ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) I Semester
BTCSE301 DIGITAL LOGIC DESIGN
MODEL QUESTION PAPER

Time: 3hrs. **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1. **a)** List out the Basic Theorems and Properties of Boolean Algebra. Justify with the Proof **(15M)**

    Or

    b) Explain how 1's complement and 2's complement of a binary number is obtained? Illustrate by an example. **(7M)**

    c) What is gray code? What are the rules to construct gray code? Develop the 4 bit gray code for the decimal 0 to 15. **(8M)**

2. **a)** Using K-map method determine the prime Implicant and obtain the possible minimal expression for the following function
    $F(A,B,C,D) = \Sigma\ m(8,12,13) + d(1,2,4,6,7,11)$ **(15M)**

    Or

    b) Define the following terms with respect to K-Map with an example.
    i) Prime Implicant ii) Redundant terms iii) Essential Prime Implicant iv) Octet **(15M)**

3. **a)** Design 4 line to 16 line decoder using 2 line to 4 line decoders. **(7M)**
    b) Implement the following switching function using a Four input multiplexer
    $F (A, B, C, D) = \Sigma\ m (0, 1, 2, 4, 6, 9, 10, 13, 14)$ **(8M)**

    Or

    c) Implement a full adder with two 4×1 multiplexers. **(7M)**
    d) Implement Half adder using NAND gates. **(8M)**

4. **a)** Draw and explain 4-bit universal shift register **(7M)**
    b) Explain different types of shift registers **(8M)**

    Or

    c) Explain the working of a master-slave JK flip flop. State its advantages **(8M)**
    d) Implement the following Boolean functions using PAL
    $F_1 (x, y, z) = \sum m (0,1,3,6,7)$ and $F_2 (x, y, z) = \sum m (0,2,3,5)$ **(7M)**

SECTION- B (5×3=15M)
Answer any FIVE Questions

5.

a) Perform $(28)_{10} - (15)_{10}$ using 6 bit 2's complement representation.

b) Convert $(12.125)_{10}$ into binary

c) What are the limitations of K-maps?

d) Convert the given expression in standard POS form. $f(A,B,C) = (A+B) (B+C) (A+C)$

e) Explain about parallel adder.

f) What is meant by encoder?

g) Compare PLA with PROM?

h) What is meant by race around condition in flip-flops?

ADIKAVI NANNAYA UNIVERSITY::RAJAMAHENDRAVARAM
II BTech (CSE) I Semester
BTCSE302 OPERATING SYSTEMS
MODEL QUESTION PAPER

Time: 3hrs.   **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.   **a)** Explain different types of systems?   **(8M)**
      b) Write a short notes on system calls?   **(7M)**
<div align="center">Or</div>

      c) Briefly explain the classical problems of synchronization?   **(8M)**
      d) Write a short notes on semaphores?   **(7M)**

2.   **a)** Explain in brief various scheduling algorithms?   **(7M)**
      b) Write a short notes on co operating processes?   **(8M)**
<div align="center">Or</div>

      c) Write a short notes on Deadlock Characterization, deadlock prevention and recovery from deadlock?   **(15M)**

3.   **a)** Explain segmentation and paged segmentation?   **(7M)**
<div align="center">Or</div>

      b) Briefly explain page replacement algorithms?   **(8M)**

4.   **a)** Explain file structure and file access methods?   **(7M)**
      b) Explain directory structure?   **(8M)**
<div align="center">Or</div>

      c) Explain briefly the concept of disk scheduling?   **(15M)**

SECTION - B (5×3=15M)
Answer any FIVE Questions

5.   **Write short notes on**
      a) Storage Hierarchy
      b) Operating system services.
      c) Threads.
      d) Paging and demand paging.
      e) File operations.
      f) DMA.
      g) Critical section problem.
      h) Secondary storage structure.

