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MANIPAL INSTITUTE OF TECHNOLOGY
Manipal University

**FIFTH SEMESTER B.TECH (E & C) DEGREE END SEMESTER EXAMINATION**
**NOV/DEC 2015**
**SUBJECT: COMMUNICATION NETWORKS (ECE - 309)**

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

**Instructions to candidates**
- Answer **ANY FIVE** full questions.
- Missing data may be suitably assumed.

1A. Draw and explain the ISO: OSI Reference model.

1B. In which layer of the OSI model that the following LAN connecting devices work? Mention the purpose of each device. i) Repeater ii) Bridge iii) Switch iv) Router

1C. What is the theoretical highest bit rate that is allowed by a regular telephone line which carries human voice range from 300 to 3300 Hz with signal-to-noise ratio of 3162?

(5+3+2)

2A. Write about the various network topologies along with their advantages and disadvantages.

2B. Show the optical signal propagation through various types of fibers. Also mention the dimensions of the layers and Refractive index profile of each.

2C. Represent the bit stream "01001110" using the following line encoding schemes.
i) Manchester ii) Unipolar iii) NRZ-L iv) NRZ-I

(5+3+2)

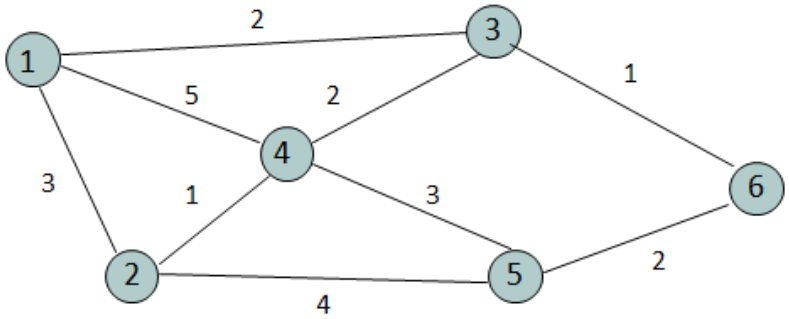
3A. Explain the HDLC frame format and write about various types of HDLC frames.

3B. Measurements of a slotted ALOHA channel with an infinite number of users show that 10 percent of the slots are idle. (a) What is the channel load, G? (b) What is the throughput? (c) Is the channel underloaded or overloaded?

3C. If the length of a 10Base-5 cable is 2.5 km and the speed of propagation in a thick co-axial cable is 60% of the speed of light, how long does it take for a bit to travel from the beginning to the end of the cable? Ignore any propagation delay in the equipment.

(5+3+2)

4A. Form a routing table for node '6' using Bellman-Ford Algorithm. Also show the updated Routing table after the link fails between node '3' and node '6'.



4B. Manipal University is granted a block of addresses starting with 190.100.0.0/16. It needs to distribute these addresses to three groups as follows:

a. The first group has 64 departments; each department requires 256 addresses.

b. The second group has 128 supporting staff departments; each requires 128 addresses.

c. The third group has 128 maintenance & security departments; each requires 64 addresses.

Design the address allocation using IPv4, and also calculate the remaining addresses.

4C. What is Silly Window Syndrome? Explain the various algorithms to resolve this.

(5+3+2)

5A. Write about the components of a HTTP browser? Explain about the fields in URL and types of HTML documents.

5B. Write about the following: i) Port addresses classification ii) TCP Timers

5C. Explain the 4-way handshaking used in TCP Protocol with an example.

(5+3+2)

6A. Draw and explain the GSM Network architecture.

6B. What are Hidden and Exposed Terminals problem in MANETs? How MACA Protocol addresses these problems explain with an example?

6C. What are the steps involved in processing a telephone call through VoIP?

(5+3+2)