

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**  
**(END SEMESTER EXAMINATION)**

**CLASS : IMSC**  
**BRANCH: MATHS & COMP.**

**SEMESTER : VIII**  
**SESSION : SP/2023**

**SUBJECT: CA559 DATA COMMUNICATION AND COMPUTER NETWORK**

**TIME: 3 Hours**

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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			CO	BL
Q.1(a)	Explain a simplified Data Communication Model with its key component using a suitable block diagram.	[5]	1	4
Q.1(b)	Discuss the exchange of information using the OSI reference model.	[5]	1	2
Q.2(a)	Calculate the maximum bit rate for a channel having a bandwidth of 3100 Hz and S/N ratio of 10 dB.	[5]	2	4
Q.2(b)	Compare the Twisted pair cable, Co-axial cable, and Optical fiber cable using their characteristic.	[5]	2	5
Q.3(a)	A bit stream 10011101 is transmitted using the CRC method. The generator polynomial is $X^3 + 1$ . Suppose the third bit from the left is inverted during transmission. Justify your answer that, the receiver can detect the error at the receiving end.	[5]	3	6
Q.3(b)	Sketch the signal waveform when data 01001100011 is transmitted using the following encoding techniques: (i) Manchester (ii) Differential Manchester (iii) Pseudoternary	[5]	3	3
Q.4(a)	Explain the frame structure of the HDLC protocol.	[5]	4	4
Q.4(b)	Compare circuit switching, datagram packet switching and virtual circuit packet switching.	[5]	4	5
Q.5(a)	Explain with a suitable diagram the call establishment using virtual paths in ATM.	[5]	5	4
Q.5(b)	Write the elements of routing techniques for packet-switching networks.	[5]	5	5

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