Time: 3hrs.   **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.   **a)** Briefly Explain various features of Object Oriented Programming Language   **(15M)**
                                              Or
           b) Define Function. Explain various types of functions used in C++   **(15M)**

2.   **a)** What is Class? Explain data hiding in Classes   **(15M)**
                                              Or
           b) What is Constructor? Write the syntax of declaring the Constructor and Explain
               various types of Constructors used in C++   **(15M)**

3.   **a)** Explain different forms of Inheritance. Illustrate each type with an example   **(15M)**
                                              Or
           b) What is Virtual Function? Why it is important to make a class virtual   **(15M)**

4.   **a)** What is file mode? Describe the various file mode options available in C++.   **(7M)**
           b) Explain the various unformatted I/O Operations and Formatted Console
               I/O Operators   **(8M)**
                                              Or
           c) What is Template? Explain the various templates with example   **(8M)**
           d) Write a function template for finding the minimum value contained in an array   **(7M)**

SECTION - B (5×3=15M)
Answer any FIVE Questions

5.   **Write short notes on**
           a) Applications of OOP
           b) Scope Resolution Operator
           c) Friend Function
           d) Operator Overloading
           e) Virtual Base Class
           f) Pure Virtual Function
           g) Command Line Arguments
           h) Overloading of Template Functions

Time: 3hrs.   **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.   **a)** What is skip lists? Explain about skip lists with examples.   **(8M)**
      b) Explain about the analysis of skip lists.   **(7M)**
                                     Or
      c) Explain about different hashing functions with examples.   **(8M)**
      d) Explain about the analysis of closed hashing for unsuccessful search and insertion **(7M)**

2.   **a)** Explain about the deletion procedure to delete an element from AVL Tree with
         examples   **(8M)**
      b) Write a routine to delete an element from an AVL tree.   **(7M)**
                                     Or
      c) What are the applications of binary heap.   **(8M)**
      d) Write a routine for creating a binary heap and explain with example **(7M)**

3.   **a)** Write a routine for shortest path algorithm with example   **(8M)**
      b) Write a routine for warshall's algorithm.   **(7M)**
                                     Or
      c) Explain about Knapsack problem using Greedy Paradigm   **(7M)**
      d) Construct an Optimal Binary Search Tree for the following data: **(8M)**

i –	1	2	3	4	5
P_i –	0.24	0.22	0.23	0.3	0.01

4.   **a)** Explain about amortized analysis of Binomial Queues.   **(8M)**
      b) Explain about AA-Trees with examples.   **(7M)**
                                     Or
      c) Explain about amortized analysis of Fibonacci Heaps   **(8M)**
      d) Explain about k-d Trees with examples.   **(7M)**

Section B (5×3=15M)
Answer anyFIVE Questions

5.   **Write short notes on**
      a. Queue ADT
      b. LZW Compression
      c. Path Compression
      d. Huffman Codes
      e. Randomized Algorithms
      f. NP-Completeness
      g. Skew Heaps
      h. Treaps

ADIKAVI NANNAYA UNIVERSITY:: RAJAMAHENDRAVARAM
II BTech (CSE) I Semester
BTCSE305 PROBABILITY, STATISTICS AND QUEUING THEORY
MODEL QUESTION PAPER

Time: 3hrs.   **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.   **a)** State and prove BAYE's theorem   **(8M)**
   b) In a bolt factory machines A, B, C manufacture 20%, 30%, 50% of the total of their
   output and 6%,3% and 2% are defective. A bolt is drawn at random and found to be
   defective. What is the probability that it is manufactured by machines A, B and C? **(7M)**

<div align="center">Or</div>

   c) State and prove Boole's inequality   **(8M)**
   d) There are 15 boys and 5 girls in a class. If three students are selected one after the other
   What is the probability that they are (1) All boys (2) 2 boys one girl (3) All girls.   **(7M)**

2.   **a)** A continuous random variables X is defined by

$$f(x) = \begin{cases} \frac{(3+x)^2}{16} & if \quad -3 \le x \le -1 \\ \frac{(6-2x^2)}{16} & if \quad -1 \le x \le 1 \\ \frac{(3-x)^2}{16} & if \quad 1 \le x \le 3 \end{cases} \quad , 0 \text{ elsewhere. Verify that f(x) is a}$$

   Density function also find the mean of X.   **(8M)**
   b) Ten coins are thrown simultaneously. Find the probability of getting at least seven
   heads   **(7M)**

<div align="center">Or</div>

   c) In a distribution exactly normal 7% of the items are under 35 and 89% are under
   63. What are the mean and standard deviation of the distribution?   **(8M)**
   d) Fit a Poisson distribution for the following data and calculate the expected frequencies,
   N = 200.   **(7M)**

X	0	1	2	3	4
F(x)	109	65	22	3	1

3.   **a)** A lady stenographer claims that the she can take dictation at the rate of 120 words per
   minute. Can we reject her claim on the basis of 100 trails in which she demonstrates a
   mean of 116 words with a S.D of 15 words.   **(8M)**
   b) Two independent samples of 8 and 7 items respectively had the following values.

