

1. Which of the following elements are constituents of proteins?

- I. Carbon
- II. Nitrogen
- III. Oxygen

- A. I only
- B. I and II only
- C. I and III only
- D. I, II and III

2. One water molecule is held together by intramolecular bonds, and separate water molecules interact with each other via intermolecular bonds. Which of the following is correctly matched to their bond types?

	<b>Intramolecular bond</b>	<b>Intermolecular bond</b>
A.	Covalent	Ionic
B.	Ionic	Hydrogen
C.	Hydrogen	Covalent
D.	Covalent	Hydrogen

3. Hydrolysis of maltose results in the formation of the following:

- A. Fructose and glucose
- B. Two glucoses
- C. Galactose and fructose
- D. Sucrose and glucose

4. Which of the following statements about enzyme activity is false?

- A. Enzymes increase the activation energy of reactions.
- B. Enzymes can be denatured by high temperatures.
- C. Enzyme activity is influenced by pH.
- D. Enzymes speed up the rate of reaction without being consumed.

5. Anaerobic respiration takes place in the:
- A. Mitochondria
  - B. Nucleus
  - C. Chloroplast
  - D. Cytoplasm
6. Which of the following is the correct sequence of events during cellular respiration?
- A. Glycolysis → Electron transport chain → Krebs cycle
  - B. Glycolysis → Krebs cycle → Electron transport chain
  - C. Krebs cycle → Glycolysis → Electron transport chain
  - D. Electron transport chain → Glycolysis → Krebs cycle
7. Which of the following is not required for a successful polymerase chain reaction (PCR)?
- A. Free nucleotides
  - B. DNA primer
  - C. RNA polymerase
  - D. Extracted DNA sample as the template
8. Which of the following is most likely to result in a frameshift mutation?
- A. Substitution of one base for another.
  - B. Insertion of a nucleotide.
  - C. Deletion of a single base.
  - D. Both B and C.

9. Which row correctly compares the magnification and resolution of a light and electron microscope?

	<b>Light Microscope</b>	<b>Electron Microscope</b>
A.	Lower magnification, lower resolution	Higher magnification, higher resolution
B.	Lower magnification, higher resolution	Higher magnification, lower resolution
C.	Higher magnification, lower resolution	Lower magnification, higher resolution
D.	Same magnification and resolution	Same magnification and resolution

10. The fungal cells of Coenocytic organisms, such as Rhizopus are considered to be atypical eukaryotes that are characterized by which of the following?

- A. They have separate, individual cells with distinct membranes.
- B. They have a continuous cytoplasm with multiple nuclei and no compartmentalization.
- C. They contain mitochondria and chloroplasts.
- D. They are multicellular but lack any cellular differentiation.

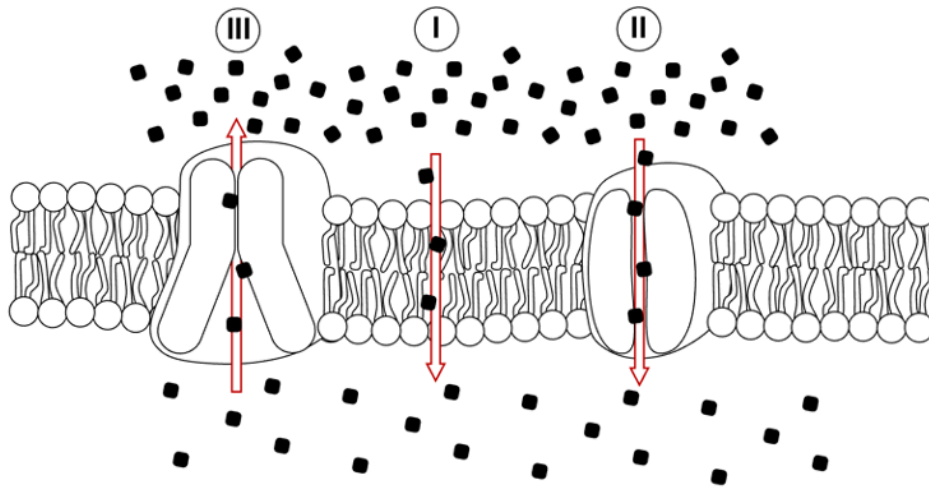
11. Which of the following structures is found in both prokaryotic and eukaryotic cells?

- A. Nucleus
- B. Mitochondrion
- C. Ribosome
- D. Chloroplast

12. Which of the following is NOT a function of the smooth endoplasmic reticulum?

- A. Detoxification of drugs and poisons
- B. Lipid synthesis
- C. Protein synthesis
- D. Calcium storage

13. Which of the following modes of membrane transport requires chemical energy in the form of ATP?



- A. I only
- B. II only
- C. III only
- D. II and III only

14. Which type of RNA is involved in translating genetic information into proteins?

- I. mRNA
- II. tRNA
- III. rRNA

- A. I only
- B. II only
- C. I and II only
- D. I, II and III

15. During which phase of meiosis do homologous chromosomes separate?

- A. Anaphase I
- B. Metaphase I
- C. Anaphase II
- D. Telophase II

16. In the human Karyogram below, which chromosome pair is responsible for determining the gender, and which gender is this specific individual?



