

## YMCA UNIVERSITY OF SCIENCE &amp; TECHNOLOGY, FARIDABAD

## MTech I SEMESTER

## Data Communication and Networking (E16C 605)

Time: 3 Hours

Max. Marks: 75

- Instructions:**
1. It is compulsory to answer all the questions (1.5 marks each) of Part -A in short.
  2. Answer any four questions from Part -B in detail.
  3. Different sub-parts of a question are to be attempted adjacent to each other.

PART -A

- Q1 (a) For n devices in a network, what is the number of cable links required for a mesh , ring , bus and star topology. (1.5)
- (b) Draw the analog and digital hierarchies for FDM and TDM respectively. (1.5)
- (c) Define carrier signal and its role in analog transmission. (1.5)
- (d) Given dataword 1010011010 and the divisor 10111, show the generation of code word at the sender site. (1.5)
- (e) Compare and contrast the flow control with the error control. (1.5)
- (f) Change the following IPv4 addresses from dotted decimal to binary and binary to dotted decimal notation respectively: (1.5)
- (i) 111.56.45.78
- (ii) 10000001 00001011 00001011 11101111
- (g) Explain the terms NT1 NT2 TE1 TE2 in ISDN. (1.5)
- (h) Differentiate between physical, logical and service point addressing. (1.5)
- (i) What is null modem connection . (1.5)
- (j) Compare OSI model with the TCP/IP protocol suite. (1.5)

PART -B

- Q2 (a) Draw and discuss the various bipolar, polar and unipolar techniques of digital to digital conversion. (10)
- (b) What is Nyquist Theorem. If the bandwidth of the channel is 8kbps, how long does it take to send a frame of 200000 bits out of this device. (5)
- Q3 (a) Why is mapping of physical and logical addresses needed . Name the protocols which are designed for this purpose and explain anyone in detail. (7)
- (b) What is the function of the transport layer . Draw the TCP segment format and explain each of its field. (8)
- Q4 What are the two approaches to packet switching . Compare packet switching with circuit switching. Design a three stage  $200 \times 200$  switch ( $N=200$ ) with  $k=4$  and  $n=20$  where  $N$  is input lines into groups each of  $n$  lines and  $k$  is the number of crossbars in middle stage. (15)
- Q5 (a) What is RS-232 serial interface . Draw its pin diagram and explain the sequence of events that take place while signal exchange between the DTE and DCE. (8)
- (b) Discuss synchronous TDM. If there are four sources each creating 250 characters per second and one synchronizing bit is added to each frame, find (i) the data rate of each source (7)
- (ii) the duration of each character in each source
- (iii) the number of bits in each frame. (5)
- Q6 Write notes on: (5)
- (a) ISDN (5)
- (b) Token Ring (5)
- (c) HDLC protocol
- Q7 Draw and explain in detail each field of the TCP Protocol Header. Also explain how TCP is used to deal with network or internet congestion. (15)

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