Sample1	11	11	13	11	15	9	12	14
Sample2	9	11	10	13	9	8	10	-

   Is the difference between the means of samples significant?   **(7M)**

<div align="center">Or</div>

   c) A manufacturer of electric bulbs claims that the percentage of defectives in his product
   does not exceed 6. A sample of 40 bulbs is found to contain 5 defectives would
   you consider the claim justified   **(8M)**
   d) Tests are made on the proportion of defective castings produced by 5 different
   molds. If there were 14 defectives among 100 costing mold – I, 33 defectives
   among 200 costing mold –II, 21 defectives among 180 costing mold – III,

17 defectives among 120 costing mold – IV and 25 defectives among 150 costing mold – V. Use the 0.01 level of significance to test whether the true proportion of defectives is the same for each mold. **(7M)**

4.   **a)** Fit a second degree parabola to the following data using method of least squares.

X	0	1	2	3	4
Y	1	1.8	1.3	2.5	6.3

(8M)

b) The equations of two regression lines obtained in a correlation analysis are
$3x + 12y = 19$, $3y + 9x = 46$. Find (i) coefficient of correlation, (ii) Mean values Of x and y and (iii) The ratio of the coefficient of variability of X to that of Y.   **(7M)**

Or

c) Derive expressions for P_o , P_n for the (M/M/1): (∞/FCFS) queuing model.   **(8M)**

d) In a railway marshalling yard, good trains arrive at a rate of 30 trains per day. Assuming that the inter arrival time follows an exponential distribution and the service time distribution is also exponential with an average of 36 minutes, Calculate (i) expected queue size (line length) (ii) Probability that the queue size exceeds 10. If the input of trains increases to an average of 33 per day, what will be the change in(i) and ii)?   **(7M)**

Section B (5×3=15M)
Answer any FIVE Questions

5.

a) Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is even if the two cards are drawn one after the other with replacement.

b) Prove that, for any two events A and B; $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

c) A random variables X has the following probability function

X	- 3	-2	-1	0	1	2	3
P(x)	K	0.1	K	0.2	2K	0.4	2K

Find Mean and variance.

d) Use Poisson recurrence formula to find probabilities x = 0,1,2 with mean 3

e) Define type-1 error and type-2 error.

f) If we can assert with 95% that the maximum error is 0.05 and P is given as 0.2. Find the size of the sample.

g) Write the normal equations of straight line by using method of least square

h) What is queuing theory? Explain transient and steady state.

Time: 3hrs.   **Max. Marks: 75**

SECTION-A (4 X 15 = 60 M)
Answer ALL Questions

1.   **a)** Define Managerial Economics, Explain Nature and Scope of managerial economics?   **(15M)**

Or

     b) What is Demand Forecasting? What are the methods of Demand forecasting?   **(15M)**

2.   **a)** Explain Economies of scale and diseconomies of scale.   **(15M)**

Or

     b) Explain the features of Short –run average cost curve and Long –run average cost curve.   **(15M)**

3.   **a)** Differentiate between Perfect and Imperfect markets.   **(15M)**

Or

     b) Explain any four Methods of Pricing based on strategy.   **(15M)**

4.   **a)** What are the Types of Account and rules governing each account?   **(15M)**

Or

     b) Journalise the following transactions in the books of madhu and prepare necessary ledger accounts.

     2014 January 1. Madhu commenced with Rs.15,000/-
                 2. Paid into bank Rs. 10,000/-
                 3. Purchased goods from B for Rs. 2,000/-
                 4. Returned goods to B for Rs. 200/-
                 5. Paid to B in full settlement of A/c Rs 1,700/-
                 7. Received interest from the bank Rs.750/-
                 9. Sold goods for cash Rs. 7,000/-
               12. Sold goods for Don for Rs. 4,000/-
               15. Received goods worth Rs. 100/- from Don with a complaint about damage.
               16. Paid salaries Rs. 400/-
               17. Entertainment Rs. 50/-
               20. Received a cheque from Don Rs. 500/-
               25. Issued a cheque for Rs. 100/- towards rent to landlord   **(15M)**

Section B (5×3=15M)
Answer any FIVE Questions

5.   **Write short notes on**
     a) Law of equi – marginal utility
     b) Barometric techniques
     c) Cobb- Douglas production function
     d) Isoquants and their features
     e) Equilibrium price
     f) Joint stock company
     g) Double -entry book –keeping
     h) Types of shares