F-301



# END-SEMESTER EXAMINATION, January-2024
# Algorithms Design 1 (CSE 3131)

**Programme: B.Tech (CSE/CSIT/CIOT/CAIML/CCS/CDS)** **Sem:3rd**

**Full Marks: 60** **Time: 3 Hours**

| Subject/Course Learning Outcome | *Taxonomy Level | Ques. Nos. | Marks |
|---|---|---|---|
| to apply **knowledge of computing and mathematics** to algorithm design, (i) to understand computational tractability considering polynomial time as a definition of efficiency of an algorithm; (ii) to analyze worst-case **running times of algorithms (both recursive and iterative)** using asymptotic analysis; | L2, L3, L4, L5, L6 | 1(a).1(b) . 1(c).2(a). 2(b).2(c) | 2+2+2 +2+2 +2 . |
| to understand various types and aspects of basic data structures (array, linked list, stack, queue, binary tree) and **advanced data structures like priority queue (implementation using heap)**. | L4, L5, L6 | 3(a).3(b) . 3(c) | 2+2+2 |
| to explain the major **graph algorithms** and their analyses. Employ graphs to model engineering problems, when appropriate | L3, L4, L6 | 4(a).4(b) .4(c).5(a) . | 2+2+2 +2 |
| to describe the **greedy paradigm** and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms. Derive and describe the performance of greedy algorithms. | L3, L4, L5, L6 | 5(b).5(c). 6(a). 6(b). 6(c). | 2+2+2 +2+2 |
| to describe the **divide-and-conquer paradigm** and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms. | L3, L4, L5, L6 | 7(a). 7(b).7(c). 8(a).8(b) . 8(c). | 2+2+2 +2+2 +2 |
| to describe the **dynamic programming paradigm** and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic programming algorithms. Derive and solve recurrences describing the performance of dynamic programming algorithms. | L2, L3, L4 | 9(a). 9(b).9(c). 10(a). 10(b). 10(c) | 2+2+2 +2+2 +2 |

*Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

*Answer all questions. Each question carries equal mark.*

1. (a) Given a number, design a recursive algorithm to find the multiplication of the digits of the number. (Eg. Input: 5131 and Output: 5 * 1 * 3 * 1 i.e. 15.) 2
   (b) Find the recurrence relation of the algorithm designed. Explain each part of the recurrence relation. 2
   (c) Estimate the time complexity of the algorithm designed above. 2
2. (a) Draw the recurrence tree for the given recurrence relation: $T(n)=T(n/5) + T(4n/5) + cn$. 2
   (b) Estimate the lower bounding and upper bounding function of the above recurrence relation. 2
   (c) Let $f(n)=3n^2+2n+2$ and $g(n)=4n^2+6$. Can we say $f(n)=\Omega(g(n))$? Justify your answer. 2
3. (a) Given a list of numbers as {16, 15, ?, 12, 14, 8, 6, ?, 9, 11, ?} from 6 to 16 with no repetition. How many MAX-HEAP can be constructed by putting the missing numbers? Depict all. 2
   (b) Construct the MIN-HEAP out of the given HEAP consisting of numbers 11, 7, 19, 2, 16, 8, 28, 15, 17, 12. How many calls are made to MIN-HEAPIFY, and how many swap operations are performed to find the MIN-HEAP? 2
   (c) Given a Min-Priority Queue of elements having their keys as 27, 82, 65, 104, 92, 80, 105, 212, 106, 314, 109. Let an operation **Increase_Key(Q,x,k)** be allowed on the Min-Priority Queue in contrast to the normal Decrease_Key(Q,x,k) operation. If the element with priority 82 is increased to 115, what will be the updated Min-Priority Queue? Design the algorithm for **Increase_Key(Q,x,k)** where Q is the Min-Priority Queue, x is the existing key, and k is the new key. 2
4. (a) Given an undirected graph, G:(V, E) where V denotes a finite set of vertices and E denotes a finite set of edges. How will you verify that the given graph is connected or not? Design an algorithm for it. 2
   (b) Given an undirected graph G where V={A, B, C, D, E, F, G, H} and E={B-A, C-A, B-D, E-B, D-E, E-F, B-C, C-E, G-C, C-H, H-G, F-H, C-F}. Apply BFS at node E and generate a BFS tree. 2
   (c) What must be the size of the QUEUE, which will be sufficient to construct the BFS tree above? Explain why? 2
5. (a) Given a directed graph G(V, E). Design an algorithm to find the vertices in G from which a given node u (where $u \in V$) is reachable. Analyse its time complexity. 2

