

Biomolecules — NEET Chemistry PYQ (2005-2021)

Class 12 Chemistry · 32 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. The RBC deficiency is deficiency disease of :

- (A) Vitamin B₁₂
- (B) Vitamin B₆
- (C) Vitamin B₁
- (D) Vitamin B₂

NEET 2020 · Q117

2. Which of the following is a basic amino acid ?

- (A) Serine
- (B) Alanine
- (C) Tyrosine
- (D) Lysine

NEET 2020 · Q121

3. Sucrose on hydrolysis gives :

- (A) β -D-Glucose + α -D-Fructose
- (B) α -D-Glucose + β -D-Glucose
- (C) α -D-Glucose + β -D-Fructose
- (D) α -D-Fructose + β -D-Fructose

NEET 2019 · Q64

4. The non-essential amino acid among the following is:

- (A) valine
- (B) leucine
- (C) alanine
- (D) lysine

NEET 2018 · Q53

5. Which of the following compounds can form a zwitterion?

- (A) Benzoic acid
- (B) Acetanilide
- (C) Aniline
- (D) Glycine

NEET 2018 · Q56

6. The difference between amylose and amylopectin is

- (A) Amylopectin have 1 $\rightarrow$ 4 α -linkage and 1 $\rightarrow$ 6 β -linkage
- (B) Amylose have 1 $\rightarrow$ 4 α -linkage and 1 $\rightarrow$ 6 β -linkage
- (C) Amylopectin have 1 $\rightarrow$ 4 α -linkage and 1 $\rightarrow$ 6 α -linkage
- (D) Amylose is made up of glucose and galactose

NEET 2017 · Q32

7. Which of the following statements is not correct?

- (A) Insulin maintains sugar level in the blood of a human body.
- (B) Ovalbumin is a simple food reserve in egg - white.
- (C) Blood proteins thrombin and fibrinogen are involved in blood clotting.
- (D) Denaturation makes the proteins more active.

NEET 2017 (Gujarati paper) · Q34

8. The letter 'D' in D-glucose signifies:

- (A) configuration at all Chiral Carbons
- (B) dextrorotatory
- (C) that it is a monosaccharide
- (D) configuration at the penultimate Chiral Carbon

NEET 2017 (Gujarati paper) · Q43

9. Which of the following amino acid is not optically active?

- (A) Proline
- (B) Serine
- (C) Leucine
- (D) Glycine

NEET 2016 Phase 2 · Q82

10. The central dogma of molecular genetics states that the genetic information flows from

- (A) Amino acids → Proteins → DNA
- (B) DNA → Carbohydrates → Proteins
- (C) DNA → RNA → Proteins
- (D) DNA → RNA → Carbohydrates

NEET 2016 Phase 1 · Q56

11. In a protein molecule various amino acids are linked together by:

- (A) α -glycosidic bond
- (B) β -glycosidic bond
- (C) peptide bond
- (D) dative bond

NEET 2016 Phase 1 · Q87

12. The correct statement regarding RNA and DNA, respectively is:

- (A) The sugar component in RNA is arabinose and the sugar component in DNA is 2'-deoxyribose.
- (B) The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose.
- (C) The sugar component in RNA is arabinose and the sugar component in DNA is ribose.
- (D) The sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose.

NEET 2016 Phase 1 · Q89

13. Which one given below is a non-reducing sugar?

- (A) Maltose
- (B) Lactose
- (C) Glucose
- (D) Sucrose

AIPMT 2014

14. Which of the following hormones is produced under the condition of stress which stimulates glycogenolysis in the liver of human beings?

- (A) Insulin
- (B) Adrenaline
- (C) Estradiol
- (D) Thyroxine

AIPMT 2014

15. D(+) glucose reacts with hydroxyl amine and yields an oxime. The structure of the oxime would be: (Fischer projections: C-1 is $\text{CH}=\text{NOH}$ and C-6 is CH_2OH ; the side of the -OH group on C-2, C-3, C-4 and C-5 is given)

- (A) C-2: left, C-3: left, C-4: right, C-5: right
- (B) C-2: left, C-3: right, C-4: left, C-5: right
- (C) C-2: right, C-3: left, C-4: right, C-5: right
- (D) C-2: right, C-3: left, C-4: left, C-5: right

