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[A-94]

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SARDAR PATEL UNIVERSITY

M. Sc. (Integrated) Biotechnology – Sixth Semester Examination

23rd April, 2015

2:30 p.m. to 5:30 p.m.

PS06CIGB02: GENETIC ENGINEERING

Note: 1) Figures to the right indicate marks
2) Draw diagram wherever necessary

Total marks: 70

Q – 1 Choose the most appropriate alternative for the following: (08)

1. The process of DNA transfer from one bacterium to another by bacteriophage is called_____.
   a) Transfection **b)** Conjugation
   c) Transduction **d)** All of these
2. _____ is a specific cutting site in pBR322 for conjugative transfer.
   a) Mob **b)** Tra
   c) Nic / bom **d)** All of them
3. Homopolymer tailing of cDNA can be achieved with _____
   a) Ligase **b)** Reverse transcriptase
   c) Terminal deoxynucleotidyl transferase **d)** Klenow fragment
4. _____key feature of *Taq* polymerase is suitable for PCR.
   a) *Taq* polymerase does not require primers **b)** *Taq* polymerase does not require a template
   c) *Taq* polymerase is not damaged by heating **d)** *Taq* polymerase can work at very low temperatures
5. _____is not used for radioactive labelling of probe.
   a) Alkaline phosphatase **b)** Terminal transferase
   c) Biotin **d)** Klenow fragment
6. Detection of radioactive probe on x-ray after hybridization is called _____.
   a) Southern hybridization **b)** Northern hybridization
   c) Autoradiography **d)** Western hybridization
7. In purification of histidine tagged recombinant proteins, _____ is responsible to replace it from sepharose.
   a) Ni^{+2} **b)** EDTA
   c) NaCl **d)** None of these
8. CaMV 35S promoters is used for _____ production of recombinant protein.
   a) Endosperm specific **b)** Universal
   c) Chloroplast specific **d)** Mitochondrial specific

[P.T.O.]

Q – 2 Attempt ANY SEVEN from the following: **(14)**

1. Explain significance of orientation and maintaining correct ORF for the expression of cloned gene.
2. Explain procedure of *in vitro* phage packaging for cloning.
3. Explain application of selectable and reporter markers with example.
4. What are the advantages of metagenomic library?
5. Give a brief introduction of membranes used in hybridization technique.
6. Write a note on primer walking.
7. Give diagrammatic representation of plaque hybridization.
8. Enlist safety concern associated with GMO research.
9. Explain principle and importance of TA cloning.

Q – 3 **(a)** Enlist different methods of transformation. Explain calcium chloride mediated transformation in detail. **(06)**

(b) Give an account on YAC. **(06)**

OR

(b) Describe tri-parental mating in *Agrobacterium* mediated transformation. **(06)**

Q – 4 **(a)** Discuss the method for preparation of Genomic library? You have been provided with 4.2×10^6 Kb of genome size and average cloned fragment is 20 kb. Calculate 99% recombinant probability based on Clarke and Carbon method. **(06)**

(b) Explain Okayama and Berg method for cDNA library preparation with one method of screening. **(06)**

OR

(b) Discuss the procedure of integration of DNA insert into vector by use of linkers, adaptor and homopolymer tailing. **(06)**

Q – 5 **(a)** Explain Fluorescence *in situ* hybridization (FISH) technique in detail. **(06)**

(b) Give an account on northern and western hybridization. **(06)**

OR

(b) Discuss Colony and Plaque hybridization for selection of recombinant clones. **(06)**

Q – 6 **(a)** Give an account on M13 based site directed mutagenesis. **(06)**

(b) Explain purification technique of recombinant protein with suitable examples. **(06)**

OR

(b) Explain the methodology of *Bal*31 nuclease based technique of nested deletion. **(06)**

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