LOGIC BLOOM · NEET BIOLOGY

Biomolecules
Practice Set

Class 11 Biology · High-Yield NEET Questions

15 must-do questions with detailed explanations

15 MCQs | NEET Level | Detailed Solutions

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PART I · QUESTIONS

Biomolecules — 15 NEET MCQs

Single correct answer. Cover amino acids, proteins, enzymes, nucleic acids, carbohydrates and lipids.

Attempt all 15 before checking the key. Time yourself: aim for under 60 seconds per question, the NEET pace.

Q1 CARBOHYDRATES

Which one of the following is the most abundant **organic** compound on Earth, and the chief structural polysaccharide of plant cell walls?

(A) Glycogen
(B) Cellulose
(C) Starch
(D) Chitin

Q2 PROTEINS

The bond that joins two amino acids in a protein, and the bond that joins two monosaccharides in a disaccharide, are respectively:

(A) Glycosidic bond and peptide bond
(B) Peptide bond and glycosidic bond
(C) Ester bond and peptide bond
(D) Phosphodiester bond and glycosidic bond

Q3 PROTEINS

A protein loses its biological activity on boiling, but its primary structure remains intact. This phenomenon is called:

(A) Denaturation
(B) Hydrolysis
(C) Coagulation only
(D) Peptisation

Q4 PROTEINS

Which level of protein structure is described by the α-helix and β-pleated sheet?

A Primary structure

B Secondary structure

C Tertiary structure

D Quaternary structure

Q5 ENZYMES

The first enzyme to be crystallised was urease (Sumner, 1926). Chemically, almost all enzymes are:

A Lipids

B Proteins

C Carbohydrates

D Nucleic acids

Q6 ENZYMES

An enzyme lowers the activation energy of a reaction. Which statement about enzyme action is **correct**?

A It changes the equilibrium constant of the reaction

B It is consumed during the reaction

C It lowers the activation energy without altering ΔG of the reaction

D It makes a thermodynamically non-spontaneous reaction spontaneous

Q7 ENZYMES

The 'lock and key' and 'induced fit' models both explain enzyme:

A Denaturation

B Specificity for substrate

C Quaternary structure

D Competitive inhibition only

Q8 ENZYMES

In a competitive inhibitor such as malonate acting on succinate dehydrogenase, the inhibitor:

A Binds the allosteric site irreversibly

B Resembles the substrate and competes for the active site

C Denatures the enzyme permanently

D Increases the V_{max} of the enzyme

Q9 NUCLEIC ACIDS

Which of the following is a purine base found in DNA?

A Cytosine

B Thymine

C Adenine

D Uracil

Q10 NUCLEIC ACIDS

According to Chargaff's rule for double-stranded DNA:

A. A + T = G + C

B. A = G and T = C

C. A = T and G = C, hence A+G = T+C

D. Purines and pyrimidines are present in unequal amounts

Q11 NUCLEIC ACIDS

A nucleotide differs from a nucleoside in that a nucleotide additionally contains:

A. A nitrogenous base

B. A pentose sugar

C. A phosphate group

D. A hydrogen bond

Q12 LIPIDS

Which of the following statements about fats and oils (triglycerides) is correct?

A. Oils are solid at room temperature due to saturated fatty acids

B. Fats are usually rich in unsaturated fatty acids and are liquid

C. Oils have a lower melting point owing to unsaturated (double-bonded) fatty acids

D. Both fats and oils lack ester linkages

Q13 LIPIDS

Lecithin, an important phospholipid of cell membranes, contains which nitrogen-containing component?

A Glycine

B Choline

C Serine only

D Adenine

Q14 BIOMACROMOLECULES

The acid-insoluble fraction (the macromolecular pool) of a living cell, obtained after treating tissue with trichloroacetic acid, mainly contains:

A Amino acids, sugars and nucleotides

B Proteins, nucleic acids, polysaccharides and lipids

C Only water and minerals

D Glucose and amino acids only

Q15 BIOMACROMOLECULES

Which of the following correctly matches the biomolecule with its monomer (building block)?

A Protein – fatty acid

B Polysaccharide – amino acid

C Nucleic acid – nucleotide

D Lipid – nucleoside

PART II · ANSWER KEY & EXPLANATIONS

Detailed Solutions

Quick-check grid first, then the reasoning for every option.

Q1 **B**	Q2 **B**	Q3 **A**	Q4 **B**	Q5 **B**	Q6 **C**	Q7 **B**	Q8 **B**	Q9 **C**	Q10 **C**	Q11 **C**	Q12 **C**
Q13 **B**	Q14 **B**	Q15 **C**									

Q1 **Correct: B** *Cellulose*

Cellulose is a homopolymer of D-glucose linked by β-1,4-glycosidic bonds, making it unbranched and able to pack into tough microfibrils — ideal for the structural role in plant cell walls. It is the most abundant organic compound in the biosphere. Starch and glycogen are storage polysaccharides (α-linkages), and chitin (a nitrogen-containing polysaccharide of N-acetylglucosamine) builds arthropod exoskeletons and fungal walls.

Q2 **Correct: B** *Peptide bond and glycosidic bond*

Amino acids are joined by a **peptide bond** (a substituted amide, –CO–NH–) formed between the α-carboxyl of one and the α-amino of the next, with loss of water. Monosaccharides are joined by a **glycosidic bond**. Phosphodiester bonds link nucleotides in nucleic acids, and ester (and glycosidic) linkages appear in lipids and carbohydrates — useful to keep the linkage–polymer pairings straight for NEET.

