:

Answer all questions in this paper

Answers to section A must be written in the table below.

Answers to section B must be written only in the spaces provided.

SECTION A (40 Marks)

| | | | | | | | |
|----|-----|-----|-----|-----|-----|-----|-----|
| 1. | 6. | 11. | 16. | 21. | 26. | 31. | 36. |
| 2. | 7. | 12. | 17. | 22. | 27. | 32. | 37. |
| 3. | 8. | 13. | 18. | 23. | 28. | 33. | 38. |
| 4. | 9. | 14. | 19. | 24. | 29. | 34. | 39. |
| 5. | 10. | 15. | 20. | 25. | 30. | 35. | 40. |

SECTION A

- Gaseous exchange in earth worms occurs at the body surface because the body is
 - Moist
 - Elongated
 - Segmented
 - Flattened.
- . In drosophila, the alleles for width of abdomen and length of the wings are linked. When a drosophila with long wings and broad abdomen were mated with one possessing vestigial wings and narrow abdomen, the following offsprings were obtained:
Long wings, broad abdomen, =686
Long wings, narrow abdomen=211
Vestigial wings, broad abdomen=206
Vestigial wings, narrow abdomen=465.
What was the cross over value?
 - 13.3%
 - 26.6%
 - 49.4%
 - 73.4%
- Which of these substances make up the sap of plant vacuoles?
 - Sugar, cellulose, salts and water
 - Sugar, organic acids, salts and water
 - Sugars, organelles, organic acids and salts
 - Sugar, organelles, organic acids and salts
- The technique of staining in microscopy helps to increase
 - Magnifying power
 - Resolution
 - Transmission
 - Contrast
- The action spectrum of chlorophyll is highest in the following region of the spectrum
 - Green
 - Blue
 - Yellow
 - Red
- . In which part of the chloroplast are complex carbohydrates are made?
 - Intermembrane space
 - Inner membrane

- C. Stroma
D. Thylakoid
7. During interconversions between carbohydrates, fats and proteins in body metabolism, which of these is irreversible?
- Amino acids to pyruvic acids
 - Fatty acids to acetyl co-enzyme A
 - Pyruvic acid to acetyl co-enzyme A
 - Amino acids to acetyl co-enzyme A
8. The correct sequence of the transfer of hydrogen in the hydrogen carrier system is
- FAD \longrightarrow cytochrome \longrightarrow cytochrome oxidase \longrightarrow O₂ \longrightarrow NAD
 - NAD \longrightarrow FAD \longrightarrow cytochrome \longrightarrow cytochrome oxidase \longrightarrow O₂
 - NADP \longrightarrow FAD \longrightarrow cytochrome \longrightarrow cytochrome oxidase \longrightarrow O₂
 - NADH₂ \longrightarrow FAD \longrightarrow cytochrome \longrightarrow cytochrome oxidase \longrightarrow O₂
9. Squamous epithelial tissue occurs in
- Lungs
 - Endocrine glands
 - Esophagus glands
 - Mammary glands
10. Which of the following statements is not true about O₂ dissociation curves?
- The foetal O₂ dissociation curve is to the right of the adult one
 - The O₂ dissociation of large animals is to the right of that for smaller animals
 - CO₂ shifts the O₂ dissociation curve to the right
 - Myoglobin has an O₂ dissociation curve to the left of that for haemoglobin.
11. Carotenoids are mostly abundant in plant organs like
- Roots and flowers
 - Stems and roots
 - Flowers and fruits
 - Flowers and stems
12. Which of these sequences of changes in guard cells results in the opening of stomata in a plant.
- Light \longrightarrow low CO₂ \longrightarrow low pH \longrightarrow starch \longrightarrow sugar \longrightarrow exosmosis
 - Light \longrightarrow low CO₂ \longrightarrow High pH \longrightarrow starch \longrightarrow sugar \longrightarrow endosmosis
 - Light \longrightarrow low CO₂ \longrightarrow High pH \longrightarrow sugar \longrightarrow starch \longrightarrow endosmosis
 - Light \longrightarrow High pH \longrightarrow CO₂ \longrightarrow low pH \longrightarrow starch \longrightarrow endosmosis
13. Facultative parasites are more difficult to control than obligatory ones because they.
- Are cupusulated.
 - Have many hosts.
 - Can change the mode of feeding.
 - Live in colonies
 - .
14. Which of the following is the first step of protein synthesis.
- Translation.
 - Transportation.
 - Transcription.
 - D.N.A replication
15. Analysis of DNA showed that 33% of the bases were adenine. The percentage of guanine bases in the DNA sample was
- .34.
 - 33
 - 17
 - 28
16. C₃ plants Are less efficient than C₄ plants in fixing CO₂ at low CO₂ and high oxygen partial pressure because.

