

TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2077 Chaitra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

**Subject:** - Computer Network (CT 657)

- ✓ 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 briefly the architecture for peer-to-peer network model with example. Compare and contrast between OSI Reference Model and TCP/IP Model. [3+5]
2. Explain twisted pair cable with its practical applications. Differentiate between circuit switching and packet switching. [4+4]
3. What are the services provided by data link layer? Explain Ethernet frame with the function of each field. [3+5]
4. Perform the subnetting of IP address block 194.53.0.0/24 for six different departments having 2, 62, 120, 5, 14 and 16 hosts. List out the subnet mask, network address, broadcast address, useable host ranges and wasted IP addresses in each subnet. [8]
5. What is routing? Describe flooding technique with its characteristics. Differentiate between distance vector and link-state routing. [1+4+3]
6. Why port number is used in networking? Explain connection management of TCP with necessary figures. [2+6]
7. Discuss briefly on following. [4×2]
  - a) HTTP
  - b) SMTP
  - c) SNMP
  - d) Packet tracer
8. What are the problems of IPv4? How IPv6 reduce these problems? List out the different strategies to transit form IPv4 and IPv6. Explain any one in detail. [1+2+1+4]
9. Encrypt the message "RANDOM" using RSA algorithm. Also recover the original message from encrypted one. [4+4]
10. Write short notes on: (Any Two) [2×4]
  - a) ALOHA
  - b) Firewall
  - c) Virtual Private Network

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TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2076 Baisakh

Exam.	Back		
Level	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

**Subject: - Computer Networks (CT 667)**

- ✓ 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 computer network? What are the applications of computer networks? Explain the differences between OSI and TCP/IP reference model. [1+2+5]
2. Define latency and throughput for a transmission channel? Explain the characteristics of twisted pair, coaxial and optical fiber cable. [2+6]
3. What are the different sub-layers of data link layer? Explain the functions of each sub-layer. [2+6]
4. Suppose you are given the IP address block of 202.101.8.0/24 from your ISP. How can you divide this IP address for four different departments of your organization requiring 50, 10, 25, 100 number of hosts with minimal wastage of IP addresses in each department? List out the subnet mask, network address, broadcast address and usable host addresses for each subnet. [8]
5. What is routing? What is static and dynamic routing? Differentiate between distance vector and linked state routing. [1+3+4]
6. What is the importance of addressing at transport layer? Explain the TCP connection establishment, data transfer and connection termination process with necessary diagrams. [2+6]
7. What is DNS? Why is it used Internet system? Explain recursive and iterative query with suitable diagrams and their applications. [1+2+5]
8. What are the advantages of IPv6? How both IPv4 and IPv6 networks are interoperable? Explain. [2+6]
9. What is network security? Explain the symmetric key and public key cryptography. [3+5]
10. Write short notes on: (Any two) [2×4]
  - a) PPP
  - b) BGP
  - c) WEP

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TRIBHUVAN UNIVERSITY  
INSTITUTE OF ENGINEERING  
**Examination Control Division**  
2076 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

**Subject: - Computer Network (CT 657)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
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- ✓ Assume suitable data if necessary.

1. Explain the different layers of OSI Reference Model with appropriate figure. How it differs from TCP/IP model? Explain. [5+3]
2. What are the causes of packet delay in computer networks? Explain the bandwidth and throughput. What are the differences between circuit switching and packet switching? [2+2+4]
3. What are multiple access protocols? How CSMA/CD works? Why is it not suitable for wireless medium? Explain. [2+4+2]
4. A company has four departments having 20, 32, 60 and 24 computers in their respective departments. Assume an IPv4 class C public network address and design IP address blocks for each department from the assumed IP network using VLSM. Include network address, broadcast address, usable IP range and subnet mask for each of the subnet. [8]
5. What are the differences between Distance Vector Routing Algorithm and Links State routing Algorithm? How routing loops are prevented in distance Vector Routing? Explain with examples. [3+5]
6. Draw the segment structure of TCP and explain it briefly. How flow control is addressed by TCP? [5+3]
7. What is the difference between HTTP and HTTPS? Explain the working of DNS in detail. [2+6]
8. What are the advantages of IPV6 over IPV4? Explain various methods for transition from IPV4 to IPV6 with suitable diagrams. [2+6]
9. What are the desirable properties of secure communication? Explain how Packet filtering firewall works. [4+4]
10. Write short notes on: (Any two) [4+4]
  - a) PPP
  - b) VPN
  - c) Symmetric key cryptography

