COURSE CODE: 10B11CI611   MAX. MARKS: 50
COURSE NAME: Computer Networks
COURSE CREDITS: 04   MAX. TIME: 2:00 HRS

Note: *All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

Ques 1. [2 +6 = 8 Marks] Discuss at least five major differences between OSI and the TCP/IP reference model in brief with suitable diagram. Further, explain the major functionality and important services of OSI reference model.

Ques 2. (a) [2 +5 = 7 Marks] List the differences (at least five) between circuit and packet switching with suitable examples. We need a three-stage space-division switch with N =100. We use 10 crossbars at the first and third stages and 4 crossbars at the middle stage.
   a. Draw the configuration diagram.
   b. Find the blocking factor.
   c. Redesign the configuration of part (a) and calculate total number of cross points using the Clos criteria

Ques 3. [2 +5 = 7 Marks] Why does the data link protocol always put the CRC in a trailer rather than in a header? A bit stream 110101010 is transmitted using the standard CRC method described in the text. The generator polynomial is $x^4 + x^2 + 1$. Show the actual bit string transmitted. Suppose the 4th, 5th and 6th bit from the left is inverted during transmission. Show that this error is detected at the receiver's end.

Ques 4. [4 + 4 = 8 Marks] Write the algorithmic steps for Selective Repeat algorithm. A channel has bit rate of 20 Kbps. The stop and wait protocol with the frame size of 4500 bits is used. The delay for error detection and sending acknowledgment by receiver is 0.25 sec because of the error/fault. Find the maximum efficiency of the channel if the destination is 30000 km away and the speed of propagation of the signal 2.8×10^8 m/s. Find the decrease in efficiency due to error/fault.

Ques 5. [5 Marks each] Write the short notes on following with suitable examples or diagram
   a. Novel applications of computer networks
   b. HDLC and PPP
   c. Digital-to-Analog conversion techniques
   d. Frequency and time division multiplexing