ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION **SUMMER SEMESTER, 2018-2019**
DURATION: 1 Hour 30 Minutes **FULL MARKS: 100**

CSE 4405: Data and Telecommunications

Programmable calculators are not allowed. Do not write anything on the question paper.
There are **4 (four)** questions. Answer any **3 (three)** of them.
Figures in the right margin indicate marks.

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1. a) What is data communication? Identify the five components of a data communication system. Describe the three criteria necessary for an effective and efficient network. 2+3+5
   b) Write short notes on the followings: 3x3
   i. Network topology ii. Protocol iii. Process-to-process delivery
   c) What is the difference between a port address, a logical address and a physical address? 3.33
   d) How OSI and ISO are related to each other? Write down the functionalities of bottom three layers of TCP/IP protocol suite. 3+8

2. a) Define the followings with example: 3x3
   i. Jitter ii. Latency iii. Bandwidth-Delay Product
   b) Briefly explain the concept of digital signal as a composite analog signal. Explain the baseband transmission of digital signal. 4+9.33
   c) State the Nyquist bit rate formula. How does Nyquist bit rate formula differ from Shannon capacity formula? Consider a channel having SNR 127 and bandwidth 2 MHz. What will be the approximate signal level and bit rate? 2+2+4
   d) Name different causes of transmission impairments. 3

3. a) Write short notes on any two of the followings: 4x2
   i. DC Component ii. Transmission Modes iii. PCM
   b) Give the taxonomy of line coding schemes and name one scheme from each category. 5
   c) Consider a bit stream: 0110001001. Draw corresponding digital signal for following line coding schemes and also comment on the bandwidth requirement of each of the scheme. 10
   i. AMI ii. NRZ-I iii.MLT-3 iv. Manchester v. polar RZ
   d) What do you mean by scrambling? How does scrambling differ from block coding? Briefly explain the HDB3 scrambling technique. 4+6.33

4. a) Distinguish between synchronous and statistical time division multiplexing (TDM). Briefly explain the strategies used when the input lines of a multiplexer have different data rates? 5+6
   b) Give the taxonomy of digital-to-analog conversion techniques. Briefly explain the Quadrature PSK (QPSK) technique. 3+5
   c) Write short note on any one of the followings: 5
   i. Constellation Diagram ii. Frequency Modulation (FM)
   d) Briefly explain the Frequency Hopping Spread Spectrum (FHSS) technique? How does the FHSS technique differ from the Direct Sequence Spread Spectrum (DSSS) technique? 6+3.33