This question paper contains 4 printed pages.

3130 *Your Roll No.* .....

MECTA J

COMPUTER TECHNOLOGY AND APPLICATION

Paper— CS.508

(Computer Networks)

Time : 3 hours *Maximum Marks* : 100

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

Attempt any five questions.

Any required data, not explicitly given, may be suitably assumed and state the assumptions made.

1. (*a*) What is channel capacity? Define channel capacity for noisy and noiseless channel. 3

   (*b*) Calculate the maximum achievable data rate of a standard telephone channel with a 32 dB signal-to-noise ratio. 3

   (*c*) Why is keying required in data communication over networks? Using appropriate diagram compare the various features of FSK with PSK. 6

   (*d*) Describe the various functions of a PCM communication system, and also derive the mean square quantization error. 8

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2. (*a*) Describe and derive a frequency modulated wave with appropriate symbols. 8

(*b*) In a OSI model a physical service is non-confirmed service. If some data bits are lost during transmission over the interconnecting media, which layer detects their loss and takes recovery? Explain. 6

(*c*) Describe the various framing schemes with suitable example. 6

3. (*a*) How does slotted aloha improve performance of system over pure aloha? Explain. 8

(*b*) What are the differences between "Go-Back-N" and "Selective-Repeat" sliding window protocols? Explain using an example. 6

(*c*) Explain the sliding window protocol and compare its performance against the simple stop and wait protocol. 6

4. (*a*) Explain the various classes of IP addresses and also discuss advantages of dividing IP addresses into class. 6

(*b*) Draw a IP datagram header format. IP datagram has a checksum field still it is called unreliable protocol. Justify. 6

(*c*) Describe a link state routing algorithm, and its working using a suitable example. 8

5. (*a*) Describe the purpose of the following fields in TCP header segment:

(*i*) Scalar factor

(*ii*) Window size

(*iii*) Urgent pointer

(*iv*) Sin 1-bit flags. 8

(*b*) How is the flow control at the transport layer different from data link layer? Discuss. 6

(*c*) How does TCP handle connection establishment and crash recovery? 6

6. (*a*) Explain various layers of TCP/IP model. Also list the protocol used in each layer. 6

(*b*) Describe RSA algorithm with appropriate symbols, and perform encryption and decryption using RSA alogrithm for a given data:

$p=5, q=11, e=9, m=9.$ 8

(*c*) How are digital signatures generated and verified? Describe with example. 6

7. Attempt any *five* of the following:

(*a*) Differentiate between bit rate and baud rate.

(*b*) Contrast between Bridge and Gateway.

(*c*) Define analog and digital signal.