53 (IT-302) DCOM

2015

DATA COMMUNICATION

Paper : IT 302

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions out of **eight** questions.*

1. 10×2

(a) "Ultra Violet light, X-Rays and Gamma rays are not used for data transmission", —Why they are not used for communication ?

(b) What are the differences between network layer delivery and transport layer ?

(c) Why the two wires in twisted pair cable are twisted together in a helical form ?

(d) What are the services provided by data link layer to network layer ?

(e) In a ring topology, how the chance of data collisions can be reduced?

(f) What do you mean by multipath fading?

(g) A signal travels through an amplifier and the power is increased 10 times. Calculate the power gained.

(h) Relate baud Rate and bit rate.

2. (a) Draw the layered architecture for TCP/IP and OSI reference model and list out their commonalities and differences with each other. 4+6

(b) Explain different forms of noise. How does noise affects channel capacity? 6+4

3. (a) Describe the function of Shannon and Nyquist on channel capacity? Each places an upper limit on the bit rate of a channel based on two different approaches. How are two related? 4+4+2

(b) Low pass communication has bandwidth of 1*MHz*. What is Shannon capacity of channel if SNR is 40*db*? What is the bit rate attainable using 8-level pulses? 3+3

(c) What is fiber optic cable? Compare fiber optic cable with co-axial cable. 4

4. *(a)* What are the factors that determine whether a network system is a LAN, MAN or WAN ? 6

(b) Explain different network topologies with their merits and demerits ? What are the basic role of topologies in computer networking ? Which network topology is widely used and why ? 8+4+2

5. *(a)* With the help of example, explain the three processes of PCM encoding scheme : Sampling, Quantization and Re-construction. 10

(b) Explain satellite and terrestrial microwave transmission. 3+3

(c) Distinguish between Baseband and Broadband transmission. 4

6. *(a)* What is modulation ? Explain the need of modulation in communication. Explain briefly *three* basic types of modulation. 2+2+6

(b) Describe Unipolar NRZ, Polar NRZ-I, Bipolar AMI and Manchester encoding by applying on the information sequence 101011100. 8

(c) Which one is better—a point-to-point connection or a multipoint connection and why ? 2

7. *(a)* Describe the Process of Delta modulation system. How the Quantization errors are minimized in delta modulation ? 6+2

(b) Differentiate between QAM and QPSK in detail. What are the advantages of QAM over QPSK. 4+2

(c) Differentiate between Packet Switching and Circuit Switching. 6

8. *(a)* Why is encoding needed for baseband transmission ? Explain HDB3 and how it outperforms most other encoding scheme. 4+6

(b) Differentiate the following : ***(any five)*** 5×2

(i) Thin ethernet and Thick Ethernet

(ii) Step index fiber and Graded index fiber

(iii) Isotropic antenna and Parabolic antenna

(iv) Half-Duplex and Full-Duplex communication

(v) Connection-less and Connection-oriented

(vi) Geo and Leo

(vii) STP and UTP cable.
