Code No: R203205K **R20** SET -1

III B. Tech II Semester Regular/Supplementary Examinations, May/June - 2024
COMPUTER NETWORKS
(Com. To CE,EEE,ME,ECE)

Time: 3 hours Max. Marks: 70

Answer any **FIVE** Questions **ONE** Question from **Each unit**
All Questions Carry Equal Marks
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UNIT-I

1. a) Explain the following with respect to communication through networks. i) Components ii) Data Representation iii) Data Flow [7M]
   b) What is protocol layering? Explain with respect to Internet Protocol suit. [7M]

(OR)

2. a) Describe OSI model layered framework for the design of network systems that allows communication between all types of computer systems. [10M]
   b) Explain the given wireless transmission : Radio waves and Microwaves [4M]

UNIT-II

3. a) Discuss the role of data link layer in providing various services to the above layer in network hierarchy in detail. [7M]
   b) What is the role of sender window size, receiver window size and acknowledgements in sliding window protocols? Explain in detail with suitable protocol. [7M]

(OR)

4. a) Consider some transmission scenarios. Assume the sender sends the data word 1011. The codeword created from this data word is 10111, which is sent to the receiver. Use Encoder and decoder for simple parity-check code and explain error detection and correction with hamming code. [7M]
   b) Write a note on the following for PPP protocol. i) Framing ii) Transition phases iii) Multiplexing [7M]

UNIT-III

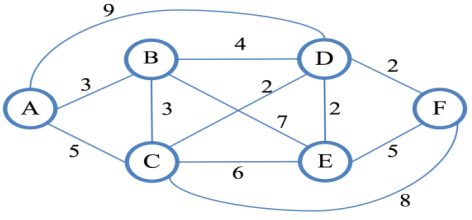
5. a) Prove that average number of successful transmissions for slotted ALOHA is $S = G \times e^{-G}$. Explain in detail its working and throughput. [7M]
   b) What is controlled access? Explain the implementation of it through reservation, polling and token passing. [7M]

(OR)

6. a) Write the following for fast Ethernet with 100MBps: i) Access Method ii) Physical Layer iii) Compatibility with Standard Ethernet. [7M]
   b) Write a note on 'sense before transmit' principle and its protocols used for multiple access. [7M]

UNIT-IV

7. a) Explain the implementation of routing of packets through connectionless packet-switched network. [7M]
   b) State and explain the principle of optimality followed in network routing and find the shortest path for the given graph. [7M]



(OR)

|'''|'|'|''||'''||||

8. a) Formulate the congestion in terms of Packet delay and throughput as functions of load. Explain mechanisms that can either prevent congestion before it happens or remove congestion after it has happened. [7M]
   b) Write a note on Transition from IPV4 to IPV6, Comparison of IPV4 &IPV6 in detail. [7M]

UNIT-V

9. a) Write a note on port number. How these are important in User Data gram protocol? Explain the implementation of User datagram protocol UDP. [7M]
   b) Write a short note on i) the usage of TELENET and its local versus remote Loggings to system ii) SNMP protocol. [7M]

(OR)

10. a) Explain the services offered by TCP to the processes at the application layer. Describe the importance of streams and segments. [7M]
    b) How Electronic mail (or e-mail) allows users to exchange messages? Explain its architecture, use agent and Message Transfer Agent in detail. [7M]

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UNIT-I

1. a) Distinguish different network types based on size, geographical coverage, and ownership. [7M]
   b) Explain various issues related to physical layer. How it handles data and signals? Discuss. [7M]

(OR)

2. a) Describe the Communication through an internet with Layers in the TCP/IP protocol suite. [7M]
   b) Distinguish between guided and unguided media. Explain transmission media used with respect to ground, sky and line-of sight propagation. [7M]

UNIT-II

3. a) With neat sketch explain the communication takes place at data link layer and discuss the concepts of nodes, links, two sub layers and addressing. [7M]
   b) Implement sliding window protocols with selective repeat and go back N principles. Compare the performance. [7M]

(OR)

4. a) Write a note on cyclic codes. Show an example of a CRC code. Perform encoding and decoding operations with it. Explain the role of generator polynomials. [7M]
   b) Explain how High-level Data Link Control (HDLC) implements the Stop-and-Wait protocol? Explain with Configurations, Transfer Modes and framing. [7M]

UNIT-III

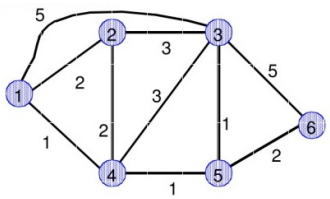
5. a) Prove that average number of successful transmissions for pure ALOHA is $S = G \times e^{-2G}$. Explain in detail its working and throughput. [7M]
   b) How CSMA algorithm handles the collision? Explain the Flow diagram for the CSMA/CD. [7M]

(OR)

6. a) Describe IEEE Project 802, Ethernet evolution, seven important fields of Ethernet frame and Efficiency of Standard Ethernet. [7M]
   b) Write a note on 'listen before talk' principle and its protocols used for multiple access. [7M]

UNIT-IV

7. a) Write a note on the following for the network layer: Packetizing, Routing and Forwarding, Error and Flow Control, Congestion Control, Quality of Service and Security services. [7M]
   b) Describe the operational steps of link state routing and find the routing path for the given graph. [7M]



(OR)

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8. a) Write a note on Traffic Control Algorithm and its importance on congestion handling. Describe the implementation as Leaky bucket and Token bucket approaches. [7M]
   b) Write about IPv6 protocol and structure of IPv6 datagram with extension headers. [7M]

UNIT-V

9. a) How to establish Logical connection at the transport layer to enable Process-to-Process Communication? Explain and other services of transport layer. [7M]
   b) Explain the most client-server application used in web, its Architecture, usage of Uniform Resource Locator and Web Documents. [7M]

