

NEET BIOTECHNOLOGY: PRINCIPLES AND PROCESSES — CLONING VECTORS (PBR322, TI PLASMID) AND COMPETENT HOST — PYQS

Max. Marks: 128

Questions: 32

Section A (MCQ) — 32 questions

Q.1 Insertion of a foreign DNA at BamHI site in an *E. coli* cloning vector pBR322 results in the loss of antibiotic resistance towards : [NEET (UG) 2026]

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

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Q.2 Match List-I with List-II. [RE-NEET (UG) 2026]

List-I		List-II	
A.	Transformation	I.	Restriction enzyme
B.	Cloning site	II.	Transfer DNA to host bacteria
C.	Selection	III.	Replication
D.	Ori	IV.	Antibiotic

- (1) A-IV, B-I, C-III, D-II (2) A-II, B-I, C-IV, D-III
(3) A-I, B-II, C-IV, D-III (4) A-III, B-IV, C-II, D-I

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Q.3 Given below are two statements:

Statement-I: Plasmids are autonomously replicating DNA.

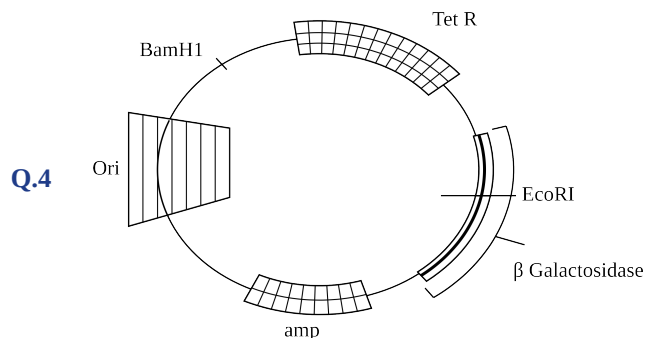
Statement-II: Plasmids are extrachromosomal DNA.

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

[RE-NEET (UG) 2026]

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

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In the above represented plasmid, an alien piece of DNA is inserted at EcoRI site. Which of the following strategies will be chosen to select the recombinant colonies? [NEET (UG) 2025]

- (1) White color colonies will be selected.
- (2) Blue color colonies grown on ampicillin plates can be selected.
- (3) Using ampicillin & tetracycline containing medium plate.
- (4) Blue color colonies will be selected.

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Q.5 The blue and white selectable markers have been developed which differentiate recombinant colonies from non-recombinant colonies on the basis of their ability to produce colour in the presence of a chromogenic substrate.

Given below are two statements about this method:

Statement-I: The blue coloured colonies have DNA insert in the plasmid and they are identified as recombinant colonies.

Statement-II: The colonies without blue colour have DNA insert in the plasmid and are identified as recombinant colonies.

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

[NEET (UG) 2025]

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

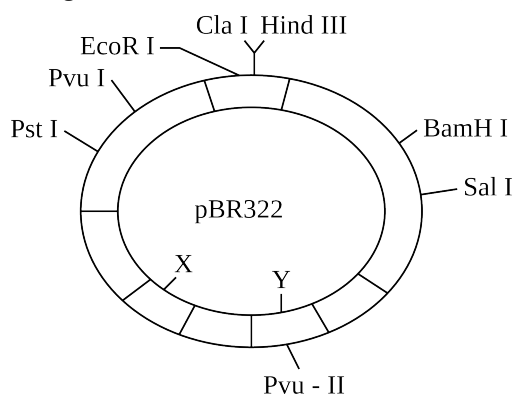
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Q.6 The "Ti plasmid" of *Agrobacterium tumefaciens* stands for [NEET (UG) 2024]

- (1) Tumour inhibiting plasmid
 (2) Tumor independent plasmid
 (3) Tumor inducing plasmid
 (4) Temperature independent plasmid

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Q.7 The following diagram shows restriction sites in *E. coli* cloning vector pBR322. Find the role of 'X' and 'Y' genes : [NEET (UG) 2024]



- (1) The gene 'X' is responsible for resistance to antibiotics and 'Y' for protein involved in the replication of Plasmid.
 (2) The gene 'X' is responsible for controlling the copy number of the linked DNA and 'Y' for protein involved in the replication of Plasmid.
 (3) The gene 'X' is for protein involved in replication of Plasmid and 'Y' for resistance to antibiotics.
 (4) Gene 'X' is responsible for recognition sites and 'Y' is responsible for antibiotic resistance.

