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## MANIPAL INSTITUTE OF TECHNOLOGY Manipal University FIFTH SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION - NOV/DEC 2016 SUBJECT: COMMUNICATION NETWORK (ECE - 3105)

## TIME: 3 HOURS

MAX. MARKS: 50

## Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.
- 1A. Draw the ISO: OSI and TCP/IP reference models. Brief the functionalities of each layer.
- 1B. The channel bandwidth is given as 1 MHz and SNR = 24 dB. How many signal levels are required to achieve the maximum data rate?
- 1C. Synchronous TDM with four 1Mbps data stream inputs is given. Find (a) the input bit duration, (b) the output bit duration, (c) the output bit rate, and (d) the output frame rate.

(5+3+2)

- 2A. Given the generator polynomial g = 110011 and the message bits m = 11100011. Find the CRC and the transmitted string T. Also verify the correctness of the code word at the Receiver.
- 2B. A slotted 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/sec b) 500 frames/sec c) 250 frames/sec.
- 2C. Consider the use of 10 K-bit size frames on a 10 Mbps satellite channel with 270 ms delay. What is the link utilization for stop-and-wait ARQ technique assuming  $P = 10^{-3}$ ?

(5+3+2)

- 3A. Explain the controlled access protocols for accessing the medium in the network with examples.
- 3B. For figure 3B, determine, the shortest path from source node 5 to all other destination nodes using bell man ford algorithm.
- 3C. If a block of 1 million IPv6 addresses is allocated every picosecond, how many years will the addresses last?

(5+3+2)

- 4A. 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 approximately 128 addresses.
  - b. The second group has 400 small businesses; each needs approximately 16 addresses.
  - c. The third group has 2000 households; each needs 4 addresses.

Design the sub blocks and give the slash notation for each sub block. Find out how many addresses are still available after these allocations.

- 4B. Write and describe the function of each field in IPv4 Header.
- 4C. List out the significance of different TCP timers.

(5+3+2)

- 5A. Describe VOIP signalling protocols mentioning the functions of each.
- 5B. Write and describe the function of each field in TCP header.
- 5C. Explain the difference between the recursive technique and the iterative technique in DNS.

(5+3+2)



Figure 3B