

B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2024

(Regulation 2018)

Seventh Semester

BIOTECHNOLOGY

U18BTE0016: Molecular Pathogenesis

COURSE OUTCOMES

- CO1:** Outline the principles of microbial pathogenesis, clinical importance of specific pathogens.
- CO2:** Acquire importance of Host defense mechanisms and pathogen adaptation against host defence
- CO3:** Compare the molecular mechanisms involved in pathogenesis of diseases caused by E.coli, Vibrio, Shigella, Salmonella, malarial parasite and Influenza virus
- CO4:** Evaluate the different host-pathogen interaction with respect to the pathological damage of pathogens
- CO5:** Acquire knowledge about virulence and virulence factors in genomic approach
- CO6:** Recognize the different diagnostic techniques like ELISA, RIA etc.,

Time: Three Hours**Maximum Marks: 100****Answer all the Questions:-****PART A (10 x 2 = 20 Marks)****(Answer not more than 40 words)**

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| 1. Identify the significance of Molecular Koch's postulates in microbial pathogenesis. | CO1 | [K ₁] |
| 2. List the major modes of entry used by pathogenic microbes to infect the host. | CO1 | [K ₂] |
| 3. Differentiate between the classical and alternative complement pathways. | CO2 | [K ₄] |
| 4. Identify key pathogenic adaptations that help microbes overcome host defenses. | CO2 | [K ₃] |
| 5. Classify superficial mycoses with examples of dermatophytes and Candida species. | CO3 | [K ₂] |
| 6. Differentiate between the modes of transmission of HIV and Plasmodium species. | CO3 | [K ₄] |
| 7. Define adherence in the context of virulence assays. | CO4 | [K ₁] |
| 8. Understand the role of cytopathic assays in evaluating pathogen-induced host cell damage. | CO4 | [K ₂] |
| 9. Identify the advantages of DNA-based techniques over immuno-based techniques in pathogen diagnosis. | CO5 | [K ₃] |
| 10. Compare live-attenuated vaccines and inactivated vaccines in terms of their efficacy and safety | CO6 | [K ₄] |

Answer any FIVE Questions:-**PART B (5 x 16 = 80 Marks)****(Answer not more than 400 words)**

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| 11. a) Illustrate the mechanisms by which bacteria, viruses, and fungi gain entry into the host and establish colonization, providing specific examples. | 8 | CO1 | [K ₄] |
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| | b) | Critically evaluate the clinical implications of inflammation in microbial infections and discuss how it contributes to disease progression and resolution. | 8 | CO1 | [K5] |
| 12. | a) | Critically evaluate the effectiveness of host defense mechanisms, including antimicrobial compounds and the complement system, in combating infections | 16 | CO2 | [K5] |
| 13. | a) | Critically evaluate the pathogenic mechanisms of EPEC, ETEC, and EIEC, including their virulence factors and associated clinical features. | 16 | CO3 | [K5] |
| 14. | a) | Propose a comprehensive experimental framework for the molecular characterization of virulence factors, integrating multiple assay types and techniques. | 16 | CO4 | [K5] |
| 15. | a) | Describe the applications and limitations of PCR in modern pathogen diagnosis. | 8 | CO5 | [K2] |
| | b) | Analyze the role of immuno-based techniques like ELISA and RIA in the early detection of infectious diseases. | 8 | CO5 | [K4] |
| 16. | a) | Critically evaluate immuno-based and DNA-based techniques for pathogen diagnosis, emphasizing their clinical applications, | 16 | CO6 | [K5] |
