

Biotechnology: Principles and Processes

NEET previous year questions · Biology

16 questions from the official papers: NEET 2026 (6), Re-NEET 2026 (4), NEET 2020 (6). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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1. NEET 2026 · Q95

Match List-I with List-II and choose the correct answer from the options given below:

List I	List II
P) Genetically modified organism	I) <i>Agrobacterium tumefaciens</i>
Q) Thermostable DNA polymerase	II) Bt cotton
R) Ti plasmid	III) <i>Thermus aquaticus</i>
S) pBR322	IV) <i>Escherichia coli</i>

- (1) P-II, Q-III, R-I, S-IV (2) P-II, Q-I, R-IV, S-III
(3) P-I, Q-IV, R-III, S-II (4) P-I, Q-II, R-IV, S-III

Answer (1)

Sol. *Bacillus thuringiensis* (Bt) cotton is a classic genetically modified organism (P-II); the thermostable DNA polymerase (Taq polymerase used in polymerase chain reaction (PCR)) is isolated from the bacterium *Thermus aquaticus* (Q-III); the Ti plasmid is derived from *Agrobacterium tumefaciens* (R-I); and plasmid constructed by Bolivar and Rodriguez, number 322 (pBR322) is a cloning vector of *Escherichia coli* (S-IV). This gives P-II, Q-III, R-I, S-IV.

2. NEET 2026 · Q100

Identify the correct sequence of steps in each cycle of Polymerase Chain Reaction :

- (1) Extension → Annealing → Denaturation
(2) Annealing → Denaturation → Extension
(3) Denaturation → Extension → Annealing
(4) Denaturation → Annealing → Extension

Answer (4)

Sol. Each PCR cycle proceeds as denaturation (heat separates the two DNA strands), then annealing (primers bind to the single-stranded templates), then

extension (DNA polymerase synthesises the new strands). Hence the correct order is Denaturation, then Annealing, then Extension.

3. NEET 2026 · Q112

Arrange the following steps of somatic hybridisation in the correct sequence

Statement I: Digestion of cell walls.

Statement II: Isolation of naked protoplasts.

Statement III: Fusion of protoplasts to get hybrid protoplast.

Statement IV: Isolation of single cells from two different varieties of plants.

Statement V: Growing of hybrid protoplast to form a new plant.

choose the correct answer from the options given below:

- (1) IV, I, II, III, V (2) V, II, I, IV, III
(3) IV, II, I, V, III (4) V, I, II, III, IV

Answer (1)

Sol. Somatic hybridisation starts by isolating single cells from two different plant varieties (Statement IV), digesting their cell walls with enzymes (Statement I) to release naked protoplasts (Statement II), fusing the protoplasts to form a hybrid protoplast (Statement III), and finally growing it to regenerate a new plant (Statement V). Hence the correct sequence is IV, I, II, III, V.

4. NEET 2026 · Q120

Which of the following statements are not true regarding restriction endonucleases?

Statement I: They are called molecular scissors.

Statement II: These are the enzymes responsible for restricting the growth of bacteriophages in *E.coli*.

Statement III: They cut the DNA only at the centre of the palindromic sites.

Statement IV: They remove nucleotides only from the ends of DNA fragments.

Statement V: They recognise specific palindromic base-pair sequences.

Choose the answer from the options given below:

- (1) I and II only (2) I and V only
(3) IV and V only (4) III and IV only

Answer (4)

Sol. Restriction endonucleases cut DNA a little away from the centre of the palindrome (between the same two bases on the two strands), not exactly at the centre, so statement III is untrue. They cut within the DNA; removing nucleotides from the ends is the job of exonucleases, so statement IV is also untrue. Statements I, II and V correctly describe them. Hence III and IV only are not true.

5. NEET 2026 · Q134

Which of the following statements are correct with respect to DNA separation, isolation and visualization?

Statement I: The cutting of DNA is done by molecular scissors.

Statement II: The DNA fragments separate according to their size in an agarose gel, upon electrophoresis.

Statement III: The separated DNA fragments can be seen without staining when exposed to UV light.

Statement IV: The separated DNA fragments, when stained with ethidium bromide, can be seen in visible light.

Choose the correct answer from the options given below:

- (1) II and IV only (2) I and II only
(3) II and III only (4) I and IV only

Answer (2)

Sol. Restriction enzymes act as molecular scissors that cut DNA (I correct), and the resulting fragments separate by size on an agarose gel during electrophoresis, with smaller fragments migrating farther (II correct). Statement III is wrong because DNA cannot be seen without staining, and Statement IV is wrong because ethidium-bromide-stained DNA is visualised under

ultraviolet (UV) light, not in visible light. Hence I and II.

