

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

***Subject:* - Computer Network (CT702)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
- ✓ The figures in the margin indicate Full Marks.
- ✓ Assume suitable data if necessary.

1. What is the significance of OSI layer? Explain different layers of OSI with its functionalities. [2+6]
2. Define switching and multiplexing. Explain about any two guided transmission media in detail. [2+6]
3. What are the causes of packet delay in computer networks? What are the differences between circuit switching and packet switching? [2+6]
4. What is classful and classless address? Differentiate between link state and distance vector routing protocol. [8]
5. Suppose you are a private consultant hired by a company to setup the network for their enterprise and you are given a large number of consecutive IP address starting at 120.89.96.0/19. Suppose that four departments A, B, C and D request 100, 500, 800 and 400 addresses respectively, how the subnetting can be performed so that address wastage will be minimum? [8]
6. Explain the TCP protocol with its Header. What do you understand by socket? Explain with its importance. [5+3]
7. What is recursive and iterative query? Explain with suitable diagram. Discuss the DNS records. [6+2]
8. List the advantages of IPv6 over IPv4. Explain header translation and tunneling approach used for migrating IPv4 to IPv6. [4+4]
9. Explain briefly the desirable properties of secure communication. Explain how Packet filtering firewall Works. [4+4]
10. Write short notes on: (Any two) [4+4]
 - a) SMTP and POP
 - b) Diffie Hellman's Algorithm
 - c) CSMA/CD
 - d) DLL Flow Control Mechanisms

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1. Distinguish between Client-Server network and Peer-Peer network. Explain Open System Interconnection (OSI) model. [3+5]
2. Define transmission media. Compare among Twisted Pair, Coaxial cable and Fiber optic. [3+5]
3. What is the main functionality of data link layer? Differentiate between circuit switching and packet switching. [4+4]
4. Mention the criteria for good routing. Explain RIP, OSPF, BGP, IGRP and EIGRP. [2+6]
5. How can you dedicate 32, 65, 10, 21, 9 public IP address to the departments A, B, C, D and E respectively from the pool of class C IP addresses with minimum loss. Explain. [8]
6. How connection is established and released in TCP. Explain Token Bucket algorithm. [4+4]
7. Which protocols are used in sending and receiving an email? Illustrate with necessary figure. Give a comparison of POP3 and IMAP. [5+3]
8. What are the factors that lead to the speedy development of IPv6? Define the process of transition from IPv4 to IPv6. [4+4]
9. Define type of Encryption used in security. How PGP can secure email communication? [5+3]
10. Write short notes on: (any two)
 - i) Types of firewalls
 - ii) FDDI
 - iii) Socket programming

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1. Differentiate between TCP/IP and OSI Model. Define Frame Relay in detail. [5+3]
2. What do you mean by switching in communication? Compare switching with multiplexing. Explain the E1 Telephone hierarchy system. [2+2+4]
3. What do you understand by Media Access Control? What is its significance in data link layer? Explain why token bus is also called as the token ring. [2+2+4]
4. You are a private contractor hired by the large company to setup the network for their enterprise and you are given a large number of consecutive IP address starting at 202.70.64.0/19. Suppose that four department A, B, C and D request 100, 500, 800 and 400 addresses respectively, how the subnetting can be performed so, that address wastage will be minimum? [8]
5. Discuss about the network congestion? Explain how different network parameters effect the congestion. Compare operation of link state routing with the distance vector routing. [2+2+4]
6. How web server communication and file server communication are possible in network, explain with used protocols. Define socket programming. [6+2]
7. What are the factors that lead to the development of IPv6? Define the process of transition from IPv4 to IPv6. [4+4]
8. Compare symmetric key encryption method with asymmetric key encryption. Explain RSA algorithm with example. [3+5]
9. What do you mean by firewall? Explain different types of firewall. [2+6]
10. Write short notes on:
 - i) HDLC
 - ii) Web Server

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1. What are the reasons for using layered protocols? What are headers and trailers and how do they get added and removed? [3+5]
2. Why do you think that static channel assignment is not efficient? Explain about the operation of Carrier Sense Multiple Access with Collision Detection. [2+6]
3. What is meant by byte stuffing technique? What is piggy backing? Suppose a bit string, 0111101111101111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? [3+2+3]
4. Why do we think that there arised the need of classless IP address although class based IP address was in used? Show the classless IP with an example. [4+4]
5. Suppose we have 4 departments A, B, C and D having 25 hosts, 16 hosts, 29 hosts and 11 hosts respectively. You are given a network 202.70.91.0/24. Perform the subnetting in such a way that the IP address wastage in each department is minimum and find out the subnet mask, network address, broadcast address and usable host range in each department. [8]
6. Explain the differences between TCP and UDP. How congestions can be handled using Token Bucket? Explain with proper diagram. [8]
7. For the client-server application over TCP, why must the server program be executed before the client program? TCP is known as reliable process, describe how reliability is provided by TCP. [3+5]
8. "IPv4 and IPv6 coexists" what does this mean? Explain Dual stack approach with an appropriate figure. [3+5]
9. What are the attributes of information Security? Explain the operation of RSA algorithm. [4+4]
10. Write short notes on: (Any Two) [4+4]
 - a) DHCP
 - b) Firewall
 - c) DNS