AIPMT 2012 Prelims

16. Deficiency of vitamin B₁ causes the disease

- (A) Sterility
- (B) Convulsions
- (C) Beri-Beri
- (D) Cheilosis

AIPMT 2012 Prelims

17. Which one of the following statements is incorrect about enzyme catalysis?

- (A) Enzymes are least reactive at optimum temperature
- (B) Enzymes are mostly proteinous in nature
- (C) Enzyme action is specific
- (D) Enzymes are denatured by ultraviolet rays and at high temperature

AIPMT 2012 Prelims

18. Which one of the following sets of monosaccharides forms sucrose?

- (A) α -D-Glucopyranose and β -D-fructopyranose
- (B) α -D-Galactopyranose and α -D-Glucopyranose
- (C) α -D-Glucopyranose and β -D-fructofuranose
- (D) β -D-Glucopyranose and α -D-fructofuranose

AIPMT 2011 Mains

19. Which of the statements about "Denaturation" given below are correct?

(a) Denaturation of proteins causes loss of secondary and tertiary structures of the protein

(b) Denaturation leads to the conversion of double strand of DNA into single strand

(c) Denaturation affects primary structure which gets distorted

- (A) (a) and (b)
- (B) (a), (b) and (c)
- (C) (b) and (c)
- (D) (a) and (c)

AIPMT 2011 Mains

20. Which of the following is not a fat soluble vitamin?

- (A) Vitamin E
- (B) Vitamin A
- (C) Vitamin B complex
- (D) Vitamin D

AIPMT 2011 Prelims

21. Which one of the following statements is not true regarding (+) Lactose?

- (A) (+) Lactose, $C_{12}H_{22}O_{11}$ contains 8 -OH groups
- (B) On hydrolysis (+) Lactose gives equal amount of D(+) glucose and D(+) galactose
- (C) (+) Lactose is a β -glycoside formed by the union of a molecule of D(+) glucose and a molecule of D(+) galactose
- (D) (+) Lactose is a reducing sugar and does not exhibit mutarotation

AIPMT 2010 Mains · Q119

22. Fructose reduces Tollens' reagent due to

- (A) Asymmetric carbons
- (B) Primary alcoholic group
- (C) Secondary alcoholic group
- (D) Enolisation of fructose followed by conversion to aldehyde by base

AIPMT 2010 Prelims · Q87

23. Which one of the following does not exhibit the phenomenon of mutarotation?

- (A) (-) Fructose
- (B) (+) Sucrose
- (C) (+) Lactose
- (D) (+) Maltose

AIPMT 2009 Prelims · Q167

24. The segment of DNA which acts as the instrumental manual for the synthesis of the protein is:

- (A) ribose
- (B) gene
- (C) nucleoside
- (D) nucleotide

AIPMT 2009 Prelims · Q200

25. Which of the following hormones contains iodine?

- (A) testosterone
- (B) adrenaline
- (C) thyroxine
- (D) insulin

AIPMT 2008 Prelims · Q93

26. In DNA, the complementary bases are

- (A) Uracil and adenine; cytosine and guanine
- (B) Adenine and thymine; guanine and cytosine
- (C) Adenine and thymine; guanine and uracil
- (D) Adenine and guanine; thymine and cytosine

AIPMT 2008 Prelims · Q100

27. Which one of the following is an amine hormone?

- (A) Progesterone
- (B) Thyroxine
- (C) Oxypurin
- (D) Insulin

AIPMT 2007 Prelims · Q52

28. RNA and DNA are chiral molecules, their chirality is due to

- (A) chiral bases
- (B) chiral phosphate ester units
- (C) D-sugar component
- (D) L-sugar component

AIPMT 2007 Prelims · Q71

29. Which of the following is water-soluble?

- (A) Vitamin E
- (B) Vitamin K
- (C) Vitamin A
- (D) Vitamin B

AIPMT 2006 Prelims · Q57

30. The human body does not produce :

- (A) DNA
- (B) vitamins
- (C) hormones
- (D) enzymes

AIPMT 2006 Prelims · Q72

31. Which one of the following is a peptide hormone ?

- (A) Glucagon
- (B) Testosterone
- (C) Thyroxin
- (D) Adrenaline

32. Which functional group participates in disulphide bond formation in proteins ?

- (A) Thiolactone
- (B) Thiol
- (C) Thioether
- (D) Thioester

Answer key and explanations**1. Answer: (A) Vitamin B₁₂**

Vitamin B₁₂ is needed for red blood cell formation; its deficiency causes pernicious anaemia. Vitamin B₁ deficiency causes beriberi and B₂ deficiency causes cheilosis, not an RBC deficiency.

