

SAMPLE CONTENT



MHT-CET

TRIUMPH

BIOLOGY

SOLUTIONS

to MCQs



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TRIUMPH MHT-CET BIOLOGY SOLUTIONS to MCQs

Salient Features

- ☞ Detailed solutions provided for difficult MCQs as per the concepts emphasized in the syllabus
- ☞ **Smart Keys** (Smart Code, Caution, Thinking Hatke) - Multiple Study Techniques to enhance understanding of concepts and problem solving skills
- ☞ Solutions to Evaluation Test for each chapter
- ☞ Solutions to Two Model Question Papers
- ☞ Solutions to Two MHT-CET 2023 Question Papers

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PREFACE

Target's **Triumph MHT-CET Biology Solutions to MCQs** book provides students with holistic comprehension of principles of biology through solutions to MCQs based on the concepts emphasized in the syllabus.

It includes **Smart Keys** (Smart Code, Caution and Thinking Hatke), which offer supplemental explanations for the tricky questions and are intended to help students how to approach problems in novel ways in the shortest possible time with accuracy.

- **Smart Code** showcases simple and smart mnemonic.
- **Caution** apprises students about mistakes often made while solving MCQs.
- **Thinking Hatke** reveals quick witted approach to crack the specific question.

Solutions to two **Model Question Papers** and two **MHT-CET 2023 Question Papers** are also included in this book.

All the features of this book are designed keeping the following elements in mind: Time management, easy memorization or revision, and non-conventional yet simple methods for MCQ solving.

We hope the book benefits the learner as we have envisioned.

Publisher

Edition: First

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

Please write to us on: mail@targetpublications.org

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Classical Thinking

6.0 Introduction

1. (C) 2. (C) 3. (B)

6.1 Biomolecules in the Cell

1. (B) 2. (D) 3. (A)
 4. (B) 5. (D) 6. (B)
 7. (B) 8. (B) 9. (B)
 10. (A) 11. (B) 12. (B)
 13. (A) 14. (D) 15. (D)
 16. (B) 17. (A) 18. (A)
 19. (A) 20. (C) 21. (D)
 22. (A) 23. (C) 24. (B)
 25. (D) 26. (A) 27. (C)
 28. (B) 29. (B) 30. (B)
 31. (B) 32. (B) 33. (C)

34. (C) 35. (B) 36. (C)
 37. (C) 38. (C) 39. (B)
 40. (D) 41. (B) 42. (C)
 43. (B) 44. (C) 45. (C)
 46. (B)
 47. (C) In Watson and Crick's DNA molecule, there are 10 base pairs in one spiral. The length of one complete turn (spiral or gyre or pitch) is 3.4 nm (34 Å).
 48. (C) 49. (C) 50. (D)
 51. (D) 52. (C) 53. (A)
 54. (B) 55. (C) 56. (D)
 57. (A) 58. (C) 59. (B)

6.2 Concept of Metabolism

1. (B) 2. (A) 3. (C)

Critical Thinking

6.1 Biomolecules in the Cell

1. (B) 2. (C)
 3. (D) Glucose, fructose, galactose and mannose have the same molecular formula but different configuration. Hence, they are isomers of each other.
 4. (D) Glucose and galactose cannot be easily converted into one another.
 5. (A) 6. (D)
 7. (D) Fructose being monosaccharide it cannot be further hydrolysed.
 8. (C) 9. (B) 10. (C)
 11. (A) 12. (A) 13. (C)
 14. (D) 15. (D) 16. (C)
 17. (D) 18. (A)
 19. (D)
 i. In tertiary structure, the peptide chains are much looped, twisted and folded back on themselves due to formation of disulphide bonds.
 ii. When a protein has more than two polypeptide subunits their arrangement in space is called quaternary structure.
 20. (C) 21. (A)

22. (D)
 i. Histones of nucleoproteins are soluble in water.
 ii. Albumins are soluble in water but they get coagulated on heating.
 23. (A) 24. (B) 25. (C)
 26. (A) One Kbp of DNA contains 1000 base pairs. So the total number of base pairs in 3.2kbp is (3.2×1000) 3200 bp. Out of which 820 base pairs are adenine so the number of thymine will also be 820 as number of adenine is equal to thymine according to Chargaff's rule. A total number of cytosine + guanosine will be $3200 - 820 \times 2 = 1560$. As the number of cytosine is equal to guanine so cytosine bases in the DNA can be calculated as $1560/2 = 780$
 27. (C)
 28. (C) The amount of purine is equal to the amount of pyrimidine in DNA. According to Chargaff's rule,
 $A + G = C + T$
 As amount of guanine is 19%, thus the amount of cytosine has to be 19% because in a DNA molecule, guanine always pairs with cytosine.



