Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, Dec 2019

Course: Data Communication and Networking
Program: B.Tech ECE **Semester: V**
Course Code: ECEG 3004 **Time 03 hrs.**
Max. Marks: 100

Instructions: Attempt all questions.

SECTION A

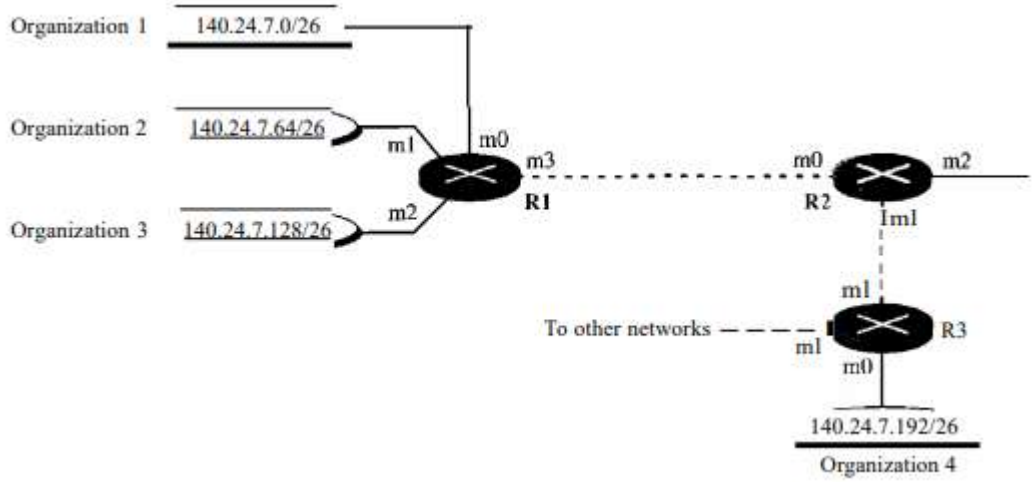
S. No.		Marks	CO
Q 1	Draw and explain the structure of mesh topology with 8 nodes. How many full duplex links are possible in an ***n*** node mesh network? Also write advantages and disadvantages of mesh networks.	**5**	**CO2**
Q 2	Differentiate OSI model and TCP/IP model. Briefly explain the protocols supported by TCP/IP in network layer and transport layer.	**5**	**CO1**
Q 3	Why protocols and standards are needed in data communication? Differentiate two different categories of data communication standards.	**5**	**CO1**
Q 4	Define the type (unicast, multicast, broadcast) of the following destination addresses: a) 4A:30:10:21:10:1A b) 47:20:1B:2E:08:EE c) FF:FF:FF:FF:FF:FF	**5**	**CO2**

SECTION B

Q 5	Design a bidirectional algorithm for the Go-Back-N ARQ Protocol using piggybacking. Note that both parties need to use the same algorithm.	**10**	**CO3**
Q 6	Draw a switched network and explain the necessity of switching within a network.	**10**	**CO2**
Q 7	Define, discuss and compare the format of Internet Protocols IPV4 and IPV6?	**10**	**CO3**
Q 8	This problem shows a special case in checksum handling. A sender has two data items to send: Ox4567 and OxBA98. What is the value of the checksum?	**10**	**CO3**

SECTION-C

Q 9 A	Suppose the length of a lOBase5 (thick Ethernet) cable is 2500 m. If the speed of propagation in a thick coaxial cable is 200,000,000 m/s, how long does it take for a bit to travel from the beginning to the end of the network? Assume there is 10μs delay in the equipment.	**10**	**CO2**
Q 9 B	Assume that a voice channel occupies a bandwidth of 4 kHz. We need to combine three voice channels into a link with a bandwidth of 12 kHz, from 20 to 32 kHz. Show the configuration, using the frequency domain. Assume there are no guard	**10**	**CO2**

	bands.		
Q 10 A	A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces: a) 1000 frames per second b) 500 frames per second c) 250 frames per second	**10**	**CO3**
Q 10 B	Create the routing tables for the Router R1 and R2 as shown below: 	**10**	**CO3**