

MCA41

USN	1	M	S					
-----	---	---	---	--	--	--	--	--

(Autonomous Institute, Affiliated to VTU)
(Approved by AICTE, New Delhi & Govt. of Karnataka)
Accredited by NBA & NAAC with 'A' Grade



RAMAIAH
Institute of Technology

SEMESTER END EXAMINATIONS – MAY/JUNE 2018

Course & Branch	: Master of Computer Applications	Semester	: IV
Subject	: Computer Networks	Max. Marks	: 100
Subject Code	: MCA41	Duration	: 3 Hrs

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT- I

1. a) What advantage does a circuit-switched network have over a packet-switched Network? What advantages does TDM have over FDM in a circuit-switched Network? CO1 (06)
- b) List six access technologies. Classify each one as home access, enterprise access, or wide-area wireless access. CO1 (04)
- c) Discuss protocol layered architecture and explain Internet protocol stack. CO1 (10)
2. a) What are the propagation time and the transmission time for a 5-Mbyte message (an image) if the bandwidth of the network is 1 Mbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s. CO1 (05)
- b) Most packet switches use store-and-forward transmission. Justify. CO1 (05)
- c) Consider sending a packet from a source host to a destination host over a fixed route. Discuss the list of delay components in the end-to-end delay. Which of these delays are constant and which are variable? CO1 (10)

UNIT - II

3. a) Discuss HTTP protocol in terms of its working, the request and response message formats. CO2 (12)
- b) Present the overview of the working of DNS. Discuss the different steps to translate Host name to IP address. CO2 (08)
4. a) Consider an e-commerce site that wants to keep a purchase record for each of its customers. Describe how this can be done with cookies. CO2 (08)
- b) Discuss the difference between HTTP and SMTP protocol. CO2 (06)
- c) Explain the working of a circular DHT. CO2 (06)

UNIT- III

5. a) Calculate the UDP check sum for 1110011001100110, 1101010101010101 and 100011100001100 and check whether the receiver detect any errors or not. CO3 (06)
- b) What is pipelined protocol? What is the advantage of pipelined protocol over stop and wait protocol? Explain the working of a GBN protocol. CO3 (10)
- c) Write short note on rdt1.0. CO3 (04)

MCA41

6. a) Explain reliable data transfer protocol 2.1 with the help of FSM for CO3 (10)
sender and receiver.
b) Explain how connection is established in TCP using three-way CO3 (10)
handshaking with neat diagrams.

UNIT- IV

7. a) Explain the causes and the cost of congestion in TCP by considering CO3 (10)
different scenarios.
b) Explain in detail obtaining a host address with help of a DHCP protocol. CO4 (10)
8. a) Write and discuss the working of link state routing algorithm. CO4 (10)
b) Explain the architecture of the Router and the functionalities of each CO4 (10)
component with the help of a neat diagram.

UNIT- V

9. a) Explain in detail the working of RIP Protocol. CO4 (10)
b) Write a brief note on error detection and correction techniques Find CO5 (10)
CRC if $G(x)=x^3+1$ and $D(x)=x^5+x^3+x^2+x$ show all the arithmetic
involved.
10. a) List and explain the services provided by the link layer. CO5 (10)
b) Explain the working of pure ALOHA and slotted ALOHA protocols. CO5 (10)
Compare the efficiency of the protocols.

SEMESTER END EXAMINATIONS – MAY/JUNE 2017

Course & Branch : **Master of Computer Applications**
 Subject : **Computer Networks**
 Subject Code : **MCA41**

Semester : **IV**
 Max. Marks : **100**
 Duration : **3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT - I

1. a) What is DoS? Explain the different categories of DoS. CO1 (08)
 b) What is an access network? List and explain any three access networks. CO1 (12)
2. a) List the layers in the OSI reference model and Explain the principle responsibilities of each of these layers. CO2 (10)
 b) Differentiate between packet switching and circuit switching techniques for data transmission. CO1 (06)
 c) A geostationary satellite is transmitting a digital photo of size 120MB over a microwave channel of 10Mbps. The propagation speed is 3×10^8 meters/sec.
 - i. What is the propagation delay of the link?
 - ii. What is the bandwidth delay product $R \times d_{\text{propagation}}$?

