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Question Paper Code:U6C01

B.E./B.Tech. DEGREE EXAMINATION, APRIL / MAY 2025

Sixth Semester

Biotechnology

21UBT601 GENETIC ENGINEERING

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

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| 1. What is the function of modification enzymes? | CO1- U |
| 2. Differentiate between RFLP and RFLP markers. | CO2- App |
| 3. What is chromosomal walking? | CO1- U |
| 4. How are DNA libraries screened using nucleic acid probes? | CO2- App |
| 5. How does random mutagenesis differ from site-directed mutagenesis? | CO2- App |
| 6. What is phage display technology? | CO1- U |
| 7. What are bacteriophage vectors? Give an example. | CO1- U |
| 8. Define cosmid vectors and their applications. | CO1- U |
| 9. How are Genetically Modified Organisms (GMOs) used in medicine? | CO3-App |
| 10. What are the benefits of GMOs in agriculture? | CO1- U |

PART – B (5 x 16= 80 Marks)

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| 11. (a) Compare the characteristics of different types of cloning vectors and their applications. | CO1- U | (16) |
| Or | | |
| (b) How can RFLP be applied in genetic fingerprinting and disease diagnosis? What are its practical implications in forensic and medical research? | CO1- U | (16) |

12. (a) How can different DNA sequencing techniques be applied in genomic research, and what factors determine their suitability for specific applications? CO2-App (16)
- Or
- (b) How can hybridization techniques be effectively utilized in DNA library screening, and what makes them essential for identifying specific genetic sequences? CO2-App (16)
13. (a) How do Inverse PCR and Nested PCR improve DNA amplification efficiency as well as accuracy, and in what experimental scenarios would each method be most suitable? CO2-App (16)
- Or
- (b) How is phage display technology applied in protein engineering, and what advantages does it offer in developing therapeutic proteins and antibodies? CO2-App (16)
14. (a) Explain the role of yeast and insect vectors in recombinant protein expression and describe their key advantages in biotechnology applications. CO1- U (16)
- Or
- (b) Describe the principles and advantages of T7 expression vectors in bacterial protein production. CO1- U (16)
15. (a) How can molecular diagnostic tools be applied for early disease detection, and what factors influence their accuracy and reliability in clinical settings? CO2-App (16)
- Or
- (b) Demonstrate how CRISPR-Cas9 technology can be applied to correct genetic disorders. CO2-App (16)