**HOT CAKE SET 1 BEGINNING OF TERM THREE EXAMINATIONS 2024**
**UGANDA ADVANCED CERTIFICATE OF EDUCATION**
**MIDLAND HIGH SCHOOL BUNTABA MUKONO CAMPUS**
**S.5 BIOLOGY PAPER ONE**

**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)**

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|---|---|---|---|---|---|---|---|
| **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.** |

**1.** During transpiration, from where does the evaporation of water occur?

A. Intercellular spaces
B. Leaf surface
C. Mesophyll cell walls
D. Stomatal pores

**2.** Which statement explains how mass flow arises in sieve tube elements?

A. Sucrose activity loaded into sieve tube elements decreases the water potential causing the hydrostatic pressure to increase.
B. Sucrose actively loaded into sieve tube elements increases the water potential causing the hydrostatic pressure to decrease.
C. Sucrose diffused into sieve tube elements decreases the water potential causing the hydrostatic pressure to increase.
D. sucrose diffused into sieve tube elements increases the water potential causing the hydrostatic pressure to decrease.

**3.** Antibodies can act in a number of ways to protect the body from pathogenic bacteria. Which event will not occur following antigen – antibody binding?

A. Agglutination of bacteria to reduce their spread.
B. Increased susceptibility to phagocytosis.
C. Neutralization of toxins to make them harmless.
D. Secretion of histamine to produce an allergic reaction.

**4.** Which function of the liver results in the production of bile pigments?

A. Breakdown of hemoglobin.
B. Deamination of amino acids.
C. Detoxification of metabolic poisons.
D. Release of stored vitamin

**5.** A couple had children with a disorder that appeared in only sons. Which one of the following statements is true about this occurence? The disorder is

A. Sex linked and the mother is a carrier.
B. Caused by multiple alleles.
C. Sex linked and both parents are carriers.
D. Sex limited to males and father is a carrier.

**6.** Which of the following is responsible for increasing the pressure of blood flowing in veins, back to the heart?
A. Pumping action of the heart.
B. Contraction of skeletal muscles.
C. Closing of valves.
D. Inspiratory movement of muscles.

**7.** Which one of these is **not true** about lock and key theory of enzyme catalyzed reaction?
A. A small change in the active site alters the enzyme effectiveness.
B. The substrate and active site are complementary.
C. Enzyme catalyzed reactions go through the enzyme-substrate complex.
D. A molecule which fits in active sites is a substrate.

**8.** A cell is said to have full turgor pressure when
A. The cell membrane is just touching the cell wall.
B. Water enters the vacuole by osmosis.
C. Water leaves the vacuole by osmosis.
D. The cell cannot be stretched anymore.

**9.** In a highly industrialized area with high levels Sulphurdioxide pollution, which of the following is most likely to be absent
A. Bryophytes
B. Pteridophytes.
C. Lichens.
D. Angiosperms.

**10.** If a metabolic poison was taken up by a plant, which one of the following processes would be affected immediately?
A. Evaporation of water from leaf surfaces.
B. Movement of food from leaves to roots.
C. Movement of water within the stem.
D. Movement of water within the leaves.

**11.** When a tall red flowered plant was crossed with a short white flowered plant, all off springs were tall and red flowered. When the f1 plants were selefed, the f2 plants' phenotypes were in a ratio of 3:1. This suggests occurrence of
A. Epistasis
B. Recombination
C. Crossing over
D. Linkage.

**12.** Which of the following plant tissues performs both storage and supportive functions?
A. Parenchyma
B. Sclerenchyma
C. Collenchyma.
D. Phloem.

**13.** Which of the following conditions results from gene mutation?
A. Klinefelter's syndrome.
B. Turner's syndrome.
C. Sickle cell anaemia.
D. Down's syndrome

**14.** A probable function of the endoplasmic reticulum is to
A. Control entry and exit of materials in cells.
B. Facilitate intracellular transport of materials
C. Act as a template in protein synthesis.
D. Enable substances diffuse against concentration gradient.