- A. C₃ plants use more energy
 - B. In C₃ plants, energy is lost.
 - C. RuBP carboxylase is inactivated by high oxygen partial pressures.
 - D. PEP carboxylase has a high affinity for oxygen.
17. what is the water potential of a cell if its pressure potential is 500KPa and its solute potential is -4900KPa?
- A. -4400 KPa
 - B. 4400KPa
 - C. 5400KPa
 - D. -5400KPa.
18. Which of the following factor will be the greatest limiting factor on the population growth of algae at the bottom of a pond.
- A. Light
 - B. Carbondioxide.
 - C. Minerals.
 - D. Oxygen
19. Lack of iodine in the diet causes cretinism because iodine
- A. Controls metabolism.
 - B. Is essential in the formation of metabolic enzymes.
 - C. Influences growth of bones.
 - D. Is required for synthesis of thyroxine.
20. According to Mendel, the following are correct **except**
- A. Each characteristic of an organism is controlled by a pair of alleles.
 - B. Each allele is transmitted from generation to generation in a discrete unit.
 - C. There are several varieties of alleles from each parent.
 - D. Each organism inherits one allele of each pair, from each parent.
21. Which of the following can change Mendel's dihybrid ratio from 9:3:3:1 to 1:1:1:1
- A. Linkage.
 - B. Pleiotropy
 - C. Complementary genes.
 - D. Lethal genes
22. The correct order of transmission of electrical impulses to initiate the heart beat is
- A. Sino-atrio node **to** atria **to** atrio-ventricular node **to** Purkinje tissue **to** ventricles.
 - B. Sino-atrio node **to** ventricles **to** atrio-ventricular node **to** Purkinje tissue **to** atria
 - C. Atrio-ventricular node **to** atria **to** sino-atrio node **to** Purkinje tissue **to** ventricles .
 - D. Atrio-ventricular node **to** Purkinje tissue **to** ventricles **to** atria **to** sino-atrio node
23. Which of the following enzymes is secreted by the lining of the ileum?
- A. Lipase.
 - B. enterokinase
 - C. lactase
 - D. sucrase
24. cells are limited to small size in order to
- A. keep their volume down.
 - B. Allow movement of materials in and out of the cells.
 - C. Cut down the energy requirements.
 - D. Enable the nucleus control the cell effectively
25. Cartilaginous fish extract less oxygen from water than bony fish because the former
- A. Live in sea water.