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1. What are the reasons for using layered protocol? How the process of data encapsulation occurs in transmission mode described by seven layers of OSI model. [3+5]
2. What is switching? Compare between Circuit switching and packet switching. [3+5]
3. What are the different methods of framing? Explain any one method of framing with example. [2+6]
4. Why do we use dynamic routing? Explain with example how distance vector routing is used to route the packet and why count-to-infinity problem arises and how does it get solved. [2+6]
5. What is private IP address? You are given an IP address block of 201.40.58.0/24. Perform subnetting for four departments with equal hosts. [2+6]
6. What are the functions of transport layer? Explain the TCP segment format in detail. [3+5]
7. What is the function of proxy server? Explain the working of FTP in detail. [2+6]
8. Distinguish between IPv6 and IPv4. Explain about tunneling in IPv6. [4+4]
9. What do you mean by cryptography? Encrypt the message "MISCELLANEOUS" using RSA algorithm. [2+6]
10. Why network security is very important? Explain different types of firewall that can be used to secure the network. [2+6]



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- ✓ Attempt All questions.
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1. What are the reasons for using layered protocols? Compare OSI reference model and TCP/IP model. [3+5]
2. Differentiate between wired and wireless media with their benefits and drawbacks. Discuss Packet and Circuit switching concepts with example. [3+5]
3. Explain different types of ALOHA. Differentiate between Token bus and Token ring networks. [4+4]
4. What are the factors effecting the Congestion? Explain the operation of Link State Routing Protocol. [3+5]
5. Compare IMAP and SMTP. How a request initiated by a HTTP client is served by a HTTP server? Explain. How HTTPS works? [3+3+2]
6. Explain Transmission Control Protocol with its Header Formate? Compare it with User Datagram Protocol. [6+2]
7. Compare the header fields of IPV6 and IPV4. Explain about the process to simplify the writing of addresses of IPV6? [4+4]
8. Compare symmetric key encryption method with asymmetric key encryption. Describe the operation of RSA algorithm. [3+5]
9. What are digital signatures? Explain the operation of Data Encryption Standard algorithm. [2+6]
10. Write short notes: (Any two) [4+4]
  - a) HUB, Switch and Routers
  - b) Firewalls and their types
  - c) Flow control / Mechanism of DLL

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**Examination Control Division**

2074 Bhadra

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

**Subject:** - Computer Network (CT657)

- ✓ 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 about the designed issues of Computer Network software. Distinguish between physical channel and physical layer. [5+3]
2. What do you mean by switching in communication? Compare Virtual Circuit and datagram approach with suitable diagram. [2+6]
3. Why do you think that the issues of media access is very important in data link layer? Explain about the operation of CSMA/CD. How can you make it more efficient? [3+5]
4. Institute of Medicine has 4 colleges. They need to be connected in same network. Allocate following numbers of IP addresses: 25, 68, 19 and 50 to those colleges by reducing the losses. The IP address provided to you to allocate is: 202.61.77.0/24. List the range of IP Addresses, their network address, broadcast addresses and corresponding subnet mask. [8]
5. What is congestion? What are the techniques for congestion control? Explain TCP three way handshaking process. [1+3+4]
6. Differentiate following points in the context of layers of TCP/IP. [3+2.5+2.5]
  - a) SMTP and IMAP
  - b) HTTP and DNS
  - c) Port and socket
7. Why network layer is the key layer in OSI reference model? Describe the working principle of OSPF routing protocol. [2+6]
8. Explain IPV6 with its frame format. What methods are used so that IPV6 and IPV4 networks are interoperable? [4+4]
9. List the properties of secure communication. Encrypt and decrypt "BEX" using RSA algorithm. [8]
10. Write short notes on: (Any Two) [2×4]
  - a) Medium Access Sub layer
  - b) DNS Queries
  - c) Firewalls