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Q.8 Select the restriction endonuclease enzymes whose restriction sites are present for the tetracycline resistance (tet^R) gene in the pBR322 cloning vector. [RE-NEET (UG) 2024]

- (1) Bam HI and Sal I (2) Sal I and Pst I
 (3) Pst I and Pvu I (4) Pvu I and Bam HI

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Q.9 Which of the following is not a cloning vector?

[NEET (UG) 2023]

- (1) YAC (2) pBR322 (3) Probe (4) BAC

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Q.10 Which of the following is not a desirable feature of a cloning vector? [NEET (UG) 2022]

- (1) Presence of origin of replication
 (2) Presence of a marker gene
 (3) Presence of single restriction enzyme site
 (4) Presence of two or more recognition sites

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Q.11 Plasmid pBR322 has Pst I restriction enzyme site within gene amp^R that confers ampicillin resistance. If this enzyme is used for inserting a gene for β -galactosidase production and the recombinant plasmid is inserted in an *E. coli* strain

[NEET (UG) 2021]

- (1) It will be able to produce a novel protein with dual ability
 (2) It will not be able to confer ampicillin resistance to the host cell
 (3) The transformed cells will have the ability to resist ampicillin as well as produce β -galactosidase
 (4) It will lead to lysis of host cell

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Q.12 The sequence that controls the copy number of the linked DNA in the vector, is termed

[NEET (UG) 2020]

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

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Q.13 A gene whose expression helps to identify transformed cell is known as [NEET 2017]

- (1) Selectable marker (2) Plasmid
 (3) Vector (4) Structural gene

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Q.14 Which of the following is not a feature of the plasmids ? [NEET 2016 (Phase 1)]

- (1) Single-stranded
 (2) Transferable
 (3) Independent replication
 (4) Circular structure

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Q.15 The DNA molecule to which the gene of interest is integrated for cloning is called - [AIPMT 2015]

- (1) Transformer (2) Template
(3) Vector (4) Carrier

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Q.16 The introduction of T-DNA into plants involves - [AIPMT 2015]

- (1) Altering the pH of the soil, then heat-shocking the plants
(2) Infection of the plant by *Agrobacterium tumefaciens*
(3) Exposing the plants to cold for a brief period
(4) Allowing the plant roots to stand in water

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Q.17 Which vector can clone only a small fragment of DNA ? [AIPMT 2014]

- (1) Cosmid
(2) Bacterial artificial chromosome
(3) Yeast artificial chromosome
(4) Plasmid

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Q.18 The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of : [NEET 2013]

- (1) Insertional inactivation of α -galactosidase in recombinant bacteria
(2) Inactivation of glycosidase enzyme in recombinant bacteria
(3) Insertional inactivation of α -galactosidase in non-recombinant bacteria
(4) Non-recombinant bacteria containing β -galactosidase

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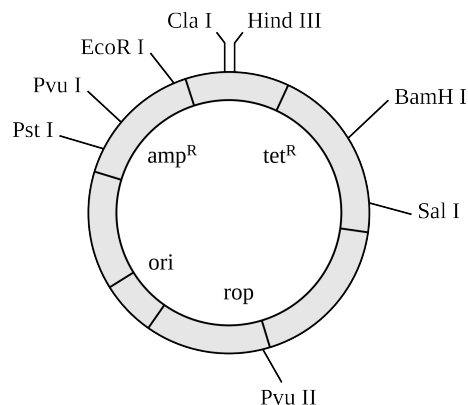
Q.19 In genetic engineering, the antibiotics are used [AIPMT 2012 (Mains)]

- (1) As sequences from where replication starts
(2) As selectable markers
(3) To keep the cultures free of infection
(4) To select healthy vectors

