

# HUSO Dubai 7th/8th Grade Biology Final Round Exam

## Instructions:

- This test is one hour long and has 40 questions.
- Each question has five answer choices and is multiple-select multiple choice.
- Each question has at least one correct selection but may have up to five correct selections.
- The grading scheme for each question will be as follows:
  - +2 for perfectly correct
  - +1 for one mistake (only one of the answer choices was incorrectly selected/not selected)
  - +0 for two or more mistakes
- The tiebreaker is the sum of the scores on questions 3, 7, 15, 28, and 31.
- Don't spend too much time on any single question.

Name:

**Question 01.** Which of the following biological molecules are considered polymers?

- A) Carbohydrates
- B) Lipids
- C) Nucleic Acids
- D) Proteins
- E) Vitamins

**Question 02.** Which of the following statements correctly contrast RNA and DNA?

- A) RNA is assembled from 3' to 5' while DNA is assembled from 5' to 3'.
- B) RNA is generally double-stranded while DNA is generally single-stranded.
- C) RNA nucleotides have an extra hydroxyl group compared to DNA nucleotides.
- D) RNA possesses thymine while DNA possesses cytosine.
- E) Unlike RNA, DNA is prone to breaking down in acidic environments.

**Question 03.** Which of the following are NOT present in a prokaryotic cell?

- A) Cell Wall
- B) Nucleoid
- C) Nucleus
- D) Ribosomes
- E) Rough Endoplasmic Reticulum

**Question 04.** Which of the following spaces inside a cell would have a low pH?

- A) Lysosome
- B) Mitochondrial Intermembranal Space
- C) Mitochondrial Matrix
- D) Rough Endoplasmic Reticulum
- E) Smooth Endoplasmic Reticulum

**Question 05.** Which of the following microscopy techniques can be used to observe living cells?

- A) Electron microscopy
- B) Fluorescence microscopy
- C) Light microscopy
- D) Scanning electron microscopy
- E) Transmission electron microscopy

**Question 06.** Which of the following organelles/structures will a membrane protein pass through on its pathway to the cell membrane?

- A) Golgi Apparatus
- B) Ribosome
- C) Rough Endoplasmic Reticulum
- D) Secretory Vesicle
- E) Smooth Endoplasmic Reticulum

**Question 07.** Question: Which of the following statements are TRUE about chloroplasts?

- A) Chloroplasts are found in both plant and animal cells.
- B) Chloroplasts are the site of photosynthesis.
- C) Chloroplasts contain their own DNA.
- D) Chloroplasts produce glucose from carbon dioxide and water.
- E) Chloroplasts release oxygen as a byproduct.

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**Question 08.** Which of the following are pieces of evidence for the endosymbiotic origin of mitochondria?

- A) Mitochondria are only passed down from mother to offspring.
- B) Mitochondria are susceptible to antibiotics.
- C) Mitochondria can survive outside of the host cell.
- D) Mitochondria possess a double membrane.
- E) The mitochondrial genome lacks histones.

**Question 09.** Which of the following is TRUE regarding photosynthesis?

- A) The oxygen atoms of carbon dioxide show up in the sugar produced during photosynthesis.
- B) The oxygen atoms of water show up in the oxygen gas produced during photosynthesis.
- C) The light-dependent reactions can run indefinitely without the light-independent reactions (Calvin cycle).
- D) The light-independent reactions (Calvin cycle) can run indefinitely without light.
- E) Oxygen is produced and carbon dioxide is fixed during the light-dependent reactions.

**Question 10.** Which of the following are similarities between photosynthesis and cellular respiration?

- A) Both are catabolic pathways.
- B) Both are utilized by plants.
- C) Both contain an electron transport chain.
- D) Both rely on ATP synthase.
- E) Both use NADH as an electron carrier.

**Question 11.** Which of the following molecules/components could be involved in anaerobic respiration?

- A) Alcohol
- B) FADH<sub>2</sub>
- C) Lactate Dehydrogenase
- D) Mitochondrial Electron Transport Chain
- E) Pyruvate

**Question 12.** Which of the following structures would NOT be present in BOTH human and onion cells during mitosis and cytokinesis?

- A) Cell Plate
- B) Centriole
- C) Kinetochore
- D) Phragmoplast
- E) Spindle Microtubules

**Question 13.** Which of the following structures are present in BOTH cardiac muscle and skeletal muscle?

- A) Actin Filaments
- B) Intercalated Discs
- C) Many Nuclei
- D) Striations
- E) T-Tubules

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**Question 14.** Which of the following digestive organs perform chemical digestion?