(b) Conventionally, the PRIM algorithm uses a MIN-priority queue for constructing a minimum weight spanning tree. Design a variant of the PRIM algorithm, finding a suitable substitute in place of the MIN-Priority queue. 2

(c) Compare the above variant of the PRIM algorithm with the original PRIM algorithm. 2

6. (a) There is a tender about installing insulated electricity supply across 'n' locations in a city. The tender contains a map showing the possible connectivity between locations and the length of the required insulated wire. Company "X-Corporation" got the tender and wished to use as minimum wire as possible to complete the project. Suggest an algorithm for it. 2

(b) Given a CACHE with a capacity of 4 blocks and the sequence of blocks being referred as 3, 5, 2, 4, 8, 0, 6, 3, 9, 6, 0, 1, 2, 1, 3, 2, 2, 3, 5, 8, 1, 4. Considering the policy, "The block that last brought in must be evicted first". Produce a cache eviction schedule. 2

(c) Compare the eviction schedule with the one achieved with Optimal Caching, which works with the policy "evict the block that is needed the farthest into the future". 2

7. (a) Given two lists, A and B, whose elements are ordered in non-decreasing order. Design an algorithm to merge these two lists and produce a list C whose elements are ordered in non-increasing order. 2

(b) Compare Merge-Sort and Quick-Sort. Suggest some scenarios where one is preferred over the other. 2

(c) Given a list of numbers 12,3,20,7,5,16,4,10,8. Find how far this list is from being arranged in ascending order. (Illustration: When the given list is {5,1,3,2}. the arrangement in ascending order is {1,2,3,5}. These are the instances (5,1),(5,3),(5,2),(3,2) where the expected order is deviated. Hence, the given list is at a distance of 4 from the list being arranged in ascending order). 2

8. (a) Propose a divide and conquer approach to find the number of 0s in a given binary string of n bits. 2

(b) Find the recurrence relation of the above algorithm and deduce the time complexity of it. 2

(c) Compare its performance with the Naive (or brute-foce) algorithm to find the number of 0s in a given binary string of n bits. 2

9. (a) Compare Dynamic Programming with Greedy Paradigm.

(b) Given a weighted directed graph with five vertices {A, B, C, D, E} and edges with their weights as {A->B (2), B->D (3), A->C (2), C->D (6), C->E (4), E->D (-7), D->C (2)}. Check whether Bellman-Ford can estimate the shortest path from A to all other nodes.

(c) In Q9(b), If the answer is "YES", show the shortest path estimate from A to all other nodes. If the answer is "NO", mention the reason for it. 2

10 (a) Given a set of Intervals with their (start-time, finish-time, weight) as S = {(1,3,4), (3,6,5), (6,9,4), (6,7,2), (1,4,3), (2,7,5)}. Use Memoization with Recursion to find a set of non-conflicting intervals with the maximum weight. 2

(b) Estimate the time complexity of finding the set of non-conflicting intervals with the maximum weight considering the algorithm used to solve Q10(a). 2

(c) Given a set of items S={$i_1$,$i_2$,$i_3$,$i_4$} with their weights w[]={2,3,4,5} and profits p[]={3,4,5,6} and a knapsack with capacity W=9, find an optimal selection of items to fill the knapsack using dynamic programming approach so that the total profit of the selected items will be maximum. 2

