

Duration: 3 Hrs.

Total Marks : 80

N.B.: 1) Question No. 1 is Compulsory.

2) Attempt any three questions, from remaining five questions

3) Figure to the right indicates full marks

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|-------------|--|------------------|
| Q.1. | a) State and explain the design issues of OSI layers.
b) Compare the performance characteristics of coaxial, twisted pair and fiber optic transmission media.
c) List the types of Error Detection and Correction techniques with the help of example.
d) Compare the Network layer protocols IPv4 and IPv6. | 5
5
5
5 |
| Q.2. | a) Explain ISO-OSI reference model with diagram.
b) Illustrate TCP protocol for establishing a connection using 3-way handshake technique in the transport layer. | 10
10 |
| Q.3. | a) What is the throughput of the system both in Pure ALOHA and Slotted ALOHA, if the network transmits 200 bits frames on a shared channel of 200 Kbps and the system produces?
a) 1000 frames per second
b) 500 frames per second

b) Analyze the steps involved in Token and Leaky bucket algorithm by quoting the need and benefit in the network layer with suitable diagrams. | 10
10 |
| Q.4. | a) Explain Linked State Routing with the help of example.
b) An ISP is granted a block of addresses starting with 190.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows:
a. The first group has 64 customers; each need 256 addresses.
b. The second group has 128 customers; each need 128 addresses.
c. The third group has 128 customers; each need 64 addresses.
Design the subblocks and find out how many addresses are still available after these allocations. | 10
10 |
| Q.5. | a) What is Congestion control? Explain Open loop and Close loop Congestion control.
b) Draw and summarize the structure of HTTP request and response. | 10
10 |
| Q.6. | Write Short Note on (Any Two)
(a) Address Resolution Protocol (ARP)
(b) Classful and Classless Addressing
(c) Distance Vector Routing (DVR) | 20 |

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TE / comp / sem-II / CBCGGS / R-19 / C-Scheme / CN / SH-2024

Duration: 3hrs

[Max Marks: 80]

QP-10064609

- N.B. : (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

1	Attempt any FOUR	[20]
A	Explain with examples the classification of IPv4 addresses.	5
B	Create 7-bit hamming code for the message bit 1110 with even parity.	5
C	List the advantages of fiber optics as a communication Medium.	5
D	What are sockets and its different types?	5
E	What is the use of DNS in networking?	5
2	Attempt the following	
A	For the class C network 193.160.10.0 having subnet mask 255.255.255.192 finds the number of subnet created and Number of host per subnet.	10
B	What is network traffic congestion? How congestion is controlled?	10
3	Attempt the following	
A	Explain different framing methods? What is the advantage of variable length frame over fixed layer frame?	10
B	How collision is controlled at MAC layer using CSMA/CD?	10
4	Attempt the following	
A	What is use of ARP protocol? And also discuss header structure for ARP packet.	10
B	Which algorithms are useful for dynamic routing?	10
5	Attempt the following	
A	Explain the process of connection management at TCP layer.	10
B	With the help TCP segment header structure, discuss importance of sequencing.	10
6	Attempt the following	
A	Compare FTP and Telnet.	10
B	What are the benefits of Selective repeat ARQ protocol over Go-back N ARQ protocol?	10

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[Time: 3 Hours]

[Marks:80]

N.B

- (1) Question no. 1 is compulsory.
- (2) Attempt any 3 from the remaining questions.
- (3) Assume suitable data if necessary.
- (4) Figures to right indicate full marks.

Q.1 Attempt any four of the following

- a) What is subnetting? Compare subnetting and supernetting [5]
- b) What are three reasons for using layered protocols? What are two possible disadvantages of using layered protocols? [5]
- c) Explain the count to infinity problem in detail. [5]
- d) List two ways in which the OSI reference model and the TCP/IP reference model are the same. Now list two ways in which they differ. [5]
- e) 4-bit data bits with binary value 1010 is to be encoded using even parity Hamming code. What is the binary value after encoding? [5]

Marks

Q.2 Attempt the following

- a) Define guided transmission media? Illustrate with diagram the details for coaxial cable? State any 5 comparative characteristics of coaxial cable with fiber optics and twisted pair cables. [10]
- b) Explain how collision handled in CSMA/CD? A 5 km long broadcast LAN uses CSMA has 10^7 bps bandwidth and uses CSMA/CD. The signal travels along the wire at 5×10^8 m/s. What is the minimum packet size that can be used on this network? [10]

Q.3 Attempt the following

- a) An organization has granted a block of addresses starting with 105.8.71.0/24, organization wanted to distribute this block to 11 subnets as follows [10]
 - 1. First Group has 3 medium size businesses, each need 16 addresses
 - 2. The second Group has 4 medium size businesses, each need 32 addresses.
 - 3. The third Group has 4 households, each need 4 addresses. Design the sub blocks and give slash notation for each subblock. Find how many addresses have been left after this allocation.
- b) Explain classful IP addressing scheme in detail? List the advantages and disadvantages of classless IP addressing scheme. [10]

Q.4 Attempt the following

- a) Explain the open loop congestion control and closed loop congestion control policies in detail [10]
- b) Explain the TCP connection establishment and Connection release. [10]

Q.5 Attempt the following

- a) Explain the concept of sliding protocol? Explain the selective repeat protocol with example? Compare the performance of Selective repeat & Go-back-N protocol. [10]
- b) Explain the link state routing algorithm with example? [10]

Q.6 Write a short note on following

- a) ARP & RARP [10]
- b) DNS [10]

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TEC COMP) / SEM VI / R-19 / PA-28 / 29-05-23

(3 Hours)

[Total Marks: 80]