**15.** The rapid stomatal closure during wilting is due to
- A. Increase in abscisic acid.
- B. Rapid conversion of sugar to starch.
- C. Rapid accumulation of carbon dioxide in guard cells.
- D. Reduction in the level of mineral ions in guard cells.

**16.** A cockroach has a respiratory system while an earth worm does not have because
- A. Earth worms do not need much oxygen.
- B. The surface area to volume ration in a cockroach is small.
- C. Earthworms can be parasitic.
- D. The respiratory system provides shape in a cockroach.

**17.** An organism living in an oxygen deficient environment has
- A. Haemoglobin that easily picks up oxygen.
- B. Its oxygen dissociation curve is to the right
- C. Haemoglobin that readily releases its oxygen.
- D. Haemoglobin that less readily picks up oxygen.

**18.** Which one of the following is correct about parallel flow of water across the gills?
- A. Water has a higher concentration of oxygen at each point of contact.
- B. Low blood oxygen concentration is attained.
- C. Diffusion occurs across the whole region of the gill filament.
- D. High blood oxygen concentration is achieved. t

**19.** The main difference between endotherms and ectotherms is that ectotherms
- A. Gain their body heat from internal sources.
- B. Gain less heat than endotherms.
- C. Gain the body heat from external sources.
- D. Are lower animals while endotherms are higher animals.

**20.** Which one of the following adaptations of xerophytes does **not** reduce transpiration?
- A. Hairy leaves.
- B. Leaves with a thick waxy cuticle.
- C. Small sized leaves.
- D. Succulent stems.

**21.** If the triplet of mRNA is AAG what is the complementary triplet of the bases on Trna molecule?
- A. TTC
- B. UUC
- C. CCT
- D. CCU.

**22.** Which one of the following is correct about the first division of meiosis but not mitosis?
- A. Nucleolus disappears.
- B. Spindle is formed.
- C. Centrioles move to opposite poles of the nucleus.
- D. Homologous chromosomes associate to form bivalents.

**23.** In the body, proteins may combine with acids or bases depending on the
- A. Temperature of the medium.
- B. Hydrogen ion concentration in the medium.
- C. Number of solvent molecules present in the medium.
- D. Number of amino acid molecules in the protein.

**24.** Which of the following is a simple branched tubular gland?
- A. Brunner's gland
- B. Salivary gland.
- C. Sweat gland.
- D. Mammary gland.

**25.** Which one of the following plant substances would be produced by plants during conditions of water stress?
- A. Indole acetic acid
- B. Ethane.

C. Gibberellins.
D. Abscisic acid.

**26.** The significance of etiolation to germinating seeds in the soil is that
A. Leads to rapid elongation of hypocotyl in monocotyledonous plants.
B. Allows maximum growth in length with minimum use of food reserves.
C. Allows the seedling to grow in the dark.
D. Ensures that leaves remain small to break through the soil.

**27.** When a foetus receives antibodies from the mother through the placenta, it acquires
A. Active immunity.
B. Long term immunity.
C. Passive immunity.
D. Artificial immunity.

**28.** Which one of the following does **not** contribute to the movement of water from the root system to the leaves in a flowering plant?
A. Root pressure
B. Cohesion forces
C. transpiration pull.
D. Atmospheric pressure.

**29.** In guinea pigs, the allele for rough coat (R) is dominant over one for smooth coat (r) and that for black coat (B) is dominant over one for white coat (b). The alleles for coat type and colour are not linked. A cross between rough black guinea pig and rough white one produced 28 rough black, 31 rough white, 11 smooth black and 10 smooth white. Which one of the following could be the genotype of the parents?
A. RrBb x Rrbb
B. RRBB x RRbb
C. RRBb x Rrbb
D. RrBB x Rrbb.

**30.** Mixing of oxygenated blood and deoxygenated blood in amphibians is minimized by
A. Rapid contraction of the ventricle.
B. Spongy nature of the heart muscles.
C. Spiral valves in the trancus arteriosus.
D. Columnae carnae in the ventricular walls.

