

BIOTECHNOLOGY: PRINCIPLES AND PROCESSES

2. Assume that the occurrence of nitrogen bases in adjacent positions in DNA strand is random. Identify the minimum number of nucleotides in a DNA strand where GAAT can occur once on the basis of probability? (EAM-2014)

1) 512

✓ 2) 256

3) 4096

4) 1024

4 bases \rightarrow A, T, G, C

$$4^4 \rightarrow \underline{256}$$

3. Which one of the following SCP organisms lack a membrane bound nucleus? (2012)

✓ 1) Spirulina

2) Paecilomyces ✓

3) Chlorella ✓

4) Chaetomium ✓

*Prokaryotic org lack
a true nucleus*

4. Arrange of the following in sequential order of their usage in recombinant DNA technology.....

I) Calcium chloride — *competent host (2012)*

II) DNA ligase — *Joining DNA with vector DNA*

III) Ethylene diamine tetra acetic acid → *EDTA - lysis*

IV) Restriction endonuclease — *cutting DNA of Bac cell*

The correct answer is

✓ 1) III, IV, I, II

2) IV, I, II, III

3) I, IV, II, III

4) IV, III, II, I

5. Study the following lists:

(2011)

List-I

- A) Embryoids *Plant Tissue
- culture embryo*
- B) Gene pollution
- C) Transgenic microbes
- D) Bioreactors

List-II

- I) Environmental clean up
- II) Molecular farming
- III) Super weeds
- IV) Artificial seeds
- V) Somaclonal variations

Correct combination match is

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
✓ 1)	V	III	I	II
2)	III	IV	I	II
3)	I	IV	III	II
4)	V	III	II	IV

**6. Which one of the following represents palindromic sequence in DNA?
(2010)**

1) 5' - GATACC - 3'

3' - CCTAAG - 5'

X

✓ 2) 5' - GAATTC - 3'

3' - CTTAAG - 5'

✓

3) 5' - CCAATG - 3'

3' - GAATCC - 5'

4) 5' - CATTAG - 3'

3' - GATAAC - 5'

7. Identify the palindromic sequence in the following...

(2009)

1) $\frac{GAATTC}{GAATTC}$ ✗

2) $\frac{GAATTC}{CTTUUG}$ ✗

3) $\frac{GAATTC}{CUUAAG}$ ✗

✓ 4) $\frac{GAATTC}{CTTAAG}$ ✓

8. The characteristics of a molecular probe is.....

(2009)

I) Very long molecule ✓

II) Double stranded ✓

III) DNA or RNA ✓

IV) Complementary to a part of desired gene ✓

1) I, II

2) II, III

✓ 3) III, IV

4) IV, I

9. Reverse transcriptase enzymes are employed to....

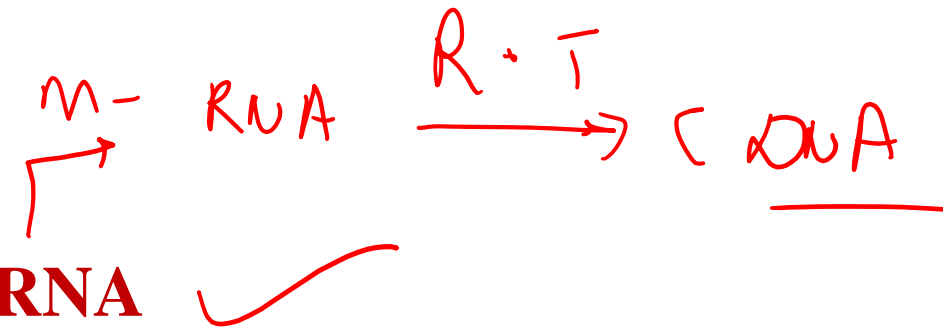
(2010)

1) Cut DNA molecules at specific site

2) Join DNA fragments

✓ 3) Synthesize complementary DNA from m-RNA

4) Introduce recombinant DNA into host



10. Identify the vector suitable to clone long fragments of DNA...

(2002)

X

- 1) Phage vectors
- 2) Bacterial plasmids
- 3) Yeast plasmids
- ✓ 4) Cosmids

11. Study the following table:

(2004)

Component character used in

- I) Plasmid – Small circular DNA – Gene clone ✓
- II) Cosmid ^{→ Vector} – Restriction enzyme – Identification of genes _{– x → cloning}
- III) Vector – Restriction enzyme – Isolation of genes _{→ Cutting of DNA}
- IV) Gene transfer – Vector – Gene carrier 'I' w components in above table show correct combination of their character and use Identify the correct pair.

