TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Chaitra

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

Subject: - Computer Network *(CT 702)*

- ✓ 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 protocol? What are the reasons for using layered network architecture? Compare OSI with TCP/IP reference model. [1+2+5]
2. What is transmission medium? Explain different transmission medium with their merits and demerits. [1+7]
3. What is collision? How is it occured? How the possibility of collision is reduced in IEEE 802.3 and IEEE 802.11? Explain. [1+1+6]
4. Suppose your company has leased the IP address of 222.70.94.0/24 from your ISP. Divide it far five different departments containing 50, 30, 25, 12, 10 no of hosts. There are also two points to point links far interconnection between routers. List out the network address, broadcast address, usable IP address range and subnet mask for each subnet. Also mention the unused range of IP addresses. [8]
5. What is the purpose of Time to live (TTL) and protocol field in header of IPv4 datagram. Which protocol is used in internet layer to provide feedback to hosts/routers about the problems in the network environment? What is ARP and how does it work? [4+1+3]
6. What are the major task of transport layer? Explain. What is token bucket algorithm? [5+3]
7. What is DNS? Explain the working principle of DNS with a proper diagram. Compare IMAP and POP3 protocols. [1+4+3]
8. "IPv4 and IPv6 coexistence" what does this mean? Explain Dual stack approach with an appropriate figure. [3+5]
9. How does a Digital Signature work? Encrypt the world HELLO using RSA algorithm. Also decrypt it by showing steps. [2+6]
10. Explain briefly the desirable properties of secure communication. Explain how packet filtering firewall works. [4+4]

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Chaitra

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

Subject: - Computer Network *(CT 702)*

- ✓ 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. Draw the architecture for Client/Server network model. Explain in details about P2P network model with supportive examples. [2+6]
2. What is switching? What are the various switching techniques? Elaborate packet switching with a proper diagram. [1+2+5]
3. What are multiple access protocols? Describe the various framing techniques at data link layer. [2+6]
4. Suppose you are a private consultant 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 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]
5. What do you mean by autonomous system? Explain how routing loops are prevented in Distance Vector Routing with examples. [2+6]
6. Explain connection establishment and termination in TCP. Explain briefly about Leaky-Bucket algorithm for congestion control? [4+4]
7. Why we need proxy servers? What are the importance of DNS and HTTP(S) while you are browsing any website? [2+6]
8. "IPv4 and IPv6 coexistence" what does this mean? Explain what you mean by address family translation in IPv4/IPv6 migration process with an appropriate figure. [3+5]
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) Digital Signature
    b) VPN
    c) Symmetric key cryptography

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TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2076 Ashwin

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

Subject: - Computer Network *(CT 702)*

- ✓ 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 are the features of Client/Server Architecture? What are headers and trailers and how do they get added and removed? [4+4]
2. Why the telephone companies developed ISDN? Explain the working principle of ISDN with its interface and functional group. [2+6]
3. Explain the working principle of CSMA/CD with appropriate figure. [8]
4. Institute of Engineering has six departments having 16, 32, 61, 8, 6 and 24 computers. Use 192.168.1.0/24 to distribute the network. Find the network address, broadcast address, usable IP range and subnet mask in each department. [8]
5. What is routing? Differentiate between distance vector and link state routing algorithms. [2+6]
6. Explain the TCP segment structure. Why TCP is known as reliable protocol and also describe how reliability is provided by TCP? [4+4]
7. What is TFTP? Explain working principle of FTP with data transfer process including proper port connection. Use proper diagram to justify your answer. [2+6]
8. List the advantages of IPv6 over IPv4. Explain any two transition strategies for IPv4 to IPv6. [2+6]
9. List the properties of secure communication. Encrypt and decrypt "ROSE" using RSA algorithm. [2+6]
10. Write short notes on: (Any two) [4+4]
    a) Firewall and their types
    b) 803 Token Bus
    c) Virtual circuit switching

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Chaitra

Exam.	Regular		
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. 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 form 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) [4+4]
    i) Types of firewals
    ii) FDDI
    iii) Socket programming