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Exam.	Regular		
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**Subject:** - Computer Network (CT657)

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1. Explain the importance of layered architecture of computer networking. Explain the function of following devices in brief: [4+6]
  - i) Hub
  - ii) Bridge
  - iii) Router
2. A frame having size of 100 bits is transmitted through a channel having capacity of 200 KB/Sec. Calculate the percentage of idleness of the channel assuming the round trip time of the channel to be 20 ms. Is the channel efficient? What is your recommendation further? [5+1+4]
3. Explain HDLC with its frame format. Explain the fault tolerance mechanism of Fiber Distributed Data Interface. [4+4]
4. What are the mechanisms adapted for optimization of uses of IP address. Explain with your example the use of sub-netting showing network address, broadcast address and sub-net mask. [4+6]
5. What is socket? Explain connection management of TCP. [1+7]
6. What is the difference between POP and IMAP? Explain DNS servers and its query types. [3+5]
7. Why the world has decided to migrate to new internet addressing scheme IPV6? Which method do you suggest for the migration of IPv4 to IPv6 and why? [3+5]
8. What are the properties of secure communication? Encrypt and Decrypt "OIE" message using RSA algorithm. [3+7]
9. Write short notes on: (any two) [4×2]
  - i) Token Bucket algorithm
  - ii) E<sub>1</sub> Telephone Hierarchy
  - iii) Distance vector routing

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**Examination Control Division**  
**2073 Magh**

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

**Subject: - Computer Network (CT657)**

- ✓ 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. How the client-server model works? Differentiate it with peer-to-peer network with advantages and disadvantages. [3+5]
2. List guided and unguided media used in computer network. Explain Ethernet cable standards. [2+6]
3. What is PPP? Explain fault tolerance mechanism of FDDI. [2+6]
4. What is the importance of routing in computer networking? Explain how distance vector routing algorithm operates dynamically? What is its problem? [2+6+2]
5. What is physical address? You are given the IP address block 201.40.58.0/24. Design the subnet for 49, 27, 1145 hosts group so that IP address wastage is minimum. Find subnet mask, network ID, broadcast ID, assigned IP and unassigned IP range in each department. [2+6]
6. Define UDP with its header structure. Explain the leaky Bucket algorithm for traffic shaping. [4+4]
7. What is DNS? How can you transfer mail over internet? What are the protocols used on it? [1+4+3]
8. Explain IPV6 Headers with its features. Compare it with IPV4. [2+6]
9. What is cryptography? How Deffi Hellman algorithm negotiate a shared key between the receiver and transmitter. Explain with example. [2+6]
10. Write short notes on: (any two) [3×2]
  - i) Hypertext transfer protocol
  - ii) Flow control mechanism
  - iii) Web Server

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**Examination Control Division**  
2072 Ashwin

Exam.	Regular		
Level	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

**Subject: - Computer Network (CTS67)**

- ✓ 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. Define protocol. Why do we need layered protocol architecture? Explain each layer of TCP/IP protocols architecture in detail. [1+2+5]
2. Write down the transmission media used for networking. Differentiate between circuit switching and packet switching. [4+4]
3. What are the methodologies used in data framing? How a complete link is established during the dialup connection? Explain. [4+4]
4. What are the interconnecting devices used for networking, explain in brief. [8]
5. Design a network for the Institute of Engineering central campus, Pulchowk having 5 departments having 45, 35, 40, 23 and 30 computers in their respective network by allocating public IP to each computer with minimum losses. Assume IP by yourself. [8]
6. Explain TCP and UDP. Describe congestion control algorithm with example. [3+5]
7. Write down the process of e-mail transfer. Explain SMTP, POP3 and IMAP. [5+3]
8. Compare the header structure of IPv6 with IPv4. Write down the major advantages of IPv6 over IPv4. [4+4]
9. What are the types of cryptography and why it is needed? Explain RSA algorithm with appropriate example. [4+4]
10. Explain the Deffi Helman Algorithm with example. [8]

