BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION)

CLASS: BE **SEMESTER: V**
BRANCH: ECE **SESSION : MO/2018**

SUBJECT : EC5205 DATA COMMUNICATION

TIME: 1.5 HOURS **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) What is meant by Eb / N_o? How is it related to bit error rate? [2]
(b) For a channel with an intended capacity of 20 Mbps, the bandwidth of the channel is 3 MHz. Assuming thermal noise, what Signal-to-Noise ratio is required to achieve this capacity? [3]

Q2 (a) Differentiate between Primitives and PDUs. Why PDUs are standardized while Primitives are non- standardized? [2]
(b) Differentiate between TCP/IP Protocol Suite and OSI layered architecture. [3]

Q3 (a) What are the design goals of Scrambling techniques? What is meant by Code violation and why it is required? [2]
(b) An audio signal with spectral components in the range of 300-3000 Hz is sampled at a rate of 7000 samples per second. For a SNR of 30 dB, what is the number of quantization levels needed? What is the required data rate? [3]

Q4 (a) Why the choice of step size in a Delta Modulation scheme is a trade-off between Quantization error and Slope over load error? [2]
(b) Explain the Delta Modulation scheme with relevant block diagram and input-output signal waveforms. [3]

Q5 (a) What are the considerations for selection of the Generated polynomial in a CRC Error detection scheme? Justify the considerations. [2]
(b) For a frame 1011000110110100101 received at the receiver, check whether there is any error in the frame, if the Generator Polynomial P(x) is $x^5 + x^4 + x^3 + x + 1$. Use CRC method. What is the original message? [3]

Q6 (a) Differentiate between Group A and Group B signals in EIA-232-F Interface standard. Name the respective signals in each group. [2]
(b) During transmission, the ASCII code of H (48H) has changed to ASCII code of I (49H). Show how the error can be detected and corrected. [3]

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