**31.** In which of the following parts of a chloroplast are water splitting enzymes mostly located?
A. Stroma
B. Intergrana
C. Cytoplasm
D. Grana

**32.** Which of the following nitrogenous wastes is suitable for elimination by a freshwater fish?
A. Urea
B. Uric acid
C. Ammonia
D. Trimethylamine oxide.

**33.** Which of the following structures is found in both xylem and phloem tissues of higher plants?
A. Sieved tracheids.
B. Parenchyma cells.
C. Companion cells.
D. Hollow vessels.

**34.** Which one of the following pairs of events occur to increase the oxygen concentration in the alveoli of the lungs?
A. Contraction of the diaphragm muscles and internal intercostal muscles.
B. Relaxation of the diaphragm muscles and internal intercostal muscles.
C. Contraction of the diaphragm muscles and external intercostal muscles
D. Relaxation of the diaphragm muscles and external intercostal muscles.

**35.** The bacteria which converts nitrites to nitrates during the nitrogen cycle is an example of
A. Nitrogen fixing bacteria.
B. Nitrifying bacteria.
C. Decomposing bacteria.
D. Denitrifying bacteria.

**36.** If carbon dioxide containing radioactive carbon was added to a suspension of photosynthesizing algae, in which of the following compounds would the radioactive carbon show first

A. Glucose.
B. Phosphoglyceric acid.
C. Ribulose biphosphate.
D. Triose phosphate.

**37.** Which of the following is the disadvantage of a tracheal system for gaseous exchange in insects?

A. Ventilation is limited
B. Trachioles are impermeable.
C. Spiracles are too small.
D. The system does not supply all body parts.

**38.** In higher plants, the problem of obtaining oxygen for respiration is solved by leaves possessing

A. Large intercellular spaces.
B. Compact palisade layer.
C. Thin epidermis.
D. Numerous stomata on lower epidermis.

**39.** The qualitative increase in the complexity of an organism due to specialization of cells is refered to as?

A. Growth
B. Development.
C. Allometric growth
D. Isometric growth

**40.** Which of the following when at high levels in blood, increases the heart beat rate

A. Carbon dioxide.
B. Thyroxine.
C. Oxygen.
D. Adrenaline.

**41.** a ) Distinguish between the following.

i. Biomagnification and Bioaccumulation (02mks)

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ii. Pest resurgence and Pest resistance. (02mks)

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b) Explain how DDT affects reproductive potential of birds. (03mks)

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C) Explain three features of a successful parasite- host relationship. (03mks)

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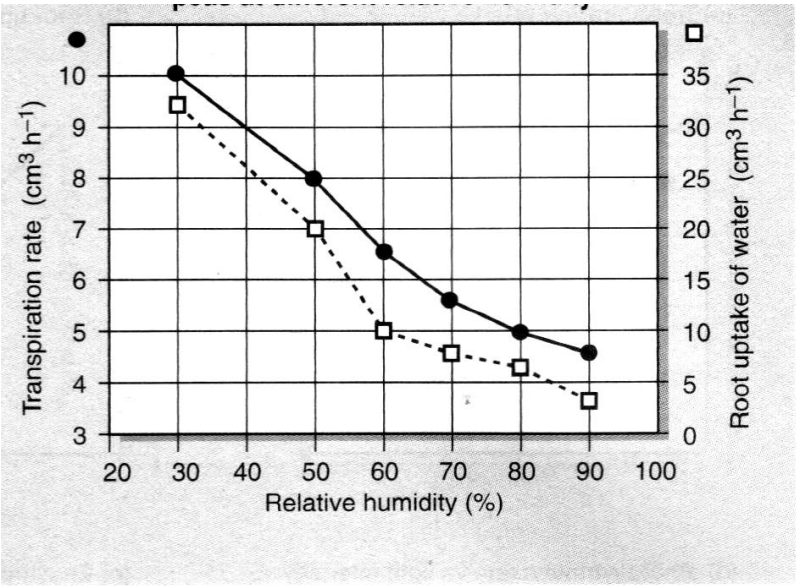
**42.** Figure 4 shows the transpiration and root uptake rates in peas at different relative humidity




