A-PDF Watermark DEMO: Purchase from www.A-PDF.com to remove the watermark

USN | 1 | K | 4 | 0 | 7 | 1 | S | 0 | 0 | 9 |

CS/ISE New Scheme

06MAT41

Fourth Semester B.E. Degree Examination, June-July 2009
Engineering Mathematics – IV

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Solve $\frac{dy}{dx} = 2y + 3e^{\lambda}$, $y(0) = 0$. Using Taylor's series method an find y(0.1), y(0.2). **(06 Marks)**

b. Use Runge-Kutta method of fourth order to solve $\frac{dy}{dx} = x + y$, $y(0) = 1$ at $x = 0.2$ with step length $h = 0.2$. **(07 Marks)**

c. Use Milne's predictor –corrector method to find y at x = 0.8, given $\frac{dy}{dx} = x - y^2$ with,

X	0	0.2	0.4	0.6
Y	0	0.02	0.0795	0.1762

Apply corrector once. **(07 Marks)**

2 a. Find the analytic function f(2) = u + iv if $v = e^x (x \sin y + y \cos y)$. **(06 Marks)**

b. Find the image of lines parallel to x – axis and lines parallel to y – axis under the transformation $w = z^2$. Draw neat sketch. **(07 Marks)**

c. Find the bilinear transformation that maps the points z = -1, j, 1 on to the points w = 1, j, -1. **(07 Marks)**

3 a. If f(z) is analytic within and on a simple closed curve C and 'a' is a point within 'C' then prove that $f(a) = \frac{1}{2\pi j}\int_c \frac{f(z)}{z-a}dz$. **(06 Marks)**

b. State Cauchy's residue theorem. Hence or otherwise evaluate –

$\int_c \frac{e^{2z}}{(z+2)(z+4)(z+7)}dz$ for 'C' as $|Z| = 3$. **(07 Marks)**

c. Find the Taylor's series expansion of $f(z) = \frac{1}{(z+1)^2}$ about the point z = -i. **(07 Marks)**

4 a. Prove that $J_{1/2}(x) = \sqrt{\frac{2}{\pi x}}\sin x$. **(06 Marks)**

b. Express polynomial $2x^3 - x^2 - 3x + 2$ in terms of Legendre polynomials. **(07 Marks)**

c. Compute P_0, P_1, P_2, P_3, P_4 using Rodrigue's formula. **(07 Marks)**

PART – B

5 a. Fit a parabola $y = a + bx + cx^2$, given the data : **(06 Marks)**

x	–3	–2	–1	0	1	2	3
y	4.63	2.11	0.67	0.09	0.63	2.15	4.58

b. Obtain the coefficient of correlation and the liens of regression if : **(07 Marks)**

x	1	3	4	2	5	8	9	10	13	15
y	8	6	10	8	12	16	16	10	32	32

c. A tea set has four sets of cups and saucers. Two of these sets are of one colour and the other two sets are of different colours. (totally three colours). If the cups are placed randomly on saucers, what is the probability that no cup is on a saucer of same colour. **(07 Marks)**

SKIT LIBRARY

6 a. Define i) Random variable ii) Discrete probability distribution with an example. **(06 Marks)**

b. The probability that a man aged 60 will live up to 70 is 0.65. What is the probability that out of 10 men, now aged 60, i) exactly 9, ii) at the most 9 iii) at least 7, will live up to the age of 70 years. **(07 Marks)**

c. In a normal distribution, 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation, given that A(0.5) = 0.19 and A(1.4) = 0.42. **(07 Marks)**

7 a. Find the probability that in 100 tosses of a fair coin between 45% and 55% of the outcomes are heads. **(06 Marks)**

b. A mechanist is making engine parts with axle diameter of 0.7 inches. A random sample of 10 parts showed a mean of 0.472 inches with a standard deviation of 0.04 inches. On the basis of this sample, can it be concluded that the work is inferior at 5% level of significance. **(07 Marks)**

c. For the following data test the hypothesis that the accidents are uniformly distributed over all the days of the week for 99% confidence.

Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
No. of accidents	14	16	8	12	11	9	14	84

(07 Marks)

8 a. Find the –
Marginal distribution of x
Marginal distribution of y
Cov (x, y) if the joint pdf of x and y is

x \ y	1	3	9
2	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{12}$
4	$\frac{1}{4}$	$\frac{1}{4}$	0
6	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{12}$

(06 Marks)

b. Find the fixed probability vector of regular stochastic matrix

$$A = \begin{bmatrix} 0.5 & 0.25 & 0.25 \\ 0.5 & 0 & 0.5 \\ 0 & 1 & 0 \end{bmatrix}.$$ **(07 Marks)**

c. A company executive changes his car every year. If he has a car of make A, he changes over to make B. from make B he changes over to make C. if he has car 'C' then he gives equal preference to change over to make A or make B car. If he had a car of make C in year 2008 find the probability that he will have a car of i) make A in 2010, ii) make 'C' in 2010. **(07 Marks)**

* * * * *

SKIT LIBRARY

USN | 1 | K | T | 0 | 5 | I | S | 0 | 4 | 7 | 06CS42

Fourth Semester B.E. Degree Examination, June-July 2009
Graph Theory & Combinatorics

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Determine | Υ | for the following graphs:
   i) G is regular with 15 edges.
   ii) G has 10 edges with two vertices of degree 4 and all others of degree 3. **(05 Marks)**

b. Define isomorphism of graphs. Show that the following graphs are isomorphic.

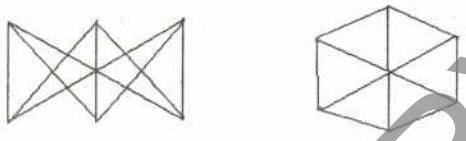


Fig.1(b) **(05 Marks)**

c. Define i) Complete graph ii) Induced subgraph iii) Euler circuit. Give one example for each. **(05 Marks)**

d. If G is an undirected graph with n vertices and e edges, let $\delta = \min_{v \in \Upsilon}\{\deg(v)\}$ and let $\Delta = \max_{v \in \Upsilon}\{\deg(v)\}$, then prove that $\delta \leq 2(e/n) \leq \Delta$ **(05 Marks)**

2 a. Define Hamilton cycle. How many edge-disjoint Hamilton cycles exist in the complete graph with seven vertices? Also, draw the graph to show these Hamilton cycles. **(05 Marks)**

b. Define : i) Planar graph ii) Bipartite graph iii) Complete bipartite graph. Give one example for each. **(05 Marks)**

c. If G is a connected simple planar graph with n (≥3) vertices, e(>2) edges and r regions, then prove that i) $3r \leq 2e$ ii) $e \leq 3n - 6$. **(05 Marks)**

d. Define chromatic number. Find the chromatic polynomial for the cycle of length 4 as shown in Fig.2(d) below. Hence find the chromatic number. **(05 Marks)**

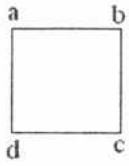


Fig.2(d)

3 a. Define a tree.
   i) Prove that a tree with two or more vertices contains at least two pendant vertices.
   ii) Suppose that a tree T has two vertices of degree 2, four vertices of degree 3 and three vertices of degree 4. Find the number of pendant vertices in T. **(06 Marks)**

b. Define : (i) Binary rooted tree (ii) Balanced tree.
Draw all the spanning trees of the graph show in Fig.3(b) below. **(07 Marks)**

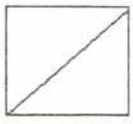


Fig.3(b)

c. Define prefix code. Obtain an optimal prefix code for the message ROAD IS GOOD. Indicate the code. **(07 Marks)**

SKIT LIBRARY

4 a. Explain Dijkstra's algorithm. **(06 Marks)**

b. State Kruskal's algorithm. Using Kruskal's algorithm, find a minimal spanning tree for the weighted graph shown in Fig.4(b) below. **(07 Marks)**

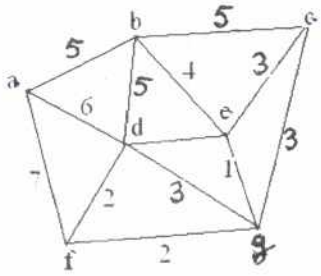


Fig.4(b)

