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Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam – 603 110

(An Autonomous Institution, Affiliated to Anna University, Chennai)

B.E. / B.Tech. End Semester Theory Examinations, Nov / Dec 2021

Fifth Semester

Computer Science and Engineering

UCS1501 COMPUTER NETWORKS

(Regulations 2018)

Time: **Three Hours****Answer ALL Questions****Maximum:100 Marks**

K1: Remembering

K2: Understanding

K3: Applying

K4 :Analyzing

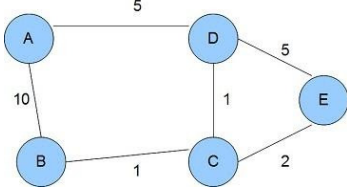
K5: Evaluating

PART – A (10 × 2 = 20 Marks)

01.	K2	How many cables and ports are needed to connect 10 devices in a mesh topology?	CO1												
02.	K2	Protocols used as part of Internet are standardized. Give one advantage and one disadvantage for this.	CO1												
03.	K3	A user wishes to send a message of size 1 MB (MegaByte) to another user over a point-to-point link. The message is divided into blocks of size 1000 bytes. Each of the 5 layers add a header of length 20 bytes each to the block as it goes down the protocol stack. What is the "user" throughput (as seen by the end-user) if the link capacity is 10 Mbps. Ignore processing and propagation delays. Express the answer in Mbps.	CO2												
04.	K3	Byte stuff the following frame payload in which E is the escape byte, F is the flag byte and D is the data byte other than an escape or a flag character. <div><table><tr><td>D</td><td>E</td><td>D</td><td>D</td><td>F</td><td>D</td><td>D</td><td>E</td><td>E</td><td>D</td><td>F</td><td>D</td></tr></table></div>	D	E	D	D	F	D	D	E	E	D	F	D	CO2
D	E	D	D	F	D	D	E	E	D	F	D				
05.	K3	How many hosts can be supported by a class C address?	CO3												
06.	K3	Compare IPV4 and IPV6.	CO3												
07.	K1	What are the four aspects related to reliable delivery of data?	CO4												
08.	K2	What are the criteria used to control the sender's window in TCP to control congestion in the network?	CO4												
09.	K2	How does MIME enhance SMTP?	CO5												
10.	K2	State the purpose of DNS.	CO5												

PART – B (5 × 6 = 30 Marks)

11.	K2	Compare multimode and single mode propagation modes of fiber optic cable.	CO1
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12.	K3	<p>Assume stations 1 and 2 are sending a 0 bit and station 4 is sending a 1 bit. Station 3 is silent. Let the chip sequence for the stations 1, 2, 3 and 4 are as follows:</p> <p>[+1 +1 +1 +1], [+1 -1 +1 -1], [+1 +1 -1 -1] and [+1 -1 -1 +1]</p> <p>Apply CDMA technique and compute the data transmitted in the shared channel. Demonstrate the procedure followed by station 4 to retrieve the station 1's data.</p>	CO2
13.	K3	 <p>At the beginning each node knows only the distances to its immediate neighbors.</p> <p>In step 1, each node exchanges its routing table with all of its neighbors and all update their routing tables accordingly.</p> <p>In step 2, step 1 repeats.</p> <p>After step 2, at node A, what are the costs associated with nodes B,C,D and E.</p>	CO3
14.	K2	Differentiate between UDP and TCP.	CO4
15.	K3	<p>Suppose a user wants to access a webpage with 5 embedded objects all residing on the same server. Assume that length of the request messages is 100B and all objects are under 200B. Assume a TCP MSS of 1400B.</p> <p>1. How many RTT would it take to display the webpage fully assuming non-persistent HTTP with no parallel TCP connections?</p> <p>2. How many RTT would it take to display the webpage fully assuming non-persistent HTTP with parallel TCP connections?</p> <p>3. How many RTT would it take to display the webpage fully assuming persistent HTTP with pipelined TCP connections?</p>	CO5

PART – C (5 × 10 = 50 Marks)

16.	K2	Explain the significance of layered architecture and differentiate between OSI and TCP/IP model.	CO1
OR			
17.	K2	Explain the significance of switching. Discuss the different switching techniques used in computer network?	CO1

18.	K3	Pure ALOHA and slotted ALOHA network transmits 200 bit frames on a shared channel of 250 kbps. Apply the concept and compute the throughput, if the system produces [all stations together] 2000 frames per second; 1500 frames per second and 500 frames per second.	CO2
OR			
19.	K3	Consider a 10 Mbps Ethernet LAN that has stations attached to a 3.5 km long coaxial cable. Given that the transmission speed is 2.3×10^8 m/sec, the packet size is 128 bytes out of which 20 bytes are overhead. Solve for efficiency of the Ethernet network; amount of a frame occupies the whole medium and how much percent of the time the medium is occupied? Plan how the efficiency can be increased with respect to the length of the media and the frame size.	CO2
OR			
20.	K3	An IPv4 packet has arrived with the first few hexadecimal digits (45000028000100000102...)16. Making use of IP datagram format, how many hops can this packet travel before being dropped? Which upper-layer protocol does this data belong to? Apply the fragmentation strategy of IP and determine, if a datagram with the following information is a first fragment, a middle fragment, a last fragment, or the only fragment when: M bit is set to 1 and the value of the offset field is zero; M bit is set to 1 and the value of the offset field is nonzero. Also that a packet has arrived, in which the offset value is 300 and the payload size is 100 bytes. Solve, the number of the first byte and the last byte?	CO3
OR			
21.	K3	Consider a router that interconnects three subnets: Suppose all of the interfaces in each of these three subnets are required to have the prefix 222.1.17/24; Also suppose that Subnet 1 is required to support at least 68 interfaces, Subnet 2 is to support at least 82 interfaces, and Subnet 3 is to support at least 20 interfaces. Apply the CIDR notation and construct three network addresses that satisfy these constraints. Making use of CIDR notation, how classful addresses can be mapped into classless addresses and substantiate this with proper examples.	CO3
OR			

22.	K2	Explain the Go-Back-N protocol (GBN) with necessary diagrams.	CO4
OR			
23.	K2	Explain the TCP services and segment with necessary illustration.	CO4
OR			
24.	K2	Illustrate and Explain the File Transfer Protocol.	CO5
OR			
25.	K2	Illustrate and Explain the SNMP.	CO5

Course Outcomes:

- CO1: Understand the principles, design, terminology and concepts of the network models (K2).
- CO2: Learn the protocols of data link layer and apply error control mechanisms (K3).
- CO3: Illustrate the core functions of network layer protocols and apply them for data communication (K3).
- CO4: Learn the purpose of Transport layer protocols such as UDP and TCP (K2).
- CO5: Under the application Layer protocols and their basic functionalities (K2).