 1) I, and IV

2) II, and IV

3) I, and III

4) II, and III

12. The fragments of DNA formed after treatment with endonucleases are separated by the technique... (2005)

1) Polymerase chain reaction

2) Southern blotting

3) Electrophoresis

4) Colony hybridization



13. Assertion(A): ~~Restriction~~ endonucleases and also called 'molecular scissors'

Reason(R): When fragments generated by restriction endonucleases are mixed, they join together due to their sticky ends.

(2006)

- 1) Both A and R are true and R is the correct explanation of A
- ✓ 2) Both A and R are true and R is not the correct explanation of A
- 3) A is true, R is false
- 4) A is false but R is true

14. Identify the correct combination of the following related to recombinant DNA technology ... (CBSE-AIPMT-2010)

- 1) Ti plasmid – Artificially synthesised plasmid *Naturally Present in Agrobacterium*
- 2) DNA probe – Radioactively labeled double stranded DNA *SS + double*
- 3)  Sticky ends of DNA – Facilitate the action of DNA Ligase 
- 4) Colony hybridisation – Identification of antibiotic resistant gene Marker genes – *colour of colonies*

15. Which vector can clone only a small fragment of DNA...

(2014)

1) Bacterial artificial chromosome

2) Yeast artificial chromosome

✓ 3) Plasmid

4) Cosmid

16. Select the correct option:

(2014)

**Direction of RNA
synthesis**

✓ 1) 5' - 3'

2) 3' - 5'

3) 5' - 3'

4) 3' - 5'

**Direction of reading of
the template DNA strand**

3' - 5' ✓

5' - 3'

5' - 3'

3' - 5'

17. Commonly used vectors for human genome sequencing are....

(2014)

1) T - DNA

✓ 2) BAC and YAC

3) Expression vectors

4) T/A Cloning vectors

18. DNA fragments generated by the restriction endonucleases in a chemical reaction can be separated by... (2013)

1) Polymerase chain reaction

✓ 2) Electrophoresis

3) Restriction mapping

4) Centrifugation

19. The colonies of recombinant bacteria appear white in contrast to blue colonies of non-recombinant bacteria because of...

(2013)