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Q.20 The figure below is the diagrammatic representation of the *E. coli* vector pBR322. Which one of the given options correctly identifies its certain component(s)? [AIPMT 2012 (Prelims)]



- (1) ori - original restriction enzyme
(2) amp^R , tet^R - antibiotic resistance genes
(3) rop - reduced osmotic pressure
(4) Hind III, EcoR I - selectable markers

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Q.21 In genetic engineering, a DNA segment (gene) of interest, is transferred to the host cell through a vector. Consider the following four agents (A-D) in this regard and select the correct option about which one or more of these can be used as a vector / vectors –

- A. a bacterium B. plasmid
C. *Plasmodium* D. bacteriophage

[AIPMT 2010 (Mains)]

- (1) B and D only (2) A and C only
(3) A, B and D only (4) A only

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Q.22 Which one of the following is used as vector for cloning genes into higher organisms ? [AIPMT 2010 (Prelims)]

- (1) Retrovirus
(2) *Salmonella typhimurium*
(3) *Rhizopus nigricans*
(4) Baculovirus

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Q.23 Which of the following are used in gene cloning ? [AIPMT 2010 (Prelims)]

- (1) Mesosomes (2) Nucleoids
(3) Lomasomes (4) Plasmids

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Q.24 Which one of the following is commonly used in transfer of foreign DNA into crop plants? [AIPMT 2009]

- (1) *Trichoderma harzianum*
- (2) *Meloidogyne incognita*
- (3) *Agrobacterium tumefaciens*
- (4) *Penicillium expansum*

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full solution



Q.25 Two microbes found to be very useful in genetic engineering are- [AIPMT 2006]

- (1) *Diplococcus* sp. and *Pseudomonas* sp.
- (2) *Vibrio cholerae* and a tailed bacteriophage
- (3) Crown gall bacterium and *Caenorhabditis elegans*
- (4) *Escherichia coli* and *Agrobacterium tumefaciens*

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Q.26 The most thoroughly studied of the known bacteria-plant interactions is the :- [AIPMT 2004]

- (1) Nodulation of *Sesbania* stems by nitrogen fixing bacteria
- (2) Cyanobacterial symbiosis with some aquatic ferns
- (3) Plant growth stimulation by phosphate-solubilising bacteria
- (4) Gall formation on certain angiosperms by *Agrobacterium*

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Q.27 In transgenics expression of transgene in target tissue is determined by :- [AIPMT 2004]

- (1) Enhancer
- (2) Promoter
- (3) Reporter
- (4) Transgene

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Q.28 The Ti plasmid is often used for making transgenic plants. This plasmid is found in [AIPMT 2004]

- (1) *Agrobacterium*
- (2) *Rhizobium* of the roots of leguminous plants
- (3) *Azotobacter*
- (4) Yeast as a 2 μ m plasmid

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Q.29 Which one of the following bacteria has found extensive use in genetic engineering work in plants? [AIPMT 2003]

- (1) *Xanthomonas citri*
- (2) *Agrobacterium tumefaciens*
- (3) *Bacillus coagulans*
- (4) *Clostridium septicum*

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Q.30 Maximum number of bases in plasmids discovered so far: [AIPMT 2001]

- (1) 500 kilobases
- (2) 5 kilobases
- (3) 50 kilobases
- (4) 5000 kilobases

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Q.31 The bacteria generally used for genetic engineering is: [AIPMT 2000]

- (1) *Clostridium*
- (2) *Pseudomonas*
- (3) *Agrobacterium*
- (4) *Bacillus*

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Q.32 Plasmid has been used as vector because:

[AIPMT 2000]

- (1) Both ends show replication
- (2) It has antibiotic resistance gene
- (3) It is circular DNA which has capacity to join to eukaryotic DNA
- (4) It can move between prokaryotic and eukaryotic cells

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	3	2	2	1	2	3	2	1	3	4	2
Ques.	12	13	14	15	16	17	18	19	20	21	22
Ans.	2	1	1	3	2	4	4	2	2	1	1
Ques.	23	24	25	26	27	28	29	30	31	32	
Ans.	4	3	4	4	3	1	2	3	3	3	