

FINAL QUESTION

CITY UNIVERSITY
 Department of Computer Science and Engineering
 B. Sc. in Computer Science and Engineering
 Semester: Fall 2024
 Semester-Final Examination

Course Code: CSE-313
 Course Title: Data Communication
 Year, Semester: 3rd, 2nd

Total Marks: 150
 Time: 2hr 30min
 Date: 30.12.24

Instructions:

- Marks in the margin indicate full marks.
- Symbols and abbreviations bear their standard meaning.
- The corresponding course learning outcomes (CLOs) are given in the right-most column.

PART-A

Question No.1 is Compulsory. Answer three questions including the compulsory question no. 1.

		Marks	CLOs
1. (a)	Discuss Nyquist theorem according to low pass and band pass signal. Distinguish between a signal element and a data element.	10	1
(b)	We have an available bandwidth of 200 kHz which ranges from 400 to 600 kHz. Estimate the carrier frequency and bit rate if we modulated our data using FSK and ASK with $d = 1$.	15	3
2. (a)	Assume that a voice channel occupies a bandwidth of 4 kHz. We need to multiplex 10 voice channels with guard bands of 500 Hz using FDM. Calculate the required bandwidth with the proper figure.	15	3
(b)	Write down the classification of transmission media. Describe the UTP and STP with the data rate and bandwidth of Cat 5, 6 UTP cable.	10	1
3. (a)	The city group has a medium with a 1-GHz bandwidth (lowpass). This corporation needs to create 10 separate independent channels, each capable of sending at least 10 Mbps. Calculate the minimum number of bits per baud and level for each channel.	10	2
(b)	Briefly explain about one of the analog to digital conversion techniques with proper graphical and mathematical example.	15	4
4. (a)	Analyze the Amplitude shift keying (ASK) and Frequency shift keying (FSK).	10	2
(b)	Show the difference between ipv4 and ipv6 IP addressing. Solve the following IP addresses using dotted-decimal and binary notation:	15	3
	(i) 01011110 10110000 01110101 00010101		
	(ii) 10001001 10001110 11010000 00110001		
	(iii) 01010111 10000100 00110111 00001111		

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- (iv) 201.24.44.32
- (v) 110.11.5.88
- (vi) 192.17.10.15

PART-B

Question No.5 is Compulsory. Answer three questions including the compulsory question no. 5.

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|--------|--|----|---|
| 5. (a) | Suppose you are a system administrator, and you are given an IP Address of 192.168.10.0, Subnet Mask 255.255.255.248. | 15 | 3 |
| | i) Find out the IP block size.
ii) Find out the first three Subnet Addresses.
iii) Find out the First Valid host.
iv) Find out the Last Valid host.
v) Find out the Broad Cast Address in each subnet. | | |
| (b) | Differentiate between parallel and serial transmission in data communication. | 10 | 2 |
| 6. (a) | Elaborate on Analog-to-analog Modulation types. | 10 | 1 |
| (b) | We must use synchronous TDM and combine 20 digital sources, each of 100 Kbps. Each output slot carries 1 bit from each digital source, but one extra bit is added to each frame for synchronization. Solve the following questions:
i) Evaluate is the size of an output frame in bits
ii) Find the output frame rate.
iii) Compute the duration of an output frame.
iv) Show the output data rate.
v) Estimate the system's efficiency (ratio of useful bits to the total bits). | 15 | 3 |
| 7. (a) | Distinguish between Asynchronous transmission and Synchronous transmission. | 10 | 2 |
| (b) | Construct the graph of the NRZ-I, AML, and Manchester scheme using each of the following data streams-
i) 01010101
ii) 0110101 | 15 | 2 |
| 8. (a) | A signal is carrying data in which two data elements are encoded as one signal element ($r = 2$). If the bit rate is 300 kbps, analyze the average value of the baud rate if c is between 0 and 1. | 10 | 2 |
| (b) | Discuss about the working procedure of optical fiber. Differentiate between step index and graded index in optical fiber transmission mode. | 15 | 1 |

MidTerm Question



CITY UNIVERSITY
 Department of Computer Science & Engineering
 B.Sc. in Computer Science & Engineering
 Semester : Spring 2025
 Mid-Term Examination

Course Code: CSE 323
 Course Title: Compiler Design
 Year, Semester: 3rd, 2nd

Total Marks: 25
 Time: 1 hour
 Date: 11/04/2025

Instructions:

- Answer three questions including the compulsory question no. 1
- Marks in the margin indicate full marks.
- Symbols and abbreviations bear their standard meaning.

	Marks
1. (a) Describe the key differences between Compiler and Interpreter.	3
(b) Recall the definition of syntax error and lexical error with an example.	2
(c) Construct a parse tree for this string "aaabbbba". $S \rightarrow aB \mid bA$ $A \rightarrow aS \mid bAA \mid a$ $B \rightarrow bS \mid aBB \mid b$	4
2. (a) Recall language processor and mention four common language processors.	3
(b) Find whether the following grammar is LL1 or not: $S \rightarrow A$ $A \rightarrow Bb \mid Cd$ $B \rightarrow aB \mid \epsilon$ $C \rightarrow cC \mid \epsilon$	5
3. (a) Write down the two main Phases of a Compiler and describe its work.	3
(b) Find First() and Follow() of all the non-terminals. $S \rightarrow aBDh$ $B \rightarrow cC$ $C \rightarrow bC \mid \epsilon$ $D \rightarrow EF$ $E \rightarrow g \mid \epsilon$ $F \rightarrow f \mid \epsilon$	5
4. (a) With an appropriate example describing the working principle of preprocessor, compiler, assembler and linker or loader.	3
(b) Construct a parse tree for this string aabbbba. $S \rightarrow aB \mid a \mid aS \mid bAA \mid bA$ $A \rightarrow a \mid bAB \mid aS$ $B \rightarrow b \mid aBB \mid bS$	5