- A) Mouth
- B) Esophagus
- C) Stomach
- D) Small Intestine
- E) Large Intestine

**Question 15.** Which of the following glands are both endocrine and exocrine?

- A) Adrenal Glands
- B) Pancreas
- C) Pituitary Gland
- D) Salivary Glands
- E) Thyroid Gland

**Question 16.** Which of the following correctly match digestive secretions to their function?

- A) Amylase - Digests Starch
- B) Bile Salts - Digest Nucleic Acids
- C) Lipase - Emulsify Lipids
- D) Pepsin - Lowers pH of Stomach
- E) Trypsin - Digests Proteins

**Question 17.** Which of the following correctly match a vitamin with its associated deficiency disease?

- A) Vitamin A - Night Blindness
- B) Vitamin B1 - Rickets
- C) Vitamin C - Anemia
- D) Vitamin D - Scurvy
- E) Vitamin K - Beriberi

**Question 18.** A patient comes in with decreased TSH and elevated T4 levels. Which of the following are true about this patient?

- A) This patient could be suffering from an iodine deficiency.
- B) This patient could be treated with injections of TSH.
- C) This patient likely has bulging eyes.
- D) This patient likely has hyperthyroidism.
- E) This patient likely has gained weight due to their condition.

**Question 19.** Which of the following brain regions control the rhythm of involuntary breathing?

- A) Cerebellum
- B) Cerebrum
- C) Medulla Oblongata
- D) Midbrain
- E) Pons

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**Question 20.** Which of the following are correct about the order of blood flow through the heart starting from when it enters the right atrium? Refer to the following events (labelled 1 through 5) below. You should still answer by selecting some subset of A through E.

1. Blood passes through the left atrium.
  2. Blood passes through the mitral valve.
  3. Blood passes through the pulmonary artery.
  4. Blood passes through the right ventricle.
  5. Blood passes through the tricuspid valve.
- A) 1 happens before 2
  - B) 2 happens before 3
  - C) 3 happens before 4
  - D) 4 happens before 5
  - E) 5 happens before 1

**Question 21.** Which of the following blood type donations can be done?

- A) A+ donor to AB- recipient
- B) A- donor to B+ recipient
- C) AB- donor to A+ recipient
- D) B- donor to AB+ recipient
- E) O+ donor to O- recipient

**Question 22.** Which of the following statements correctly describe adaptations of blood vessels?

- A) Arteries have thick muscular walls to regulate blood flow and pressure.
- B) Arteries have valves to prevent backflow during diastole.
- C) Capillaries have thin walls to allow for gas exchange.
- D) Veins have extensive elastic fibers to handle large pressure changes.
- E) Veins have thin walls to extract oxygen from the oxygen-poor blood they carry.

**Question 23.** Which of the following veins carry deoxygenated blood back to the heart?

- A) Coronary Vein
- B) Hepatic Vein
- C) Portal Vein
- D) Pulmonary Vein
- E) Vena Cava

**Question 24.** Which of the following cells are involved in the adaptive immune response?

- A) B Cells
- B) Dendritic Cells
- C) Macrophages
- D) Neutrophils
- E) T Cells

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**Question 25.** Which of the following statements correctly describe functions of antibodies?

- A) Antibodies agglutinate pathogens into large clumps that are more easily targeted for destruction by immune cells.
- B) Antibodies block the molecules on pathogens required for cell entry and successful infection.
- C) Antibodies mark pathogens for destruction by immune cells in a process called opsonization.
- D) Antibodies neutralize pathogens by puncturing holes in their cell wall upon binding.
- E) Antibodies promote the activation of B and T cells in what is termed the complement system.

**Question 26.** Which of the following excretory organs are responsible for managing blood pH?

- A) Kidneys
- B) Lungs
- C) Sweat Glands
- D) Ureters
- E) Urethra

**Question 27.** Which of the following are true about malaria?

- A) Malaria is caused by a virus.
- B) Malaria is most widespread in dry countries like the UAE.
- C) Malaria is vulnerable to antibiotics like penicillin.
- D) Mosquitoes are a vector for malaria.
- E) The malaria pathogen infects red blood cells.

