

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2019

Course: Data Communication and Networking

Program: B. Tech. EE-Spz-IOT

Course Code: ELEG444

Instructions: Attempt all the questions

Semester: II

Time: 03 hrs.

Max. Marks: 100

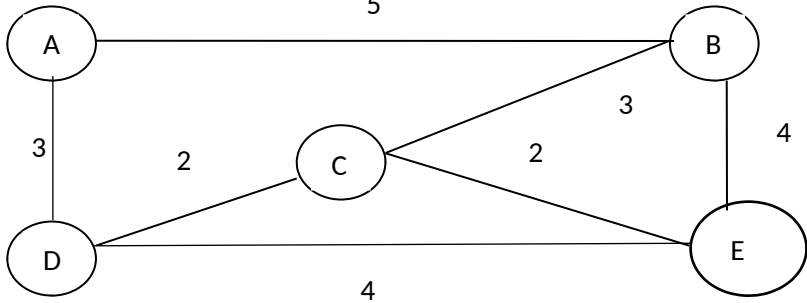
SECTION A

S. No.		Marks	CO
Q 1	<p>Objective questions</p> <p>(a) TCP is a _____</p> <p>(i) Connectionless, reliable protocol</p> <p>(ii) Connection-oriented, unreliable protocol</p> <p>(iii) Connection-oriented, reliable protocol</p> <p>(iv) Connectionless, unreliable protocol</p> <p>(b) When displaying a web page, the application layer uses the</p> <p>(i) HTTP protocol</p> <p>(ii) FTP protocol</p> <p>(iii) SMTP protocol</p> <p>(iv) none of the mentioned</p> <p>(c) The acronym BOOTP stands for _____ and DHCP stands for _____</p> <p>(d) The _____ layer oversees both error control and flow control at the source and destination level.</p> <p>(i) Transport (ii) Network (iii) Session (iv) Presentation</p>	4	CO2
Q 2	<p>Find the error in the following IPv4 addresses</p> <p>(a) 112.56.45.078</p> <p>(b) 85.45.7.8.20</p>	4	CO3

	(c) 221.34.301.14 (d) 11100010.23.14.67		
Q 3	Elucidate the following terms with respect to data traffic in the network. (a) Average data rate (b) Peak data rate (c) Maximum burst size (d) Effective bandwidth	4	CO3
Q 4	Elucidate the significance of following terms with respect to protocols and standards in data communication. (a) Syntax (b) Semantics (c) De facto (d) De jure	4	CO1
Q 5	What is a proxy server and how it is related to HTTP? How does recursive resolution differ from iterative resolution?	4	CO2
SECTION B			
Q 6	What do you understand by NAT? How can NAT help in address depletion? An ISP is granted a block of addresses starting with 150.80.0.0/16. The ISP wants to distribute these blocks to 2600 customers as follows. (a) The first group has 200 medium-size businesses; each needs 16 addresses. (b) The second group has 400 small businesses; each need 8 addresses. (c) The third group has 2000 households; each needs 4 addresses. Design the subblocks and give the slash notation for each subblock. Find out how many addresses are still available after these allocations.	8	CO3
Q 7	Why framing is done in data link layer? What are the different types of framing? Compare and contrast byte-stuffing and bit stuffing.	8	CO2
Q 8	(a) Which protocol is used to handle error-reporting messages in network layer? Briefly explain the different error reporting messages handled by it. (b) A host with IP address 135.20.35.20 and physical address B2:34:55:10:22:10 has a packet to send to another host with IP address 135.20.35.25 and physical address A4:6E:F4:59:83:AB. The two hosts are on the same Ethernet network. Draw the figure to show ARP request and reply packets encapsulated in Ethernet frames.	8	CO4, CO3
Q 9	How the congestion control and quality of service related to each other. With the help of suitable diagram briefly differentiate leaky bucket and token bucket traffic shaping technique.	8	CO3

Q 10	Explain the domain name space. Differentiate the Generic domain and Country domain. Briefly discuss the frame format of DNS message	8	CO2
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SECTION-C

Q 11	<p>(a) Differentiate static and dynamic routing tables. Design the routing table for node A, E in figure 1 using distance vector routing algorithm (Dijkstra Algorithm).</p>  <p style="text-align: center;">Figure 1</p> <p>(b) Design an OSI communication system by highlighting the function to be performed by all the layers in accessing a web page on a Personal Computer.</p>	[10+10]	CO3, CO1
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Q 12	<p>(a) Design the topology of the network if Table 1 is the routing table for router R1.</p> <p style="text-align: center;">Table 1</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Mask</th> <th>Network Address</th> <th>Next Hop</th> <th>Interface</th> </tr> </thead> <tbody> <tr> <td>/27</td> <td>201.18.17.224</td> <td>--</td> <td>m1</td> </tr> <tr> <td>/18</td> <td>135.14.182.0</td> <td>--</td> <td>m0</td> </tr> <tr> <td>Default</td> <td>--</td> <td>132.45.11.2</td> <td>m2</td> </tr> </tbody> </table> <p>(b) What do understand by piggybacking? Design a bidirectional algorithm for Stop and Wait ARQ Protocol with the size of window 4.</p>	Mask	Network Address	Next Hop	Interface	/27	201.18.17.224	--	m1	/18	135.14.182.0	--	m0	Default	--	132.45.11.2	m2	[10+10]	CO3, CO2
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SECTION A

