Name:	UPES
Enrolment No:	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018
SET-1

Course: Data Communication & Networking   Semester: V
Program: B. Tech EE and B. Tech EE with Spl in BCT
Time: 03 hrs.   Max. Marks: 100
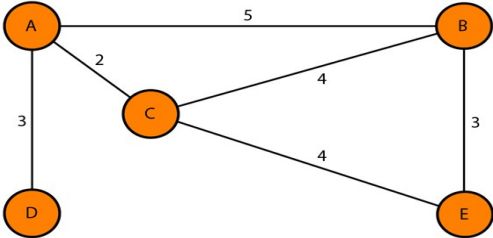Instructions: Attempt all the questions

SECTION A

S. No.	Answer all the questions	Marks	CO
1	What is Ethernet? Classify Ethernet types with respect to speed and maximum length of cable	5	CO3
2	Convert the MAC address *47:20:1B:2E:08:EE* into dotted decimal notation and also show how it is sent on outgoing line.	5	CO3
3	Expand i) SMTP ii) TELNET iii) DNS iv) HTTP v) UDP	5	CO4
4	Expand the generic domain labels given i) .biz ii) .aero iii) .info iv) .org v) .net	5	CO4

SECTION B

Q	Answer any four questions	Marks	CO
5	Elucidate the operation of following transmission media with suitable diagrams (a) Coaxial cable (b) Optic fiber cable	10	CO1
6	Frames of 1000 bits are sent over a 1-Mbps channel using a geostationary satellite whose propagation time from the earth is 270 msec. Acknowledgements are always piggybacked onto data frames. The headers are very short. Three-bit sequence numbers are used. What is the maximum achievable channel utilization for a. Stop-and-wait. b. Protocol with 7 frames. c. Protocol 4 frames.	10	CO3
7	With respect to OSI layered architecture, name the layers that performs the following functions: a. Layer that has a local address built in by the LAN adapter card manufacturer. b. Transmits and receives signals through an external port (connector). c. Provides standard services to various computer programs. d. Layer, which uses a hierarchical address assigned by the local network manager. e. Responsible for end-to-end connections across a multi-node switched network or router network.	10	CO2
8	What does congestion control refers to? Compare in a brief different congestion	10	CO3

	control techniques		
9	What is leaky bucket algorithm? What is its use? List advantages of leaky bucket algorithm over token bucket algorithm.	**10**	**CO4**

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SECTION-C

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Q	**Answer any two questions**	**Marks**	**CO**
10	To implement flow control in a network Design a Go-Back-N ARQ (Automatic Repeat Request) protocol that uses piggybacking method whose window size is 2. Write the sender side and receiver side algorithm and draw the flow diagram.	**20**	**CO2**
11	Design a layered OSI communication module by explaining the function of each layer for the following practical applications a) Accessing a Web page through a desktop PC. b) Travelling through a ship on the sea.	**20**	**CO1**
12	Design Dijikstra topology along with its flow chart. Consider the network topology given in the following figure, design routing table for each node and shortest path tree. 	**20**	**CO4**

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018
SET-2

Course: Data Communication & Networking **Semester: V**
Program: B. Tech EE and B. Tech EE with Spl in BCT
Time: 03 hrs. **Max. Marks: 100**
Instructions: Attempt all the questions
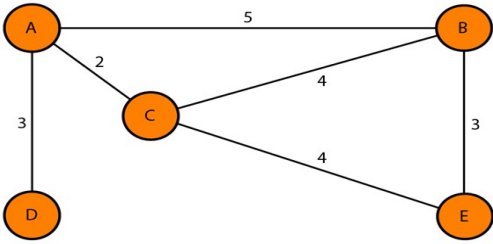
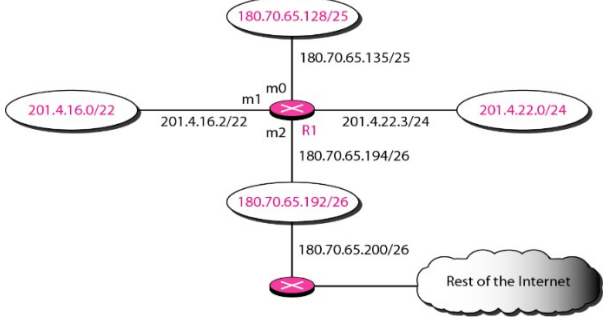| SECTION A			
S. No.	Answer all the questions	Marks	CO
1	*Find the class of each address.* *a.* <u>00000001</u> 00001011 00001011 11101111 *b.* <u>11000001</u> 10000011 00011011 11111111 *c.* <u>14</u>.23.120.8 *d.* <u>252</u>.5.15.111 *e.* 192.168.1.1	5	CO4
2	What is three-level hierarchy in IPv4 address? What is size, in bits, of network prefix, subnet prefix and host address.	5	CO4
3	OSI model has 7 layers that are divided into three sub-groups. Identify the layers in each sub-group according to i) Layers that deals with physical aspects of moving data from one device to another. ii) Layer that links the two sub-groups iii) Layers that allow interoperability among unrelated software systems.	5	CO1
4	Highlight the main differences between hub, bridge, and lay-2 Ethernet switch?	5	CO3
SECTION B			
Q	Answer any four questions	Marks	CO4
5	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) Variable bit rate	10	CO3
6	An organization is granted the block 192.168.0.0/8. 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 and last addresses in subnet 1 (d) Find the first and last address in subnet 1024	10	CO4
7	A host with logical address 192.168.1.1 and MAC address AC: 98:25:10:42:10 has a packet to send to another host with IP address 130.23.43.25 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.	10	CO3
8	Consider the network given in the figure i) Design the routing table for each node by taking into consideration the cost of	10	CO4

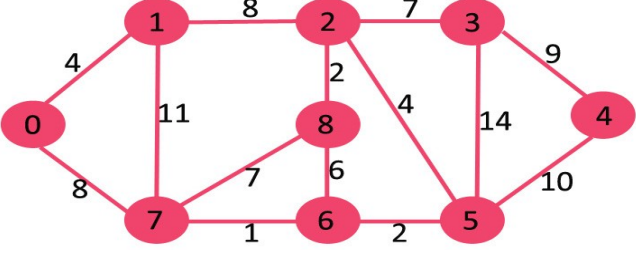|	links given using distance vector routing. ii) Differentiate between inter-domain and intra-domain routing protocols 		
9	Compare and contrast a circuit-switched network and a packet switched network. Briefly explain all the three phases of virtual circuit network with suitable diagrams.	10	CO2

<div align="center">SECTION-C</div>

Q	**Answer any two questions**	Marks	CO5
10	Design the routing table for router R1, using the configuration in figure below. i) Show the forwarding process if a packet arrives at R1 in Figure with the destination address 180.70.65.192. ii) Show the forwarding process if a packet arrives at R1 in Figure with the destination address 201.4.22.4. iii) Show the forwarding process if a packet arrives at R1 in Figure with the destination address 18.24.32.80.	20	CO2
11	Design a bidirectional send and receive algorithm using Stop-n-Wait ARQ protocol. Note that both the parties need to use the same algorithm. Write the sender site and receiver site algorithms.	20	CO3
12	Design a Dijkstra's algorithm for the topology of the network shown in the figure. Show every step in detail by redrawing the network for finding shortest path. 	20	CO4