(a) Describe the effect of increasing relative humidity on rate of transpiration and root uptake (0 3 marks)

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(b) State the relationship between transpiration and root uptake with humidity (01 mark)

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(c) Explain how increasing Relative humidity affects

(i) rate of transpiration (03 marks)

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(ii) root uptake rates (03 marks)

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(d) On the graph draw the rate of transpiration if wind speed was s increased (01 mark)

(e) Explain why the graph would take up the new shape drawn (03 marks)

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**43.** (a) Describe **three** characteristics of the specific immune response (03 marks)

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(b) (i) What is meant by **inflammation**? (01 mark)

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(ii) Outline the stages of an inflammatory response (04 marks)

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(c) Briefly explain how the immune system responds to pathogen re invasion. (02 marks)

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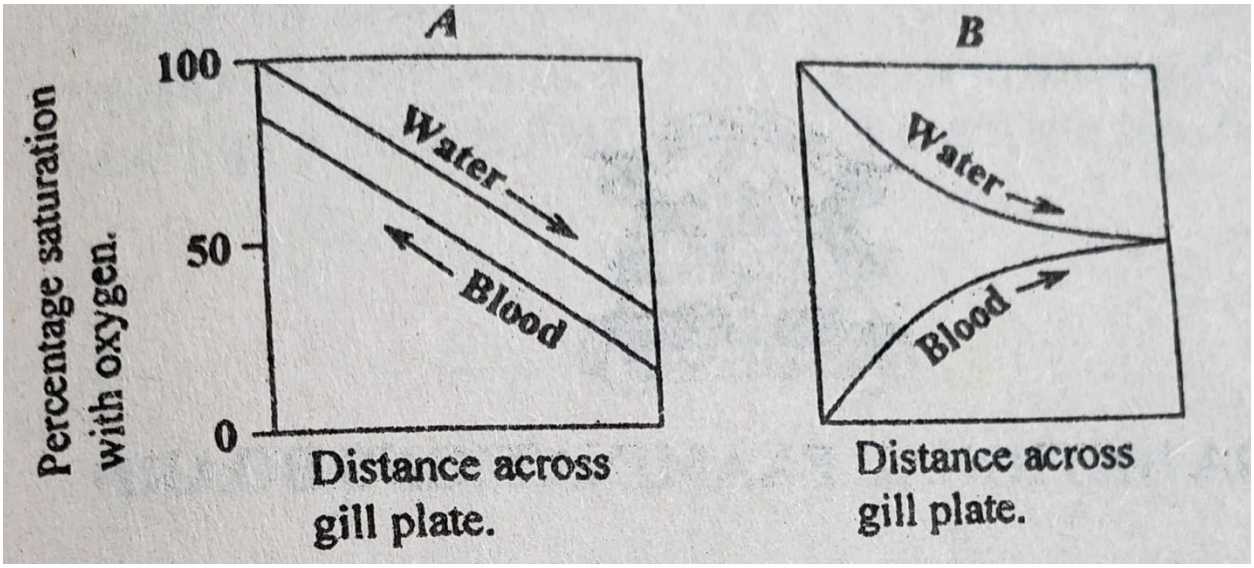
**44.** The figure below illustrates two different mechanisms of gaseous exchange in fish **A** and **B**




(a) State two differences between the **two** systems in terms of oxygen concentration (02 marks)

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(b) Explain the physiological advantage of fish A over **B.** (02 marks)

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(c) Explain how efficient uptake of oxygen by gills is achieved in a fish such as Tilapia (04 marks).

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b) Explain the significance of air as a medium of gaseous exchange compared to water. (02mks)

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**45.** How are organelles involved in the production and secretion of enzymes? (04mks)

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b) Relate structure to function of cell membrane proteins. (04mks)

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c) Describe the structure of an enzyme molecule. (02mks)

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46a) Explain what is meant by each of the following.

i. photophosphorylation. (02mks)

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ii. Oxidative phosphorylation. (02mks)

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b). Give three differences between oxidative phosphorylation and photophosphorylation.

(03mks)

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c). Explain the role of ATP in cells. (03mks)

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**END**