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S. No. of Question Paper : 1567

Unique Paper Code : 2341302

F-3

Name of the Paper : Data Communication and Computer Networks

Name of the Course : B.Tech. in Computer Science

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt all the questions.

1. Write the layer in OSI Model perform the following functions : 2
 - (a) Route determination
 - (b) Flow control
 - (c) Mechanical and electrical interface
 - (d) Reliable process-to-process data transportation
 - (e) Reassembly of data packets
 - (f) Error correction and retransmission.

2. Explain the following :
 - (1) Does the Nyquist theorem bit rate agree with the intuitive bit rate described in baseband transmission ? 3

P.T.O.

- (2) The signal-to-noise ratio is often given in decibels. Assume that $\text{SNR}_{\text{dB}} = 36$ and the channel bandwidth is 2 MHz. Calculate the theoretical channel. 3
- (3) An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second, find the bit rate. 2
- (4) Differentiate between binary PSK and Quadrature PSK. 4
3. Briefly describe the following :
- (a) Three phases required for the actual communication in a circuit-switched network. 3
- (b) If there are no setup or teardown phases, how are the packets routed to their destinations in a datagram network ? 3
- (c) Draw the pulse diagram for the bit stream 101110001011 for the following encoding technique : 6
- (i) NRZ-L
- (ii) Manchester
- (iii) Differential Manchester.
4. (a) How do multiple senders share the common transmission media in a network. List three techniques commonly used for this purpose. 2+3
- (b) Explain bridge, router and gateway. 3
- (c) Suppose a computer is moved from one building to another within a campus. Does the physical address need to change ? Does the IP address need to change ? Does it make a difference if the computer is a laptop ? Justify your answer. 3

5. (a) Explain header field in IP protocol with diagram. 4
- (b) An organization has been assigned the network address : 140.25.0.0 and it needs to create a set of subnets that support upto 25 hosts on each subnet. What is the subnet mask you would use to do this ? 3
- (c) What is the maximum possible number of such subnets in the given network ? The use of special address must be avoided. 2
6. What is the difference between a connection-oriented service and a connectionless service ? For each of the following tell whether it might be a connection oriented service, a connectionless service, both or neither : 2+3
- (i) Connection establishment
 - (ii) Data transmission
 - (iii) Connection release.
7. (a) Write the port number of the following protocols : 2
- (i) FTP
 - (ii) HTTP
 - (iii) TELNET
 - (iv) SMTP.
- (b) What is DNS and how it resolves IP Address from URL ? 4

8. Write short notes on any *six* of the following :

3×6=18

- (1) ARQ
- (2) Selective repeat ARQ
- (3) TDM
- (4) FSK
- (5) Hamming code
- (6) CRC
- (7) Packet switching
- (8) Exponential back of algorithm
- (9) Coaxial Cable Standards.