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2075 Ashwin

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.*
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1. Why layering is important? Explain design issues for layers in detail. Mention service primitives for implementing connection oriented service. [2+4+2]
2. Compare circuit switching and packet switching. Explain ISDN channels with architecture. [3+5]
3. State the various design issues for the data link layer. What is piggybacking? A bit string 01111011111101111110 needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? [3+3+2]
4. Why routing is essential in computer networking? Compare working of distance vector routing algorithm with link state routing algorithm. [3+5]
5. Design a network for 5 departments containing 29, 14, 15, 23 and 5 computers. Take a network example IP 202.83.54.91/25. [8]
6. What are the differences between TCP and UDP services? Explain the TCP datagram format in detail. [3+5]
7. Define socket programming. How web server communication and file server communication are possible in network. Explain with used protocols. [6+2]
8. What are the methods used to interoperate IPv6 and IPv4. Show IPv6 datagram format. [6+2]
9. What is VPN? Encrypt a message "network" using RSA algorithm. [2+6]
10. Write short notes on: (any two) [4+4]
    i) Flow control in D22
    ii) X.25
    iii) ALOHA

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Chaitra

Exam.	Regular		
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 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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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2074 Ashwin

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 IPv_6 over IPv_4. Explain header translation and tunneling approach used for migrating IPv_4 to IPv_6. [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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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Chaitra

Exam.	Regular		
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.*
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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 form 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: [4×2]
    a) Simple Mail Transfer Protocol
    b) Doman Name Server

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34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2073 Shrawan

Exam.	New Back (2066 & Later Batch)		
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. 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: [4×2]
    i) HDLC
    ii) Web Server

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Chaitra

Exam.	Regular		
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.*
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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: [4×2]
    a) SSL
    b) WEP

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam.	New Back (2066 & Later Batch)		
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. 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 recommadation 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: [4×2]
    a) Digital signature
    b) IPSec

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34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	New Back (2066 & Later Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Networks *(CT702)*

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ *Attempt **All** questions.*
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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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071/01/01

34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Chaitra

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

Subject: - Computer Networks *(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 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 01111011111011111110 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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34 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2069 Chaitra

Exam.	Regular		
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. 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 where as 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]

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31 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2070 Ashad

Exam.	Old Back (2065 & Earlier Batch)		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	IV / I	Time	3 hrs.

Subject: - Computer Network *(EG741CT)*

- ✓ 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 do you mean by protocol and interfaces? Write the protocols used in each layer of ICP/IP model. [4+4]
2. How do you define network topology? Discuss the types of network topologies based on its size and geographical distributions. [3+5]
3. What are the functions of LLC and MAC sub-layer? Discuss different farming approaches used in data link layer. [2+2+6]
4. How data transfer occurs in Ethernet network? Explain. [6]
5. Discuss how CSMA works? Differentiate it with CSMA-CD. Explain the optical fiber cabling standards with examples. [2+2+4]
6. What is virus circuit switching? Describe the operation of Frame-Relay network. [2+6]
7. Differentiate between adaptive and non-adaptive routing. Explain shortest path finding algorithm in link state routing. [3+5]
8. Compare between leaky bucket and token bucket algorithm with the operation how token bucket works. [3+5]
9. What are the major problems with existing IPv4 network? Explain IPv4 addressing and sub-netting with example. [4+4]
10. Write short notes on: [4+4]
    a) ALOHA system
    b) TCP header

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31 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2067 Ashadh

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

Subject: - Computer Networks

- ✓ 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. Why network software should be in hierarchical form? Explain in detail about OSI layer. [3+5]
2. If you are assigned to design a LAN for Pulchowk Campus having 5 departments. Each department will have 100 computers locating in 5 rooms each equipped with 20 computers. Make your own justification while selecting connecting devices and accessories. [6+2]
3. What do you mean by ISDN and what is it contribution in the field of data communication? Explain various types of multiplexing mechanism used in communication. [3+5]
4. Describe what do you understand by switching along with various types of switching mechanism. Explain the fault tolerance mechanism of FDDI. [4+4]
5. Why access control of channel is essential? Compare operating details of IEEE 802.4 and IEEE 802.5. [2+6]
6. Explain along with the packet format about the virtual circuit connection of X.25. [4+4]
7. Why routing is essential in computer networking? Compare working of distance vector routing algorithm with link state routing algorithm. [2+6]
8. Explain in detail about IP frame format. [8]
9. If you need to assign IP addresses to all computers of question no. 2 making each department as a network. What will be your approach? Explain with IP address ranges you are suggesting. [8]
10. How does the protocol SMTP operate? Explain the procedures to make your network secured. [3+5]