2. Answer: (D) Lysine

Lysine has an extra -NH₂ group on its side chain, so it has more amino groups than carboxyl groups and is basic. Serine, alanine and tyrosine have neutral side chains.

3. Answer: (C) α-D-Glucose + β-D-Fructose

Sucrose is formed by a glycosidic link between C1 of α-D-glucose and C2 of β-D-fructose, so hydrolysis releases α-D-glucose and β-D-fructose. Swapping the anomers (β-glucose, α-fructose) is the usual trap.

4. Answer: (C) alanine

Alanine can be synthesised in the body, so it is non-essential. Valine, leucine and lysine must be obtained from the diet and are essential amino acids.

5. Answer: (D) Glycine

Glycine has both an acidic -COOH and a basic -NH₂ group, so an internal proton transfer gives H₃N⁺-CH₂-COO⁻. Benzoic acid and aniline have only one of these groups, and the N in acetanilide is not basic.

6. Answer: (C) Amylopectin have 1 → 4 α-linkage and 1 → 6 α-linkage

Amylose is an unbranched chain of α-D-glucose with C1→C4 α-glycosidic links. Amylopectin is branched: C1→C4 α-links in the chain and C1→C6 α-links at branch points. Starch has no β-links, and amylose contains only glucose.

7. Answer: (D) Denaturation makes the proteins more active.

Denaturation destroys the secondary and tertiary structure of a protein, so it loses its biological activity rather than gaining it. The other statements are correct: insulin regulates blood glucose, ovalbumin is the storage protein of egg white, and thrombin and fibrinogen take part in clotting.

8. Answer: (D) configuration at the penultimate Chiral Carbon

'D' refers to the relative configuration of the lowest (penultimate) chiral carbon, C-5 in glucose, which matches D-glyceraldehyde (-OH on the right). It says nothing about the sign of rotation; that is shown by (+) or (-), and D-fructose, for example, is laevorotatory.

9. Answer: (D) Glycine

Glycine, H₂N-CH₂-COOH, has two hydrogens on its α-carbon, so it has no chiral centre and is optically inactive. Proline, serine and leucine all have an α-carbon with four different groups.

10. Answer: (C) DNA → RNA → Proteins

Genetic information is copied from DNA into messenger RNA (transcription) and then read to make proteins (translation). Carbohydrates are not products of genetic information transfer, and information does not flow from proteins back to DNA.

11. Answer: (C) peptide bond

Amino acids join through the -CO-NH- amide linkage formed between the carboxyl group of one and the amino group of the next; this is the peptide bond. Glycosidic bonds link monosaccharides in carbohydrates, not amino acids.

12. Answer: (B) The sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose.

RNA contains β-D-ribose, while DNA contains β-D-2-deoxyribose, which lacks the oxygen at C-2'. Arabinose is not a nucleic acid sugar.

13. Answer: (D) Sucrose

In sucrose the glycosidic link joins C1 of glucose to C2 of fructose, so both anomeric carbons are tied up and there is no free hemiacetal group to reduce Tollens' or Fehling's reagent. Maltose and lactose keep one free anomeric carbon, and glucose is a free aldose, so all three are reducing sugars.

14. Answer: (B) Adrenaline

Adrenaline (epinephrine), the 'fight or flight' hormone, is released under stress and promotes glycogenolysis in the liver to raise blood glucose. Insulin does the opposite, favouring glycogen formation.

15. Answer: (C) C-2: right, C-3: left, C-4: right, C-5: right

Oxime formation only changes the C-1 aldehyde to $\text{CH}=\text{NOH}$, so the D-glucose configuration is retained: -OH on the right at C-2, left at C-3, and right at C-4 and C-5.