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1. You are assigned to design a network infrastructure for a 3-star hotel. Recommend a network solution with hardwares and softwares in current trend that can be used in the hotel. Make necessary assumptions and justify your recommendation with logical arguments where possible. [8]
2. List out the functions of physical layer in TCP/IP reference model. Explain different types of transmission media. [2+6]
3. What are the functions of data-link layer? Explain the channel allocation problem with example. [3+5]
4. What are the functions of network layer? Explain briefly about multicast routing protocols and unicast routing protocols. [2+6]
5. Network layer is one of the key layers in OSI reference model, why? Differentiate between distance vector routing and static link routing. [2+6]
6. What is a TCP connection? Explain how a TCP connection can be gracefully terminated. [2+6]
7. What are the different components of email server? Explain different types of electronic mail sending and accessing protocol. [2+6]
8. What is IPV6? What methods are used so that IPV6 and IPV4 networks are interoperable? [2+6]
9. What is firewall? What are their types? Encrypt and decrypt "OVEL" message using RSA algorithm. [1+1+6]
10. Write short notes on:
 - a) Digital signature
 - b) IPSec
[4×2]

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1. Compare OSI layer with TCP/IP Layer? Explain in which level of OSI layer following tasks are done. [5+3]
 - i) Error detection and correction
 - ii) Encryption and Decryption of data
 - iii) Logical identification of computer
 - iv) Point-to-point connection of socket
 - v) Dialogue control
 - vi) Physical identification of computer
2. Explain five instances of how networks are a part of your life today. Through we have MAC address, why do we use IP address to represent the host in networks? Explain your answer. [5+3]
3. Briefly explain different types of Data Link Layer framing mechanisms. List the features of FDDI. [8]
4. Explain how can you allocate 30, 24, 25 and 20 IP addresses to the four different department of ABC company with minimum wastage. Specify the range of IP addresses, Broadcast Address, Network Address and Subnet mask for each department from the given address pool 202.77.19.0/24. [8]
5. What is routed and routing protocol? Give examples. Explain Token Bucket algorithm. [4+4]
6. For the client-server application over TCP, why must the server program be executed before the client program? TCP is known as reliable process how, describe reliability is provided by TCP. [3+5]
7. Compare the header fields of IPV6 and IPV4. Which method do you suggest for the migration of IPv6 and why? [4+4]
8. Explain briefly how firewalls protect network and also explain different types of Firewall. Illustrate your answer with appropriate figures. [8]
9. Write down the steps involved in RSA encryption algorithm. Encrypt the word CAT using RSA algorithm, choose the suitable data for encryption by yourself according to RSA algorithm. [8]
10. Write short notes on:
 - a) Simple Mail Transfer Protocol
 - b) Domain Name Server

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1. What is computer network? Distinguish between OSI and TCP/IP reference model. [2+6]
2. What is transmission media? Explain about any three transmission media in detail. [2+6]
3. What are the major functions of data link layer? Explain about framing in detail. [3+5]
4. What is routing? Differentiate between link state routing and distance vector routing. [2+6]
5. Write short notes on: (any two) [4+4]
 - a) ARP
 - b) ICMP
 - c) IP
6. Distinguish between TCP and UDP. How is TCP connection established? Explain. [3+5]
7. SMTP is a text based protocol and uses 7 bit ascii. How can this be used to transmit sometimes like images? Explain. [8]
8. What are the drawbacks in IPV4? Which of these drawbacks do IPV6 solve? Explain. [2+6]
9. What is cryptography? Differentiate between symmetric key and public key cryptography. [2+6]
10. Write short notes on: (any two) [4×2]
 - a) WEP
 - b) IDS
 - c) SSL

