



Central University of Haryana  
V Term End Examination, January 2023  
B.Tech. Programmes  
Branch: Computer Science and Engineering

202074

Course Code: BT CS 504A  
Course Title: Microprocessor and Interfacing

Max Time: 3 Hours  
Max Marks: 70

**Instructions:**

Question Number **one (PART-I)** is compulsory and carries total 14 marks (Each sub Question carries two Marks).

Question Numbers 2(two) to 5(five) carry fourteen marks each with internal choice.

**PART -I**

Q. No.1

- (a) State the difference between 8085 and 8086 microprocessor. (2 marks)
- (b) Why data bus is bi-directional? (2 marks)
- (c) Difference between HLT and NOP instructions? (2 marks)
- (d) There are four types of shift instructions: shift logical left, shift logical right, shift arithmetic left (SAL), and \_\_\_\_\_? (2 marks)
- (e) Difference between Static RAM and Dynamic RAM? (2 marks)
- (f) In Zero-address instruction, operands are stored in stack or accumulator? (2 marks)
- (g) Which IC is used to perform parallel communication operation?
  - 1. 8251
  - 2. 8252
  - 3. 8254
  - 4. 8255 (2 marks)

**PART -II**

Q. No.2 Draw and explain the signal and pin diagram of 8086 microprocessor

OR

Q. No.2 Draw and explain the block diagram of 8086 microprocessor.

(14 marks)

Q. No.3 Explain any 7 Addressing modes with the examples.

OR

Q. No. 3 Explain any 3 string manipulation instructions with example.

(14 marks)

Q. No.4 Write a program for conversion of a BCD number into Binary number.

OR

Q. No .4 Mention the procedure for Memory Interfacing of RAM having odd and even memory.

(14 marks)

Q. No.5 Draw the block diagram of 8255 and explain its working. What is control word of 8255?

OR

Q. No.5 Write brief notes on the following:

(a) Programmable Interval Timer

(b) A/D Converter

(14 marks)



Central University of Haryana  
Odd Semester Term End Examination January 2023  
B.Tech. Programmes

Branch: Computer Science & Engineering

Course Code: BT CS 503A

Max Time: 3 hour

Course Title: Computer Network

Max Marks: 70

Semester: V

**Instructions:**

Question Number one [PART-I] is compulsory and carries total 14 marks (Each sub Question carries two Marks).

Question Numbers 2(two) to 5(five) carry fourteen marks each with internal choice.

**PART -I**

Q. No.1

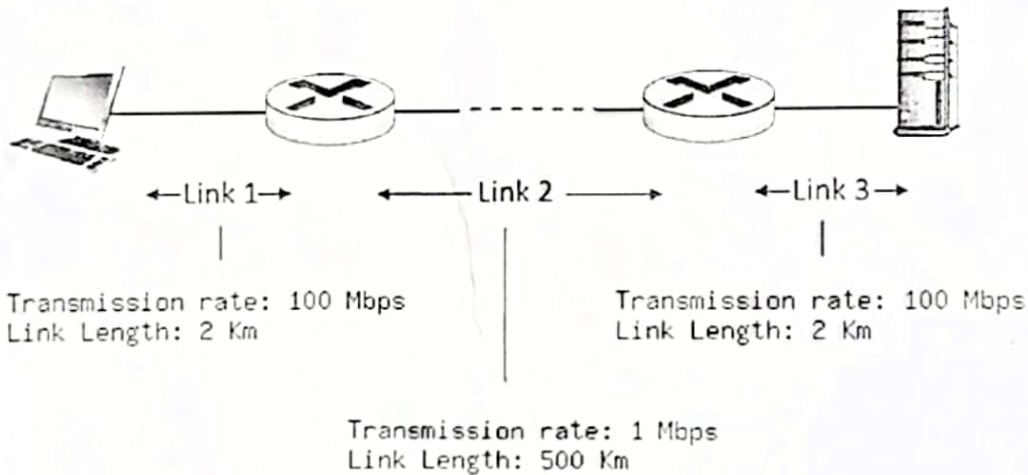
[2X7=14]

- Name all the components of data communication systems.
- What is Queuing and Transmission Delay.
- Compare TCP and UDP protocol.
- Write the points that needs to be considered while designing subnets.
- Define forwarding and routing.
- What is p-persistent method?
- Discuss two services provided by the Data link layer.

**PART -II**

Q. No.2

- Explain circuit switched network and packet switched network in detail. Use example for proper explanation. Also compare both of them. [4+3]
- Consider the figure below, with three links, each with the specified transmission rate and link length.



Assume the length of a packet is 8000 bits. The speed of light propagation delay on each link is  $3 \times 10^8$  m/sec. Round your answer to two decimals after leading zeros. Answers should be in seconds.

- What is the transmission delay of link 1?
- What is the propagation delay of link 1?
- What is the transmission delay of link 2?

