Question Paper

Exam Date & Time: 18-Jul-2022 (02:00 PM - 05:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

FOURTH SEMESTER B.TECH END SEMESTER MAKEUPEXAMINATIONS, JULY-AUGUST 2022

COMPUTER NETWORK PROTOCOLS [ICT 2255]

Marks: 50	Duratio	n: 180 mins.
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Instructions	to Candidates: Answer ALL questions Missing data may be suitably assumed	
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1)	Explain with suitable diagram, how a DNS query proceeds if the local name server does not have the IP address for a given host when the following approaches are used. Assume an example where four machines are involved in ultimately resolving a given query.	(5)
A)	i. When a machine B cannot resolve an address in response to a query from machine A, machine B sends the query to another machine in the chain. When B receives the response, it forwards the result to A.	
	ii. When a machine B cannot resolve an address in response to a query from A, machine B sends a DNS reply to A with the IP address of the next machine in th chain, and machine A contacts that machine.	e
B)	Explain the DHCP operations when DHCP client and server are on the same network as well as in different network.	(3)
C)	What are the different types of links defined in OSPF?	(2)
2)	An ISP is granted a block of addresses starting with 140.80.0.0/16. The ISP wants to distribute these blocks to customers as follows:	(5)
A)	i. The first group has 64 medium-size businesses; each need 512 addresses.	
	ii. The second group has 16 small businesses; each need 128 addresses.	
	Design the sub-blocks and give the slash notation for each sub-block	
B)	Explain the three network management components used in SNMP	(3)
C)	Draw the SMI object identifier for the sequence 1.3.6.1.2.1	(2)
3)	Depict the error control mechanisms using relevant flow diagram in TCP	(5)
A)		
B)	Consider an IP packet with a length of 4,500 bytes that includes a 20-byte IPv4 header and 40-byte TCP header. The packet is forwarded to an IPv4 router that supports a Maximum Transmission Unit (MTU) of 600 bytes. Assume that the length of the IP header in all the outgoing fragments of this packet is 20 bytes. Assume that the fragmentation offset value stored in the first fragment is 0. Find the fragmentation offset value stored in the third fragment.	(3)
C)	An ICMP message has arrived with the header (in hexadecimal)	(2)
	05 00 11 12 11 0B 03 02	
	a. Identify the type of message.	

b. Illustrate the purpose of this message.

4) Five equal-size datagrams belonging to the same message leave for the destination one after another. However, they travel through different paths as shown in Table Q.4A (5) Table Q.4A

A)

Datagram	Path Length	Visited Switches
1	3,200 km	1, 3, 5
2	11,700 km	1, 2, 5
3	12,200 km	1, 2, 3, 5
4	10,200 km	1, 4, 5
5	10,700 km	1, 4, 3, 5

Assume that the delay for each switch (including waiting and processing) is 3, 10, 20, 7 and 20 ms for the switches 1, 2, 3, 4, 5 respectively. Assuming that the propagation speed is 2×10^8 m, find the order the datagrams arrive at the destination and the delay for each. Ignore any other delays in transmission.

	B)	Illustrate the 3 way handshaking between client and server process during TCP connection establishment. Indicate appropriate flag field.	(3)
	C)	Explain multiplexing and demultiplexing techniques in UDP.	(2)
5)		List and explain different IP forwarding techniques with suitable diagram.	(5)
	A)		
	B)	Explain with suitable diagram, slow start phase of congestion control.	(3)
	C)	Derive the formula to compute the total number of crosspoints in a three-stage switch. Compute the number of crosspoints with N = 32 and n = 16 required for a nonblocking switch.	(2)

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