Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

FIFTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION
NOV 2017
SUBJECT: COMMUNICATION NETWORKS (ECE - 3105)

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to candidates
- Answer **ALL** questions.
- Missing data may be suitably assumed.

1A. Draw the ATM Reference model and explain the functionalities of each layer. Also equate these functionalities with ISO:OSI layers.

1B. Mention the functions of the following devices and in which layer those devices are operated.
i) Bridge ii) Switch iii) Hub iv) NIC v) Router vi) Repeater

1C. The digital signal is to be designed to permit 160 kbps for a bandwidth of 20 KHz. Determine
(a) the number of levels (b) S/N ratio.

(5+3+2)

2A. a) Explain the various switching techniques with suitable examples and event diagrams. Mention the advantages and disadvantages of each technique.
b) Encode the bit stream "0110110" at physical payer using the following techniques:
i) Bipolar ii) NRZ-I iii) Differential Manchester iv) RZ

2B. 20 digital sources are multiplexed using synchronous TDM. Out of which 5 are with a bit rate of 120 kbps, 10 with a bit rate 60 kbps, and the last 5 with a bit rate of 110 kbps. Design a synchronous TDM for these sources (The unit of data is 1 bit), and find: a) The output frame rate b) The output data rate c) Efficiency of the system

2C. An IP packet was received at the receiver with following header:

4	5	0	28
1		0	0
4	17	35761	
10.12.14.5			
12.6.7.9			

Verify that whether the receiver will accept this packet or not and justify your answer.

(5+3+2)

3A. Draw the frame formats of IEEE 802.5 and FDDI. Mention the significance of each field.

3B. a) Ten thousand airline reservation stations are competing for the use of a single slotted ALOHA channel with slot time as 125μsec. On average, each station makes 18 requests/hour. What is the approximate total channel load?

b) Let a 10 KB/s link with 100msec propagation delay and frame size of 1 KB. If a stop-and-wait protocol is used, then what is the i) minimum wait time for sending the next frame ii) maximum link utilization iii) If we use a sliding window protocol with the sender window size of 5, what is the maximum link utilization?

3C. Let a 4Mbps token bucket with capacity of 10K tokens and tokens are added at the rate of 1K/sec. If 1KB of data is allowed to transmit per token, what is the maximum average data rate?

(5+3+2)

4A. a) One of the block addresses allocated to an ISP is 190.100.10.250/16. The ISP needs to distribute these addresses to three groups of customers as follows:
i.) The first group has 64 customers; each needs 256 addresses.
ii.) The second group has 128 customers; each needs 128 addresses.
iii.) The third group has 128 customers; each needs 64 addresses.
Design the subblocks and find out how many addresses are still available after these allocations.

b) A routing table at node has 20 entries and it does not receive information about five routes for 200sec. How many RIP timers are running at this time?

4B. Use Distance Vector Routing algorithm shown in Figure Q4B for the following topology and form the Routing Table at Node 'B'.

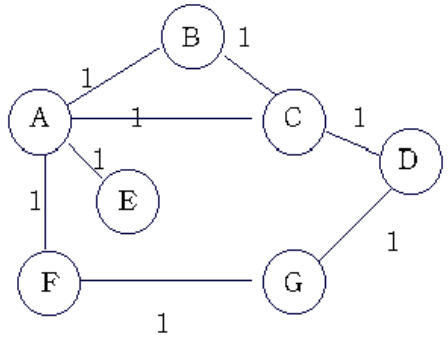

Figure Q4B

4C. Update the routing table using Bellman-Ford algorithm for the topology shown in Figure Q4C before and after the link failure.

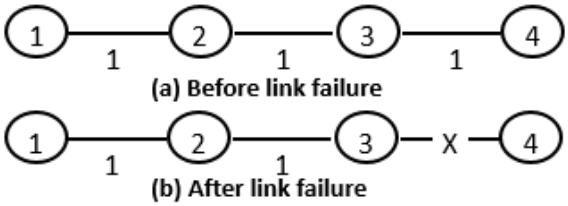

Figure Q4C

(5+3+2)

5A. a) Draw the TCP segment header format. Mention the significance of each field.
b) What are the TCP timers? Mention the functioning of each.

5B. Explain the stages in delivering an Email with help of relevant Protocols and diagrams.

5C. What is "Silly Window Syndrome"? Propose any two techniques to resolve it.

(5+3+2)