- iv. What is the propagation delay of link 2?
- v. What is the transmission delay of link 3?
- vi. What is the propagation delay of link 3?
- vii. What is the total delay? [7]

**OR**

- c. Briefly explain the HTTP protocol. Also discuss HTTP with respect to Non-persistence connection and its drawback. [4+3] [7]
- d. Describe ISO/OSI reference model in detail.

**Q. No.3**

- a. Describe UDP checksum mechanism with an example. [4]
- b. Why UDP provides checksum mechanism? [3]
- c. Discuss the different problems of reliable data transfer protocol rdt2.0. Also discuss the solution to the discussed problem [7]

**OR**

- d. Discuss the principle of congestion control with respect to the following cases
  - i. Two senders and a router with infinite buffers.
  - ii. Two senders and a router with finite buffers.
  - iii. Four senders and routers with finite buffers and multihop paths. [4+5+5]

**Q. No.4**

- a. Explain the network layer virtual-circuit service and datagram service in detail. [7]
- b. An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 3 subblock of addresses to use in its three subnets as shown below:
  - i. One subblock of 120 addresses
  - ii. One subblock of 60 addresses
  - iii. One subblock of 10 addresses
 Find number of addresses allocated to each subblock, the first address and the last address of the subblocks. Also find the unallocated addresses that are reserved. [7]

**OR**

- c. By the help of an example, explain the Distance vector routing algorithm. [8]
- d. Discuss the following special addresses (i) limited broadcast address, (ii) Loopback address, (iii) Multicast address, (iv) Direct Broadcast Address [6]

Q. No.5

- a. Derive the throughput of pure ALOHA. [7]
- b. Write short notes on the following
- i. Frame Relay
  - ii. Parity Checking. [3.5+3.5]

**OR**

- c. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces (i) 1000 frames per second (ii) 500 frames per second and (iii) 250 frames per second. Explain the answer with reason. [6]
- d. Describe CSMA/CD protocol in detail. [8]

**Instructions:**

Question Number one (PART-I) is compulsory and carries total 14 marks (Each sub Question carries two Marks).

Question Numbers 2(two) to 5(five) carry fourteen marks each with internal choice.

**PART -I**

Q. No.1

- What are immutable variables? Explain the usage of immutable variables with a suitable example.
- Describe conditional statements with proper syntax and example.
- What is list comprehension? Explain the advantage of it with a suitable example.
- What are class and objects in python? How to define or declare them?
- What is the meaning of Hiding Redundancy? Support your answer with a proper example.
- Write a Python code to receive two values from user & perform the addition operations on these values.
- Show various ways to use range() function.

**PART -II**

Q. No.2

- Explain the process of reading and writing the text file with python code? (07 marks)
- Is string in python is mutable or immutable? Justify your answer with a suitable example. (07 marks)

OR

Q. No.2

- How slicing a string can be achieved in python? (07 marks)
- Write the python code to reverse a string without using any inbuilt function? (07 marks)

Q. No.3

- What are mutable and immutable data structures in python? Explain each of them with proper syntax. (07 marks)
- Write a python program to search an element in a sorted list. (07 marks)

OR

Q. No 3 Write a python program to sort the dictionary without using any inbuilt function. (14 marks)

Q. No.4 a) What is abstract class? Explain the usage of it using a simple example. (07 marks)

b) Describe all types of inheritance with python code example. (07 marks)

OR

Q. No .4 Create an abstract class "Sorting" where there are TWO abstract functions "sort()" and "is\_empty()". Also, create TWO derived class "Linear\_Search" and "Binary\_Search" that derives the base class "Sorting". (14 marks)

Q. No.5 Write a program to create the "Register Student" GUI using tkinter module? This GUI has the following fields: (14 marks)

Name → Text Field

RollNumber → Text Field

Semester → Radio button

Category → Drop down menu

Submit → Button

OR

Q. No.5 Demonstrate the nested frames using a simple GUI application in tkinter. (14 marks)



Central University of Haryana  
Term End Examination January 2023  
B.Tech. Programmes

Branch: Computer Science and Engineering

Course Code: BT CS 502 A  
Course Title: Theory of Computation

Max Time: 3Hrs.  
Max Marks: 70

**Instructions:**

Question Number one (PART-I) is compulsory and carries total 14 marks (Each sub Question carries two Marks).

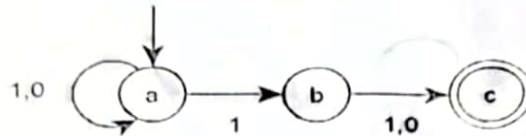
Question Numbers 2(two) to 5(five) carry fourteen marks each with internal choice.

**PART -I**

Q. No.1

(2X7=14)

- (a) What do you mean by ambiguous grammar? Explain by using suitable example.
- (b) Convert the given NFA into DFA.



- (c) What is recursively enumerable language?
- (d) Explain the concept of Pumping Lemma.
- (e) What is Turing machine?
- (f) Discuss Arden's Theorem.
- (g) How to decide that a given problem is undecidable?