- B. Are relatively bigger in size.
 - C. Employ parallel flow system of gaseous exchange.
 - D. Possess large gills with a small surface area to volume ratio.
26. Usually, Na^+ and K^+ are actively pumped out of the red blood cell. When the cell is treated with a metabolic poison, it bursts because.
- A. The metabolic poison weakens the cell surface.
 - B. Accumulation of K^+ and Na^+ inside the cell alters its water potential.
 - C. The influx of K^+ damages the structure of the surface.
 - D. The accumulation of Na^+ inside of the cell alters its water potential.
27. The latent heat of vaporization of sweat is 3.15 KJ cm^{-3} . What is the percentage of energy lost by sweating from a manual worker who loses 2 dm^3 per day of sweat if his daily energy intake is $40,000 \text{ KJ per day}$?
- A. 6.30
 - B. 7.88.
 - C. 8.25.
 - D. 15.75.
28. The figure below represents a



- A. Tracheids.
 - B. Xylem vessel element.
 - C. Sieve tube.
 - D. Phloem parenchyma cells.
29. Which set of products is liberated during both aerobic and anaerobic respiration in plants?
- A. Carbondioxide and ethanol
 - B. Ethanol and water.
 - C. Water and carbondioxide.
 - D. Carbondioxide and ethanol.
30. Which of the following pairs of reactants is not required for the light independent reactions of photosynthesis ?
- A. NADPH and ATP
 - B. ATP and carotenoids.
 - C. RUBP and free oxygen
 - D. Carbon dioxide and enzymes
31. A property of water that makes it a suitable component of the hydrostatic skeleton is its
- A. High density.
 - B. High surface tension.
 - C. Low viscosity.
 - D. Incompressibility.
32. Gametes are haploid because
- A. Two replications of DNA occur during meiosis
 - B. Homologous chromosomes separate during meiosis.
 - C. Crossing over occurs during prophase I
 - D. Chromatids do not separate during meiosis.

33. Which one of the following is correct about the counter current mechanism in teleosts?
- Blood with a low oxygen concentration flows in the same direction with water of high oxygen concentration.
 - Water of low oxygen concentration flows near blood of high oxygen concentration.
 - Blood with a high oxygen concentration flows in the opposite direction to water of a high oxygen concentration.
 - Water of a high oxygen concentration flows in opposite direction to blood of low oxygen concentration.
34. Which one of the following is the tidal volume in an individual whose ventilation rate is $2000\text{dm}^3/\text{min}$ and takes 10 breaths per minute?
- 0.2dm^3
 - 2.0dm^3
 - 200dm^3
 - 20dm^3
35. In single circulation, blood flows at a low pressure because,
- the blood passes through two capillary system .
 - Animals that have single circulation have single-chambered hearts.
 - The single circulatory system lacks valves.
 - The main vessels in single circulation are capillaries.
36. When someone is infected with HIV, reduction in..... results into AIDS
- Number of plasma cells
 - Number of T helper cells
 - Number of T killer cells.
 - Number T suppressor cells
37. The biochemical property of blood essential for its protective function of the body is the
- Ability to clot.
 - Possession of antibodies.
 - Presence of haemoglobin.
 - Possession of white blood cells.
38. When a tall red flowered plant was crossed with a short and white flowered plant, all the offspring were tall and redflowered. When the F1 plants were selfed, the F2 phenotypes were in a ratio of 3:1. This occurrence suggests occurrence of
- Epistasis
 - Recombination
 - Crossing over.
 - Linkage.
39. A man of blood group **B** married a woman of blood group **AB**. **Which** of the following blood genotypes would not be of their children?
- AO**
 - BO**
 - BB**
 - AA**.
40. Loss of water from the blood of a human body can result into.
- Lowering of the body temperature.
 - Slowing down the rate of breathing.
 - Lowering of blood pressure.
 - Slowing down of heart beat.