29. (D) Length of one gyre of DNA = 34 Å. In one gyre, number of nucleotides = 20 (10 bp)
∴ Number of nucleotides in DNA molecule measuring 680 Å = $\frac{20 \times 680}{34} = 400$.
30. (A) Ribose nucleic acid (RNA) differs from Deoxyribose nucleic acid (DNA) in presence of an additional '-OH' group at the 2' position.
31. (D) 32. (C)
33. (C) Enzymes are destroyed at higher temperature of 60-70°C.
34. (A) 35. (D)

36. (C)

Thinking Hatke – Q. 36

Identifying the first or the last step of the sequence can help identify the correct option more quickly. Statement (iii) appears to be the first step of the catalytic cycle of enzyme action. Since there are only two options (C) and (D) that begin with (iii), the other options get eliminated. The sequence of option (C) and (D) is similar except for order of statement (ii) and (iv). As step (iv) occurs after (ii), hence (C) is the correct option.

6.2 Concept of Metabolism

1. (B) 2. (C)

Concept Fusion

1. (C) 2. (B)
3. (A) While lipids can also be used for energy, carbohydrates are the body's preferred source of fuel because they are easily and quickly broken down into glucose, which can be used for energy by the cells.
4. (C)
5. (C) Glycoproteins are a type of biomolecule that contain both carbohydrate and protein components. These molecules play a variety of important roles in the body, such as serving as structural components of cell membranes, facilitating cell-to-cell interactions, and acting as enzymes or receptors. Cellulose and starch

are both carbohydrates, while glucose is a monosaccharide and a simple carbohydrate.

6. (C)
7. (B)

Thinking Hatke Q. 7

In the given options (A, B, C and D), only point (iv) contains all different matches (p, q, r and s) respectively. Hence, identifying the correct match for (iv) will make it easier to choose the correct option. Since, (iv- Carbohydrate) correctly matches (r-Starch), which appears only in option (B), the possibility of the other options being correct can be eliminated. Hence, the correct option is (B).

MHT-CET Previous Years' Questions

1. (C) In a DNA molecule, adenine pairs with thymine, so if there are 20 thymine bases, there will also be 20 adenine bases. The remaining bases will be guanine and cytosine. Since the segment is 340 Å long, it corresponds to 100 base pairs, and out of those 100 bases, 20 are thymine and 20 are adenine, leaving 80 bases for guanine and cytosine.
2. (D)
3. (C) The empirical formula of a carbohydrate is $(\text{CH}_2\text{O})_n$, while the empirical formula of Digitoxose is $\text{C}_9\text{H}_{16}\text{O}_5$.
4. (D) Mono and disaccharides are crystalline, sweet and soluble in water. But polysaccharides like starch, glycogen, cellulose are not sweet they are amorphous and insoluble in water.
5. (D) 6. (B)

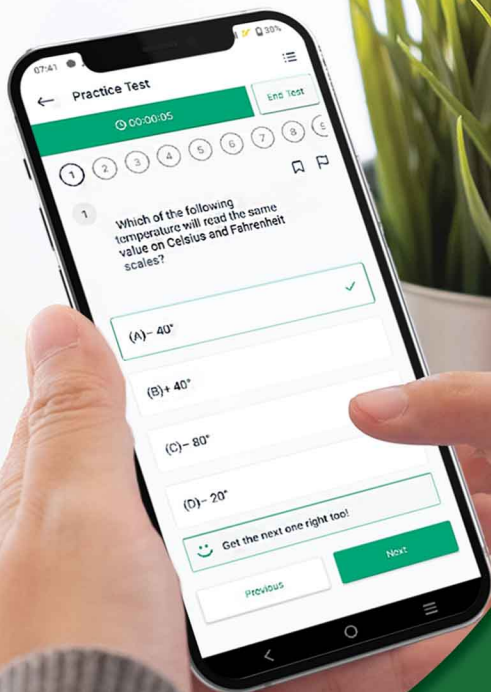
7. (B) Carboxyl groups are typically found in organic acids, such as fatty acids, but not in carbohydrates.
8. (D) While lactose, fructose, and glucose follow the general formula of carbohydrates, rhamnose does not. Rhamnose has the molecular formula $\text{C}_6\text{H}_{12}\text{O}_5$, deviating from the general formula of carbohydrates, which is $(\text{CH}_2\text{O})_n$.
9. (C) 10. (B) 11. (C)
12. (A) 13. (A)
14. (B) The spiral configuration of α -helix and the β -helix of polypeptide chains are held together by hydrogen bonds to form the secondary structure of a protein. Hydrogen bonds form between the oxygen atom of the carbonyl group and the hydrogen atom of the amino group in the backbone of the polypeptide chain.