**PART -II**

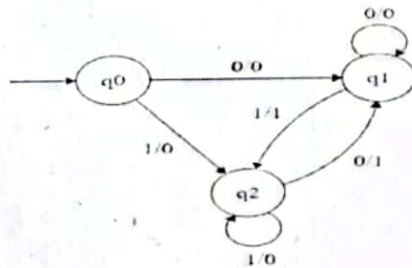
Q. No.2

- a) Explain the Minimization of DFA by taking a suitable example. (2)
- b) Construct a deterministic finite automaton for accepting all the strings with even number of a's and odd number of b's. (2)
- c) Construct the deterministic finite automata for accepting the set of all strings with three consecutive 0's. (3)

OR

Q. No.2

- a) Distinguish NFA and DFA with examples. (2)
- b) Convert the given Mealy machine into equivalent Moore machine. (2)



- c) Explain pumping lemma for regular sets. (3)

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**Q. No.3**

- a) Convert the given Context Free Grammar into GNF. (8)
- $$S \rightarrow XA|BB$$
- $$B \rightarrow b|SB$$
- $$X \rightarrow b$$
- $$A \rightarrow a$$
- b) Simplify the Context Free Grammar. (6)

$$S \rightarrow abS | abA | abB$$
$$A \rightarrow cd$$
$$B \rightarrow aB$$
$$C \rightarrow dc$$

OR

**Q. No.3**

- a) Explain the relation between classes of language. (7)
- b) What is the use of Equivalence classes to minimize the Finite Automata? (7)

**Q. No .4**

- a) Write down the Closure properties of Context Free Languages. (7)
- b) Design a PDA for the language such that (7)
- $$L = \{ a^n b^m a^n \mid n, m \geq 1 \}$$

OR

**Q. No.4**

- a) Design a Turing Machine for odd length palindrome. Also discuss the approach to be used. (7)

**Q. No.4**

- b) Write a short note on-
- i) Chomsky Hierarchy (3.5)
- ii) Halting Problem (3.5)

**Q No. 5.** What is the decidability problem in languages how, to overcome the problem of decidability? (14)

OR

**Q.No. 5.**

- (a) Describe the mathematical relation between recursive and recursive enumerable problem.
- (b) Explain the Post correspondence problem with suitable example.



Central University of Haryana  
V Semester Term End Examination January 2023  
B.Tech. Programmes

Branch: Computer Science & Engineering

Course Code: BT CS 501A

Max Time: 03 hrs.

Course Title: Analysis and Design of Algorithm

Max Marks: 70

**Instructions:**

Question Number one (PART-I) is compulsory and carries total 14 marks (Each sub Question carries two Marks).

Question Numbers 2(two) to 5(five) carry fourteen marks each with internal choice.

**PART -I**

Q. No.1

- Why Asymptotic notations are used? Also, formally define its type?
- What is Recurrence relation? Compute the time complexity for the Fibonacci series generation problem.
- Compute the time complexity of Selection sort for all the cases (best, average, worst).
- Compute the time complexity analysis of kruskal's algorithm.
- How dynamic programming is used to solve 0/1 knapsack problem?
- Explain the key ideas to solve graph coloring problem using dynamic programming.
- What is randomized algorithm? Name a few standard randomized algorithm.

**PART -II**

Q. No.2 What are the key components of Quicksort algorithm? Explain the pseudo code of it with a suitable example. (14 marks)

OR

Q. No.2

- What are the necessary conditions that need to be satisfied before applying Binary search? Write the pseudo code of Binary search algorithm. (07 marks)
- Why Merge sort algorithm is called to be an outplace algorithm? Derive the time and space complexity for the same? (07 marks)

Q. No.3

- Discuss the general ideas to solve the problem using Greedy method. How knapsack problem can be solved using greedy method? (07 marks)
- Derive the time complexity of the Job sequencing with deadlines problem. (07 marks)

OR

Q. No 3 What are the well known algorithms used to solve the Single Source Shortest Path problem? Explain the pseudo code of one of them along with a suitable example. (14 marks)

Q. No.4

- a) Define the Optimal BST problem? Explain the algorithm with a suitable example? (07 marks)
- b) Write the pseudo code to solve the Longest common Subsequence problem. (07 marks)

OR

Q. No .4 Write the optimized code in any programming language to solve the n-queens problem with space-complexity- $\Theta(n)$ ? (14 marks)

Q. No.5

- a) Explain any TWO algorithm for the primality testing in detail? (07 marks)
- b) Write the Pollard's rho algorithm to solve integer factorization? (07 marks)

OR

Q. No.5

- a) What is NP-Hard and NP-Complete problem? Compare the characteristics of NP-Hard and NP-Complete problems. (07 marks)
- b) Discuss the key ideas behind the Rabin-Karp algorithm in detail? (07 marks)