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Question Paper Code: UC304

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

Professional Elective

Biotechnology

21BTV304 MOLECULAR PATHOGENESIS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. How did early microbial genetics studies influence modern diagnostic and therapeutic techniques? CO2- App
2. What is a toxic assay? CO1- U
3. What is the role of fever in host defense? CO1- U
4. Define adaptive immunity and how it differs from innate immunity. CO1- U
5. Define quorum sensing in bacterial pathogenesis. CO1- U
6. What are the key stages in the Plasmodium life cycle? CO1- U
7. How can gene knockout studies be used to analyze the role of specific genes in pathogen virulence? CO2- App
8. Explain how in vitro infection models help in understanding host-pathogen interactions and testing therapeutic strategies. CO2- App
9. Mention two advantages of molecular pathogen detection techniques. CO1- U
10. What is the importance of next-generation sequencing in infectious disease research? CO1- U

PART – B (5 x 16= 80 Marks)

11. (a) Discuss how microbial genetics has contributed to understanding infectious diseases. CO3-App (16)
- Or
- (b) Evaluate the role of early microbial pathogenesis research in modern disease control strategies. CO3-App (16)

12. (a) Assess the effectiveness of host immune responses in different types of infections. CO3-App (16)
- Or
- (b) Compare innate and adaptive immunity with suitable examples. CO2-App (16)
13. (a) Explain the molecular basis of virulence in bacterial pathogens. CO1- U (16)
- Or
- (b) Discuss the role of Plasmodium proteins in erythrocyte invasion. CO1- U (16)
14. (a) Describe the role of signal transduction in virulence regulation. CO1- U (16)
- Or
- (b) Discuss the role of immune responses in different virulence assays. CO1- U (16)
15. (a) Discuss the development and application of DNA-based vaccines. CO2-App (16)
- Or
- (b) Compare and contrast different vaccine strategies, including DNA, subunit, and cocktail vaccines. CO3-App (16)