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

**Subject: - Computer Network (CT567)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
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1. What are the advantages of computer network? Differentiate between TCP/IP and OSI model. [3+5]
2. Explain different types of multiplexing used in communication system. Differentiate between Virtual-Circuit switching and datagrams. [4+4]
3. Write down the importance of error detection and correction bits. What is the different type of ALOHA? [3+5]
4. Explain the following terminologies Network Layer, Shortest Path routing algorithm, link State Routing Protocol, Interior Gateway Routing protocol, ICMP. [4×2]
5. Design IPv4 sub network for an organization having 16, 48, 61, 32 and 24 computers in each departments. Use 192.168.5.0/24 to distribute the network. [8]
6. What is the importance of socket in internet? Explain the Transmission control protocol along with its frame format. [3+5]
7. Define SMTP. What are the importance of DNS and HTTP while you are browsing any website? [2+6]
8. Explain and draw the frame format of IPV6. Describe tunneling in IPV6. [4+4]
9. Show the working of RSA algorithm with suitable example. [8]
10. Explain SSL in brief. Describe the type of firewalls in detail. [3+5]

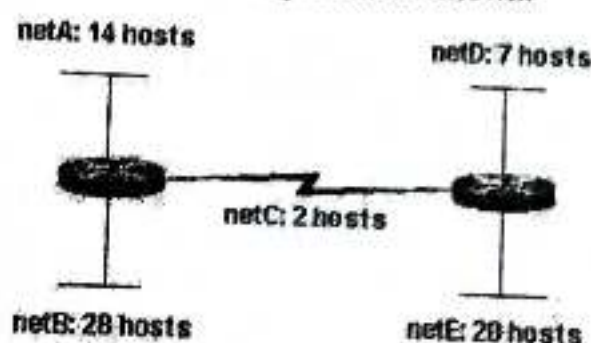


Exam. Level	Regular / Back		
	BE	Full Marks	80
Programme	BEX	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

**Subject: - Computer Network (CT657)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
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1. What is Internetwork? What are the layer design issues? Explain about connection oriented and connection less service. [2+3+3]
2. Define transmission media. Why now a day all communication media like twisted pair, co-axial pair even wireless media are replaced by optical fibre? Justify your answer with necessary diagram, working principle and transmission mechanism. [8]
3. What is pure ALOHA and slotted ALOHA? Consider the delay of both at low load. Which one is less? Explain sliding window protocol. [3+2+3]
4. What is dynamic routing? Explain distance vector routing? What is count to infinity problem? [1+5+2]
5. Given the class C network of 204.15.5.0/24, subnet the network in order to create the network in Figure below with the host requirements shown. [8]



6. Describe connection establishment, data transfer and connection release in TCP protocol. [8]
7. What is the importance of DNS? Explain POP3 and IMAP in detail. [3+5]
8. Why IPV4 address is going to replace by IVP6 address? Is IPV6 address 2002::3A03::01:BFF5 valid address? Justify your answer. [8]
9. What is Digital Signature? Explain about any public key encryption algorithm with example. What security mechanism is used in transport layer? [2+4+2]
10. What is SSL? Explain the different types of firewall those can be implemented to secure the network. [2+6]

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1. Explain OSI reference model. Differentiate between OSI and TCP/IP model. [5+3]
2. Compare packet switched networks and circuit switched networks. Which kind would you prefer and why? Explain various cabling techniques used in IEEE 802.3 standard. [2+2+4]
3. Explain IEEE 802.4. How carrier sense multiple access with collision detection (CSMA/CD) is better than CSMA? [3+5]
4. Compare and contrast between Hub, Switch, Bridge and Router. [8]
5. What is subnet mask? If there are 5 departments which require 27, 28, 7, 12, 8 hosts respectively, Design the subnet with minimum loss of IPs and write the starting and ending address of each subnet. [1+7]
6. Explain leaky bucket algorithm for traffic shaping. Differentiate between TCP and UDP. [3+5]
7. Write short notes on: [8]
  - a) DNS
  - b) Web Server
8. Draw the header structure of IPV6. Explain about the major improvement of IPV6. How IPV4 address is converted into IPV6 address. [3+2+3]
9. What is cipher text? Explain the Symmetric key and public key encryption. [2+6]
10. What are uses of Firewall? Write down features of IPsec and WEP. [8]