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36 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2066 Bhadra

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

Subject: - Computer Network

- ✓ 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. a) Why do communication process within computer network is divided into layers? How the process of data encapsulation occurs in transmission mode described by seven layers of OSI model. Compare OSI model with TCP/IP model. [2+2+4]

   b) What is client/server networking? Explain Active Networking model framework comparing with traditional legacy network. [3+5]

2. a) What are the services provided by data link layer? Explain any one methods of framing and flow control. [2+3+3]

   b) Calculate SNR and maximum channel capacity of a cat6 channel having bandwidth 300 MHz with 2mW and 200 μW as signal and noise power respectively. [4+4]

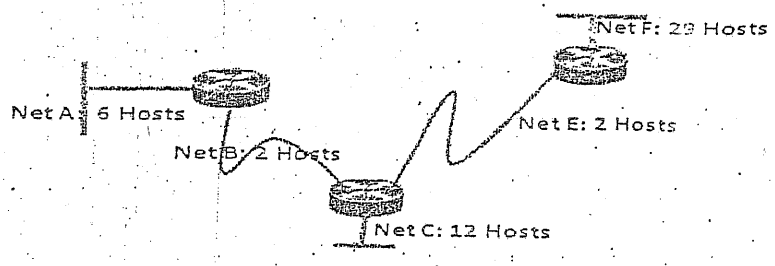
3. a) Describe the 802.3 Ethernet standard for CSMA/CD and compare it with 802.4 token bus technology. Explain how DSSS technique is applied in wireless transmission. [5+3]

   b) Differentiate between circuit switching and packet switching technology. Explain the operation how switched virtual circuit in frame relay network is established, maintained and teardown. [2+6]

4. a) What is unicast and multicast routing? Describe the concept of optimality principle. Describe how the routers in its link state routing come into fully adjacency state. [2+6]

   b) What are the factors that cause congestion within WAN? Propose your best traffic shaping approach to manage congestion in packet switched network. [2+6]

5. a) Give the reason why the current world is moving to IPv6 addressing mechanism. Describe the IPv6 address types with its representation format. You are given the IPv4 address block 203.71.53.0/26; assign the IP subnet for the following network. [2+2+6]



   b) Write short notes on (any two) [3+3]

   i) TCP Sliding Window Protocol
   ii) Secrete Key Algorithm: DES
   iii) ISDN Signaling and ATM AAL
   iv) ICMP Message Types

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2065 Kartik

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

Subject: - Computer Networks

- ✓ 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 are the reasons for using layered protocols? Explain the layers of OSI Reference Model with appropriate figure. [2+8]

2. Why do we need the network servers? Explain briefly the different types of Network servers. [2+4]

3. Why we need RAID in the computer networks? Define and discuss the difference between RAID 0, RAID 1, and RAID 5. [2+6]

4. List two advantages and two disadvantages of having international standards for network protocols. Compare and explain the different types of transmitting media with appropriate figure? [3+8]

5. Consider the delay of pure ALOHA versus slotted ALOHA at low load. Which one is less? Explain your answer. [3]

6. Explain the working principle of FDDI with FDDI specifications, FDDI devices, and FDDI fault tolerance. [10]

7. Suppose the network 200.168.10.0/24 is subnetted to create 7 subnetworks and an IP address 200.168.10.177 is assigned to a host computer. Determine the subnet mask, network address, broadcast address, usable host range and in which subnet the given host lies. [10]

8. Explain the Datagram Format of IP V4 with the appropriate figure. What is the minimum header length of IP datagram format? [10 +2]

9. Explain the working principle of Message Handling System (MHS) X.4000 protocol. [10]

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INSTITUTE OF ENGINEERING
Examination Control Division
2065 Shrawan