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1. What do you mean by network architecture? Compare TCP/IP and OSI reference models. Explain X.25 Network with its key feature. [2+3+3]
2. What is ISDN? Explain about the ISDN architecture in detail with example. [2+6]
3. What are multiple access protocols? Explain how multiple access is achieved in IEEE 802.5. [2+6]
4. What is network security? Explain Virtual Private Network (VPN) with an example. [2+4]
5. You are given the following address space 10.10.10.0124. You have to assign addresses to 4 departments with the following hosts 5, 16, 23 and 27 respectively. Perform the subnetting in such a way that the IP address wastage in each department are minimum. Also find out the subnet mask, network address, broadcast address and unassigned range in each department. [10]
6. Why port number is used in networking? What are the services of transport layer? Differentiate between TCP and UDP protocol. [1+2+5]
7. What is DNS? Explain the structure of DNS request and response with practical example. [2+6]
8. What are the problems of IPv4? How IPv6 reduce these problems? Explain different strategies to transit from IPv4 and IPv6. [2+2+4]
9. What is public key cryptography? Explain about RSA algorithm in detail. [2+6]
10. Write short notes on:
 - a) SSL
 - b) WEP

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1. Explain the layers of OSI Reference Model with appropriate figure. [8]
2. What do you mean by switching in communication? Why switching is necessary? Explain virtual circuit switching. [2+2+4]
3. How can a multi-access channel be shared by different nodes? Explain about reservation protocols in detail. [3+5]
4. A large number of consecutive IP addresses are available starting at 120.89.96.0/19. Suppose that four organizations A, B, C, and D request 500, 1000, 1500 and 2000 addresses respectively, how the subnetting can be performed so, that address wastage is minimum? [8]
5. Discuss the significance of router in computer networking along with its operation. Compare operation of link state routing with the distance vector routing. [4+4]
6. Specify the structure of TCP headers and briefly explain the purpose of the header fields. Explain how flow control is done. [4+4]
7. Explain how the proxy server reduces the use of access network bandwidth. Illustrate your answer with appropriate figure. [8]
8. Compare the header fields of IPv6 and IPv4. Which method do you suggest for the migration from IPv4 to IPv6 and why? [4+4]
9. Explain why do we need Firewalls and also explain different types of Firewall. Illustrate your answer with appropriate figures. [8]
10. Write short notes on:
 - a) RSK
 - b) IPSEC

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1. What are the features of Client/Server Architecture? What are headers and trailers and how do they get added and removed? Explain. [4+4]
2. What do you mean by data switching? Explain about various types of switching with practical implementation example. [8]
3. What is the difference between Error Correcting and Error detection process? A bit string 011110111101111110 needs to be transmitted at the data link layer what is string actually transmitted after bit stuffing, if flag patterns is 01111110. [5+3]
4. Explain the working principle of different types of network devices Repeater, HUB, Bridge, Switch and Router. [8]
5. How can you dedicate 10, 12, 8, 14 public IP addresses to department A, B, C and D respectively from the pool of class C with minimum losses of IP? Explain. [8]
6. Explain the UDP segment structure. Illustrate your answer with appropriate figures. [8]
7. What do you mean by email server? What are the protocols used on it? [2+6]
8. Explain the IPv6 datagram format with appropriate figures. [8]
9. Explain briefly how firewalls protect network and also explain different types of Firewall. Illustrate your answer with appropriate figures. [8]
10. What do you mean by Network security? Explain the operation of Data Encryption Standard Algorithm? [3+5]

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1. Explain the need of Networking Software in the form of Hierarchy? Mention in which level layer of OSI reference model following tasks are done. [6+2]
 - i) Timing and voltage of received signal
 - ii) Encryption and decryption of data
 - iii) Data framing
 - iv) Point-to-point connection of socket.
2. Define switching and multiplexing. Differentiate between circuit switching and packet switching. [4+4]
3. Explain different types of Data link layer framing mechanisms. [8]
4. What is the contribution of sub-netting in IP address management? Show the importance in this case. Banijya bank need to allocate 15 IPs in HR department, 30 in finance department, 24 in customer care unit and 25 in ATM machines. If you have one network of class C range public IP address. Describe how you will manage it. [8]
5. Why is routing protocol necessary? Explain the working process of Routing Information protocol (RIP) with example. [3+5]
6. Why do you think that there exist two protocols in transport layer whereas there exists only one protocol in Internet layer in TCP/IP reference model. Explain token bucket algorithm for congestion control. [5+3]
7. What is HTTP protocol? With an example explain how a request initiated by a HTTP client is served by a HTTP server. [2+6]
8. Explain the IPv6 datagram format and the function of each field with necessary figure. [8]
9. Compare symmetric key encryption method with asymmetric key encryption. Describe the operation of RSA algorithm. [4+4]
10. What is network security? How can firewalls enhance network security? Explain how firewalls can protect a system. [2+2+4]