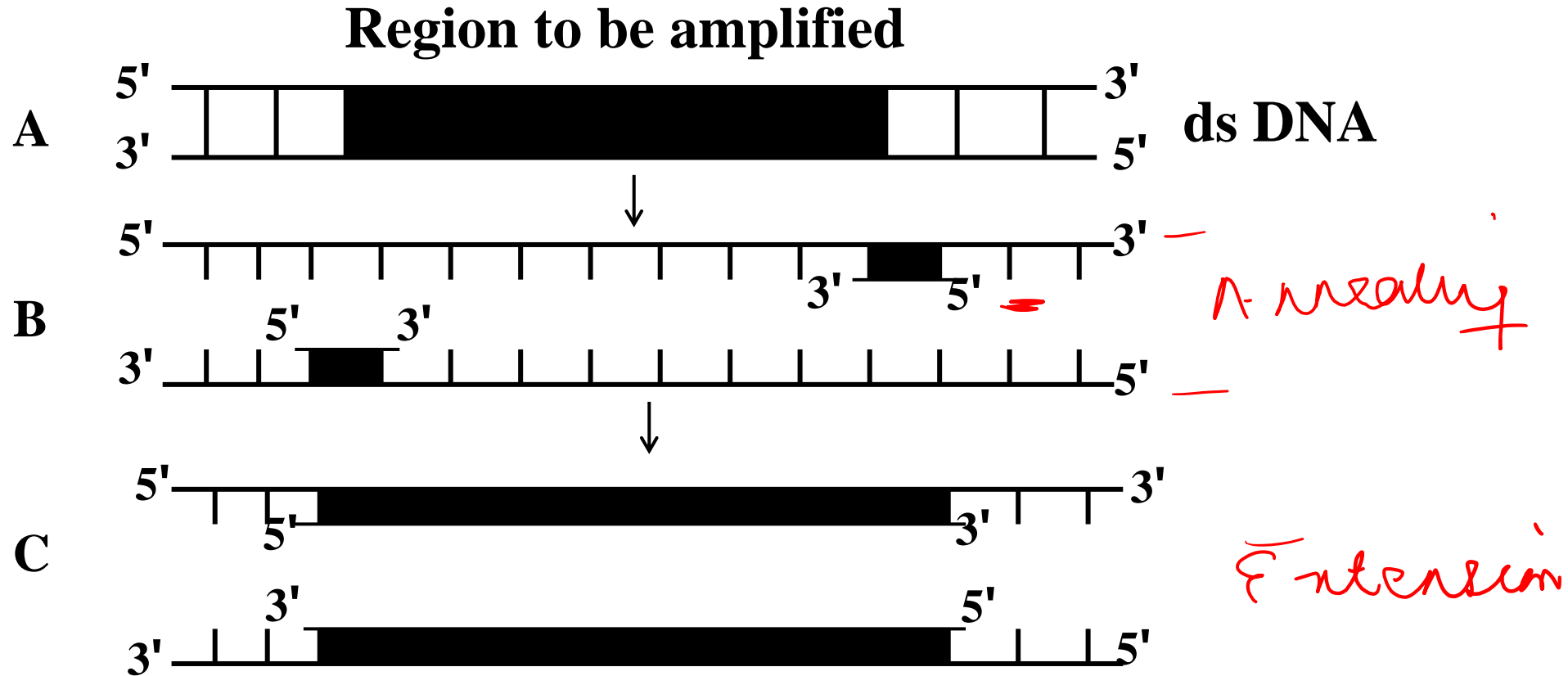
1) Insertional inactivation of alpha galactosidase in non – recombinant bacteria

2) Insertional inactivation of alpha-galactosidase in recombinant bacteria

3) Inactivation of glycosidase enzyme in recombinant bacteria

✓ 4) Non – recombinant bacteria containing beta-galactosidase → *No change in colour in recombinants*

20. The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents? (2012)



1) A – Annealing with two sets of primers

2) B – Denaturation at a temperature of about 98⁰C separating the two DNA strands

3) A - Denaturation at a temperature of about 50⁰C

4) C – Extension in the presence of heat stable DNA polymerase

21. Biolistics (gene – gun) is suitable for....

(2012)

1) DNA finger printing

2) Disarming pathogen vectors

3) Transformation of plant cells

4) Constructing recombinant DNA by joining with vectors

22. In genetic engineering, the antibiotics are used....

(2012)

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

23. What is it that forms the basis of DNA fingerprinting?

(2012)

✓ 1) Satellite DNA occurring as highly repeated short DNA segments



2) The relative proportions of purines and pyrimidines in DNA

U n T R
↓

3) The relative difference in the DNA occurrence in blood, skin and saliva

Basis

4) The relative amount of DNA in the ridges and grooves of the fingerprints

DNA
F P
—————

24. Read the following four statements (A-D) about certain mistakes in two of them (2011)

- A) The first transgenic buffalo ^{cow} Rosie produced milk which was human alpha – lactalbumin enriched
- B) Restriction enzymes are used in isolation ^{cutting} of DNA from other macro - molecules
- C) Downstream processing is one of the steps of R-DNA technology
- D) Disarmed pathogen vectors are also used in transfer of R-DNA into the host

Which are the two statements having mistakes?