UNIT - II

3. a) List and explain the transport services needed by an application. CO3 (06)
 b) Discuss persistent and non-persistent connections by considering the URL for the base HTML file as <http://msrit.edu/department/mca/faculty.jpeg>. CO3 (10)
 c) Discuss conditional GET with example with respect to HTTP. CO3 (04)
4. a) List and explain the services provided by DNS. Discuss the need for DNS caching. CO3 (10)
 b) Explain the working of an SMTP protocol. CO3 (05)
 c) What is Web Caching and explain its advantage. CO3 (05)

UNIT - III

5. a) Calculate the UDP check sum for 1110011001100110, 1101010101010101 and 100011100001100 and check whether the receiver detect any errors or not. CO4 (08)
 b) Explain GBN protocol in detail with the help of FSM for sender and Receiver. CO4 (12)
6. a) Explain reliable data transfer over a lossy channel with bit errors. CO4 (10)
 b) Write short note on rdt1.0. CO4 (05)
 c) Discuss the Selective Repeat(SR) sender, receiver events and actions. CO4 (05)

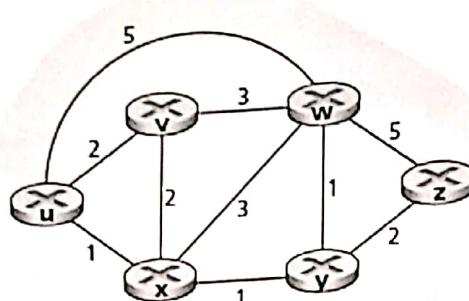
MCA41

UNIT - IV

7. a) Explain how TCP control its congestion by using slow start, Congestion Avoidance and fast recovery. CO4 (12)
- b) Explain how connection is established in TCP using three-way handshaking with neat diagrams. CO4 (08)
8. a) Explain the architecture of the Router and the functionalities of each component with the help of a neat diagram. CO6 (10)
- b) Draw the IPv6 datagram format and mention the significance of each field and discuss the difference between IPv4 and IPv6. CO5 (10)

UNIT - V

9. a) Give an algorithm for the Link-State Routing Algorithm and also apply the following diagram. CO6 (10)



- b) Find CRC if $G = 1001$ and $D = 101110$ show all the arithmetic involved. CO8 (10)
10. a) What is Multicast? Illustrate with an example multicast routing problem. CO6 (08)
- b) How routing algorithms are classified? Explain Distance Vector routing algorithm. CO6 (08)
- c) Briefly explain link layer services. CO7 (04)

M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE - 560 054

SEMESTER END EXAMINATIONS - MAY/JUNE 2016

Course & Branch	: Master of Computer Applications	Semester	: IV
Subject	: Computer Networks	Max. Marks	: 100
Subject Code	: MCA41	Duration	: 3 Hrs

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT - I

1. a) Explain the functions of layered architecture (TCP/IP). What are the disadvantages? CO2 (10)
- b) Consider two hosts, A and B, connected by a single link of rate R bps. The two hosts are separated by m meters, and the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B.
- By ignoring processing and queuing delays, derive the expression for propagation delay, transmission delay, and end-to-end delays.
 - If Host A begins to transmit the packet at time $t=0$. At time $t=d_{trans}$, where is the last bit of the packet?
 - If $d_{prop} > d_{trans}$. At time $t=d_{trans}$, where is the first bit of the packet?
 - If $d_{prop} < d_{trans}$. At time $t=d_{trans}$, where is the first bit of the packet?
 - If $s=2.5 \times 10^8$ L=100 bits R=28 kbps. Find the distance m so that d_{prop} equals d_{trans}

- 2 a) Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates $R_1=400$ kbps, $R_2=2$ Mbps, $R_3=1$ Mbps. Assuming no other traffic in the network:
- Obtain the throughput for the file transfer
 - Suppose the file is 5 million bytes. Roughly how long it will take to transfer the file to Host B?
 - Repeat (i) and (ii) but now R_2 is reduced to 300kbps.
- b) Define traffic intensity and give its equation. Plot a graph showing traffic Intensity against average queuing delay. CO1 (04)
- c) List and explain different categories of DoS attacks. CO1 (10)

UNIT - II

3. a) Why HTTP is called stateless protocol? What are cookies and how HTTP manages cookies? What are the disadvantages of cookies? CO3 (08)
- b) Discuss how SMTP works and state how it is different from HTTP. CO3 (12)
4. a) Present an overview of the working of DNS. CO3 (12)
- b) Illustrate the working of Distributed Hash Tables in a P2P application. CO3 (08)

UNIT - III

5. a) An application developer might choose to run an application over UDP rather than TCP. Justify. CO4 (06)
- b) Calculate UDP checksum for 1110011001100110, 11010101010101, and 1000111100001100. CO4 (04)



