

BIOCHEMISTRY TEST – PRACTICE QUESTIONS (Answers on last page)

- The atomic # for Fe (iron) is 26. How many protons in Fe^{2+} ?
(A) 22 (B) 24 (C) 26 (D) 28 (E) 30
- Two molecules that are **isomers**:
(A) must contain the same functional groups
(B) often differ in the number of unsaturated bonds they possess
(C) have the same molecular formulas
(D) often have different masses
- The maximum number of **electrons** which may occupy any given energy level in an atom is:
(A) the Group number (D) $2n^2$
(B) the valence of that atom (E) the octet rule
(C) n^2
- In which of the following kinds of organic compounds does a **carbon** atom bond ONLY to **hydrogen** and other **carbon** atoms?
(A) carbohydrates (D) nucleic acids
(B) fatty acids (E) hydrocarbons
(C) lipids
- Glycogen is best defined as a:
(A) storage form of lipids (D) polymer of glucose
(B) storage form of glycerol (E) storage form of proteins
(C) polymer of lactose
- Most **biologically important atoms** attempt to possess _____ electrons in their outermost energy level.
(A) n^2 (B) 2 (C) 10 (D) 4 (E) 8
- The number of **valence** electrons in an atom with atomic number 13 is:
(A) 1 (B) 3 (C) 5 (D) 8 (E) 13
- Which molecule does NOT have a **polar covalent** bond?
(A) H_2O (B) H-Br (C) H-H (D) H-F (E) H-I
- What chemical family does $\text{H}_2\text{C}=\text{C}=\text{CH}_2$ belong to?
(A) alkane (D) ether
(B) alkene (E) ester
(C) alkyne
- In the **induced-fit model** of enzyme action, a _____ must bind to the enzyme's _____ for the enzyme to perform its function.
(A) catalyst; activation energy (D) product; catalytic site
(B) product; active site (E) water molecule; allosteric site
(C) substrate; active site
- Which one of the following applies to a **basic solution**?
(A) high OH^- (D) $\text{H}^+ = \text{OH}^-$
(B) low OH^- (E) both B and C are correct
(C) high H^+
- Which one of the four classes of biologically important molecules does **CELLULOSE** belong to?
(A) carbohydrates (C) proteins
(B) nucleic acids (D) lipids
- Amino acids** are joined during a(n) _____ reaction and a(n) _____ bond/linkage is formed.
(A) hydrolysis; peptide (C) condensation; amide
(B) neutralization; ether (D) oxidation; ester
- With respect to proteins, the **primary structure** refers to the:
(A) helix or pleated sheet pattern of a polypeptide
(B) complex 3-dimensional folding pattern of a polypeptide
(C) interaction of more than one polypeptide chain
(D) ordered sequence of amino acids in a polypeptide

15. With respect to proteins, the **quaternary structure** refers to the:
 (A) helix or pleated sheet pattern of a polypeptide
 (B) complex 3-dimensional folding pattern of a polypeptide
 (C) interaction of more than one polypeptide chain
 (D) ordered sequence of amino acids in a polypeptide
16. Complete the equation: glucose + fructose ----> ?
 (A) maltose (D) lactose
 (B) sucrose (E) hexose
 (C) cellulose
17. Which molecule would provide the **most glucose** upon hydrolysis?
 (A) polypeptide (D) lactose
 (B) starch (E) galactose
 (C) amino acid
18. An athlete is tested at an Olympic event and STEROIDS are found in the bloodstream. Which class of biologically important molecules are **steroids** related to?
 (A) carbohydrates (C) nucleic acids
 (B) proteins (D) lipids
19. The **independent** variable in a scientific experiment is the:
 (A) condition or event manipulated by the investigator
 (B) condition or event that may change due to the other variable
 (C) condition which the investigator attempts to keep the same
 (D) same as the dependent variable
20. Glucose + galactose produces:
 (A) lactose (D) sucrose
 (B) cellulose (E) fructose
 (C) maltose
21. If the H from the OH group in CH₃-OH is removed and replaced with a METHYL group, what **family** will the molecule then belong to?
 (A) ether (D) ester
 (B) aldehyde (E) ketone
 (C) carboxylic acid
22. Which of the following is CORRECT for an exergonic reaction?
 (A) more activation energy is needed than for an endergonic reaction
 (B) less activation energy is needed than for an endergonic reaction
 (C) products have more energy than reactants
 (D) products have less energy than reactants
 (E) both B and C are correct
23. **Hydrolysis** is best described as the:
 (A) heating of a compound in order to drive off excess water and concentrate its volume
 (B) breaking of a long-chain compound into subunits by adding water
 (C) linking of two or more molecules by the removal of one or more water molecules
 (D) constant removal of hydrogen atoms from the surface of a carbohydrate
24. Unlike triglycerides, **phospholipid** molecules:
 (A) have 1 lipid tail (D) have 4 lipid tails
 (B) have 2 lipid tails (E) have NO lipid tails
 (C) have 3 lipid tails
25. Which one of the following would convert a **liquid** fat to a **solid** fat:
 (A) add heat (D) unsaturate it
 (B) add hydrogen (hydrogenation) (E) add "kinks" in tails
 (C) add carbon

26. **Enzymes:**
 (A) increase the rate of a chemical reaction (D) are always stored in active form
 (B) are consumed in chemical reactions (E) all of the above
 (C) raise activation energy
27. The following **chemical reaction** occurs during a process called "glycolysis":

$$\text{glucose} + \text{ATP} \xrightarrow{\text{kinase}} \text{glucose-6-phosphate} + \text{ADP}$$

 In this reaction, the substrate is _____ and the enzyme is _____.
 (A) ATP; ADP (D) kinase; glucose
 (B) ADP; glucose-6-phosphate (E) glucose; kinase
 (C) glucose-6-phosphate; kinase
28. The exoskeleton of many insects is made of **chitin** which is a modified form of:
 (A) carbohydrate (C) lipid
 (B) protein (D) nucleic acid
29. Electrons are shared **unequally** in a(n) _____ bond.
 (A) non polar covalent (D) polar covalent
 (B) hydrogen (E) both A and B
 (C) ionic
30. Myoglobin is an oxygen-carrying molecule in muscle. It consists of just one polypeptide chain. Myoglobin **lacks**:
 (A) primary structure (C) tertiary structure
 (B) secondary structure (D) quaternary structure

(ANSWERS ON NEXT PAGE)

Answers for EVEN question numbers are given below. Students discuss all ODD questions.

1	2	3	4	5	6	7	8	9	10
	C		E		E		C		C
11	12	13	14	15	16	17	18	19	20
	A		D		B		D		A
21	22	23	24	25	26	27	28	29	30
	D		B		A		A		D