- A. Chromosome pair 1, Female
  - B. Chromosome pair 22, Male
  - C. Chromosome pair 23, Male
  - D. Chromosome pair 23, Female
17. Which of the following is not a characteristic of the human alveolus that enhances gas exchange?
- A. A large surface area provided by alveolar sacs.
  - B. A thin, single layer of squamous epithelial cells.
  - C. The presence of a moist lining that allows gases to dissolve.
  - D. The lack of a blood supply to the alveoli to prevent interference with gas diffusion.

**18.** Which of the following increases the rate of transpiration?

- I. Increased temperature
- II. Increased wind
- III. Increased humidity

- A. I only
- B. I and II only
- C. I and III only
- D. I, II and III

**19.** Which part of the human brain is primarily responsible for regulating heart rate?

- A. Cerebellum
- B. Medulla oblongata
- C. Cerebrum
- D. Thalamus

**20.** The production of antibodies in response to an infection is an example of:

- A. Active immunity
- B. Passive immunity
- C. Artificial immunity
- D. Innate immunity

**21.** Which of the following is NOT true regarding the corpus luteum?

- A. It secretes progesterone to maintain the uterine lining for pregnancy.
- B. It forms after ovulation from the ruptured follicle.
- C. It degenerates and becomes the placenta if pregnancy occurs.
- D. Its activity is supported by HCG during early pregnancy.

22. For a trait that is autosomal dominant, if both parents are heterozygous for that trait, how many unique genotypes and phenotypes are possible in the offspring?

	Possible genotypes	Possible phenotypes
A.	2	2
B.	3	3
C.	4	3
D.	3	2

23. In a genetic cross involving two heterozygous individuals (Aa), what is the probability that their offspring will inherit the genotype AA?

- A. 25%
- B. 50%
- C. 75%
- D. 100%

24. Which of the following is an example of a negative feedback mechanism?

- A. Increased production of insulin when blood glucose levels are high.
- B. Increase production of red blood cells when oxygen levels are low.
- C. The release of adrenaline during stress.
- D. Increased oxytocin production during labor.

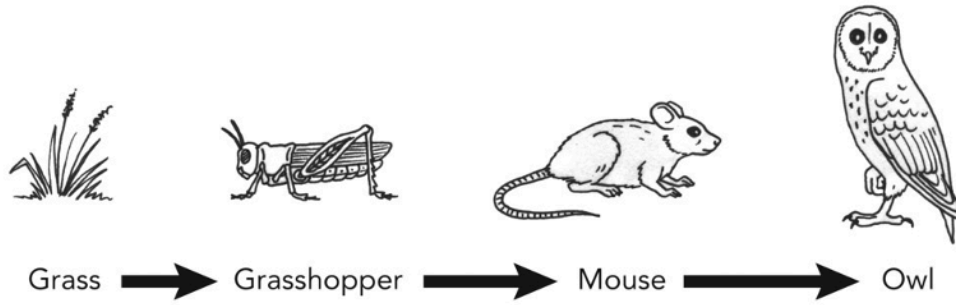
25. Which of the following is/are true regarding homologous structures?

- I. They indicate common ancestry between species.
  - II. They may perform different functions in different species.
  - III. They result from convergent evolution due to similar environmental pressures.
- A. I only
  - B. I and II only
  - C. II and III only
  - D. I, II and III

- 26.** Which of the following best describes an ecosystem?
- A. A group of organisms of the same species in a given area.
  - B. A community of organisms interacting with their environment.
  - C. The physical environment of an organism.
  - D. A group of populations in a region.
- 27.** Which of the following is a major factor that determines the biome in a given region?
- A. Type of vegetation.
  - B. Soil composition.
  - C. Climate conditions.
  - D. Animal species present.
- 28.** Which of the following is a true statement about ecological pyramids?
- A. Energy is transferred efficiently at each trophic level.
  - B. Biomass decreases as you move up trophic levels.
  - C. Producers are typically at the top of the pyramid.
  - D. The number of individuals increases as you move up trophic levels.



29. In the food chain below, what is the trophic level of the mouse, and what is its mode of feeding?



	Trophic level	Mode of feeding
A.	2	Heterotroph
B.	3	Secondary consumer
C.	3	Tertiary consumer
D.	2	Producer

30. Which diagram best represents how atmospheric greenhouse gases trap heat energy?