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1. Can we implement OSI model in any type of communication? Describe TCP/IP model with reference to OSI model. [2+6]
2. What is transmission media? Describe the following: [2+6]
  - a) Twisted pair
  - b) Co-axial
  - c) Satellite
3. Explain different types of flow control mechanism in data link layer. [8]
4. What is link state routing? Describe the working process of OSPF with an example. [2+6]
5. A large number of consecutive IP addresses are available starting at 193.122.2.1. Suppose that four organizations Pulchok, Thapathali, WRC and ERC request 6000, 2000, 4000 and 2500 addresses respectively. Design the network and find the first valid IP address, last IP address and mask in w.x.y.z/s notation for each organization. [8]
6. "TCP uses a three way handshake to establish a connection". Justify. Explain how flow control is addressed by TCP. [4+4]
7. Describe the following algorithms [4+4]
  - a) SMTP
  - b) HTTPS
8. "IPv4 and IPv6 coexistence" what does this mean? Explain header translation approach with an appropriate figure. [4+4]
9. Explain RSA algorithm and describe it with example. [8]
10. What is SSL? How can SSL be used to secure http protocol? Explain. [2+6]

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**Examination Control Division**  
**2070 Magh**

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

**Subject: - Computer Network (CT657)**

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt All questions.
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- ✓ Assume suitable data if necessary.

1. Why it is necessary to have network software's in layered architecture? Compare TCP/IP and OSI reference model. [3+5]
2. Compare the different types of transmitting media with appropriate figures. [8]
3. What are the differences between error control and flow control? Describe Cyclic Redundancy Check with example. [3+5]
4. What is routing? Explain about BGP protocol and clarify how routing works in the internet. [2+6]
5. A large number of consecutive IP addresses are available at 202.70.64.0/19. Suppose that four organizations 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. What is congestion control? Describe Token Bucket and Leaky Bucket algorithms. [2+6]
7. Explain the Mail transfer and Mail access protocol. Show how the email is transferred from one domain to another domain. Illustrate your answer with an appropriate figure. [3+5]
8. Describe Tunneling and Dual stack to transit from IPV4 to IPV6. [4+4]
9. What is encryption? How can Diffie-Hellman algorithm be used to negotiate a shared key between the receiver and transmitter. Explain. [2+6]
10. What are the desirable properties of secure communication? Explain how wireless network can be secured. [3+5]

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1. Why are network software designed with layers stacked on top of one another? What are the factors to be considered while designing these layers and the interfaces in-between. [2+6]
2. Explain different types of multiplexing used in communication system. Differentiate between circuit switching and packet switching. [5+3]
3. What are the different methods of framing? Compare IEEE 802.3, 802.4 and 802.5 standards. [3+5]
4. What are the major functions of network layer? Explain BGP in detail. [3+5]
5. Design a network for the Institute of Engineering, Pulchowk campus having 5 departments having 45, 35, 40, 23 and 30 computers in their respective network by allocating public IP to each computer with minimum losses. Assume IP by yourself. [8]
6. Why multiplexing is requirement in transport layer. Draw the segment structure of TCP and compare TCP with UDP. [2+3+3]
7. What is HTTP? Explain the protocol with reference to the request and response header structure. [2+6]
8. Draw the frame format of IPV6. Explain about tunnelling in IPV6. [4+4]
9. Why network security is very important? Explain different types of firewall that can used to secure the network. [2+6]
10. What are PGP and SSL? Encrypt the message "ATTACK" using RSA algorithm. [2+2+4]

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