

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc. Winter 2018-19 Examination

Semester: 3
Subject Code: 11202203
Subject Name: Genetic Technologies

Date: 27/10/2018
Time: 10:30 am to 1:00 pm
Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1. A) Answer the following questions (08)**
- (a) Describe in details: Steps for DNA isolation from plant cells
 - (b) Write a note on: YAC
- Q.1. B) Answer the following questions (Any two) (04)**
- (a) Explain role of following enzymes (04)
 1. Alkaline phosphatase
 2. Terminal nucleotide transferase
 - (b) Describe salient features of cloning vectors (04)
 - (c) Describe principle of southern blotting technique (04)
- Q.2. A) Answer the following questions (04)**
- (a) Define following terms with suitable example (04)
 1. Isoschizomers
 2. Blunt ends
 - (b) What are restriction enzymes? Give their types. (04)
- Q.2. B) Answer the following questions (Any two) (03)**
- (a) Multiple choice question – Choose correct option. (03)
 1. Process in which bacterial cell wall is disrupted by using small electric pulses is
 - a) electroporation
 - b) electric shock
 - c) electric fragmentation
 - d) electrolysis
 2. A probe is used in which stage of genetic engineering?
 - a) cleaving DNA
 - b) recombining DNA
 - c) cloning
 - d) screening
 3. Telomeric sequences are found in
 - a) YAC
 - b) BAC
 - c) HAC
 - d) NAC
 - (b) What are expression vectors? (03)
 - (c) Differentiate between cosmids and phagmids (03)
- Q.3. A) Answer following questions (08)**
- (a) Explain: FISH
 - (b) Describe application of genetic engineering in agriculture with one example
- Q.3. B) Answer the following questions (Any two) (04)**
- (a) Answer following (04)
 1. What is adaptor ligation?
 2. Students are performing PCR reactions. Student X use DNA polymerase isolated from mesophilic bacterium. Student Y use DNA polymerase isolated from psychrophilic organism. Student Z use DNA polymerase isolated from thermophilic organism but didn't add MgCl₂ in reaction mixture. Student A use DNA polymerase isolated from thermophilic organism and added MgCl₂ in reaction mixture. Which one of them are most likely to get an amplification? Why?
 - (b) In the PCR reaction, you need a three-step reaction cycle, which results in a chain reaction that produces an exponentially growing population of identical DNA molecules. (04)

Each step of a reaction cycle is performed at a specific temperature i.e. 95° C for Step 1, 55° C for step 2 and 70° C for Step 3. Briefly explain why the three steps are performed under different temperatures.

(c) What is homopolymer tailing? (04)

Q.4. A) Answer the following questions

(a) Explain role of following chemicals in genetic engineering (04)

1. Isoamyl alcohol
2. Calcium chloride

(b) pUC is circular plasmid. Following are the fragments obtained. Draw restriction map of pUC plasmid. Mention the size of pUC plasmid (04)

EcoRI: 20kb, *BamHI*: 11kb, 6kb, 3kb, *EcoRI*+ *BamHI*: 8kb, 6kb, 3kb

Q.4. B) Answer the following questions (Any two)

(a) Multiple choice question – Choose correct option. (03)

1. What is the final product of the RNaseH method?

- a) blunt ended dsDNA
- b) staggered dsDNA at both ends
- c) staggered dsDNA at 3' end
- d) staggered dsDNA at 5' end

2. Any cDNA library would represent a fraction of RNA species of an organism. Is the given statement true or false?

- a) True
- b) False

3. Genomic libraries in which a particular sequence is present in one organism but are absent from another organism, are called as:

- a) normalized libraries
- b) subtractive libraries
- c) selective libraries
- d) partial libraries

(b) What is genome annotation? How it can be achieved? (03)

(c) What is a role of promotor sequence? Where it is situated in genome? (03)

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