BYJU'S EXAM PREP

Important Questions On Recombinant DNA Technology And Methods in Biology

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Q1. With the help of rDNA technology, plants can be genetically modified either by inserting new gene in host plant or by modifying the gene expression to produce protein with altered expressions. These plants are known as GMOs (genetically modified organisms). GMO being used in India is-

A. cotton
B. wheat
C. rice
D. potato

Q2. Immunotechniques are very useful in determining the antigen- antibody interaction. Match the given immunotechnique with their respective use.

a. RIA	i. Monoclonal antibody production
b. ELISA	ii. Quantitative and qualitative protein analysis
c. Hybridoma	iii. Trans gene expression
d. FISH	iv. Invivo DNA/ gene expression

A. a-ii, b-iii, c-i, d-iv
B. a-i, b-iii, c- ii, d-iv
C. a-iii, b-ii, c-i, d-iv
D. a-ii, b-i, c- iii, d-iv

Q3. The cloning vectors are used to increase the copy number of DNA fragments of interest whereas expression vectors are used for expression of transgene in the form of mRNA or proteins. What is not common between an expression and cloning vector?

A. Promoter
B. Marker genes
C. Restriction sites
D. Origin of replication

Q4. Given below are some amplification techniques for DNA. Match each technique with their corresponding use-

a. PCR	i. Evolutionary studies
b. RACE	ii. DNA/ cDNA amplification
c. RAPD	iii. $5^{'}$/ $3^{'}$ end analysis of cDNA
d. AFLP	iv. Invivo DNA/ gene expression

A. a-ii, b-iii, c-i, d-iv
B. a-i, b-iii, c- ii, d-iv
C. a-iii, b-ii, c-i, d-iv
D. a-ii, b-i, c- iii, d-iv

Q5. Restriction enzymes are molecular scissors having ability to cleave the phosphodiester backbone of the target sequence in DNA. Given below are some examples of restriction enzymes. Which of these enzymes produce blunt ends?
A. Sal1
B. EcoRV
C. Xhol1
D. HindIII

Q6. ARS (Autonomously replicating sequence) is a conserved origin of replication site present in genome which is generally required for the replication of the DNA fragment. ARS is a feature of which vector?
A. Phage vector
B. E.coli vector
C. Yeast vector
D. Plasmid vector

Q7. Match the following-

COLUMN A (Technique)	COLUMN B (application)
a. Flow cytometry	i. Nucleotide annealing
b. FACS	ii. Cell morphology and function
c. FRET	iii. Cell sorting
d. FISH	iv. Invivo DNA/ gene expression

A. . a-iii, b-ii, c-i, d-iv
B. a-i, b-iii, c- ii, d-iv
C a-ii, b-iii, c-i, d-iv
D. a-ii, b-i, c- iii, d-iv

Q8. In genome sequencing, sequencing depth is used to predict the number of distinctive reads including a given nucleotide in the recreated sequence aimed at increased number of distinctive reads of every region in a particular sequence. Sequencing depth is also known by another which term?
A. Amount
B. Trend
C. Coverage
D. Consensus

Q9. The cDNA library is the collection of the expressed genes which undergo transcription forming mRNA followed by translation forming protein in the cell. A cDNA library is also called-
A. EST library
B. Compulsory DNA library
C. Part of protein domain
D. EMT library

Q10. Match the following-

COLUMN A (Blotting type)	COLUMN B (application)
a. Western Blotting	i. For detecting RNA
b. Southern Blotting	ii. For detecting protein
c. Northern Blotting	iii. For detecting DNA
d. Sothern- western Blotting	iv. For detecting protein post- translational modification

A. a-ii, b-iii, c-i, d-iv
B. a-i, b-iii, c- ii, d-iv
C. a-iii, b-ii, c-i, d-iv
D. a-ii, b-i, c- iii, d-iv

ANSWERS

1. A	2. A	3. A	4. A	5. B	6. C
7. C	8. C	9. A	10. A		

Solution 1:
Genetically modified Bt cotton is the only permitted GM crop grown in India. Bt cotton is modified genetically to introduce pest resistance against the ball worm. It is modified by inserting gene from microbe *Bacillus thurigenesis* to combat ball worm. Bt cotton expresses toxin crystals due to insertion of transgene leading to death of pest.

Solution 2:
The correct match is as given below-
a. RIA ii. Quantitative and qualitative protein analysis
b. ELISA iii. Trans gene expression
c. Hybridoma i. Monoclonal antibody production
d. FISH iv. Invivo DNA/ gene expression

Solution 3:
Cloning vectors have origin of replication, selectable or marker gene for identification of recombinant clones, unique recognition site for restriction enzymes and high copy number. While expression vectors along with these functions show transcriptional and translational gene cassettes required for expression of mRNA from transgene along with promoter. Hence, A is correct option.

Solution 4:
The correct match is as given below-
a. PCR ii. DNA/ cDNA amplification
b. RACE iii. 5'/ 3' end analysis of cDNA
c. RAPD i. Evolutionary studies
d. AFLP iv. Invivo DNA/ gene expression

Solution 5:
Restriction enzymes are molecular scissors having ability to cleave the phosphodiester backbone of the target sequence in DNA. The enzymes EcoRV, AluI, HaeIII produce the blunt ends. In blunt ends, the cleaved restriction fragments do not have any single strand at the end i.e. unpaired nucleotides. Hence, B is correct option.

Solution 6:
ARS (Autonomously replicating sequence), a conserved origin of replication site present in genome of yeast. YAC (yeast artificial chromosome) is generally used as cloning vector which contains ampicillin resistance gene, origin of replication (Ori), ARS, CEN4 (centromere sequence) and TEL (telomere sequence) required for chromosomal stability. Hence, C is correct option.

Solution 7:

COLUMN A (Technique)	COLUMN B (application)
a. Flow cytometry	ii. Cell morphology and function
b. FACS	iii. Cell sorting
c. FRET	i. Nucleotide annealing
d. FISH	iv. Invivo DNA/ gene expression

Solution 8:
Sequencing depth is also known as coverage in genome sequencing terminology which allows for detection of sequence variants in mixed populations. Coverage is also used to represent deep sequencing which is given by-
Sequencing depth = Read length x amount of reads/ length of haploid genome
Hence, C is correct option.

Solution 9:
cDNA library is also known as expressed sequence tags library abbreviated as EST library. ESTs are short segment of DNA sequences obtained from 3' end of complementary DNA i.e. cDNA. The cDNA library is constructed from mature mRNA transcripts which are expressed in the cell. Hence, A is correct option.

Solution 10:

COLUMN A (Blotting type)	COLUMN B (application)
a. Western Blotting	ii. For detecting protein
b. Southern Blotting	iii. For detecting DNA
c. Northern Blotting	i. For detecting RNA
d. Sothern- western Blotting	iv. For detecting protein post- translational modification

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