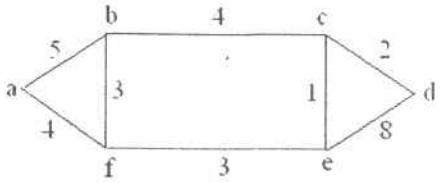


Fig.4(c)

c. Define a cut-set. For the network shown in Fig.4(c), find the capacities of all the cutsets between the vertices a and d, and hence determine the maximum flow between a and b. **(07 Marks)**

PART – B

5 a. How many positive integers n can we form using the digits 3, 4, 4, 5, 5, 6, 7 if we want n to exceed 5,000,000? **(05 Marks)**

b. In how many ways can 10 identical dimes be distributed among five children if (i) there are no restrictions (ii) each child gets at least one dime (iii) the oldest child gets at least two dimes. **(05 Marks)**

c. Determine coefficient of xyz^2 in the expansion of $(2x - y - z)^4$. **(05 Marks)**

d. Define Catalan number Using the moves $R : (x, y) \rightarrow (x+1, y)$ and $v : (x, y) \rightarrow (x, y+1)$, find in how many ways can one go

i) From (2,1) to (7,6) and not rise above the line $y = x - 1$.

ii) From (3,3) to (10,15) and not rise above the line $y = x + 5$. **(05 Marks)**

6 a. How many integers between 1 and 300 (inclusive) are

i) divisible by at least one of 5, 6, 8?

ii) divisible by none of 5, 6, 8? **(06 Marks)**

b. Define derangement. There are eight letters to eight different people to be placed in eight different addressed envelopes. Find the number of ways of doing this so that at least one letter gets to the right person. **(07 Marks)**

c. Find the rook polynomial for the 3×3 board using the expansion formula. **(07 Marks)**

7 a. i) Find a generating function for the sequence $1^2, 2^2, 3^2, \ldots\ldots$

ii) Find the coefficient of x^n in the expansion of $(x^2 + x^3 + x^4 + \ldots\ldots)^4$ **(06 Marks)**

b. Use generating function to determine in how many ways can two dozen identical robots be assigned to four assembly lines with i) at least 3 robots assigned to each line ii) at least 3 but not more than 8 robots assigned to each line. **(07 Marks)**

c. Using exponential generating function, find the number of ways in which 4 of the letters in ENGINE be arranged. **(07 Marks)**

8 a. Find and solve a recurrence relation for the number of binary sequences of length $n \geq 1$ that have no consecutive 0's. **(06 Marks)**

b. Solve the recurrence relation

$a_{n+2} + 3a_{n+1} + 2a_n = 3^n$ for $n \geq 0$; given $a_0 = 0$, $a_1 = 1$. **(07 Marks)**

c. Find a generating function for the recurrence relation

$a_{n+2} - 2a_{n+1} + a_n = 2^n$ for $n \geq 0$; given $a_0 = 1$, $a_1 = 2$.

Hence solve it. **(07 Marks)**

* * * * *

SKIT LIBRARY

USN | 1 | K | T | 0 | 7 | 1 | 8 | 0 | 1 | 9 |

06CS43

Fourth Semester B.E. Degree Examination, June-July 2009
Analysis and Design of Algorithms

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions selecting at least TWO from each part.***

PART – A

1 a. With figure, explain algorithm development process. **(10 Marks)**

b. Explain how priority Queue can be implemented as unsorted array. **(06 Marks)**

c. Find GCD (60, 24) by applying Euclid's formula. Estimate the number of times computation is done in Euclid's method and in an algorithm based on checking consecutive integers from min (m, n) down to gcd (m, n). **(04 Marks)**

2 a. Explain all asymptotic notations used in algorithm analysis. **(06 Marks)**

b. Consider the following algorithm

Algorithm Enigma $(A[0..n-1, 0..n-1])$

```
for i ← 0 to n-2 do
    for j ← i + 1 to n-1 do
        if A [i, j] ≠ A [j. i]
            return false
    end for
end for
    return true
end algorithm
```

i) What does this algorithm compute?

ii) What is its basic operation

iii) How many times is the basic operation executed?

iv) What is the efficiency class of this algorithm?

v) Can this algorithm be further imported? **(10 Marks)**

Consider the following recursive algorithm for computing the sum of the first n cubes. $S(n) = 1^3 + 2^3 + 3^3 + \ldots\ldots + n^3$

```
Algorithm S (n)
    if (n = 1) return 1
        else return (S (n-1) + n * n * n)
end algorithm
```