16. Answer: (C) Beri-Beri

Thiamine (vitamin B_1) deficiency causes beri-beri. Cheilosis is caused by riboflavin (B_2) deficiency, convulsions by pyridoxine (B_6) deficiency and sterility by vitamin E deficiency.

17. Answer: (A) Enzymes are least reactive at optimum temperature

Enzymes show maximum (not least) activity at their optimum temperature, so that statement is incorrect. The other statements are true: most enzymes are proteins, their action is highly specific, and heat or UV radiation denatures them.

18. Answer: (C) α -D-Glucopyranose and β -D-fructofuranose

Sucrose is formed by a glycosidic link between C1 of α -D-glucopyranose and C2 of β -D-fructofuranose. Fructose occurs as the five-membered furanose ring in sucrose, not as fructopyranose, and galactose is a component of lactose.

19. Answer: (A) (a) and (b)

Denaturation disrupts the secondary and tertiary structure of a protein, and in DNA it separates the double helix into single strands. Peptide bonds are not broken, so the primary structure is unchanged; any combination including that statement is wrong.

20. Answer: (C) Vitamin B complex

Vitamins A, D, E and K are fat soluble, while the B-complex vitamins and vitamin C are water soluble. So vitamin B complex is not fat soluble.

21. Answer: (D) (+) Lactose is a reducing sugar and does not exhibit mutarotation

Lactose has a free hemiacetal group on its glucose unit, so it is a reducing sugar and does show mutarotation; the statement that it does not mutarotate is false. It has 8 -OH groups, is a β -glycoside of D-galactose and D-glucose, and hydrolyses to equal amounts of the two.

22. Answer: (D) Enolisation of fructose followed by conversion to aldehyde by base

Fructose is a ketose, but in alkaline Tollens' reagent it undergoes enolisation (via an enediol) and isomerises to aldoses, which are then oxidised. The alcoholic groups or asymmetric carbons do not reduce Tollens' reagent.

23. Answer: (B) (+) Sucrose

Mutarotation needs a free hemiacetal/hemiketal group that can open and re-close. In sucrose the anomeric carbons of glucose and fructose are joined in the glycosidic bond, so sucrose is non-reducing and shows no mutarotation. Fructose, lactose and maltose have a free anomeric carbon.

24. Answer: (B) gene

A gene is the segment of DNA that carries the coded information for making a particular protein. Ribose is a sugar, and nucleosides and nucleotides are only the building units of nucleic acids.

25. Answer: (C) thyroxine

Thyroxine, secreted by the thyroid gland, is an iodinated derivative of tyrosine. Testosterone is a steroid, adrenaline a catecholamine and insulin a polypeptide; none contain iodine.

26. Answer: (B) Adenine and thymine; guanine and cytosine

In DNA, adenine pairs with thymine (two hydrogen bonds) and guanine pairs with cytosine (three hydrogen bonds). Uracil occurs in RNA, not DNA, and adenine with guanine would pair two purines, which does not fit the helix.

27. Answer: (B) Thyroxine

Thyroxine is made from the amino acid tyrosine and is classed as an amino acid-derived (amine) hormone. Progesterone is a steroid hormone, insulin is a polypeptide, and oxypurin is a purine derivative, not a hormone.

28. Answer: (C) D-sugar component

The bases and phosphate groups are achiral; the chirality of DNA and RNA comes from the D-ribose/D-deoxyribose sugars. Natural nucleic acids contain D-, not L-, sugars.

29. Answer: (D) Vitamin B

B-group vitamins (and vitamin C) are water-soluble. Vitamins A, D, E and K are fat-soluble and stored in the liver and adipose tissue.

30. Answer: (B) vitamins

The human body synthesises its own DNA, hormones and enzymes, but most vitamins cannot be made in adequate amounts and must come from the diet. That is why vitamins are called essential dietary factors.

31. Answer: (A) Glucagon

Glucagon is a peptide hormone of 29 amino acids made by pancreatic α -cells. Testosterone is a steroid, while thyroxine and adrenaline are derived from the amino acid tyrosine and are not peptides.

32. Answer: (B) Thiol

Disulphide bridges ($-S-S-$) form by oxidation of the thiol ($-SH$) groups of two cysteine residues. Thioethers (as in methionine) and thioesters do not form disulphide bonds.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.