SECTION B

41. The table below shows blood group system in humans. Complete the table by

- (i) Filling in the antigens and antibodies for each blood group.
- (ii) Indicating whether agglutination occurs (by a cross **X**) or no agglutination occurs (by a tick **✓**), when an individual of each blood group receives blood from blood group **AB**. (06 marks)

| Blood group | antigens | antibodies | Agglutination /no agglutination when receives blood of AB blood group |
|-------------|----------|------------|--|
| A | | | |
| B | | | |
| AB | | | |
| O | | | |

- (b) How can a Rhesus negative mother affect a Rhesus positive foetus in her womb? (04 marks)

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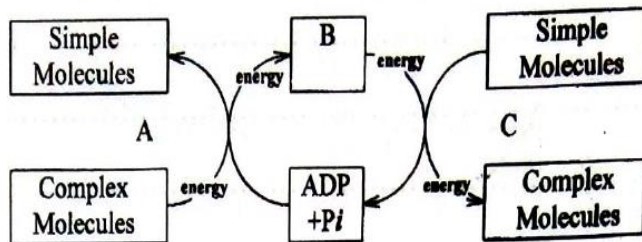
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42. (a) the figure below shows an anabolic and catabolic reaction in a living cell



- (i) Using arrows **X** and **Y**, indicate the direction of the anabolic and catabolic reactions respectively on the figure above. (02 marks)

(ii) Name the compound marked **B** and one example of the process marked **A** and **C**
(03 marks)

A.....

B.....

C.....

(b) describe what happens to the end product of glycolysis in plants in absence of oxygen

(05 marks).

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43. In an oil seed plant species, the allele for tallness is dominant over the allele for dwarfness. Meanwhile the allele for chlorophyll production and non chlorophyll show incomplete dominance. The heterozygous plants are variegated.

(a) Using suitable symbols, construct a diagram of a cross between a tall plant with green leaves and a dwarf plant with variegated leaves, to show the genotypes of the offspring.
(08 marks)

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(b) Explain why 25% of the offspring of the cross in (a) would fail to survive .(02 marks)

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44. (a) Illustrating with a cell of one pair of homologous chromosomes, draw diagrams in the space below to show.

(i) Mitotic metaphase. (02 marks)

(ii) Meiotic metaphase I (02 marks)

(iii) Meiotic metaphase II

(02 marks)

(c) Explain how meiosis contributes to genetic variation.

(04 marks)

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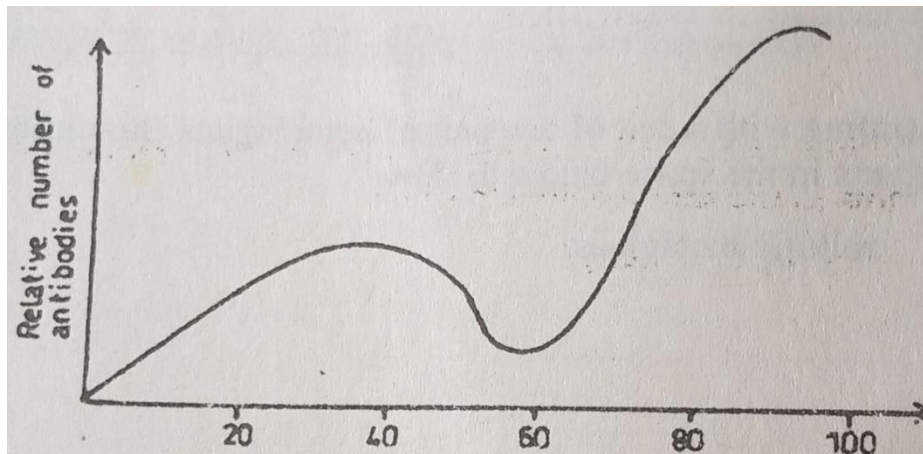
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45. The figure below shows the immune response of a person's blood after vaccinations are given on day one and 60 days later.



(a) What is the effect of giving immunization to the individual?

(01 mark)

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(b) Explain the shape of the graph.

(04 marks)

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(c) During vaccination against tetanus, children are injected with neutralized toxins from the measles virus. Explain how this procedure can result in long term immunity against tetanus. (05 marks)

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46. (a) state the role of the following in protein synthesis

(i) Messenger RNA

(03 marks)

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(ii) Transfer RNA

(03 marks)

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(b) give two ways that suggest that DNA is hereditary material (04 marks)

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END