Set up and solve a recurrence relation for the number of times the algorithm's basic operation is executed. **(04 Marks)**

3 a. Write the Quick sort algorithm. Trace the same on data set – 5, 3, 1, 9, 8, 2, 4, 7. **(10 Marks)**

b. Write an algorithm to find the height of Binary tree. **(04 Marks)**

c. Outline an exhaustive search algorithm to solve Travelling salesman problem. **(06 Marks)**

4 a. Consider a set of 13 elements in an array list the elements of array that require the largest number of key comparisons when searched for by Binary search. Find the average number of key comparisons made by binary search in successful search and unsuccessful search in this array. **(06 Marks)**

b. Write depth first search algorithm. **(08 Marks)**

c. Briefly explain how breadth first search can be used to check connectness of a graph and also to find the number of components in a graph. **(06 Marks)**

SKIT LIBRARY

PART – B

5 a. Design a Presorting – based algorithm to find the distance between the 2 closest numbers in an array of 'n' numbers. Compare the efficiency of this algorithm. With that of brute – force algorithm. **(10 Marks)**

b. Construct AVL tree for the set of elements – 5, 6, 8, 3, 2, 4, 7. **(06 Marks)**

c. Apply Horspool's algorithm to search for the pattern BAOBAB in the text
BESS␣KNEW␣ABOUT␣BAOBABS
Also, find the total number of comparisons made. **(04 Marks)**

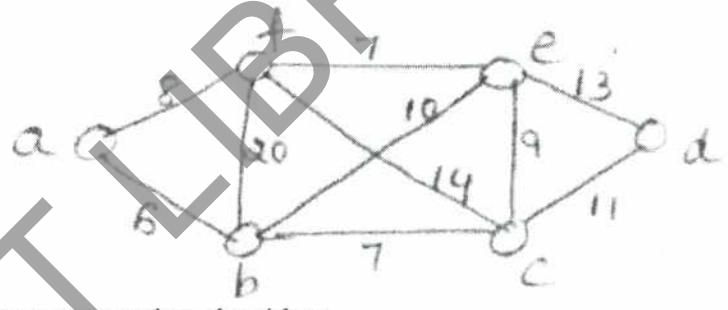
6 a. For the input – 30, 20, 56, 75, 31, 19 construct the open hash table. Find largest and average number of key comparisons in a successful search in the table. **(06 Marks)**

b. Explain Dynamic programming. **(04 Marks)**

c, Write the formula to find the shortest path using Floyd's approach. Use Floyd's method to solve the below all-pairs shortest paths problem. **(10 Marks)**

$$\begin{bmatrix} 0 & \infty & 3 & \infty \\ 2 & 0 & \infty & \infty \\ \infty & 7 & 0 & 1 \\ 6 & \infty & \infty & 0 \end{bmatrix}$$

7 a. Use Kruskal's method to find min cost spanning tree for the below graph. **(06 Marks)**



b. Write Huffman tree construction algorithm. **(08 Marks)**

c. Draw the decision tree for the 3 – elements insertion sort. **(06 Marks)**

8 a. Differentiate between back tracking and Branch – and – bound algorithm. **(06 Marks)**

b. Draw the state space tree to generate first solution to 4 – queens problem. With the first solution, generate another solution, making use of board's symmetry. **(08 Marks)**

c. Explain P and NP problems. **(06 Marks)**

* * * * *

SKIT LIBRARY

USN | 1 | K | T | 0 | 5 | I | S | 0 | 4 | 7 |

06CS44

Fourth Semester B.E. Degree Examination, June-July 2009
Object Oriented Programming with C++

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least two from each part.***

PART – A

1 a. Differentiate between procedure oriented and object oriented programming. **(06 Marks)**

b. Why should default values be given to function arguments in function prototype and not in function definition? Write a program to add three numbers using function which has one or more default values. **(09 Marks)**

c. What is data abstraction? How it is implemented in C++. Explain with an example. **(05 Marks)**

