No of Pages : 4 Course Code : 20MXBA

Roll No:
(To be filled in by the candidate)

PSG COLLEGE OF TECHNOLOGY, COIMBATORE - 641 004

SEMESTER EXAMINATIONS, JUNE 2023

MCA Semester : 2

20MXBA COMPUTER NETWORKS

Time : 3 Hours **Maximum Marks : 100**

INSTRUCTIONS:

1. Answer **ALL** questions. Each question carries 25 Marks.
2. Course Outcome : Table

Qn.1	CO1	Qn.2	CO2	Qn.3	CO3	Qn.4	CO4

1. a) Match the protocols/algorithms to their respective layers of ISO/OSI model. (3)

i)	Physical layer	a)	RIP
ii)	Network Layer	b)	SIP
iii)	Session Layer	c)	MAC
iv)	Transport Layer	d)	MIME
v)	Presentation Layer	e)	OSPF
vi)	Datalink Layer	f)	NRZ

b) i) Is ARP needed if your network is configured with a DHCP server? Explain. (3)

ii) Consider the network graph given in figure-1. The number on links represents the hop count between each node and node represents the few of the routers. This entire system uses Link State Routing algorithm with hop count as the metric. Determine the spanning tree formed and the routing table of the router 'A' with clear illustration of all the steps involved. (7)

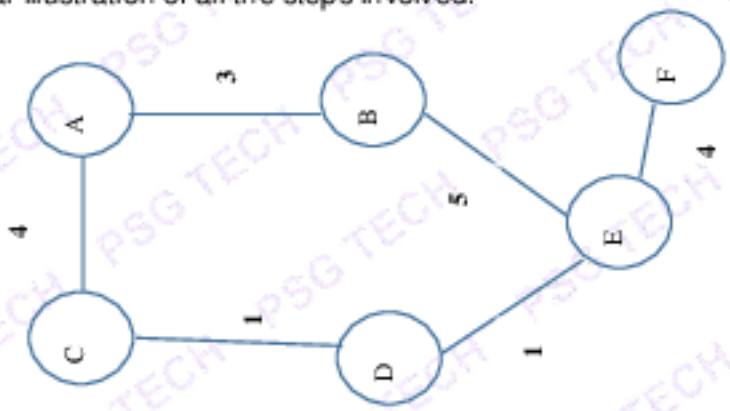

Figure-1

c) Consider the following network topology connected to the Internet. The routers R1, R2 & R3 uses address aggregation policy wherever possible to reduce number of entries in their table. Fix the suitable IP address for each interface for all routers. Construct the routing table for routers R1, R2 and R3 including the default entry in the following network topology. (12)

All routing tables should have the following format:

Mask value /n	Network Address	Details of Next-hop	
		IP address of interface	Router name R1/R2/R3
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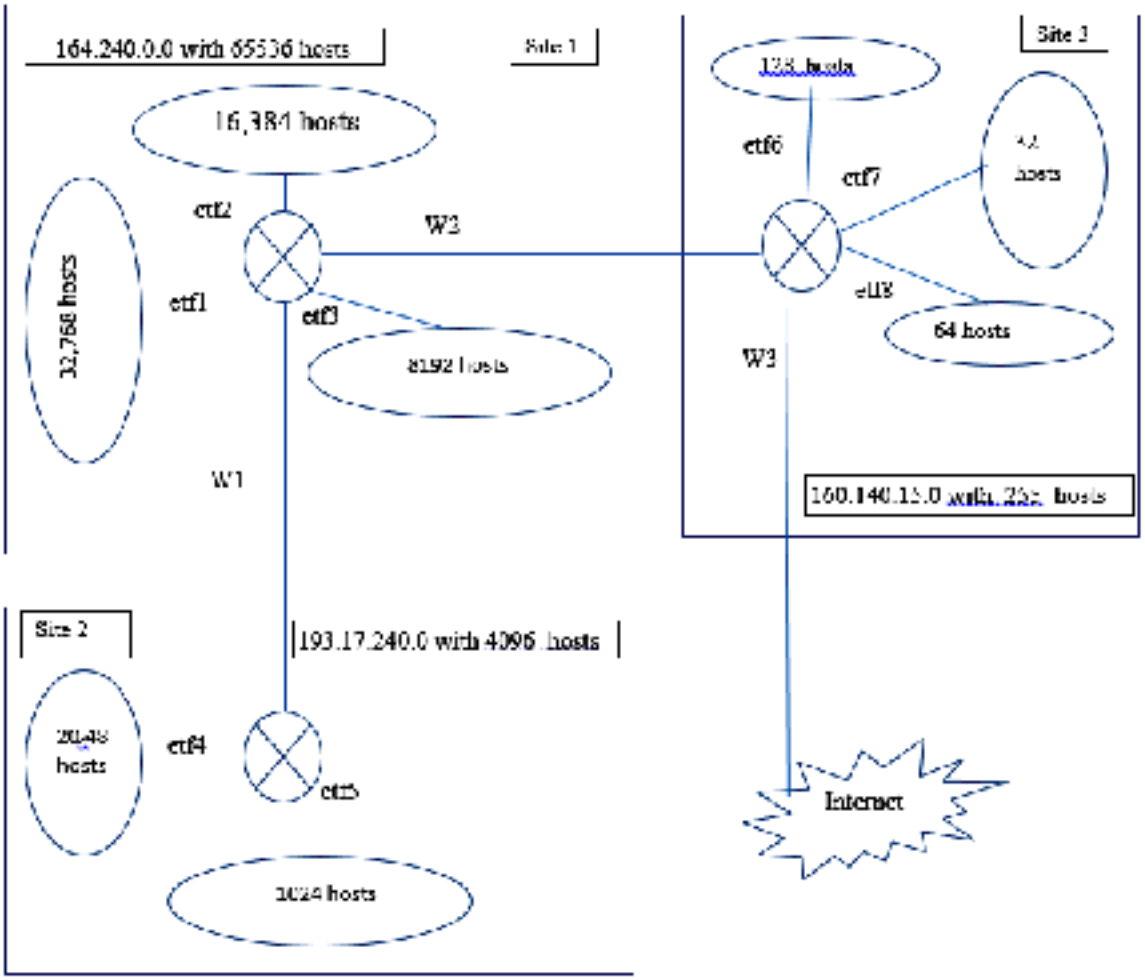
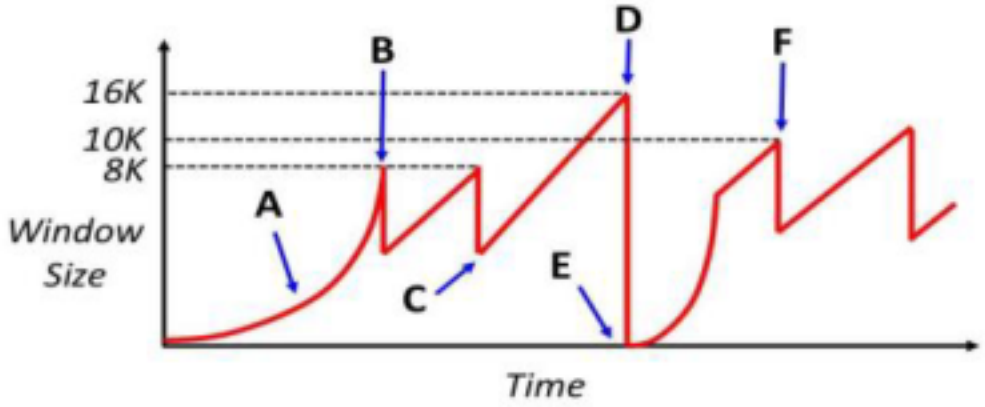


2. a) State the deadlock condition in a TCP connection and its solution. (3)

b) i) Ram at machine 11.15.16.7 on port 1120 sends an UDP with 4096 bytes of data to Kumar at machine 17.18.19.5 on port 20. Ram sets the UDP protocol field as 17. Ram's application does not expect error detection. Hence his UDP does not include Checksum. Draw the actual UDP segment constructed at the RAM machine along with the pseudo header. (5)

ii) Consider a network implemented with TCP AIMD congestion control algorithm. Assume that the network has an MSS of 1000 bytes and the roundtrip-time between sender and receiver of 100 milliseconds. Assume at time 0 the sender attempts to open the connection. Also assume that the sender can "write" a full windows worth of data instantaneously, so the only latency you need to worry about is the actual propagation delay of the network. Following graph shows the oscillation in window size upon different events.



A. Determine the time progressed at time B.

B. At D why the window decreases suddenly? Mention the event that made it .

C. What could be the reason for decrease of window at B (5)

c) A client establishes a connection with a web server using TCP 3-way handshake. The client uses the initial sequence number as (ISN) 21101 and sets the PSH flag. The server acknowledges the connection. The server has no data to send and so do not use any sequence ISN and does not set the PSH flag. The client sends three segments each carrying 1000 bytes of data. The server receives first segment and acknowledges it. Later upon receiving the next two segments, it sends a cumulative acknowledgement for these two segments. After this client wants to close the connection and sends FIN segment. Both client and server does Full-close. Draw the proper timeline diagram to represent all the segments flowing between the client and the server with proper sequence number in all the segments. (12)

3. a) Is HTTP a stateless protocol? Justify your answer. (3)

b) i) State the need for DHCP relay agent in configuring the host dynamically. (3)

ii) What are the characteristics of real-time audio/video communication? State the purpose of Jitter Buffer/playback buffer in VOIP based applications. (7)

c) What is inbound and outbound traffic? What is the significance of having two different modes of action in a single FTP session? Explain its working with proper illustration. (12)

4. a) What do you mean by non-authoritative DNS response? Give one example. (3)

   b) i) Is IMAP protocol better than POP3? Explain your answer. (3)

   ii) What are firewalls in Internet? How do the stateful firewalls discard malicious packets? Give an example. (7)

   c) i) Consider a HTTP client wants to connect to another HTTP server. The client does not know the IP address of the server. Which type of application system / application layer protocol helps in solving this issue? Describe the complete process and all the servers involved in solving this issue

   (OR)

   ii) What do you mean by virtualization of resources? Describe the different types of virtualizations. Also list out the possible ways of making server virtualization. (12)

/END/

FD/RL