



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – BIOTECHNOLOGY

SECOND SEMESTER – APRIL 2022

PBT 2501 – MOLECULAR BIOLOGY AND GENETIC ENGINEERING

Date: 15-06-2022

Dept. No.

Max. : 100 Marks

Time: 09:00 A.M. - 12:00 NOON

PART – A

Answer ALL the Questions

I. Choose the correct answer

(5 x 1 = 5 Marks)

- Which of the following subunits of RNA polymerase is solely required for initiation of transcription?
a) β (beta) b) α (alpha) c) σ (sigma) d) ω (omega)
- Rolling circle mode of replication is _____
a) Conservative b) Non Conservative
c) Semi-Conservative d) Dispersed
- Termination of replication is triggered by
a) DNA polymerase b) Helicase c) SSB d) Tus protein
- Which of the following is correct for plasmid pBR322?
a) amp^r b) tet^r c) amp^r and tet^r d) HindIII and EcoRI
- It has been used in human genome project?
a) emulsion PCR b) shot gun cloning
c) bridge amplification d) multiplex PCR

II. State whether the following are true or false.

(5x1=5 Marks)

- The trp operon is a classic example of a repressible operon.
- RNA editing occurs in the cytoplasm.
- Bacterial polymerases are slower than eukaryotic polymerases.
- pUC is a vector which is named after the place University of Canada.
- Human polymerase are used for PCR reactions.

III. Complete the following

(5 x 1= 5 Marks)

- The initial linkage of a sugar for post-translation modification N-linked glycosylation occur in the _____ organelle.
- In Eukaryotes the region between 1st AUG and 5'-G cap is known as _____.
- The addition of a CH_3CO group to the N-terminus of a protein is the most common form of protein modification. This chemical modification is called _____.
- LacZ is a _____ gene.
- Dideoxy method is also called _____.

IV. Answer the following within 50 words

(5 x 1 = 5 Marks)

- What is the role of a primer in DNA replication?
- How many ways of genetic recombination are present in bacteria?
- Why is the post-transcriptional poly-A tail an important addition to a mRNA molecule?
- What are cos sites?
- What is pyrosequencing?

PART B

Answer the following each within 500 words.

(5 x 8 = 40 marks)

Draw diagrams wherever necessary

21. (a). Explain Griffith's transformation experiments. What did he conclude from them?

OR

(b) Why genes show linkage and crossing over?

22. (a) What is the consequence of mutation of a mismatch repair enzyme? How will this affect the function of a gene?

OR

(b) Explain the different forms of DNA and its significance?

23. (a) Explain the transcription process in eukaryotes.

OR

(b) Outline the modifications that occur to ribosomal RNA as it matures.

24. (a) Describe the role of restriction enzymes and reporter genes in recombinant DNA technology.

OR

(b) Summarize the steps involved in constructing a cDNA library.

25. (a) Discuss the factors affecting PCR reaction.

OR

(b) Review the principle behind automated sequencing.

PART – C

Answer any TWO of the following, each within 1500 words.

(2 x 20 = 40 Marks)

Draw diagrams wherever necessary.

26. Explain the roles of activators, inducers, and repressors in gene regulation.

27. Describe the mechanism of translation and various processes of post transcriptional modifications.

28. Elaborate on the steps involved in molecular cloning using plasmid.

29. Devise a method to quantify PCR products during amplification.

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