(OR)

10. a) Describe general services are provided by UDP and UDP Applications. [7M]
    b) How the Resource Records are used in resolution of Domain names? Explain and specify the importance of caching. [7M]

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UNIT-I

1. a) Explain the following with respect to one or more layers of the TCP/IP protocol suite: i). Transforming bits to electromagnetic signals ii) responsibility for handling frames between adjacent nodes iii) Route determination iv) Providing services for the end user [7M]
   b) With sketch explain the working of Twisted-Pair Cable. And discriminate Unshielded Versus Shielded Twisted-Pair Cable. [7M]

(OR)

2. a) Differentiate the following: i) Refraction Vs Reflection ii) Advantages of optical fiber over twisted-pair and coaxial cable iii) Omni directional waves and unidirectional waves? [7M]
   b) Discuss different types of networks we encounter in the world today. [7M]

UNIT-II

3. a) Write a note on forward error correction, checksum. How it is used in error correction? Explain with examples. [7M]
   b) Explain how point-to-point access is enabled with Point-to-Point Protocol (PPP)? Discuss its services and framing structure. [7M]

(OR)

4. a) Draw the finite state machine of data link layer with neither flow nor error control and which uses both flow and error control. [7M]
   b) Write a note on the selective repeat-ARQ protocols. What are its limitations? How to handle them? Discuss. [7M]

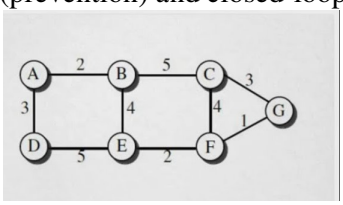
UNIT-III

5. a) Write a note on contention methods. Explain the simple process followed to allow multiple accesses. [7M]
   b) How to share available bandwidth of a link? Explain sharing with time, frequency, or through code among different stations. [7M]

(OR)

6. a) Explain concept of persistence and its implementation for multiple access with Flow diagram for three persistence methods. [7M]
   b) Summarize the Gigabit Ethernet design. Explain its MAC Sub layer, Physical Layer functionalities. [7M]

UNIT-IV

7. a) Describe the scenario of congestion and its impact on network traffic. Explain congestion control mechanisms categories: open-loop congestion control (prevention) and closed-loop congestion control (removal). [7M]
   b) 

For the given graph explain the principle of distance vector routing for finding the packet routing. [7M]

(OR)

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8. a) Describe the following for IPv6 addressing: Representation, Address Space, Address Space Allocation and Auto configuration [7M]
   b) Explain the connection oriented service and its implementation through. Virtual-circuit packet-switched network. How it is different from packet switching network? Discuss. [7M]

UNIT-V

9. a) Write about the following services in transport layer: [7M]
   (i)Process-to-Process Communication,
   ii) Flow Control and Error Control.
   b) Describe the architecture of HTTP, its concepts: Message format, HTTP connections, and Request-Reply messages. [7M]

(OR)

10. a) Write about connection-oriented, reliable protocol with its connection establishment, data transfer, and connection teardown phases to provide a connection-oriented service. [7M]
    b) Explain the role of Registrars in the provision of security of DNS Name Servers. [7M]

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*****

UNIT-I

1. a) Explain the following with respect to OSI layer and it's working. i)Node to node delivery ii) Sender to receiver delivery iii) Source to destination delivery iv) Port to Port delivery. [7M]
   b) How do guided media differ from unguided media? List and explain about Radio waves, microwaves and infrared waves. [7M]

(OR)

2. a) Name the four basic network topologies, and cite an advantage and disadvantage of each type. [7M]
   b) With sketch explain the working of Coaxial Cable And Fiber-Optic Cable. [7M]

UNIT-II

3. a) Write a note on establishing flow control in data link layer with framing. Explain variable and fixed size framing techniques. Give examples. [7M]
   b) Explain the working principle of Go-Back N protocol. Determine the window sizes of sender and receiver in this protocol. Explain with flow diagram. [7M]

(OR)

4. a) Write the working of the given data link layer protocols with flow diagram. i) Simple protocol ii) Stop-and-Wait protocol [7M]
   b) Explain error correction and detection in data link layer. Data word to be sent – 100100 Key - 1101 [generator polynomial x3 + x2 + 1]. Use CRC for detecting accidental changes/errors in the communication channel. [7M]

UNIT-III

5. a) Explain various multiplexing techniques used for channel partition and suggest the best method. [7M]
   b) Write a note on Back off time, Vulnerable time and throughput for Pure ALOHA multiple access protocol. [7M]

(OR)

6. a) Describe the role of the inter frame space, the contention window and acknowledgments in CSMA/CA for wireless networks. [7M]
   b) Write the characteristics of IEEE 802 standard Ethernet and its addressing, access methods and implementations. [7M]

UNIT-IV

7. a) Describe the services provided by network layer. What is the importance of store and forward routing? Explain. [7M]
   b) Write a note on IPV4 address space and explain the class ful and class less addressing for fixed and variable length network prefix. [7M]

(OR)

8. a) Describe the Approaches to Congestion Control: Traffic Aware Routing, Traffic Throttling and Load Shedding. [7M]
   b) Explain the principle followed in hierarchical routing and compare its performance with other routing algorithms of network layer. [7M]

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UNIT-V

9. a) Explain the implementation of Connectionless and Connection-Oriented Service in transport layer. Explain with finite state machine. [7M]
   b) Describe various paradigms of application layer and its protocols. Specify the importance of security service. [7M]

(OR)

10. a) Write a short note on : TCP Features, TCP packets-Segments and handshaking protocols. [7M]
    b) Domain name service records resolve the domain addresses-Justify this statement. [7M]