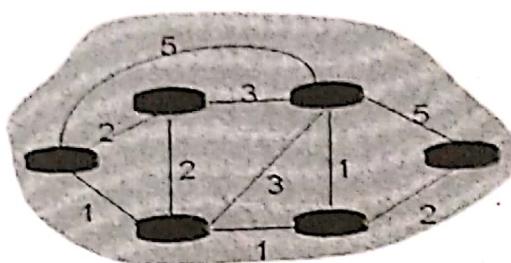
No mobile phones

MCA41

- c) With an example show the working of SR protocol. How GBN differs from SR protocol. CO4 (10)
6. a) Give FSM for rdt 2.1, both sender and receiver. CO4 (06)
b) How do you estimate RTT and Timeout? Discuss how do you set and manage retransmission Timeout Interval. CO4 (08)
c) Discuss different approaches to handle congestion. CO4 (06)

UNIT - IV

7. a) Consider the following network. With the indicated link cost use, Dijkstra's shortest-path algorithm to compute the shortest path from x to all network nodes .Show the working of the algorithm in a tabular form. CO5 (10)



- b) With the help of a neat diagram explain the architecture of the Router and the functionalities of each component. CO5 (10)
8. a) Draw the IPv6 datagram format and mention the significance of each field. Also write the difference between IPv4 and IPv6. CO5 (10)
b) List the different routing algorithms and explain in detail the link state routing algorithm. CO5 (10)

UNIT - V

9. a) What is the difference between Error Detection and Error Correction techniques? Consider the 7-bit generator, $G=10011$, and suppose that D has the value 10101010. What is the value of R? CO6 (08)
b) Why would the token-ring protocol be inefficient if a LAN had a very large perimeter? Justify your answer. CO6 (06)
c) What do you mean by hidden terminal problem? Explain with diagram. CO7 (06)
10. a) What are some of the possible services that a link layer protocol can offer to the network layer? Which of these link-layer services have corresponding services in IP? In TCP? CO6 (06)
b) Why an ARP query is sent within a broadcast frame? Why is an ARP response sent within a frame with a specific destination MAC address? CO6 (06)
c) Explain how 802.11 deals with hidden terminals? CO7 (08)



No mobile phones

MCA41

USN 1 M S

M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE - 560 054

SEMESTER END EXAMINATIONS – JUNE 2015

Course & Branch :	Master of Computer Applications	Semester :	IV
Subject :	Computer Networks	Max. Marks :	100
Subject Code	MCA41	Duration :	3 Hrs

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT – I

1. a) Differentiate the connection oriented and connection less service in the network. Why connection oriented service is so called? (06)
b) Explain the important functions of each layer in Internet Protocol Stack. Illustrate how communication is taking place between two end systems. Discuss the disadvantage of layering of protocols. (10)
c) Consider two hosts, A and B, connected by a single link of rate R bps. Suppose that the two hosts are separated by m meters, and suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B.
i). Express the propagation delay, D_{prop} in terms of m and s.
ii). Determine the transmission time of the packet, d_{trans} in terms of L and R.
2. a) Differentiate the Packet switching and circuit switching techniques for data transmission. (06)
b) What are delays in a packet switched Networks? What are the different types of delays in which packet suffers in the networks. Which is varying delay? (04)
c) Explain How guided media differ from unguided media? Briefly explain any two methods used for data transmission using guided media and two methods used for data transmission using unguided media. (10)

UNIT – II

3. a) Why HTTP is used for both Non persistent and persistent connections. Explain. What is the advantage gained by persistent connection? (08)
b) Discuss how simple Mail Transfer protocol works? Can multimedia message be transmitted using SMTP? Discuss. (08)
c) Explain the Working of FTP. Write two response and query commands. (04)
4. a) What is Stateless Protocol? Why HTTP is called Stateless Protocol? How HTTP is different from SMTP? (06)
b) What are Cookies? How HTTP manages a cookie? Why Cookies are controversial. (06)
c) Present the overview of the working of DNS. Discuss different steps to translate the Host name to IP address. (08)

UNIT – III

5. a) How Reliable data transfer over lossy channel with bit errors rdt3.0 works. Why it is called alternating bit protocol. Write FSM of rdt 3.0. (10)
b) Draw the TCP segment structure. With neat diagram explain how the connection is established in TCP using three-way handshaking. (10)