S. No.		Marks	CO
Q 1	<p>Objective questions</p> <p>(a) _____ memory is used for storing the ARP reply.</p> <p>(b) IPv4 address is _____ bits long and IPv6 address is _____ bits long.</p> <p>(c) File transfer, access and management are handled by _____ layer. (i) Transport (ii) Application (iii) Session (iv) Presentation</p> <p>(d) UDP is a</p> <p>(i) Connectionless, reliable protocol</p> <p>(ii) Connection-oriented, unreliable protocol</p> <p>(iii) Connection-oriented, reliable protocol</p> <p>(iv) Connectionless, unreliable protocol</p>	4	CO2
Q 2	<p>Find the Class, Network id and Host id for the following IP address.</p> <p>(a) 15.3.2.3</p> <p>(b) 150.236.24.35</p> <p>(c) 191.40.2.45</p> <p>(d) 192.7.131.2</p>	4	CO3
Q 3	<p>Elucidate the following terms with respect to performance measure of the network.</p>	4	CO3

	(a) Delay Versus Load (b) Throughput Versus Load		
Q 4	Show the original (unabbreviated) form of the following addresses (a) 0::0 (b) 0:ABC::0 (c) 0:234:3 (d) 1234::1:2	4	CO3
Q 5	Explain briefly how HTTP is related to WWW. Differentiate static, active and dynamic Web documents.	4	CO2

SECTION B

Q 6	(a) What are goals of Gigabit Ethernet. Discuss the topologies with suitable diagrams of Gigabit Ethernet. (b) Which wired transmission media has the highest transmission speed in a network? Discuss its principle of operation, advantages and disadvantages and applications.	8	CO2, CO1
Q 7	What do you understand by congestion in the network? Differentiate open loop and closed loop congestion control techniques. Briefly explain all the techniques in each category.	8	CO3
Q 8	Discuss the situations where RARP protocol find applications. Which protocol is used for multicasting? Briefly discuss its different message types and frame format.	8	CO4
Q 9	How TCP is different from UDP protocol. Discuss the operation of UDP. Differentiate user datagram format and TCP segment format.	8	CO4
Q 10	Why do we need a DNS system when we can directly use an IP address? If a DNS domain name is <i>voyager.fhda.edu</i> , how many labels are involved here? How many levels of hierarchy? Briefly differentiate recursive resolution and iterative resolution.	8	CO2

SECTION-C

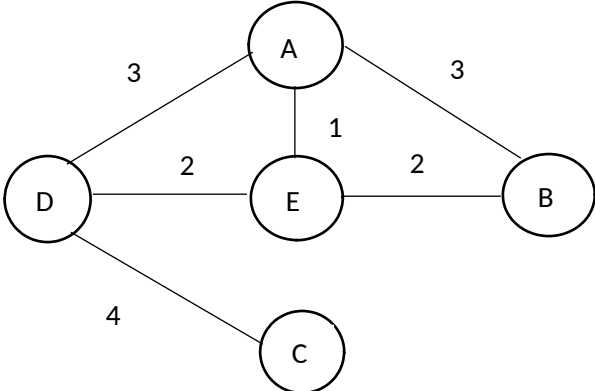
Q 11	(a) Differentiate different forwarding techniques used to route a packet from source to destination. Design the routing table for all the nodes of figure 1 using distance vector routing. 	[10+10]	CO3, CO2
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Figure 1

	(b) What are the different persistence method in CSMA. Design the CSMA/CD algorithm and explain how the collision can be detected in this algorithm.		
Q 12	<p>(a) What are the essential duties of data link layer? Design a bidirectional algorithm for the Go-Back-N ARQ protocol with the size of the window 4.</p> <p>(b) Differentiate subnetting and supernetting. An ISP is granted a block of addresses starting with 190.100.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows:</p> <p>(i) The first group has 64 customers; each needs 256 addresses.</p> <p>(ii) The second group has 128 customers; each needs 128 addresses.</p> <p>(iii) The third group has 128 customers; each needs 64 addresses.</p> <p>Design the subblocks and find out how many addresses are still available after these allocations.</p>	[10+10]	CO2, CO3