Q3 **Correct: A** *Denaturation*

Denaturation is the disruption of secondary, tertiary and quaternary structure (the non-covalent bonds — H-bonds, ionic, hydrophobic interactions, and disulphide bridges) by heat, pH or chemicals, *without* breaking the peptide bonds of the primary structure. The protein loses function (e.g. an enzyme loses catalytic activity). Hydrolysis would actually cleave peptide bonds and break the primary structure, so it is the wrong choice.

Q4 **Correct: B** *Secondary structure*

The α-helix and β-pleated sheet are regular, repeating local folding patterns stabilised mainly by hydrogen bonds between backbone –C=O and –N–H groups: this is the **secondary** structure. Primary = the linear amino-acid sequence; tertiary = the overall 3-D folding of a single polypeptide (gives the functional shape); quaternary = the assembly of two or more polypeptide subunits (e.g. haemoglobin's four chains).

Q5 **Correct: B** *Proteins*

Sumner crystallised **urease** from jack bean and showed it was a protein, establishing that enzymes are proteins. The only well-known exceptions are **ribozymes** — catalytic RNA molecules — but for NEET, the default answer for the chemical nature of an enzyme is protein. Urease catalyses hydrolysis of urea to ammonia and CO_2.

Q6 **Correct: C** *It lowers the activation energy without altering ΔG of the reaction*

An enzyme speeds up a reaction by providing an alternative path with a lower **activation energy**, increasing the rate of attainment of equilibrium. It does *not* change the equilibrium position, the equilibrium constant, or the overall free-energy change (ΔG) — it cannot drive an energetically unfavourable reaction on its own. The enzyme is regenerated unchanged at the end, so it is not consumed.

Q7 **Correct: B** *Specificity for substrate*

Both models explain enzyme–substrate **specificity** — why a given enzyme acts only on a particular substrate. In the lock-and-key model the active site is a rigid complementary shape; in the more accurate induced-fit model the active site moulds itself around the substrate on binding. The region that binds substrate is the **active site**, typically a small crevice formed by a few amino-acid residues.

Q8 **Correct: B** *Resembles the substrate and competes for the active site*

Malonate is structurally similar to the substrate **succinate**, so it competes for the same active site of succinate dehydrogenase — the classic example of **competitive inhibition**. Because the binding is reversible and substrate-like, the inhibition can be overcome by raising substrate concentration. This is a frequently asked NEET example, so remember the malonate–succinate pair specifically.

Q9 **Correct: C** *Adenine*

Purines are double-ringed bases: **Adenine** and Guanine (mnemonic: 'Pure As Gold' → Purines = A, G). Pyrimidines are single-ringed: Cytosine, Thymine (in DNA) and Uracil (in RNA). Adenine pairs with thymine via two hydrogen bonds; guanine pairs with cytosine via three. Uracil replaces thymine in RNA.

Q10 **Correct: C** *A = T and G = C, hence A+G = T+C*

Chargaff's rule states that in dsDNA, the amount of adenine equals thymine (A = T) and guanine equals cytosine (G = C). It follows that total purines = total pyrimidines, i.e. **A + G = T + C**. This base-pairing complementarity was a key clue for the Watson–Crick double-helix model. Note A + T need *not* equal G + C — that ratio varies between species.

Q11 **Correct: C** *A phosphate group*

A **nucleoside** = nitrogenous base + pentose sugar (e.g. adenosine). A **nucleotide** = nucleoside + a **phosphate** group (e.g. adenosine monophosphate, AMP). So the distinguishing feature of a nucleotide is the phosphate. Nucleotides are the monomers of nucleic acids, joined by 3′–5′ phosphodiester bonds.

Q12 **Correct: C** *Oils have a lower melting point owing to unsaturated (double-bonded) fatty acids*

Triglycerides are esters of glycerol and three fatty acids. **Oils** are rich in **unsaturated** fatty acids (containing C=C double bonds that introduce kinks), which lowers their melting point so they stay liquid at room temperature. **Fats** are rich in saturated fatty acids, pack tightly, and are solid. Both contain ester linkages, so the option denying that is wrong.

Q13 **Correct: B** *Choline*

Lecithin (phosphatidylcholine) consists of glycerol, two fatty acids, a phosphate group and the nitrogenous base **choline**. Phospholipids are amphipathic (a hydrophilic phosphate head and hydrophobic fatty-acid tails), which is why they form the bilayer of biological membranes. This amphipathic character is the conceptual link NEET often tests with membrane structure.

Q14 **Correct: B** *Proteins, nucleic acids, polysaccharides and lipids*

When tissue is ground in trichloroacetic acid and filtered, small molecules (amino acids, monosaccharides, nucleotides) pass into the **acid-soluble** pool, while large biomacromolecules — **proteins, nucleic acids, polysaccharides** and lipids — are retained as the **acid-insoluble** (macromolecular) pool. Note: lipids appear in the acid-insoluble fraction not because they are truly macromolecules but because they form membrane vesicles too large to pass through — a classic NEET nuance.

Q15 **Correct: C** *Nucleic acid – nucleotide*

Nucleic acids (DNA, RNA) are polymers of **nucleotides** — the correct match. The other pairings are wrong: proteins are polymers of amino acids (not fatty acids); polysaccharides are polymers of monosaccharides (not amino acids); and lipids are not true polymers but are assembled from glycerol and fatty acids. Knowing each polymer–monomer pair is high-yield for NEET assertion–reason questions.

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