6. a) What is an ARQ ? Compare and Contrast Go-back-n and selective repeat ARQ in terms of storage and bandwidth. Show operation of Data packet/ ACK packet/ NAK packet using sequence diagram. (10)
b) Explain how TCP Control its congestion by using slow start, Additive increase and multiplicative decrease techniques. (10)

UNIT - IV

7. a) With an Example explain the working of Link State Routing algorithm. (10)
b) What are the drawbacks in Ipv4 class full Address formats. How CIDR and subnetting over come these problems. (10)
8. a) Explain the IPv6 data gram format with neat sketch. Mention the significance of each field. (06)
b) How address mapping is done using DHCE for Logical address to the physical address. (06)
c) With neat diagram explain the architecture of the Router and explain the functionalities of each component. (08)

UNIT - V

9. a) Explain working of Pure ALOHA and slotted ALOHA protocols .Compare the Efficiency of the protocols. Discusses the probability of a collision in each case. (10)
b) What is the transmission message for the bit stream 1101011111 using the generator polynomial $g(x)$?
 x^4+x+1 . (05)
c) Briefly explain the working of Address resolution Protocol (ARP). (05)
10. a) What are service provided by the link layer protocols? (10)
b) What is Hidden terminal Problem and Exposed terminal Problem? How this problem can be overcome using CSMA/CA protocol? (10)

**MAKEUP EXAMINATIONS - JUNE/JULY 2018**

Course & Branch : Master of Computer Applications	Semester : IV
Subject : Computer Networks	Max. Marks : 100
Subject Code : MCA41	Duration : 3 Hrs

Instructions to the Candidates:

- Answer one full question from each unit.

UNIT- I

1. a) Differentiate the connection oriented and connection less service in the network. Why connection oriented service is so called? CO1 (06)
- b) List the different types of access network and explain any two in detail. CO1 (10)
- c) How long does it take to send a file of 640,000 bits from host A to host B over a circuit switched network with the given scenarios?
Scenario: TDM with 24 slots/sec, link speed 1.536 mbps and 500 msec to establish a connection. CO1 (04)
2. a) List the layers in the OSI reference model and Explain the principle responsibilities of each of these layers. CO1 (10)
- b) i) How long does it takes a packet of length 1000 bytes to propagate over a link of distance 2500 km ,given the propagation speed is 3.5×10^8 meter/sec and transmission rate is 2 Mbps. CO1 (05)
- ii) Assume the link rate is 2 Mbps and users are generating data at a rate of 100 kbps when busy. Users are busy only $\frac{1}{3}$ of time. What is the maximum number of users that a circuit switching architectures can support simultaneously? CO1 (05)
- c) What is a delay in a packet switched network? What are the different types of delays in which packet suffers in the network. CO1 (05)

UNIT - II

3. a) Discuss the need for web caching. CO2 (05)
- b) List and Explain the mail access protocols. CO2 (10)
- c) Why FTP is called out of band control and discuss the response and query commands in FTP. CO2 (05)
4. a) Illustrate the DNS name resolution with the help of iterative and recursive methodology. CO2 (08)
- b) State the difference between HTTP and SMTP. CO2 (05)
- c) Illustrate the working of distributed hash tables in a P2P application. CO2 (07)

UNIT- III

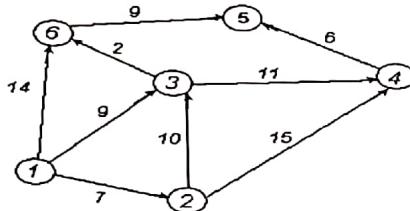
5. a) Consider the RTT between two end system is 30 milliseconds, transmission rate R of 1 Gbps. The packet size L of 1000 bytes. How big would the window size have to be for the channel utilization to be greater than 90 percent? CO3 (04)
- b) With the help of state diagram explain the TCP connection management by a client and server. CO3 (08)
- c) Present selective repeat protocol in terms of senders and receivers action. Supplement your explanations with a time-line diagram. CO3 (08)

MCA41

6. a) Is it possible for an application to enjoy reliable data transfer even when the application runs over UDP? If so, how? CO3 (06)
- b) UDP and TCP use 1's complement for their checksums. Suppose you have the following 3 8 bytes : 01010101, 01110000, 01001100. What is the 1'scomplement of a sum of these 8 bit bytes? Why is it that UDP takes the 1'scomplement of the sum; that is why not just use the sum? With the 1'scomplement scheme, how does the receiver detect errors? CO3 (06)
- c) In our rdt protocols, why did we need to introduce sequence numbers? And , why did we need to introduce timers? Explain. Also draw the FSM for rdt 2.2 sender side. CO3 (08)

