BITS Pilani, Dubai Campus

1st Semester 2013-2014

Recombinant DNA Technology BIOT F311

Compre Exam

Date: 29/12/13 (Th) Duration: 3 hours Weightage: 40% (Max Marks 40)

Answer all the questions in a sequence. Draw diagram wherever necessary.

Q1a. What are somaclonal variations? As a biotechnologist how can you make use of these variations? [2]
b. Justify, Mutations in RepA protein can lead to increased copy number in plasmids. [2]
c. Explain the different strategies of gene inactivation that do not modify the target gene. [4]
d. The two widely used BAC vectors are pBeloBAC11 and pECBAC1. Mention the important sequences/ sites/ genes present in these vectors. [2]

Q2a. Name any two endogenous markers used for animal cells. Describe the role of these markers and the method to score them. [3]
b. What are the advantages of using plant viruses as expression vectors? [2]
c. Diagrammatically explain the organization of the DNA uptake machinery in *Neisseria gonorrhoeae.*[2]
d. Give the principle of pyrosequencing and describe its two variants. [3]

Q3a. In cDNA cloning for genomic librabry construction a major disadvantage is the cleavage by SI nuclease, which tends to eliminate a few bases from the 5' end. Suggest a method to overcome this limitation? [3]
b. Some plasmids are linear in nature. How are these protected from being denatured? Give an example of the organism in which that mechanism of protection is found. [2]
c. What are the advantages and disadvantages associated with the *S.cerevisiae* system for production of recombinant proteins? [2]
d. Give examples of any two restriction enzymes and mention their source and restriction sequence. [3]

Q4a. How are adaptor molecules different from linkers? What is the application of adaptor molecules in recombinant DNA technology? [2]
b. Explain how gene manipulation has benefited the field of medicine. [3]
c. What are the unique features of filamentous phage? [2]
d. What is Real Time PCR? Explain with a diagram the working of scorpion probes. [3]

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BITS Pilani, Dubai Campus

1st Semester 2013-2014

Recombinant DNA Technology BIOT F311

Test – 2 (Open book)

Date: 12/12/13 (Th) Duration: 50 minutes Weightage: 20% (Max Marks 20)

Answer all the questions in a sequence

Q1a. What is meant by cycle sequencing? [2]

b. Why is transformation the method of choice for gene transfer in bacteria? [2]

c. What is the role of calcium in gene transfer to animal cells? [2]

Q2a. Explain the working of the integrative vector constructed by Stross. [3]

b. Justify, why DNA sequencing efficiency is greatly hampered by slab gels. [2]

c. How do polyamines help in transferring DNA into the animal cells? [2]

Q3a. Justify why plasmid vectors derived from *S. faecalis* are more stable than those derived from *B.subtilis*. [2]

b. Transient transfection is not appreciated during gene transfer. However, scientists have made use of this phenomenon. Can you explain the use of transient transfection and describe a strategy to develop it? [3]

c. What is the strategy used for sequencing a gene and what are the disadvantages associated with the strategy? [2]

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BITS Pilani, Dubai Campus

Instructions Division

1st Semester 2013-2014

Recombinant DNA Technology BIOT F311

Test – 1 (Close book)

Date: 29/9/13 (Su) Duration: 50 minutes Weightage: 25% (Max Marks 25)

Answer all the questions in a sequence

Q1a. Justify, 'Recombinant DNA has opened new horizons'. [3]
b. Explain the electrophoretic blotting technique. What is the precaution to be taken during elctrophoretic blotting? [3]
c. What are linkers? How are they useful in gene manipulation? [2]

Q2a. What are the different criteria for an efficient gene manipulation? [2]
b. Diagrammatically explain the Nested PCR technique. [3]
c. What is homopolymer tailing? How is it useful in forming recombinant molecules? [3]

Q3a. Explain pulse field gel electrophoresis. What is the disadvantage associated with it? [4]
b. What is lipofection? How is it performed? [2]
c. How can we move a cloned DNA from one vector to another? [1]
d. What are Neoschizomers? Give an example. [2]

**********ALL THE BEST**********

BITS PILANI, DUBAI CAMPUS
DUBAI INTERNATIONAL ACADEMIC CITY
FIRST SEMESTER 2013-2014
QUIZ-2 [21.11.13]

COURSE NO.: BIOT F311 MAXIMUM MARKS:7
TITLE: RECOMBINANT DNA TECH DURATION: 20 min.

Name: ID NO.

1. Why are phage promoters preferred while constructing specialized vectors? [1.5]

2. Why are genes for fusion proteins with polyhistidine residues engineered into the cloning vectors? [1]

3. Give the significance of RNAi. [1]

4. A major drawback of PCR is the low processivity of the Taq polymerase. How can we overcome this drawback? [1]

5. What is the drawback of the Maniatis *et al* strategy of cDNA cloning? [0.5]

6. What is the significance of the Okayama & Berg strategy in cDNA cloning? [0.5]

7. What are the strategies for library screening? [0.5]

8. What is the southwestern screening technique? [1]

BITS PILANI, DUBAI CAMPUS
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FIRST SEMESTER 2013-2014
QUIZ-1 [22.10.13]

COURSE NO.: BIO F311 MAXIMUM MARKS:8
TITLE: RECOMBINNAT DNA TECH DURATION: 20 min.

Name: ID NO.

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1. What are the different structural interconversions of plasmids? [0.5]

2. What are conjugative plasmids? [0.5]

3. Name the two mechanisms that help in regulating the plasmid copy numbers. [0.5]

4. Explain the Birnboim and Doly method of plasmid purification. [1]

5. What are stuffer fragments? [0.5]

6. What do you mean by the term **Spi$^+$** ? [0.5]

7. What are the advantages of filamentous phage vectors? [2]

8. Give examples of any two modern cosmids. [0.5]

9. Mention an example where the P1 vectors been used in recombinant DNA technology? [1]

10. What are the important sites present on the BAC vector? [1]