TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2072 Kartik

Exam	New Back (2068 & Later Batch)
Level	BE
Programme	BCT
Year / Part	IV / I
Full Marks	80
Pass Marks	32
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 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: [4×2]
    a) Digital signature
    b) IPSec

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BSC IT WIF

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2071 Shawan

Exam.	[illegible]		
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 <u>All questions</u>.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

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 of IPV4? Which of these drawbacks do IPV6 solve? Explain. [2+5]
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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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 <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

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 10.10.10.0/24. 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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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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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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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
2068 Chaitra

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. Why are the network softwares defined with distinct layers stacked on top of one another? What are the factors to be considered when designing these layers? [2+6]
2. Why do we need RAID in the computer networks? Define and discuss the differences between RAID 0, RAID 1 and RAID 5. [2+6]
3. What is a telephone? With a simple diagram of a telephone network explain how the system works. [2+6]
4. Why channel access mechanism is important in computer networking? Explain the operation of IEEE 802.5 with its frame format. [3+7]
5. Differentiate: [2×5]
   a) Distance vector and link state routing algorithm
   b) Circuit switching and packet switching
6. What is X.25? Explain the format of X.25 packet in detail. [3+5]
7. What are the differences between TCP and UDP services? Explain the TCP datagram format in detail. [3+5]
8. Suppose there are 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 networks 202.70.64.0/24. Perform the subnetting in such a way that the IP address wastage in each department are minimum and also find out the sunbet mask, network address, broadcast, and unable host range in each department. [10]
9. Write short notes on: [2×5]
   a) Network Security
   b) Router and Gateway

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06/BCT

31 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2068 Baishakh

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 <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. What is a switching? Differentiate between packet switching and circuit switching. [2+6]
2. What are types of twisted pair cable? Calculate the efficiency of slotted Aloha. [4+4]
3. What is a virtual LAN? Design a network which consists of two VLAN named student and department. Explain with necessary diagram, IP addresses and configurations. [2+6]
4. What is a logical address? You are given the IP address block 200.10.80.32/25. If there are five departments which require 5, 40, 28, 12, 6 hosts respectively. Design the subnet. [2+6]
5. What are the functions of transport layer? Draw the segment structure of TCP. [3+5]
6. What is a fragmentation and re-assembly? Explain about any intra-AS routing protocol. [3+5]
7. What are the advantages of IPV6? The maximum payload segment is 65495 byte. Why was such strange number chosen? [4+4]
8. What is the function of proxy server? Explain about electronic mail. [3+5]
9. What is a secure socket layer? Encrypt the message "DANGER" using RSA algorithm. [2+6]
10. Compare x.25 and frame relay network. A bit string 0111101111101111110 needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing? [6+2]

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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 network. What will be your approach? Explain with IP address ranges you are suggesting. [8]
10. How the protocol SMTP does operate? Explain the procedures to make your network secured. [3+5]

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36 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2065 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 <u>All</u> questions.*
- ✓ *The figures in the margin indicate <u>Full Marks</u>.*
- ✓ *Assume suitable data if necessary.*

1. a) Way 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]

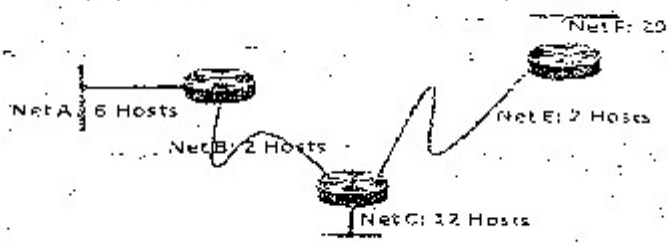
3. a) Describe the 802.3 Ethernet standard for CSMA/CD and compare it with 802.4 token bus technology. Explain how DSSS technique is applied in wireless transmission. [5+3]

   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. [3+5]

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 Signalling and ATM AAL
   iv) ICMP Message Types

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35 TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
Examination Control Division
2066 Poush

Exam.	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.*
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1. Define network and protocol for network. Explain peer-to-peer network process with example. [2+6]
2. Describe guided and unguided media used in computer network with their advantages. [8]
3. Explain the operation of pure ALOHA system. How CSMA/CD works? [4+4]
4. List the functions of Data Link Control Layer. Explain any two sliding window protocols with the advantages of piggybacking. [5+3]
5. Describe the policies that help in preventing the congestions within the network? Differentiate between leaky bucket and token bucket algorithm with their operation and working of token bucket. [4+6]
6. What do you understand by virtual circuit switching? Explain the X.25 virtual circuit switching. [2+6]
7. Explain the seven layers of OSI model with their example protocols. [8]
8. Briefly describe ICMP error and informational message types in IPv4 network infrastructure. [8]
9. How can we maintain the security within the communication network? Explain any one cryptography algorithm with example. [2+6]
10. Write short notes on (any two): [3+3]
    a) UDP and its application
    b) Network Devices: Hubs, Switches and Routers
    c) IPv4 Header Structure

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