2 a. What is nested class? What is its use? Give an example and explain. **(08 Marks)**

b. What are the points to remember about friend function? Write program to multiply two matrices using friend function devise a class MATRIX with a constructor, method to read and display the matrix. **(12 Marks)**

3 a. What are constructors? When they are called? What is their use? Define a suitable parameterized constructor with default values for the class TIME with data member hr, min, sec. **(06 Marks)**

b. What is the draw back of static memory allocation? How it is overcome? How it is achieved in C++? Explain with an example? **(06 Marks)**

c. Write program to add and multiply two complex numbers. Initialize the variables through writing constructor. Implement add and multiply operations using overloaded + and * operators. **(08 Marks)**

4 a. Explain different types of inheritance with block diagram and an example for each. **(10 Marks)**

b. What are the benefits of inheritance; can a friendship be in inherited? **(04 Marks)**

c. What is the ambiguity that might arise in multiple inheritances. How to overcome this? Explain with an example. **(06 Marks)**

PART – B

5 a. What are virtual functions? What is their use? Give an example. How compilers resolve a call to a virtual function? **(06 Marks)**

b. Describe briefly with a figure, class hierarchy provided by C++ for stream handling. **(08 Marks)**

c. Explain how text O /P is achieved in C++. Give an example. **(06 Marks)**

6 a. Describe the use of following manipulators :
i) set w ( ) ii) set fill ( ) iii) set pricision ( ) iv) set iosflags ( ) v) reset iosflags ( ). **(05 Marks)**

b. What are the rules for overloading operator? **(05 Marks)**

c. Define a class DATE, use overloaded + operator to add two dates and display the result ante-date. Assume non – leap year dates. **(10 Marks)**

7 a. With syntax, explain the different methods of over loading relational operator. **(06 Marks)**

b. Overload bit wise exclusive or operator $(\wedge)$ for the class distance. The overloading function should return true if the value of either of the two objects that are passed to the operator is not equal to zero. For the rest of the cases, the function should return false. **(08 Marks)**

c. With an example, explain how to overload the pointer – to – member $(\rightarrow)$operator. **(06 Marks)**

8 a. What are the new style casts operator. Explain the general syntax of these operators. Give one example. **(04 Marks)**

b. What are class templates? What is the need for class templates? How are they created? Create a template for bubble sort function. **(10 Marks)**

c. Which three key words are provided by C++ for implementing exception handling? What is the need to those class objects instead of values of fundamental types? Give example. **(06 Marks)**

* * * * *

SKIT LIBRARY

USN | 1 | K | T | 0 | 7 | 1 | S | 0 | 0 | 3 |

06CS45

Fourth Semester B.E. Degree Examination, June-July 2009
Microprocessors

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. With a neat diagram explain the architecture of 8086 microprocessor along with function of each block and register. **(10 Marks)**

b. How many address lines does an 8086 have?
i) How many memory addresses does this number of address lines allow the 8086 to access directly?
ii) At any given time, the 8086 works with 4 segments in this address space. How many bytes are contained in each segment?
iii) Describe the difference between the instructions
MOV AX, 2347H and MOV AX, [2347H] **(05 Marks)**

c. Write 8086 assembly instruction which will perform the following operations:
i) Multiply AL times BL.
ii) Load the number F3H into AL register.
iii) Copy BP register contents to SP register.
iv) Divide the AL register contents by 2 by using a shift instruction.
v) Multiply the AL register contents by 4 using shift instruction. **(05 Marks)**

2 a. Write and explain instruction template for MOV instruction. Also generate opcode for following instructions: The opcode for MOV is | 1 | 0 | 0 | 0 | 1 | 0 | | |
i) MOV CL, [BX]
ii) MOV CS, [BX], DL
iii) MOV 43H [S1], DH
iv) MOV CX, [437A]H **(10 Marks)**

b. What is an assembler directive? Explain the following assembler directive with example:
i) PUBLIC ii) PROC iii) MACRO iv) BB. **(05 Marks)**

c. Find and explain error if there are array in the following instructions:
i) MOV AL, CX ii) MVL BL, CX iii) MOV Arr1[S1], Arr2[D1]
iv) IN, 82H, AL v) XCHG, AL, BL **(05 Marks)**