**Question 28.** Which of the following structures are part of a plant's dermal tissue?

- A) Parenchyma
- B) Phloem
- C) Stomata
- D) Trichomes
- E) Xylem

**Question 29.** Which of the following are correct about the spatial order of the layers of a secondary growth stem?

- 1. Primary Phloem
  - 2. Secondary Phloem
  - 3. Primary Xylem
  - 4. Secondary Xylem
  - 5. Periderm
- A) 1 is exterior to 2
  - B) 2 is exterior to 3
  - C) 3 is exterior to 4
  - D) 4 is exterior to 5
  - E) 5 is exterior to 1

**Question 30.** Which of the following structures are responsible for primary growth?

- A) Apical Meristem
- B) Cork Cambium
- C) Lateral Meristem
- D) Pericycle
- E) Vascular Bundle

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**Question 31.** Which of the following are true about transpiration in plants?

- A) The plant does not expend energy for transpiration.
- B) Transpiration happens under negative pressure.
- C) Transpiration happens via the phloem and stomata.
- D) Transpiration increases when the weather is drier.
- E) Transpiration is primarily driven by capillary action.

**Question 32.** Which of the following are true about phloem sucrose transport in plants?

- A) Both sugar loading into the phloem at the source and sugar unloading from the phloem at the sink generally occur via active transport.
- B) Sucrose enters the phloem via hydrogen ion cotransport.
- C) Sugar is transported unidirectionally from the leaves to the roots.
- D) Sugar transport happens under negative pressure.
- E) The sieve tube elements that the phloem sap moves through are dead at maturity.

**Question 33.** Which of the following are true about a flower in which you knock out the C gene in the ABC model of flower development?

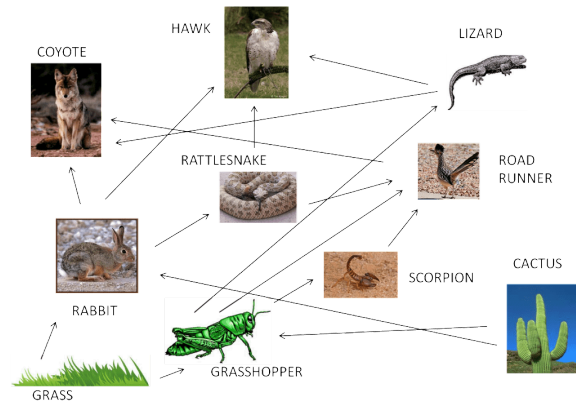
- A) The flower will have no carpels.
- B) The flower will have no sepals.
- C) The flower will be reproductively inviable.
- D) The inside whorl will be petals.
- E) The outside whorl will be stamens.

**Question 34.** Which of the following are part of the female reproductive portion of the flower?

- A) Carpel
- B) Pistil
- C) Stamen
- D) Stigma
- E) Style

**Question 35.** Which of the following are density-dependent factors?

- A) Disease
- B) Extreme Weather
- C) Food Availability
- D) Manmade Habitat Destruction
- E) Predation



**Question 36.** Which of the following are true about the above food web?

- A) Coyotes and scorpions are both secondary consumers.
- B) If the rattlesnake population increased, the cactus population likely would too.
- C) If the scorpion population increased, the coyote population likely would too.
- D) The lizard biomass is likely less than the coyote biomass.
- E) There are two producers in this ecosystem.

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**Question 37.** Which of the following are true about defenses against predation?

- A) Aposematic coloration allows organisms to blend in with their environment.
- B) Fish form schools as a way to defend against predation.
- C) In Batesian mimicry, a poisonous species mimics another poisonous species.
- D) Müllerian mimicry can be thought of as a type of parasitism because the mimic decreases the model's fitness.
- E) Poison dart frogs exhibit aposematic coloration.

**Question 38.** Which of the following are correct examples of symbiosis?

- A) Commensalism - After a volcanic eruption, fast-growing species like pine trees initially colonize the new land. Afterwards, slower-growing, more shade tolerant plants like oak trees replace the pines.
- B) Commensalism - Orchids grow on trees as epiphytes. Orchids get a place to live but this does not affect the tree at all.
- C) Mutualism - Bees pollinate flowers. The bees get to gather pollen and nectar while the flowers are able to spread their pollen and reproduce.
- D) Parasitism - Dodders are vines that attach to other plants and steal their nutrients, eventually leading to the death of the other plant.
- E) Parasitism - Wolves hunt deer. By doing so, they help keep the deer population in check, preventing the deer from overgrazing tree saplings.

**Question 39.** Which of the following organisms develop the anus before the mouth?

- A) Butterfly
- B) Cat
- C) Earthworm
- D) Starfish
- E) Squid

**Question 40.** Which of the following correctly match an animal phylum with one of their distinguishing characteristics?

- A) Arthropoda - Mantle
- B) Cnidaria - Nematocyst
- C) Nematoda - Water Vascular System
- D) Platyhelminthes - Coelom
- E) Porifera - Pentaradial Symmetry