This question paper contains 2 printed pages.

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Sl. No. of Ques. Paper	**: 6117** **F-5**
Unique Paper Code	**: 2341302**
Name of Paper	**: Data Communication and Computer Networks**
Name of 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 questions.

Q1 Which layer does the functionality given below belongs to? [3]

a) Message formatting

b) Error detection and recover

c) Addressing

d) Flow control

e) Security and QoS

f) ARP

Q2 Explain the following:-

1. A complex low-pass signal has a bandwidth of 200 kHz. What is the minimum sampling rate for this signal? [2]
2. Consider an extremely noisy channel in which the value of the signal-to-noise ratio is almost zero. In other words, the noise is so strong that the signal is faint. Calculate the capacity C for this channel. [2]
3. We need to send 265 kbps over a noiseless channel with a bandwidth of 20 kHz. How many signal levels do we need? [2]
4. discuss briefly various ploar and unipolar encoding schemes. [4]

Q3 Briefly describe the following:-

1. We have an available bandwidth of 100 kHz which spans from 200 to 300 kHz. What should be the carrier frequency and the bit rate if we modulated our data by using FSK with d = 1? [3]
2. Show the constellation diagrams for BPSK, and QPSK signals. [3]

Q4 a) A bit steam 10011101 is transmitted using the standard CRC method. The generator polynomial is x^3+1 . show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receiver end. [5]

Q4 b) Comparative Analysis of Pure ALOHA, Slotted ALOHA, P-persistent CSMA [6]

Q4 c) What is the format of TCP header ? Explain. [3]

Q5 (a) Explain various routing algorithms used by the network layer for routing packets from the source machine to the destination machine. [6]

Q5 (b) Comparison of Virtual-Circuit and Datagram Subnets [4]

Q6 a) Write short note of RARP, BOOTP, and DHCP. [6]

Q6 b Draw and explain the IPv4 (Internet Protocol) header. [3]

Q7 a) Suppose a user has two browser applications active at the same time, and suppose that the two applications are accessing the same server to retrieve HTTP documents at the same time. How does the server tell the difference between the two applications? Explain. [3]

Q7 b) At what layer do the following protocols operate in TCP/IP protocol [2]

a) IP

b) ICMP

c) TDMA

d) UDP

Q7 c) What is POP? Where it is used in Internet communication and for what purpose? [3]

Q8 write short note on five of the following [3*5]

1. Selective repeat ARQ
2. synchronous TDM
3. binary ASK
4. Virtual-Circuit Identifier
5. bridge, router and gateway
6. Packet switching
7. Exponential back of algorithm
8. DNS

400