6. NEET 2026 · Q140

Insertion of a foreign DNA at BamHI site in an *E. coli* cloning vector pBR322 results in the loss of antibiotic resistance towards:

- (1) Ampicillin and tetracycline
(2) Ampicillin
(3) Tetracycline
(4) Gentamycin

Answer (3)

Sol. In plasmid constructed by Bolivar and Rodriguez, number 322 (pBR322) the BamHI recognition site lies within the tetracycline-resistance gene (tetR). Ligating foreign DNA at this site disrupts the tetR gene, so the recombinant plasmid loses tetracycline resistance (insertional inactivation) while retaining ampicillin resistance. Hence only tetracycline resistance is lost.

7. Re-NEET 2026 · Q162

During PCR, primers bind to the DNA strands in the _____ step.

- (1) denaturation (2) extension
(3) annealing (4) ligation

Answer (3)

Sol. Polymerase chain reaction (PCR) cycles through three steps. Denaturation at about 94 °C separates the two DNA strands. ANNEALING at a lower temperature, typically 50-60 °C, lets the two short oligonucleotide primers base-pair with their complementary sequences on the separated strands. Extension then follows, with Taq polymerase building new strands from those primers. NCERT Class 12, Biotechnology: Principles and Processes.

8. Re-NEET 2026 · Q168

Given below are two statements :

Statement I: Plasmids are autonomously replicating DNA.

Statement II: Plasmids are extrachromosomal DNA.

In the light of the above statements, choose the most appropriate answer from the options given below :

- (1) Both Statement I and Statement II are correct
(2) Both Statement I and Statement II are incorrect
(3) Statement I is correct but Statement II is incorrect
(4) Statement I is incorrect but Statement II is correct

Answer (1)

Sol. Both statements are true and together explain why plasmids make such useful cloning vectors. They are small circular DNA molecules that sit OUTSIDE the bacterial chromosome, and because each carries its own origin of replication (ori) it can replicate independently of the host chromosome. Any foreign DNA spliced into a plasmid is therefore multiplied along with it. NCERT Class 12, Biotechnology: Principles and Processes.

9. Re-NEET 2026 · Q176

Given below are two statements : one is labelled as Assertion A and the other is labelled as Reason R.

Assertion (A): In recombinant DNA technology, lysozyme is used for disrupting bacterial cells while cellulase is for plant cells.

Reason (R): Isolation of genetic material needs disruption of cells.

In the light of the above statements, choose the most appropriate answer from the options given below :

- (1) Both A and R are correct and R is the correct explanation of A
- (2) Both A and R are correct but R is not the correct explanation of A
- (3) A is correct but R is not correct
- (4) A is not correct but R is correct

Answer (1)

Sol. DNA is locked inside cells behind a wall and membrane, so the first step in any recombinant DNA procedure is to break the cell open. The enzyme chosen must match the wall chemistry: lysozyme digests the peptidoglycan of bacterial walls, cellulase digests the cellulose of plant walls, and chitinase is used for fungi. The need to disrupt cells is therefore exactly why these particular enzymes are chosen, so R explains A. NCERT Class 12, Biotechnology: Principles and Processes.

10. Re-NEET 2026 · Q180

Match List-I with List-II.

List I	List II
P) Transformation	I) Restriction enzyme
Q) Cloning site	II) Transfer DNA to host bacteria
R) Selection	III) Replication
S) Ori	IV) Antibiotic

Choose the correct answer from the options given below:

- (1) P-II, Q-I, R-IV, S-III (2) P-I, Q-II, R-IV, S-III
- (3) P-III, Q-IV, R-II, S-I (4) P-IV, Q-I, R-III, S-II

Answer (1)

Sol. Transformation is the process by which recombinant DNA is taken up by a host bacterium (P-II). The cloning site is the recognition sequence where a restriction enzyme cuts the vector so foreign DNA can be inserted (Q-I). Selection uses an antibiotic resistance marker to identify which cells took up the vector (R-IV). The ori is the origin of replication, the sequence that allows the vector to be copied inside the host (S-III). NCERT Class 12, Biotechnology: Principles and Processes.

11. NEET 2020 · Q10

Match the organism with its use in biotechnology and select the correct option.

List I	List II
P) <i>Bacillus thuringiensis</i>	I) Cloning vector
Q) <i>Thermus aquaticus</i>	II) Construction of first rDNA molecule
R) <i>Agrobacterium tumefaciens</i>	III) DNA polymerase
S) <i>Salmonella typhimurium</i>	IV) Cry proteins

- (1) P-IV, Q-III, R-I, S-II (2) P-III, Q-II, R-IV, S-I
- (3) P-III, Q-IV, R-I, S-II (4) P-II, Q-IV, R-III, S-I

Answer (1)

Sol. *Bacillus thuringiensis* supplies Cry proteins; *Thermus aquaticus* supplies thermostable DNA polymerase; *Agrobacterium tumefaciens* is a plant cloning vector; and *Salmonella typhimurium* was used in the first recombinant-DNA construction. Thus P-IV, Q-III, R-I, S-II. Chapter: Biotechnology: Principles and Processes.

