



**T.E. (Information Technology) (Semester – I) (Examination, 2010)**  
**DATA COMMUNICATION AND NETWORKING**  
**(2003 Course)**

Time : 3 Hours

Max. Marks : 100

- Instructions :** 1) Answers to the two Sections should be written in *separate* books.  
2) Neat diagrams must be drawn *wherever* necessary.  
3) Assume suitable data, if *necessary*.

**SECTION – I**

1. A) What do you understand by signal to noise (S/N) ratio? Explain Shannon's channel capacity. 5
- B) Explain QAM and its advantages. Also draw the constellation patterns for 8-QAM, 16-QAM. 5
- C) Generate the CRC code for message 1101010101. 8
- Given generator polynomial  $g(x) = X^4 + x^2 + 1$ .

**OR**

2. A) What are the advantages of digital signals over analog signals ? 5
- B) What is channel capacity ? How is it related to channel bandwidth ? Example with an appropriate formula. 5
- C) Discuss the hamming code technique. Calculate hamming code if data to be sent is 1001101. 8
3. A) Discuss how ADSL technology used in modems. 8
- B) State the difference between circuit switching and packet switching. 8

**OR**



4. A) Describe the T1 frame structure. Also state the capacities of E1, E2, E3 and E4 lines. 8
- B) Discuss ADSL, DMT, HDSL technologies in brief. 8
5. A) Explain with suitable examples guided transmission media and unguided transmission media. 8
- B) **Compare :** 8
- 1) Step index and graded index fibers
  - 2) Single mode and multimode fibers.

OR

6. A) Explain the coaxial cable and its various categories. Also state the data rate and the use of every category. 8
- B) Explain different losses in the fiber-optic communication. 8

## SECTION – II

7. A) Explain TCP/IP protocol stack. 8
- B) Explain the merits and demerits of Star, Bus, Ring and Mesh Topologies. 8
- OR
8. A) Describe the functions of all the layers of the OSI reference model in short. 8
- B) Compare Bridge, Switch, Hub, Repeater. 8
9. A) Explain stop and wait ARQ, GO Back-n ARQ and selective repeat ARQ. Comment on the performance of each. 10
- B) Explain ALOHA, Slotted ALOHA and CSMA. Comment on the efficiency of each random access technique. 8

OR



10. A) Discuss the HDLC protocol specification with reference to the following : 10
- 1) Station types
  - 2) Configurations
  - 3) Modes of communication
  - 4) Types of frames.
- B) Discuss CSMA/CD Random Access technique in detail. 8
11. A) Discuss the working of VLAN. Also state its advantages. 8
- B) What is the difference between 10 Base 5, 10 Base 2 and 10 Base T specification. 8

OR

12. A) Write a short note on Gigabit Ethernet. Compare Gigabit Ethernet with Traditional Ethernet. 8
- B) What is FDDI ? Explain FDDI frame types. 8
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