Government Degree College, Baramulla (Autonomous)

Term End External Examination 4th Semester (Session- July 2024)

Subject: Biotechnology

Course No and Title: BTGC2422N/Recombinant DNA Technology

Time: 2.15 hours Max Marks:100 Min. Marks:40

Section A: Objective Type Questions

Q1. Choose the appropriate Answer: (8x1.5=12)

i. Which of the following activity is not possessed by Kelenow fragment?

A 5'→ 3' pol activity **B** 3' → 5' exonuclease activity

C 5' → 3' exonuclease activity **D** It possess all these activities

ii. Which of the following class of enzyme mediate both cleavage and ligation of DNA?

A DNA ligase **B** Restriction endonuleases

C Polynucletide kinase **D** Topoisomerases

iii. The PCR variant designed for the study of RNA expression levels is;

A q-PCR or RT (real time) PCR B Reverse transcriptase (RT-PCR)

C Assymetric PCR D Touch down PCR

iv. Which phage is used in oligonucleotide directed method for site directed mutagenesis?

A λ-phage **B** M-13 phage

C Phagemid **D** E.coli

v. The first chromosome to be sequenced in HGP was;

A Chromosome 1 **B** Chromosome Y

C Chromosome X **D** Chromosome 22

vi. Cas9 in CRISPR/Cas9 system is;

A Endonuclease that makes ds breaks in DNA **B** Exonuclease that makes ss breaks in RNA

C Exonuclease that make ds breaks in DNA **D** Endonulease that makes breaks in DNA and RNA

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vii. Bt toxin binds to which cells of the insect gut?

A Skeletal cells **B** Lymphocytes

C Epithelial cells **D** All of these

viii. Which of the following is a chemical method of gene transfer?

A Silicon carbide method **B** Electroporation

C Biolistic method **D** PEG mediated method

Section-B: Descriptive Type Questions (Short Type)

Q2: Answer all the Questions (8 x 4 =32)

i. What strategy you will use to minimize the self-ligation of the vector in a vector + insert ligation reaction?

ii. What is the use of adaptors in recombinant DNA technology?

iii. What will happen in a PCR, if the annealing temperature is set higher than the melting temperature of the oligonucleotides?

iv. What are the different steps in PCR amplification?

v. How does a dideoxy-nucleotide lead to chain termination?

vi. What do you mean by attenuated vaccine?

vii. How is antisense RNA technology used for gene silencing?

viii. What are transgenic plants? Give two examples.

Section – C: Descriptive Type Questions (Medium Type)

Answer all the questions: (4 x 7=28)

Q 3. What are plasmids? Briefly explain the features of a plasmid to be used as a vector.

OR

By a flow chart, show the different steps in cloning a gene.

Q 4. Briefly discuss qPCR. Give its applications.

OR

Discuss any one of the methods used for site-directed mutagenesis (SDM).

Q 5. Briefly discuss about CRISPR/Cas9 system and its applications.

OR

Give an outline classification of vaccines with an example.

Q6. What is golden rice? What are the genes involved in golden rice?

OR

Explain in brief microinjection and biolistic method of gene transfer.

Section – D: Descriptive Type Questions (Long Type)

Answer any two of the following: (2 x 14=28)

Q 7. Discuss in detail blue-white screening method for screening of recombinants.

Q 8. Give a detailed account of DNA foot printing. What are its applications?

Q 9. Explain chain termination and pyro sequencing method for DNA sequencing.

Q 10. Briefly explain how Ti plasmids are used for plant transformation.