*End of Questions*

# END SEMESTER EXAM, JANUARY -2024
# PROBABILITY AND STATISTICS (MTH 2002)

**Program: B.Tech.** **Semester: 3rd**
**Full Marks: 60** **Time: 3 Hours**

| Subject/Course Learning Outcome | *Taxonomy Level | Ques. Nos. | Marks |
|---|---|---|---|
| Apply probability axioms to compute probability and conditional probability. | L3,L3,L4,L3 | 1(a,b), 2(a) | 2*3 |
| Define random variables and compute probability distributions, joint & marginal distribution. | L4,L4,L1,L5, L5 | 2(b,c)3(a, b,c) | 2*5 |
| Compute expectation of random variables and their functions and compute moments and moment generating functions of a random variable. | L4,L1 | 2 (c ) 4(a),6(a) | 2*3 |
| Discuss discrete probability distribution viz: Binomial, Poisson & Hypergeometric and continuous probability distribution distributions viz: Uniform, Normal Gamma & Exponential. | L4,L5,L3, L4,L5,L3,L4, L1 | 4(b,c), 5(a), 6(b,c),7( b) | 2*6 |
| Estimate the population mean and variance of a normal distribution by point and interval estimation | L3, L5 | 5(b,c) 7(a,c) | 2*4 |
| Infer about population parameter through hypothesis testing with the help of a random sample. Analyze linear regression and co-relation | L2,L4,L4, L3,L4,L4 L3,L5,L5 | 8(a,b,c), 9(a,b),10 (a) 9(c),10(b ,c) | 2*9 |

*Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

Answer all questions. Each question carries equal mark.

1. (a) Calculate the 10% trimmed mean of the following data: [2]

8,2,2,12,5,7,15,14,15,3,11.

(b) Interest centers around the nature of an oven purchased at a particular department store. It can be either a gas or an electric oven. Consider the decisions made by six distinct customers. Suppose that the probability is 0.40 that at most two of these individuals purchase an electric oven. Compute the probability that at least three purchase the electric oven. [2]

(c) For any two events $A$ and $B$, prove that [2]

$$P(A' \cap B') = 1 + P(A \cap B) - P(A) - P(B)$$

2. (a) In a certain region of the country it is known from past experience that the probability of selecting an adult over 40 years of age with cancer is 0.05. If the probability of a doctor correctly diagnosing a person with cancer as having the disease is 0.78 and the probability that incorrectly diagnosing a person without cancer as having the disease is 0.06, evaluate the probability that a person diagnosed as having cancer actually has the disease. [2]

(b) Suppose that the random variable X having probability density function $f(x) = \begin{cases} kx^2 & , -1 < x < 2 \\ 0 & , \text{elsewhere} \end{cases}$. Then evaluate $k$. [2]

(c) With reference to 2(b), evaluate the cumulative distribution function of the random variable X. [2]

3. (a) Suppose that the random variable X has probability density function $f(x) = \begin{cases} 2(1-x), 0 < x < 1 \\ 0 \text{ , elsewhere} \end{cases}$. Calculate the variance of X. [2]

(b) Let X and Y be two independent random variables where E(X)=4, E(Y)=5 and $\sigma_X^2 = 2, \sigma_Y^2 = 3$. Evaluate the mean and variance of the Random variable $Z = 3X - 2Y$. [2]

(c) Suppose that the joint density function of random variables X and Y is $f(x,y) = \begin{cases} e^{-(x+y)} & , x > 0, y > 0 \\ 0 & , \text{elsewhere} \end{cases}$. [2]

Show that the random variables X and Y are independent.

4. (a) Suppose that X and Y have the following joint probability function [2]

| f(x,y) | | x | |
|---|---|---|---|
| | | 0 | 1 |
| y | 0 | 0.10 | 0.15 |
| | 1 | 0.20 | 0.35 |
| | 2 | 0.10 | 0.10 |

Calculate $\mu_x$ and $\mu_y$.

(b) With reference to 4(a), evaluate $P(X=1|Y\le 1)$. [2]

(c) A random variable X has a mean $\mu = 20$ and variance $\sigma^2 = 9$. Using Chebyshev's theorem, find P $(11 < X < 29)$. [2]

(a) In a certain industrial facility, accident occurs infrequently. It is known that the probability of an accident on any given day is 0.005 and accidents are independent of each other. Calculate the probability that in any given period of 400 days there are at most 3 days with an accident. [2]

(b) In an NBA championship series, the team that wins three games out of five is the winner. Suppose that teams *A* and *B* face each other in the championship games and that team *A* has probability 0.6 of winning a game over team *B*. Calculate the probability that team *A* would win the series. [2]

(c) Suppose X follows a continuous uniform distribution from 0 to 5. Determine the conditional probability $P(X>2.5|X\le 4)$. [2]

6. (a) A pair of fair die rolled 180 times, using the normal approximation to binomial distribution, calculate the probability that a total of 7 occurs at least 25 times. [2]

(b) Let X have probability distribution $f(x)=\begin{cases}2x, 0<x<1\\ 0, \text{elsewhere}\end{cases}$. [2]

Compute the probability distribution of $Y=2X-1$.