OP CODE: B1327

- Note: (1) Question 1 is compulsory
(2) Solve any three questions out of remaining
(3) Assume suitable data wherever necessary

Q.1	Solve any four	[20]
	(a) Explain principle differences between connection less and connection oriented communication.	
	(b) What is channel allocation problem?	
	(c) Find the error, if any, in the following IPv4 addresses. (i) 221.24.7.8.20 (ii) 75.45.351.14	
	(d) Differentiate between TCP and UDP.	
	(e) Write short note on SMTP.	
Q.2	(a) Describe OSI reference model with a neat diagram. (b) Explain different framing methods.	[10] [10]
Q.3	(a) Explain different types of guided transmission media in detail. (b) Explain sliding window protocol using selective repeat technique.	[10] [10]
Q.4	(a) Explain Link State Routing with suitable example. (b) What is need of DNS and explain how DNS works?	[10] [10]
Q.5	(a) Explain IPv4 header format in detail. (b) Explain Three Way Handshake Technique in TCP	[10] [10]
Q.6	(a) Explain leaky bucket algorithm and compare it with token bucket algorithm. (b) Write short notes on: (i) TCP Timers (ii) HTTP	[10] [10]

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Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	In the layer hierarchy as the data packet moves from the upper to the lower layers, headers are
Option A:	added
Option B:	removed
Option C:	modified
Option D:	rearranged
2.	TCP/IP model contains _____ layers.
Option A:	5
Option B:	6
Option C:	7
Option D:	8
3.	In the sliding window method of flow control, the receiver window _____ size when an ACK is sent.
Option A:	increase in
Option B:	decrease in
Option C:	doubles in
Option D:	remains its original
4.	A sender has a sliding window of size 15. The first 15 frames are sent ACK received is ACK 15. What frame is the receiver expecting?
Option A:	frame 14
Option B:	frame 15
Option C:	frame 16
Option D:	frame 0
5.	The required resources for communication between end systems are reserved for the duration of the session between end systems in _____ method.
Option A:	Packet switching
Option B:	Circuit switching
Option C:	Line switching
Option D:	Frequency switching
6.	What is the maximum number of IP addresses that can be assigned to host on a local subnet that uses the 255.255.255.224 subnet mask?
Option A:	14
Option B:	15
Option C:	16
Option D:	30
7.	In distance vector routing, a router sends its updating packet _____
Option A:	only to its neighbors

Option B:	to every other router in the internetwork
Option C:	both are true
Option D:	none of these
8.	An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Which of the following is a valid allocation of addresses to A and B?
Option A:	245.248.136.0/21 and 245.248.128.0/22
Option B:	245.248.128.0/21 and 245.248.128.0/22
Option C:	245.248.132.0/22 and 245.248.132.0/21
Option D:	245.248.136.0/24 and 245.248.132.0/21
9.	Which of the following can be used as both source and destination IP address?
Option A:	192.168.1.255
Option B:	10.0.0.1
Option C:	127.0.0.1
Option D:	255.255.255.255
10.	Connection request has
Option A:	SYN = 1 and ACK = 0
Option B:	SYN = 1 and ACK = 1
Option C:	SYN = 0 and ACK = 1
Option D:	SYN = 0 and ACK = 0

Q2	Solve any Two Questions out of Three	10 marks each
A	Explain design issues of layers in OSI reference model in computer networks. Explain ISO OSI Reference model with diagram.	
B	Explain CSMA/CA protocols. Explain how collisions are handled in CSMA/CD.	
C	Explain different framing methods? What are the advantages of variable length frame over fixed length frame?	

Q3.	Solve any Two.	10 marks each
A	Explain IPv4 header format with diagram.	
B	Explain different TCP Congestion Control policies.	
C	Explain TCP flow control.	

Q4.	Solve any Two.	10 marks each
A	Explain ARP and RARP protocols in detail.	
B	Explain the need for DNS (Domain Name System) and describe its functioning.	
C	Explain working of DHCP protocol.	



Time: 3 Hours

Marks: 80

Note: Q.N. 1 is compulsory. Solve any three from Q.N. 2 to Q.N. 6

Q1. Solve any Four out of Five (5*4=20 marks)

- Explain the need of layering in reference model for communication and networking?
- Explain one bit sliding window protocol.
- Explain IPv4 header format with diagram.
- Differentiate between TCP and UDP.
- What is the need of DNS? Explain DNS Name Space.

Q2. Attempt the following (10*2=20 marks)

- Explain following transmission medias - Twisted Pair, Coaxial Cable (baseband and broadband), Fiber Optic.
- What is channel allocation problem? Explain CSMA/CD protocol. Consider building a CSMA/CD network running at 1Gbps over a 1-km cable with no repeaters. The signal speed of the cable is 200,000 km/sec. What is the minimum frame size?

Q3. Attempt the following (10*2=20 marks)

- Explain Classful and Classless IPv4 addressing.
- Explain TCP connection establishment and TCP connection release.

Q4. Attempt the following (10*2=20 marks)

- Explain Selective Repeat Protocol for flow control.
- Explain shortest path (Dijkstra's Algorithm) routing algorithm.

Q5. Attempt the following (10*2=20 marks)

- A large number of consecutive IP address are available starting at 198.16.0.0. Suppose that four organizations, A, B, C, and D, request 4000, 2000, 4000, and 8000 addresses, respectively, and in that order. For each of these, give the first IP address assigned, the last IP address assigned, and the mask in the w.x.y.z/s notation.
- Explain Slow-Start algorithm for TCP's congestion handling policy.

Q6. Attempt the following (10*2=20 marks)

- Explain DHCP message format and its operation in detail.
- Explain ARP protocol in detail.
