P P SAVANI UNIVERSITY

Fifth Semester of B.Sc. Examination

Dec2020-Jan 2021

SSBT3130–Recombinant DNA Technology I

06.01.2021, Wednesday Time: 10:00a.m. to 12:30 p.m. Maximum Marks: 60

Section-A (Total Marks - 20)

Q.1 Objectives (20 MCQ Compulsory-20 mark each) **(20)**

1 If a double stranded DNA is treated with _____ enzyme, single stranded DNA product can be obtained after the treatment

- **A** Bal31
- **B** Exonuclease-III
- **C** Endonuclease V
- **D** All the options are correct

2 Which of the following can be cleaved by S1 nuclease

- **A** Only Single stranded DNA
- **B** Only double stranded DNA with a nick
- **C** Both double stranded DNA and single stranded DNA
- **D** Both double stranded DNA with a nick and single stranded DNA

3 Recognition sequence for enzyme HinfI is/are:

- **A** GAATC
- **B** GAGTC
- **C** GATTC
- **D** All of the options are correct

4 BsrFI recognizes **R**CCGG**Y**, where _____

- **A** R= A or G and Y= C or T
- **B** R= C or T and Y= A or G
- **C** R= A, G, C or T and Y= A, G, C or T
- **D** All the options are correct

5 If the first 323 amino acids of DNA pol I polypeptide is removed_____

- **A** Polymerase function will be lost
- **B** Nuclease activity will be lost
- **C** Both polymerase and nuclease activity will be lost
- **D** None of the activity will be lost

6 _____ enzyme adds one or more deoxyribonucleotides onto the 3' terminus of a DNA molecule

- **A** Alkaline phosphatase
- **B** Polynucleotide kinase
- **C** Terminal deoxynucleotidyl transferase
- **D** None of the options are correct

7 The vaccinia topoisomerase cuts DNA at the sequence

- **A** CCTTT
- **B** CCCTT
- **C** CCCCT
- **D** CTTTT

8 Which of the following plasmids do not have any apparent effect on the phenotype of host

- **A** R plasmid
- **B** Cryptic
- **C** Col
- **D** Cryptic

9 Which of the following is an expression plasmid

- **A** pBR322
- **B** pUC18
- **C** pUC19

D pET14-b

10 _____ controlled by a set of *tra* genes
A Conjugation and plasmid transfer
B Only conjugation
C Only plasmid transfer
D All the options are correct

11 In λ gt10 vector insert can be inserted into a unique EcoRI site located in the cI gene.:
A Insertional inactivation of this gene means that non-recombinants are distinguished as clear rather than turbid plaques.
B Insertional inactivation of this gene means that recombinants are distinguished as turbid rather than clear plaques.
C Insertional inactivation of this gene means that recombinants are distinguished as clear rather than turbid plaques.
D None of the options are correct

12 M13, after entering to E. coli host, converts into
A single stranded DNA molecule called non-replicative form
B double stranded DNA molecule called non-replicative form
C double stranded DNA molecule called replicative form
D Single stranded DNA molecule called replicative form

13 In which of the following area(s) M13 vectors are useful
A DNA sequencing
B Mutagenesis study
C probe generation
D All of the options are correct

14 In pEMBL8 vector the cloning sites are present within the lacZ' gene, so the visual screening can be performed by:
A Identifying recombinant plasmids on agar containing X-gal
B Identifying recombinant plaques on agar containing X-gal
C Identifying non-recombinant plaques on agar containing X-gal
D Identifying non-recombinant plasmids on agar containing X-gal

15 In YAC, the presence of the insert DNA in the vector can be checked by testing for insertional inactivation of:
A SUP4 gene
B URA3 gene
C TRP1 gene
D LEU2 gene

16 In YEp13 vector _____ region codes for a protein that can convert A form to the B form
A REP
B FLP
C REP
D LPF

17 Cloning in Drosophila can be done by:
A The N element
B The P element
C The C element
D The T element

18 For using URA3 as a selectable marker in a cloning experiment

A The yeast vector should have functional URA3 gene, whereas the host cell must have non-functional URA3 gene
B The yeast vector should have non-functional URA3 gene, whereas the host cell must have functional URA3 gene
C The yest vector and host both should have non-functional URA3 gene
D The yeast vector and host both should have functional URA3 gene

19 In order to use LEU2 as a selectable marker, the host must be an _____
A auxotrophic mutant that has a non-functional gene for b-isopropyl-malate dehydrogenase gene
B auxotrophic mutant that has afunctional LEU2 gene
C auxotrophic mutant that has a non-functional gene for orotidine 5'-phosphate decarboxylase
D None of the above

20 To clone the rabbit β-globin gene, in simian virus 40 (SV40)
A The HindIII to BamHI restriction fragment of Early gene region was replaced
B The HindIII to BamHI restriction fragment of Late gene region was replaced
C The EcoRI to BamHI restriction fragment of Late gene region was replaced
D The EcoRI to BamHI restriction fragment of Early gene region was replaced

Section-B (Total Marks - 40)

Q.1 Short Notes (attempt allfour compulsory- 3 marks each) **(12)**

A Adaptors Vs linkers

B Replacement vector

C Yeast Episomal Plasmid (YEp13)

D Degenerate recognition sequence

Q.2 Explain in detail (attempt anyfour compulsory-7 marks each) **(28)**

A What are the basic steps of gene cloning? Explain each stepin detail?

B Discuss some of the strategy to introduce sticky end onto a blunt-ended DNA molecule?

C What are Cosmids? Explain how concatemer is formed in EMBL4 vector?

D Explain YAC in detail.Why three different selection markers are required for cloning in YAC?

E Describe two cloning plasmid vectors based on E. coli?