This question paper contains **4** printed pages]

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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 $SNR_{dB} = 36$ 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

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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.