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

Subject: - Computer Networks

- ✓ 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. Explain five instances of how networks are a part of your life today. Though we have MAC address, why we use IP address to represent the host in networks? Explain your answer.[5+3]
2. What are headers and trailers, and how do they get added and removed? Explain with appropriate figure. [5]
3. Explain the working principle of different types of network devices Repeater, HUB, Bridge, Switch, and Router. [10]
4. Both UDP and TCP use port numbers to identify the destination entity when delivering a message. Give two reasons for why these protocols invented a new abstract ID (port numbers), instead of using process IDs, which already existed when these protocols were designed. [3]
5. Why the telephone companies developed the ISDN? Explain the working principle of ISDN with its interface and the functional group. [2+8]
6. Suppose we have 4 departments A, B, C and D the department A has 23 hosts, B has 16, C has 28 and D has 13 hosts. 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, and usable host range in each department. [14]
7. When the congestion occur in the network? Explain the different approach of the congestion control algorithm. [3+7]
8. Explain the Major IP services in the computer networks? [10]
9. Explain the working principle of FTAM protocol. [10]

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INSTITUTE OF ENGINEERING
Examination Control Division
2064 Kartik

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

Subject: - Computer Networks

- ✓ 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. Draw a diagram of OSI model and explain the network functions performed in layer 3 and layer 4. [3+5]
2. List the indicated network hardware devices: one operating in layer 1, one in layer 2, one in layer 3 and other layer 4; and explain each of them. [1+7]
3. Explain briefly the indicated transmission media: coaxial cable, line-of-sight, and satellite. [8]
4. What is the fundamental difference between peer-to-peer priority and non-priority systems of communication protocols? Discuss briefly peer-to-peer priority protocols. [2+6]
5. Explain and distinguish between Permanent Virtual Call and Virtual Call channel options of X.25 network. What are the purposes of LCGN and LCN fields of data packet header? [5+3]
6. Suppose an IP address 202.70.91.145 is assigned to a network that is subnetted to create 6 subnetworks. Determine the subnet mask, network address and host address range for each subnetworks. [8]
7. Differentiate between router, gateway and bridge. What are the functions of bridge and how is bridge table maintained? [3+5]
8. What is the difference between static and dynamic routing? Explain the distance vector routing with appropriate example. [3+5]
9. Explain encryption with private and public keys. Discuss with example, how monoalphabetic version of Caesar cipher works? [4+4]
10. Write short notes on: [4×2]
    a) ISDN
    b) ALOHA

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2064 Jestha

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

Subject: - Computer Networks

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

1. Discuss issues associated with the use of computer network. Explain the difference between interfaces and protocols in protocol architecture. [4+4]
2. What is the difference between peer-to-peer and client server LAN? Explain layers of CSMA/CD protocol with diagram. [4+4]
3. What is the difference between analog and digital transmission? Why PCM is used in networking? Explain steps of PCM focusing on sampling. [2+2+4]
4. Explain with diagrams, time division switch and space division switch. In what respect, time division switch is more preferred than space division switch and why? [6+2]
5. In what way do the IEEE standards 802.3, 802.4 and 802.5 differ? Explain the physical layer of IEEE 802.3 standard. [6+2]
6. Describe random and slotted ALOHA. Suppose 1000 stations share a random ALOHA channel and those stations, in aggregate, generate 0.5 frames per frame time of 300 milliseconds in average. There are, in average, 0.75 transmission attempts in the given frame time. What will be the corresponding throughout? Assume number of generated frames and number of transmission attempts have Poisson distribution. [5+3]
7. Explain fundamental features of X.25 network. Discuss, briefly, physical layer of X.25 network. Show fields of data packet. [4+2+2]
8. Define the term 'fairness' and 'optimality' in routing decision. What type of relationship they exhibit? Distinguish between routers and gateways. [5+3]
9. How can you say that IP has hierarchical addressing scheme? Show neat diagram of TCP segment and explain it's fields. [2+6]
10. What do you mean by FTAM? Discuss attributes and regimes of FTAM. [3+5]

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