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PES University, Bengaluru

(Established under Karnataka Act No. 16 of 2013)

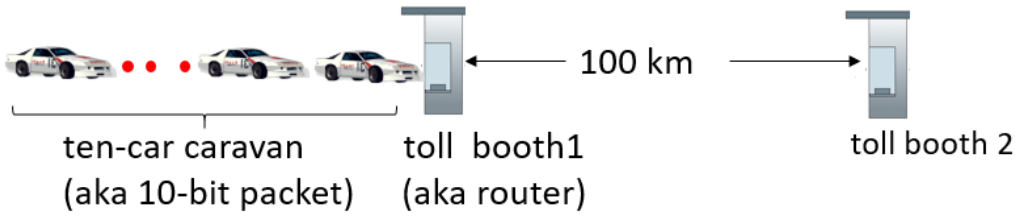
UE19CS253

DECEMBER 2021: END SEMESTER ASSESSMENT (ESA) B TECH IV SEMESTER

UE19CS253– COMPUTER NETWORKS

Time: 3 Hrs.	Answer All Questions	Max Marks: 100

All Questions are compulsory
Draw the diagrams wherever necessary
Figures to the right Indicate marks

1	a)	Consider the following scenario where a caravan consisting of 10 cars need to travel from the toll booth1 to toll booth 2 which are 100 KMs away form each other.  Suppose the cars propagate with the speed of 100 km/hr and the toll booth takes 12 sec to service a car. Considering a car as a bit and the caravan as packet, calculate the following: a. Time to push entire caravan through toll booth1 onto highway. b. Time for last car to propagate from 1st to 2nd toll both. c. Total time to line up the caravan at the 2nd toll booth.	5
	b)	Define Cloud computing. Draw and explain the Cloud Computing- NIST Visual Model.	5
	c)	Draw TCP/IP protocol stack and brief the roles and responsibilities of all the layers in it.	6
	d)	Explain in brief the architecture of a Hybrid- fiber coaxial access network.	4
2	a)	What is Web cache? Where it is implemented? With the help of suitable diagram explain the working of web cache. Also state the advantages of it.	6
	b)	Explain HTTP persistent and non-persistent connections with the help of suitable diagram.	4

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	c)	With the help of suitable diagram explain the interaction between various DNS servers for the Recursive Query.	4
	d)	Write short notes on: a. HTTPS b. FTP	6
3	a)	What are pipelined protocols? With the help of suitable diagram explain the working principle of Go-Back-N Protocol.	6
	b)	What is transport-layer multiplexing and demultiplexing? Explain Connection oriented and connectionless demultiplexing with example.	5
	c)	Explain the working of Stop and Wait protocol. Also explain NAK free rdt 2.2 protocol.	5
	d)	In GB3 if every 5^{th} packet that is transmitted is lost and if we have to send 10 packets. Then how many transitions are required? Illustrate with the help of diagram showing the sender and receiver interactions.	4
4	a)	Solve the following with respect to IPV4 Addressing. An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets. a. Find the subnet mask. b. Find the number of addresses in each subnet. c. Find the first addresses in subnet 1. d. Find the first and last addresses in subnet 1024.	6
	b)	Solve the following with respect to IPV6 Addressing. An organization is granted the block 2000:1764:1654/48. **i)** What will be the CIDR notation for the first subnet in this organization? **ii)** What will be the CIDR notation for the third subnet in this organization? **iii)** If the physical address of the computer is F5-A9-21-44-7D-D3, what will be the IPV6 address of the interface in the third subnet? Organization block: 2000:1764:1654/48	6
	c)	When the new host arrives in the network, how it obtains the IP address with the help of DHCP? Explain the four step process by drawing DHCP Client server interactions.	4
	d)	What is the role of 16 bit identifier, flag and fragmentation offset fields in IP datagram format? Explain with an example.	4
5	a)	What is wireless LAN? What is Basic Service Set and Access point with reference to wireless LAN?	6

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	b)	State True or False for the following Statements: a. Link layer has responsibility of transferring datagram from one node to physically adjacent node over a link. b. In error correction, receiver identifies and corrects bit error(s) without any retransmission. c. Link layer is implemented in network interface card (NIC) or on a chip. d. MAC address is a 32-bit IP address which is a network-layer address for interface	4
	c)	What is the role of the link layer Switch? How are entries created, maintained in switch table? Explain with an example.	6
	d)	Explain in brief the role of Analog and Digital Signals in communication.	4