CS44

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RAMAIAH Institute of Technology

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

SEMESTER END EXAMINATIONS – AUGUST / SEPTEMBER 2023

Program	:	**B.E. - Computer Science and Engineering**	**Semester**	:	**IV**
Course Name	:	**Data Communication and Networking**	**Max. Marks**	:	**100**
Course Code	:	**CS44**	**Duration**	:	**3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.
- Draw the diagrams wherever is necessary.

UNIT - I

1.	a)	Discuss the functions of 7 layered OSI reference model with neat diagram.	CO1	(10)
	b)	Define Mesh topology with the advantages and disadvantages.	CO1	(06)
	c)	What is the importance of DNS in the communication networks?	CO1	(04)
2.	a)	Explain the use of Multipurpose Internet Mail Extensions (MIME) in Email Applications.	CO1	(05)
	b)	Write the sequence of information transmitted in FTP session.	CO1	(05)
	c)	Differentiate between static and dynamic documents in the Web applications.	CO1	(10)

UNIT - II

3.	a)	Discuss Go-Back-N Protocol along with the sequence diagram.	CO2	(08)
	b)	Explain the approaches to Congestion Control.	CO2	(06)
	c)	Delineate TCP Segment Structure.	CO2	(06)
4.	a)	Summarize the flow control mechanism in TCP along with receiver window calculations.	CO2	(07)
	b)	Justify the statement: TCP congestion control is referred to as Additive-increase, multiplicative-decrease congestion control.	CO2	(07)
	c)	Suppose the measured RTT values are 106 ms and 120 ms.	CO2	(06)
		i) Compute estimated RTT after each sample RTT values is obtained using the value of α = 0.125 and assuming that the value of estimated RTT was 100 ms just before the first of these two samples was obtained.		
		ii) Compute also DevRTT after each sample is obtained assuming the value of β=0.25 and assuming the value of DevRTT = 5 ms just before the first of these two samples was obtained.		
		iii) Compute the TCP time-out interval after each of these samples was obtained.		

UNIT - III

5.	a)	With a diagram explain the IPV4 datagram format.	CO3	(08)
	b)	An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have three subblocks of addresses to use in its three subnets: one subblock of 10 addresses, one subblock of 60 addresses, and one subblock of 120 addresses. Design the subblocks.	CO3	(08)
	c)	Find the class of each address: i. 00000001 00001011 00001011 11101111 ii. 11000001 10000011 00011011 11111111 iii. 10100111 11011011 10001011 01101111 iv. 11110011 10011011 11111011 00001111	CO3	(04)

6. a) Explain RIP protocol with an example. CO3 (08)
   b) An address in a block is given as 73.22.17.25. Find the number of addresses in the block, the first address and the last address. CO3 (06)
   c) Find the least cost path using LINK state algorithm for the given graph shown in Fig.6(c): CO3 (06)

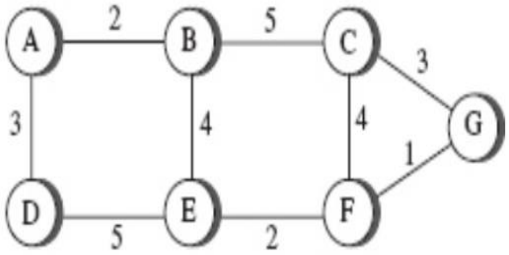

Fig. 6(c)
Graph to find least cost path

UNIT- IV

7. a) Consider CRC-8 $x^8 + x^2 + x + 1$, and answer the following questions: CO4 (08)
   i) Does it detect a single error? Defend your answer.
   ii) Does it detect a burst error of size 6? Defend your answer.
   iii) What is the probability of detecting a burst error of size 9?
   iv) What is the probability of detecting a burst error of size 15?
   b) Explain the types of errors in data transmission. CO4 (06)
   c) Discuss the different persistent methods of CSMA. CO4 (06)

8. a) What is the Hamming distance for each of the following codewords? CO4 (08)
   i. d (10000, 00000) ii. d (10101, 10000)
   iii. d (00000, 11111) iv. d (00000, 00000)
   b) Describe CSM/CA in detail. CO4 (06)
   c) Discuss the design of the CRC encoder and decoder. Also, discuss the performance of CRC. CO4 (06)

UNIT-V

9. a) Explain the different causes of transmission impairments during signal transmission through media. CO5 (08)
   b) A voice grade channel of the telephone network has a bandwidth of 3.4 KHz. CO5 (06)
   i) Calculate the channel capacity of the telephone channel for a SNR of 25 Db
   ii. Calculate the minimum SNR required to support information transmission through the telephone channel at the rate of 3600bps.
   c) What is meant by modulation? Explain any one modulation scheme by taking suitable examples. CO5 (06)

10. a) Construct the unipolar NRZ, return to zero , bipolar, Manchester and differential Manchester signal pattern for the binary sequence 110011010. CO5 (10)
   b) Explain the hidden and exposed station problems in IEEE 802.11. CO5 (10)

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