(c) The moment generating function of certain random variable X is given by $M_X(t)=e^{2(e^t-1)}$. Evaluate the mean and variance of the random variable X. [2]

7. (a) The probabilities are 0.4, 0.2, 0.3 and 0.1 respectively, that a delegate to a certain convention arrived by air, bus, automobile, or train. Compute the probability that among 9 delegates randomly selected at this convention, 3 arrived by air, 3 arrived by bus, 1 arrived by automobile, and 2 arrived by train? [2]

(b) If the random variable X, has a Gamma distribution with $\alpha = 2$ and $\beta = 1$. Evaluate $P(1.8<X<2.4)$. [2]

(c) Compute the maximum likelihood estimator for 'p' of binomial distribution from the sample of observations $x_1, x_2, \ldots, x_n$. [2]

8. (a) Given that X has a normal distribution with mean $\mu = 300$ and $\sigma = 50$. Calculate the probability that X assumes a value greater than 362. [2]

(b) Suppose that a fuse box containing 20 fuses, of which 5 are defective. If 2 fuses are selected and removed from the box in succession without replacing the first, calculate the probability that both fuses are defective. [2]

(c) A lawyer commutes daily from his suburban home to his midtown office. The average time for a one-way trip is 24 minutes, with a standard deviation of 3.8 minutes. Assume the distribution of trip times to be normally distributed. Calculate the probability that a trip will take at least 30 minutes. [2]

9. (a) The length of life of light bulbs that is approximately normally distributed with a standard deviation of 40 hours. If a sample of 30 bulbs has an average life of 780 hours, estimate a 96% confidence interval for the population mean of all bulbs. [2]

(b) The heights of a random sample of 25 college students showed a mean of 174.5 cm. and a standard deviation of 6.9 cm. Construct a 95% confidence interval for the mean height of all college students. [2]

(c) A random sample of 20 students yielded a mean 72 and a variance 16 for scores on a college placement test in mathematics. Assuming the score to be normally distributed, construct a 98% confidence interval for the variance $\sigma^2$. [2]

10. (a) The grades of a class of 5 students on a midterm report (x) and on the final examination (y) are as follows: [2]

| x | 77 | 50 | 71 | 72 | 81 |
|---|---|---|---|---|---|
| y | 82 | 66 | 78 | 34 | 47 |

Calculate the correlation coefficient.

(b) Estimate the regression line from 10(a). [2]

(c) Estimate the final examination grade of a student who received a grade of 75 on the midterm report. [2]

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# END-SEMESTER EXAMINATION, January-2024
# Modern Web Development Workshop – 1 (CSE 2191)

**Programme: B.Tech (CSIT)** **Semester: 3rd**
**Full Marks: 60** **Time: 3 Hours**

| Subject/Course Learning Outcome | *Taxonomy Level | Ques. Nos. | Marks |
|---|---|---|---|
| Understand Dynamic Web Content – understand the concept of dynamic web content and its importance in modern web development | L1 | 2,3 | |
| Setup Proficient Development Server – setup and configure a development server to host and test web applications effectively | L1, L2 | 3(b) | |
| Apply Knowledge of PHP Programming – acquire the skills needed to write, debug, and maintain PHP code, including knowledge of expressions, control flow, functions, and objects | L3, L4, L5 | 3,4 | |
| Handle Data with PHP – demonstrate proficiency in working with data using PHP, including manipulating arrays, form handling, and implementing cookies and sessions for user data management and authentication | L4, L6 | 6,7,10 | |
| Integrate Database with MySQL – proficient in integrating MySQL databases into web applications, including database design, querying and basic administration | L3, L1, L6 | 10 | |
| Explore JavaScript – foundation understanding of JavaScript including expressions, control flow and basic scripting techniques enabling them to add interactivity to web applications | L2, L3 | 8,9 | |

*Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

Answer all questions. Each question carries equal mark.

| | | | |
|---|---|---|---|
| 1. | (a) | How would you sanitize user input in a PHP application to prevent SQL injection? | |
| | (b) | Explain the differences between GET and POST methods in form submissions, and when would you use each? | |
| | (c) | Discuss the advantages and disadvantages of using MySQLi over PDO in PHP. | |
| 2. | (a) | Describe the purpose of the "SESSION" superglobal in PHP and how it can be utilized in web development. | |
| | (b) | Explain the concept of prepared statements and how they contribute to improving the security of database queries. | |
| | (c) | How would you implement user authentication and authorization in a PHP and MySQL-based web application? | |
| 3. | (a) | Discuss the role of cookies in web development and explain how you would set, retrieve, and delete cookies using PHP. | |
| | (b) | Describe the steps involved in connecting a PHP application to a MySQL database. | |
| | (c) | How do you handle file uploads securely in a PHP application, and what considerations should be taken into account? | 2 |
| 4 | (a) | What is the purpose of the "header" function in PHP, and how can it be used for HTTP redirection? | 2 |
| | (b) | How would you implement a pagination system in a PHP and MySQL application to efficiently display large sets of data? | 2 |
| | (c) | Explain the differences between server-side and client-side validation in web forms, and when would you use each? | 2 |
| 5. | (a) | Discuss the role of PHP sessions in maintaining user state across multiple pages and how session hijacking can be prevented. | 2 |
| | (b) | How would you implement password hashing in PHP for secure user authentication, and why is it crucial? | 2 |
| | (c) | Explain the use of the "foreach" loop in PHP, especially in the context of iterating through arrays and handling key-value pairs. | 2 |
| 6. | (a) | Explain the difference between "==" and "===" in PHP. | 2 |
| | (b) | What is the role of the "include" and "require" statements in PHP? | 2 |
| | (c) | What is the purpose of the "mysqli_query" function in PHP? | 2 |
| 7. | (a) | What is the use of the "$_GET" superglobal in PHP? State with an implementation level code. | 2 |
| | (b) | How do you declare an associative array in PHP? | 2 |
| | (c) | How can you handle errors in PHP using the "try," "catch," and "finally" blocks? | 2 |

| | | | |
|---|---|---|---|
| 8. | (a) | How do you set and retrieve cookies in PHP? State with an implementation level code. | 2 |
| | (b) | Provide a brief explanation of what JavaScript is and its primary use in web development. | 2 |
| | (c) | Explain how console.log() is used and what it helps developers accomplish. | 2 |
| 9. | (a) | List and briefly explain the basic data types in JavaScript. | 2 |
| | (b) | Explain the difference between let, const, and var in JavaScript. | 2 |
| | (c) | Describe what scope is and how it affects the visibility and accessibility of variables in JavaScript. | 2 |
| 10 | (a) | Write a query to insert 5 random values into a MySQL database (student) having table name (studentRecords) and columns as 'student_id', 'student_name', 'student_reg', 'student_mob_num'. | 2 |
| | (b) | Write code to display all the inserted data of question 10(a) in a table of webpage. Use database as 'student' hosted on localhost having ALL privileges to username as <your_name> and password as '1234'. | 2 |
| | (c) | Write down the contents of fourth iteration of print_r($row) that you will get after executing while($row=mysqli_fetch_assoc(<database query for selecting everything from studentRecords>) | 2 |

# END-SEMESTER EXAMINATION, January-2024
# Digital Logic Design (EET1211)

**Programme: B.Tech(CSE,CSIT)** **Semester:3rd**
**Full Marks: 60** **Time: 3 Hours**

| Subject/Course Learning Outcome | *Taxonomy Level | Ques. Nos. | Marks |
|---|---|---|---|
| Able to State and explain different number systems, binary codes. | L2 | 1 | 6 |
| Able to apply the principles of Boolean algebra, Karnaugh map and Quine McCluskey Method to simplify logic expressions. | L3 | 2,3,4b,4c | 16 |
| Able to Analyze and design various combinational circuits. | L3 | 5,6,7a,8a,8b,9a,9b | 22 |
| Able to Analyse and design Memory and Programmable Logic Devices. | L3 | 4a,7c | 4 |
| Able to Analyse and understand latches, flip-flops, registers and counter operations. | L3 | 9c,10 | 8 |
| Able to implement various digital circuits using HDL and Standard ICs. | L3 | 7b,8c | 4 |