12. NEET 2020 · Q26

Which enzyme is correctly matched with its function?

- (1) Polymerases - Break the DNA into fragments
- (2) Nucleases - Separate the two strands of DNA
- (3) Exonucleases - Make cuts at specific positions within DNA
- (4) Ligases - Join the two DNA molecules

Answer (4)

Sol. DNA ligase joins DNA fragments by sealing breaks in the sugar-phosphate backbone. It forms phosphodiester bonds between adjacent 3'-hydroxyl and 5'-phosphate ends.

13. NEET 2020 · Q30

In gel electrophoresis, separated DNA fragments can be visualized with the help of

- (1) Ethidium bromide in UV radiation
- (2) Acetocarmine in UV radiation
- (3) Ethidium bromide in infrared radiation
- (4) Acetocarmine in bright blue light

Answer (1)

Sol. Separated DNA fragments in gel electrophoresis are visualized using ethidium bromide, which intercalates with DNA and fluoresces under ultraviolet (UV) radiation. Chapter: Biotechnology: Principles and Processes.

determines how many copies of the plasmid are made within the host cell. Chapter: Biotechnology: Principles and Processes.

14. NEET 2020 · Q38

Identify the wrong statement with regard to restriction enzymes.

- (1) They cut the strand of DNA at palindromic sites.
- (2) They are useful in genetic engineering.
- (3) Sticky ends can be joined by using DNA ligases.
- (4) Each restriction enzyme functions by inspecting the length of a DNA sequence.

Answer (3)

Sol. Each restriction enzyme recognizes and cuts DNA at specific palindromic sequences, not by inspecting the length of a DNA sequence. Chapter: Biotechnology: Principles and Processes.

15. NEET 2020 · Q80

The specific palindromic sequence which is recognized by EcoRI is

- (1) 5' - GGAACC - 3' - CCTTGG - 5'
- (2) 5' - CTTAAG - 3' - GAATTC - 5'
- (3) 5' - GGATCC - 3' - CCTAGG - 5'
- (4) 5' - GAATTC - 3' - CTTAAG - 5'

Answer (4)

Sol. Restriction enzyme from *Escherichia coli* RY 13 (EcoRI) recognizes the palindromic sequence 5' - GAATTC - 3' and its complementary strand 3' - CTTAAG - 5'. Chapter: Biotechnology: Principles and Processes.

16. NEET 2020 · Q89

The sequence that controls the copy number of the linked DNA in the vector, is termed

- (1) Ori site
- (2) Palindromic sequence
- (3) Recognition site
- (4) Selectable marker

Answer (1)

Sol. The origin of replication (Ori site) controls the copy number of the linked DNA in a vector. This site is essential for the initiation of DNA replication and

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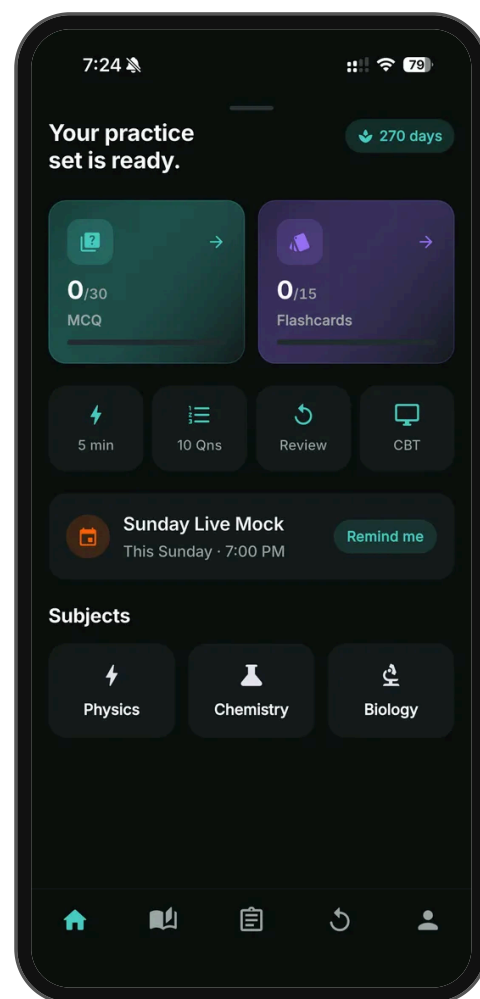
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