

TOSS-UP

1. BIOLOGY *Short Answer* By name or number, identify all of the following four techniques that are used to determine the 3-dimensional tertiary structure of proteins:

- I. X-ray crystallography
- II. Edmann degradation
- III. Nuclear magnetic resonance
- IV. 2-dimensional gel electrophoresis

ANSWER: 1 AND 3

TOSS-UP

2. BIOLOGY *Multiple Choice* An enveloped virus derives its envelope primarily from...

- (W) The proteins translated from the viral genome
- (X) The lipids synthesized by enzymes translated from the viral genome
- (Y) Lipids from the plasma membrane of the host cell
- (Z) Lipids from the viral envelope of the mother virus

ANSWER: Y

TOSS-UP

3. BIOLOGY *Short Answer* What is the term for the monomers that polymerize to form the viral capsid?

ANSWER: CAPSOMERES

TOSS-UP

4. BIOLOGY *Multiple Choice* Which of the following sugars is a ketone?

- (W) Glyceraldehyde
- (X) Threose
- (Y) Ribose
- (Z) Dihydroxyacetone

ANSWER: Z

TOSS-UP

5. BIOLOGY *Short Answer* By name or number, identify all of the following sugars that have a $\beta - 1, 4$ glycosidic linkage:

- I. Cellulose
- II. Glycogen
- III. Lactose

ANSWER: 1 AND 3

TOSS-UP

6. BIOLOGY *Multiple Choice* In which of the following countries is the greatest percentage of the population lactose-intolerant?

- (W) Finland
- (X) China
- (Y) India
- (Z) Australia

ANSWER: X

TOSS-UP

7. BIOLOGY *Short Answer* Many drugs that lower blood cholesterol levels, known as statins, act by inhibiting this enzyme, which is crucial to the mevalonate pathway that synthesizes cholesterol and other isoprenoids. Name this enzyme.

ANSWER: HMG-COA REDUCTASE

TOSS-UP

8. BIOLOGY *Multiple Choice* Which of the following functional groups would lower the pKa of an organic compound?

- (W) Carboxyl
- (X) Carbonyl
- (Y) Amine
- (Z) Ester

ANSWER: W

TOSS-UP

9. BIOLOGY *Short Answer* Which type of fermentation occurs primarily in muscle cells in humans, where the acidic organic acid produced must be converted back to pyruvate in the liver as part of the Cori cycle?

ANSWER: LACTIC ACID FERMENTATION

TOSS-UP

10. BIOLOGY *Multiple Choice* Which key regulatory enzyme in glycolysis converts fructose-6-phosphate to fructose-1,6-bisphosphate?

(W) Hexokinase

(X) Glucokinase

(Y) Phosphoglucoisomerase

(Z) Phosphofructokinase

ANSWER: Z

TOSS-UP

11. BIOLOGY *Short Answer* Name all of the following organic molecules that are reducing agents: NAD^+ , NADH , FAD , FADH_2 , NADPH

ANSWER: 2, 4, 5

TOSS-UP

12. BIOLOGY *Multiple Choice* Which of the following is not true of photosystems in land plant chloroplasts?

(W) They are tetramers

(X) They consist predominantly of chlorophyll a molecules

(Y) They have a high concentration of magnesium and calcium

(Z) Photosystem II is used in cyclic electron flow

ANSWER: Z

TOSS-UP

13. BIOLOGY *Short Answer* This molecule has been highly conserved in the Eukaryotic kingdoms. It plays a role in electron transport chains and has recently been found to function in apoptosis. Name this molecule.

ANSWER: CYTOCHROME C

TOSS-UP

14. BIOLOGY *Multiple Choice* Which of the following is not a primarily anabolic pathway?

- (W) Gluconeogenesis
- (X) Calvin cycle
- (Y) Glyoxylate cycle
- (Z) Beta-oxidation

ANSWER: Z

TOSS-UP

15. BIOLOGY *Short Answer* What is the term for the innermost membrane system of a chloroplast?

ANSWER: THYLAKOID

TOSS-UP

16. BIOLOGY *Multiple Choice* Which of the following is not a difference between eukaryotic and prokaryotic genomes?

- (W) Prokaryotes generally have a smaller number of larger genes
- (X) Eukaryotic chromosomes have more intensive packing and a higher protein concentration
- (Y) Prokaryotic genomes often contain more polycistronic mRNA
- (Z) A larger percentage of the eukaryotic genome codes for transcription factors

ANSWER: W

TOSS-UP

17. BIOLOGY *Short Answer* Which protein molecule is involved in regulation of gene expression through positive gene regulation, and binds to the promoter to increase the affinity for DNA polymerase to the promoter region?

ANSWER: CAP (CATABOLITE ACTIVATOR PROTEIN)

TOSS-UP

18. BIOLOGY *Multiple Choice* Which of the following groups is not a lophotrochozoan?

- (W) Nematodes
- (X) Flatworms
- (Y) Molluscs
- (Z) Rotifers

ANSWER: W

TOSS-UP

19. BIOLOGY *Short Answer* Arrange the following four groups in order of their proximity to angiosperms:

- I. Charophytes
- II. Anthocerophytes
- III. Pterophytes
- IV. Lycophytes

ANSWER: 1, 2, 4, 3

TOSS-UP

20. BIOLOGY *Multiple Choice* Which of the following hormones does not increase plant primary growth?

- (W) Auxin
- (X) Abcissic acid
- (Y) Giberellin
- (Z) Cytokinin

ANSWER: X

TOSS-UP

21. BIOLOGY *Short Answer* According to recent research, which amino acid in plants that is secreted by the synergids helps guide the pollen tube towards the micropyle?

ANSWER: GABA (GAMMA-AMINO BUTYRIC ACID)

TOSS-UP

22. BIOLOGY *Multiple Choice* The movement of the phloem sap is best characterized as...

- (W) Active transport
- (X) Osmotic flow
- (Y) Bulk flow
- (Z) Solute flow

ANSWER: Y

TOSS-UP

23. BIOLOGY *Short Answer* By name or number, identify all of the following animals which would have a very long loop of Henle:

- I. Jackrabbit
- II. Human
- III. Whale

ANSWER: 1 ONLY

TOSS-UP

24. BIOLOGY *Short Answer* Which group of eicosenoid hormones is derived from arachadonic acid and participates in delivery, inflammation, blood pressure, and other activities?

ANSWER: PROSTAGLANDINS

TOSS-UP

25. BIOLOGY *Multiple Choice* An infant skull contains many fontanelles, or gaps between the cranial bones, which predispose the infant to fatal head injuries. Which of the following best explains the presence of these potential time bombs in the infant skull?

- (W) They permit increaed blood flow to the cranial bones
- (X) They permit expansion of the cranium in response to the developing brain
- (Y) They serve as early anchors for the cranial meninges
- (Z) They are vestigial structures that actually pose a disadvantage to the infant

ANSWER: X