UNIT-IV

7. a) Explain the architecture of the Router and the functionalities of each component with the help of a neat diagram. CO4 (10)
- b) Discuss the difference between IPv4 and IPv6. CO4 (05)
- c) Illustrate the network Assisted Congestion Control. CO4 (05)
8. a) Write the Dijikstra's shortest-path algorithm .Consider the following network. With the indicated link cost use, Dijikstra's shortest-path algorithm to compute the shortest path from 1 to all network nodes. CO4 (10)



- b) Explain in detail obtaining a host address with help of a DHCP protocol. CO4 (10)

UNIT-V

9. a) Explain IGMP with its message format and also explain IGMP member query and membership report. CO4 (08)
- b) Find CRC if G = 1001 and D = 101110 show all the arithmetic involve. CO5 (08)
- c) How big is the MAC address space? The IPv4 address space? The IPv6 address space? CO5 (04)
10. a) Explain ALOHA and slotted ALOHA protocols. CO5 (08)
- b) List and explain possible services that can be offer by link layer protocol. CO5 (08)
- c) Brief on the working of address resolution protocol. CO5 (04)


SUPPLEMENTARY SEMESTER EXAMINATIONS - AUGUST 2012
Course & Branch : **Master of Computer Applications**Semester : **IV**Subject : **Computer Networks**Max. Marks : **100**Subject Code : **MCA41**Duration : **3 Hrs**
Instructions to the Candidates:

- Answer one full question from each unit.

UNIT - I

1. a) Differentiate Packet Switching Versus Circuit Switching. Illustrate with diagram. CO1 (08)
- b) Compute propagation and transmission time for a 2.5-kbyte message (an e-mail) if the bandwidth of the network is 1 Gbps? Assume that the distance between the sender and the receiver is 12,000 km and that light travels at 2.4×10^8 m/s. CO1 (06)
- c) What is traffic intensity? Explain different types of delays. CO1 (06)
2. a) Consider two hosts, A and B, connected by a single link of rate R bps. Suppose that the two hosts are separated by m meters, and suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B.
 - i. Express the propagation delay, d_{prop} , in terms of m and s.
 - ii. Determine the transmission time of the packet, d_{trans} , in terms of L and R.
 - iii. Ignoring processing and queuing delays, obtain an expression for the end-to-end delay
 b) List the layers in the internet protocol stack and explain the principal responsibilities of each layer. CO2 (08)
- c) Illustrate with an example, Transmission and Propagation Delay. CO1 (06)

UNIT - II

3. a) Explain the difference between persistent and non-persistent connections used in HTTP for client server connections. CO3 (06)
- b) What are cookies? How HTTP manages Cookies? Why cookies are controversial? CO3 (08)
- c) Compare client server architecture with peer to peer applications and illustrate the inherent self scalability of P2P. CO3 (06)
4. a) What is DNS? Explain different services provided by DNS. CO3 (06)
- b) Explain the working of FTP in moving files between local and remote file systems along with FTP commands and replies. CO3 (10)
- c) Why do HTTP, FTP, SMTP, POP3 and IMAP run on top of TCP rather than UDP. CO3 (04)

UNIT - III

5. a) Calculate the UDP check sum for 0110011001100000, 01010101010101 and 1000111100001100. CO4 (05)
- b) Justify why an application developer ever choose to build an application over UDP rather than over TCP. CO4 (05)

MCA41

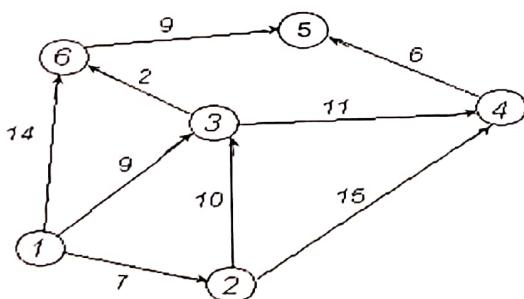
- c) Illustrate with an example the working of Selective Repeat(SR) protocol CO4 (10) and state how Go Back N(GBN) differs from SR.
6. a) Discuss Multiplexing and De-multiplexing with respect to transport layer. CO4 (10)
b) Explain reliable data transfer over a channel with bit errors. CO4 (10)