15. (D) 16. (D) 17. (D)
18. (C)
19. (A) Oxidation and reduction reaction is catalyzed by oxidoreductase type of enzymes.
20. (B) 21. (C)
22. (D) 23. (C)
24. (C) An increase in substrate concentration generally leads to an increase in the velocity of enzyme activity until a certain point, called the saturation point, where all enzyme molecules are occupied. This is known as the saturation kinetics of enzyme activity.
25. (A) Erwin Chargaff also observed that the pyrimidines and purines always occur in equal proportion in DNA.
26. (B)
27. (A) Each base pair contributes about 3.4 \AA to the length of the DNA molecule. Therefore, 100 base pairs multiplied by 3.4 \AA gives us the length of approximately 340 \AA .
28. (B)
29. (C) Fructose is a monosaccharide.
30. (D)
31. (B) Chargaff observed that the pyrimidine and purine always occur in equal amount in DNA.
32. (C) 33. (C)
34. (B) RNA always shows $A = U, G \equiv C$ pairing
35. (C) 36. (C)
37. (C)
- All enzymes are basically made up of protein except ribozymes.
 - Enzymes are denatured at temperature of $60-70^\circ\text{C}$.
 - Any increase or decrease in pH causes decline in enzyme activity.
38. (D)
39. (B)
- Disaccharides are soluble in water, but they are too big to pass through the cell membrane by diffusion.
 - Sucrose is a non-reducing sugar.
40. (D)

◆ ◆ ◆ Evaluation Test ◆ ◆ ◆

1. (B) In a given DNA segment, 25 adenine bases will pair with 25 thymine bases. Similarly, 45 cytosine bases will pair with 45 guanine bases. Thus, the total number of nucleotides in the segment is
 $A + T + C + G = 25 + 25 + 45 + 45 = 140$
2. (A) Histones are simple, globular proteins.
3. (D) DNA contains deoxyribose sugar ($\text{C}_5\text{H}_{10}\text{O}_4$), while RNA contains ribose ($\text{C}_5\text{H}_{10}\text{O}_5$) sugar.
4. (D)
5. (A)
- | Type of RNA | Shape |
|-------------|-------------------------|
| t-RNA | Hair pin or clover leaf |
| r-RNA | No particular shape |
| m-RNA | Linear |
6. (C) 7. (B) 8. (D)
9. (C)
10. (D) Unsaturated fatty acids are not fully saturated with hydrogen atoms.
11. (A)
12. (B) Disaccharides $\xrightarrow{\text{Heat}}$ Monosaccharides
(Sweet)
13. (D) 14. (D) 15. (D)
16. (B) After the Enzyme product (EP) complex is formed, the enzyme releases the product and free enzyme is ready to bind to another molecule of substrate.
17. (A)
18. (A) Sucrose is the common cane or table sugar which is composed of D-glucose and fructose attached together by the aldehyde and ketone carbon.
19. (D) When protein adjoins with carbohydrates, is known as glycoprotein, which is a conjugated protein.
20. (C) Transferases transfer a functional group from one molecule to another.
21. (C) 22. (C) 23. (C)
24. (D) 25. (C) 26. (B)
27. (C) 28. (A)
29. (C) Nucleotide: Unit which consists of a sugar, phosphate and a base.
30. (B) Lipids are not water soluble.



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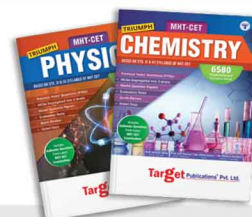
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