1) Statements (A) and (C)

✓ 2) Statements (A) and (B)

3) Statements (B) and (C)

4) Statements (C) and (D)

1. Study the following lists:

List-I (GMP)

- A) Papaya
- B) Cotton
- C) Tomato
- D) Potato

List-II (Resistance)

- I) *Pseudomonas*
- II) Herbicide
- III) *Phytophthora*
- IV) *B.thuringiensis*
- V) Ring spot virus

MCQs

The correct match is

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
✓ 1)	V	IV	I	III
2)	V	I	III	IV
3)	IV	V	III	I
4)	III	V	IV	II

2. Study the following lists:

List-I (Protein Genes)

- A) Cry I Ac**
- B) Cry I Ab**
- C) Cry II Ab**
- D) RNAi**

List-II (Controls)

- I) Nematode parasitism**
- II) Corn borer**
- III) Cotton boll worms**
- IV) Cotton boll worms**

The correct match is

- | | <u>A</u> | <u>B</u> | <u>C</u> | <u>D</u> |
|------|----------|----------|----------|----------|
| 1) | III | II | I | IV |
| ✓ 2) | III | II | IV | I |
| 3) | III | IV | I | II |
| 4) | I | IV | III | II |

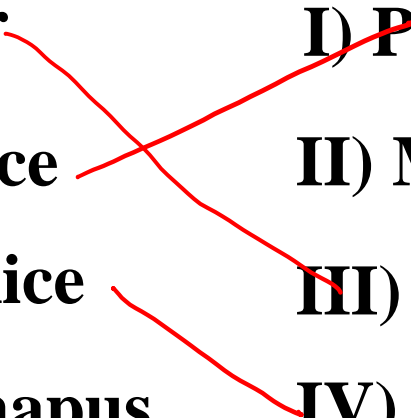
3. Study the following lists:

List-I (GMP)

- A) Flavr savr
- B) Golden Rice
- C) Basmati Rice
- D) Brassica napus

List-II (Character)

- I) Prevents Blindness
- II) Male sterile
- III) Bruise resistant
- IV) Stress resistant



	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
✓ 1)	III	I	IV	II
2)	III	IV	I	II
3)	I	II	III	IV
4)	III	I	IV	II

4. Study the following lists:

List-I

A) DNA finger printing

B) PCR

C) ELISA

D) Ti plasmid

List-II

I) *Agrobacterium tumefaciens*

II) ag-ab interaction

III) Amplication of Nucleic acid

IV) Detection of small DNA fragments

V) *Escherichia Coli*

The correct combination is

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1)	IV	III	II	V
✓ 2)	IV	III	II	I
3)	IV	II	III	I
4)	III	II	IV	I

5. Study the following lists:

List-I

- A) Gene therapy
- B) Bio-remediation
- C) Gene revolution
- D) Molecular farming

List-II

- I) Bioreactors
- II) GMO's
- III) Recycling Environmental pollutants
- IV) Correction of defective Gene

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
✓ 1)	IV	III	II	I
2)	IV	II	I	III
3)	III	IV	II	I
4)	IV	III	I	II

6. Study the following lists:

List-I

- A) Lepidopteran
- B) Coleopteron
- C) Dipteran
- D) Bacterium

List-II

- I) Tobacco budworm
- II) Beetle
- III) Mosquito
- IV) Bacillus thuringiensis

The correct match is

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1)	II	I	III	IV
2)	I	II	IV	III
3)	IV	III	II	I
4) ✓	I	II	III	IV

7. Study the following lists:

List-I

- A) Basmati variety of rice**
- B) Round ready soyabean**
- C) Transgenic golden rice**
- D) Transgenic tomato 'Flavr savr'**

List-II

- I) Bruise resistant**
- II) Prevents blindness**
- III) Resistant against biotic and abiotic stresses**
- IV) Herbicide tolerant**

The correct combination is

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1)	II	I	III	IV
✓ 2)	III	IV	II	I
3)	IV	III	II	I
4)	III	IV	I	II

8. Study the following lists....

List-I

A) Gene therapy

B) ELISA

C) PCR

D) DNA finger printing

List-II

I) Correction of defective gene

II) Helped in forensic science

III) Antigen – antibody interaction

IV) Amplification of nucleic acid

The correct match is

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1)	I	IV	III	II
2)	III	I	IV	II
3)	I	III	II	IV
✓ 4)	I	III	IV	II