UNIT - IV

7. a) Explain the causes and the cost of congestion in TCP by considering different scenarios. CO4 (12)
b) Write short notes on:
i. Network address translation
ii. DHCP Protocol. CO5 (08)
8. a) Explain the working of RIP Protocol. CO6 (10)
b) Explain the architecture of the Router and the functionalities of each component with the help of a neat diagram. CO6 (10)

UNIT - V

9. a) Find CRC if $G(x) = x^5 + x^4 + x + 1$ and $D(x) = x^4 + x^3 + 1$. Show all the arithmetic involved. CO7 (08)
b) Consider the following network. With the indicated link cost use, Dijkstra's shortest-path algorithm to compute the shortest path from 1 to all network nodes. Show the working of the algorithm. CO5 (12)



10. a) Explain the working of Pure ALOHA and slotted ALOHA protocols. CO7 (10)
b) Explain the distance vector algorithm with an example. CO6 (10)



No mobile phones

MCA41

USN 1 M S

M S RAMAIAH INSTITUTE OF TECHNOLOGY

(AUTONOMOUS INSTITUTE, AFFILIATED TO VTU)

BANGALORE - 560 054

MAKEUP EXAMINATIONS - JULY 2016Course & Branch : **Master of Computer Applications** Semester : **IV**Subject : **Computer Networks** Max. Marks : **100**Subject Code : **MCA41** Duration : **3 Hrs****Instructions to the Candidates:**

- Answer one full question from each unit.

UNIT - I

1. a) List the different layers in the Internet protocol stack? Explain the CO2 (10) advantages of Layering and discuss the responsibilities of each layer.
b) What advantage does a circuit-switched network have over a CO1 (10) packet-switched network? What advantages does TDM have over FDM in a circuit-switched network? Explain in detail.
2. a) Suppose Host A wants to send a large file to Host B. The path CO1 (04) from Host A to Host B has three links of rates $R_1=500\text{ kbps}$, $R_2=2\text{ mbps}$ and $R_3=1\text{ Mbps}$.
 - i) Assuming there is no other traffic in the network, what is the throughput for the file transfer.
 - ii) Suppose the file is 4 million bytes. How long will it take to transfer the file to Host B.
b) Define transmission and propagation delay. Illustrate with an example the differentiate between the above two delays.
c) Explain how guided media differ from unguided media. Explain any CO1 (10) two guided media and two unguided media used for data transmission.

UNIT - II

3. a) How DNS servers are classified? Explain. CO3 (08)
b) Discuss the need for web caching? CO3 (06)
List out the steps when an request from the browser for object <http://msrit.edu/department/mca/faculty.jpeg> is made.
c) Compare HTTP non persistence connections with HTTP persistence CO3 (06) connection with and without pipelining.
4. a) List and explain the services provided by DNS. Discuss the need for CO3 (10) DNS caching.
b) Consider an e-commerce site that wants to keep a purchase record CO3 (06) for each of its customers. Describe how this can be done with cookies.
c) List out some sample FTP commands and sample return codes CO3 (04)

UNIT - III

5. a) Explain GBN protocol. Draw a timeline diagram to show the CO4 (12) working of the protocol. Narrate the difference between GBN and selective repeat protocol.
b) Explain the rdt 3.0 protocol with the help of FSM models CO4 (08)



No mobile phones

MCA41

5. a) Draw the TCP segment structure. Explain how connection is established in TCP using three-way handshaking with neat diagrams. CO4 (10)
b) Some real time applications are better suited for UDP than TCP. Justify your answer. CO4 (04)
c) Explain the slow start and congestion avoidance in a TCP congestion control algorithm. CO4 (06)

UNIT - IV

7. a) Write short notes on:
i. NAT
ii. ICMP
iii. DHCP CO5 (06)
b) Describe how packet loss can occur at input ports. Describe how packet loss at input ports can be eliminated (without using infinite buffers). CO5 (06)
c) Write the Distance Vector (DV) algorithm. CO5 (08)
8. a) Draw and explain the IPv6 datagram format. CO5 (10)
b) Describe how packet loss can occur at output ports and how to control it? CO5 (06)
c) Do routers have IP addresses? If so, how many? CO5 (04)

UNIT - V

9. a) Find CRC if $G=1001$ and $D= 101110$ show all the arithmetic involved. CO6 (08)
b) Explain the working of Pure ALOHA and slotted ALOHA protocols. Compare the two protocols and discuss the probability of collision in each case. CO6 (12)
10. a) Define hidden terminal problem and exposed terminal problem. How this problem can be overcome using CSMA/CA protocol. CO7 (10)
b) List and explain the different elements in a wireless networks. CO7 (10)
