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Question Paper Code: 2144402

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV / DEC 2024

Fourth Semester

Biotechnology

U20BT403 – MOLECULAR BIOLOGY

(Regulation 2020)

Time: Three Hours

Maximum: 100 Marks

Answer ALL questions

PART – A

(10 x 2 = 20 Marks)

1. Define Chargoff rule.
2. Draw the sequence architecture in repetitive DNA.
3. State the importance of proof-reading mechanism.
4. Mention the applications of PCR.
5. Differentiate between prokaryotic and eukaryotic promoters.
6. Outline the mechanism of mRNA splicing.
7. Comment on start and stop codons.
8. List out the events in post translational modifications.
9. Why lac operon switches off in the absence of Lactose in *E.coli*?
10. Differentiate between traditional Sanger sequencing and next generation sequencing.

PART – B

(5 x 16 = 80 Marks)

11. (a) Describe the double helical structure of DNA with neat diagram. (16)

(OR)

- (b) Illustrate the typical structure of eukaryotic chromosome organization. (16)

12. (a) Detail the list of events happening during DNA replication process in prokaryotes and discuss the enzyme involved in the process. (16)

(OR)

- (b) Explain in detail about the D-loop and rolling circle mode of replication. (16)

13. (a) Give a detailed account on prokaryotic transcription initiation, elongation and termination mechanisms with suitable diagram and factors involved in it. (16)

(OR)

- (b) Describe the process of Alternative splicing, Poly 'A' tail addition and base modification. (16)

14. (a) (i) How will you Elucidate genetic code? What is Codon degeneracy? (8)
(ii) List out the properties and mechanisms of Protein regulation in translation process. (8)

(OR)

- (b) Briefly explain the role of Inhibitors of protein synthesis. (16)

15. (a) Explain the trp operon structural genes and their functions with neat diagram. (16)

(OR)

- (b) Explain the basic workflow of next-generation sequencing, highlighting the differences from Sanger sequencing. (16)

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