*Bloom's taxonomy levels: Remembering (L1), Understanding (L2), Application (L3), Analysis (L4), Evaluation (L5), Creation (L6)

**Answer all questions. Each question carries equal mark.**

1. (a) Convert $(757.25)_{10}$ to hexadecimal and then to binary. 2

   (b) Add the following numbers in binary using 1's complement to represent negative numbers. Use a word length of 6 bits (including sign bit). 2
   (-18)+25

   (c) Represent $(753)_{10}$ in 6 3 1 1 and Gray code. 2

2. (a) 

2

Write the expression for output Y.

(b) Simplify the following Boolean expression to a minimum number of literals. 2

F= (yz' + x'w)(xy' + zw')

(c) Implement the Boolean function (AB+CD) using 2-input NAND gates. 2

3. (a) Simplify the following Boolean function F, together with the don't-care conditions d. 2

F(A,B,C,D)= ∑(0,3,7,8,9,11,12,13)

d(A,B,C,D) =∑(1,4,14,15)

(b) Implement the following Boolean function using exclusive-OR and AND gates. 2

F=A'B'CD+A'BCD'+AB'C'D+ABC'D'

(c) Find the minimum product of sum expression for F=∑m (1, 3, 4, 5, 6, 7, 9, 12, 13) using Karnaugh map. 2

4. (a) Draw a PLA circuit to implement the function 2

F1= (AB + AC + BC)'

F2= AB + AC + ABC'

(b) Find all prime implicants of the following function using Quine-McCluskey procedure: 2

F(A,B,C,D) =∑m (1,3,5,6,8,9,12,14,15)+ ∑d(4,10,13)

(c) Using the method of map-entered variables, use four-variable maps to find a minimum sum-of-products expression for F(A,B,C,D,E) = ∑m(0,4,5,7,9) + ∑d(6,11) + E(m1+m15). 2

5. Design a 4 bit Excess-3 to BCD code converter.

(a) Write the truth table for the circuit. 2

(b) Derive the Minimized Boolean expression for each output of 2

the circuit.

(c) Draw the logic diagram for the circuit. 2

6. Design a combinational circuit with four inputs and four outputs that converts a 4bit binary number into the equivalent 4bit Gray code.

(a) Write the truth table for the circuit. 2

(b) Derive the Minimized Boolean expression for each output of the circuit. 2

(c) Draw the logic diagram for the circuit. 2

7. (a) Design a full adder circuit. 2

(b) Write the HDL description of a full adder circuit. 2

(c) Implement full adder using Programmable Array Logic. 2

8 Design a 4 bit priority encoder with inputs $D_3$ (MSB), $D_2$, $D_1$ and $D_0$ (LSB) and outputs X, Y and V. The priority assigned to inputs is $D_0 > D_1 > D_2 > D_3$.The output V shows a value 1 when one or more inputs are equal to one. If all inputs are 0, V is equal to 0. When V=0, then other two outputs are not inspected and are specified as don't care conditions.

(a) Write truth table of the encoder and find the minimized expression for the outputs X, Y and V. 2

(b) Draw logic diagram of the priority encoder. 2

(c) Write the HDL description of the 4bit priority encoder circuit. 2

9 (a) Design a 2 X 1 Multiplexer that will select the binary information from one of the two input lines and direct it to a single output line based on the value of a selection line. 2

(b) Design a full subtractor circuit using 3 to 8 line decoder and external OR gates. 2

(c) Write the characteristic table and Excitation table for D Flip Flop. 2

10 Design a 3-bit synchronous down counter with T Flip-Flops.

(a) Write state diagram and state table of the binary counter. 2

(b) Find the simplified flip flop input equations for the counter. 2

(c) Draw logic diagram of the 3-bit counter. 2

*End of Questions*