

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

(Regulation 2018)

Fourth Semester

ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

U18AII4201: Computer Networks

COURSE OUTCOMES**CO1:** Understand the functionality and protocols operating in each layer of OSI reference model**CO2:** Design error control, flow control and routing protocols**CO3:** Construct network traffic characteristics and congestion control mechanism**CO4:** Apply error control, flow control and routing protocols**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. Define data communication and its essential components. | CO1 | [K ₁] |
| 2. Infer the purpose of the OSI model in networking. | CO1 | [K ₂] |
| 3. Describe how CSMA/CD operates to manage network access. | CO1 | [K ₁] |
| 4. Identify the advantages of IPv6 and why it is preferred over IPv4. | CO2 | [K ₃] |
| 5. Illustrate the process of subnetting with a simple example. | CO2 | [K ₂] |
| 6. Summarize the purpose of the User Datagram Protocol (UDP). | CO3 | [K ₂] |
| 7. Identify how TCP manages congestion in a network. | CO3 | [K ₃] |
| 8. Illustrate the concept of piggybacking in bidirectional protocols. | CO3 | [K ₂] |
| 9. Define DNS and its primary roles in the internet. | CO4 | [K ₁] |
| 10. Describe the function of MIME in electronic mail systems. | CO4 | [K ₁] |

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

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| 11. a) Explain the OSI Model layers, explaining the function of each layer with examples of protocols. | 8 | CO1 | [K ₂] |
| b) Compare and contrast various transmission media and networking devices and analyze how they impact network performance in different scenarios. | 8 | CO1 | [K ₂] |
| 12. a) Analyze the aspects of Spanning Tree algorithm and its importance in network | 8 | CO2 | [K ₄] |

- stability. Provide examples.
- b) Apply and evaluate Distance Vector and Link State routing protocols in dynamic network environments. 8 CO2 [K₃]
13. a) Examine TCP Congestion Control techniques and explain how they affect network performance. 8 CO3 [K₄]
- b) Inspect Quality of Service (QoS) mechanisms for ensuring consistent data delivery in network traffic. 8 CO3 [K₄]
14. a) Explain the role of the Domain Name System (DNS) in the Application Layer and how it contributes to internet accessibility. 8 CO4 [K₂]
- b) Critically analyze IP Security (IPSec) protocols and their impact on secure network communication, providing examples from real-world applications. 8 CO4 [K₄]
15. a) A company has a growing network that includes multiple branch offices connected over different geographical locations. The network uses both IPv4 and IPv6, and they face issues with network stability and congestion in high-traffic periods. Explain how a combination of subnetting, dynamic routing protocols (like OSPF and BGP), and effective internetworking techniques could help optimize and stabilize this network. Provide diagrams and examples where applicable. 16 CO2 [K₂]
16. a) A video streaming service provider needs to ensure high-quality and uninterrupted data delivery for its users. They encounter congestion issues during peak hours, affecting user experience. Analyze how TCP congestion control mechanisms, along with UDP's characteristics, could be utilized to enhance the streaming service's efficiency and reliability. Discuss the trade-offs involved and propose possible congestion avoidance strategies. 16 CO3 [K₄]