3 a. Explain the 8086 conditional flags with each flag bits. **(06 Marks)**

b. Write an ALP to separate odd & even number in an array. **(07 Marks)**

c. Write an ALP to calculate delay of 100 ms for 8086 microprocessor working at 10 MHz clock. Assume and mention the states for each instruction used. **(07 Marks)**

4 a. Differentiate between macros and procedures. **(05 Marks)**

b. Explain REP MOVSB instruction with example. **(05 Marks)**

c. Explain the sequence of operation that takes place when a procedure is called and returned from procedure base to calling program with block diagram. **(10 Marks)**

SKIT LIBRARY

PART – B

5 a. Explain the following instructions with an example:
   i) DAA
   ii) AAM
   iii) LOOP
   iv) SUB
   v) XLAT **(10 Marks)**

   b. Write an ALP to find subtracting is present or not in the main string. **(10 Marks)**

6 a. Differentiate between memory mapped I/O and direct I/O. **(05 Marks)**

   b. Write the timing diagram for a memory read machine cycle. **(05 Marks)**

   c. With a neat diagram, explain the pin configuration of 8086. **(10 Marks)**

7 a. Briefly explain the structure of 8086 interrupt response and interrupt vector table with a neat diagram. **(10 Marks)**

   b. Explain with block diagram, the working of 8259 and also explain LCW's format. **(10 Marks)**

8 a. Explain the different methods of parallel data transfer with figure in a programmable peripheral interface. **(10 Marks)**

   b. Explain with the internal block diagram of 8255, the different operational modes and the control word formats. **(10 Marks)**

* * * * *

SKIT LIBRARY

USN | 1 | K | T | 0 | 5 | C | S | 0 | 0 | 2 |

06CS46

Fourth Semester B.E. Degree Examination, June-July 2009
Computer Organization

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Explain the function of processor registers with a block diagram. **(08 Marks)**

b. Write the basic performance equation. Explain the role of each of the parameters in the equation on the performance of the computer. **(07 Marks)**

c. Show how the operation C = A + B can be implemented in a single accumulator computer by (i) Three-address instruction (ii) Two-address instruction (iii) One-address instruction **(05 Marks)**

2 a. What is an addressing mode? Explain register, indirect, index addressing modes with an example for each. **(08 Marks)**

b. What is subroutine linkage? Explain with an example, subroutine linkage using linkage register. **(07 Marks)**

c. Register R1 and R2 of computer contain the decimal value 1200 and 4600. What is the effective address of the source operand in each of the following instructions?

i) Load 20(R1), R5
ii) Hove # 3000, R5
iii) Store R5, 30(R1, R2)
iv) Add -(R2), R5
v) Subtract (R1)+, R5 **(05 Marks)**

3 a. Explain with a diagram, how interrupt request from several I/O devices can be communicated to a processor through a single INTR line. **(08 Marks)**

b. How can the processor obtain the starting address of different interrupt-service routines using vectored interrupts? **(04 Marks)**

c. Why is bus arbitration required? Explain with block diagram bus arbitration using Daisy chain. **(08 Marks)**

4 a. Explain with a block diagram a general 8 bit parallel interface. **(08 Marks)**

b. With the help of data transfer signals explain how a real operation is performed using PCI bus. **(08 Marks)**

c. Explain briefly bus arbitration phase in SCSI bus. **(04 Marks)**

PART – B

5 a. Draw the organization of a 1K × 1 memory cell and explain its working. **(08 Marks)**

b. Explain the working of a single-transistor dynamic memory cell. **(07 Marks)**

c. Calculate the average access time experienced by a processor if a cache bit rate is 0.88, miss penalty is 0.015 milliseconds and cache access time is 10 microseconds. **(05 Marks)**

SKIT LIBRARY

6 a. Show the organization of virtual memory address translation based in fixed-length pages and explain its working. **(08 Marks)**

b. How can performance and reliability be improved using RAID technology? **(04 Marks)**

c. Explain the design of a 4-bit carry-look ahead adder. **(08 Marks)**

7 a. Explain Booth's algorithm. Multiply 01110 (+14) and 11011 (-5) using Booth's multiplication. **(10 Marks)**

b. Write the algorithm for binary division using restoring division method. **(04 Marks)**

c. List the rules for addition, subtraction, multiplication and division of floating point numbers. **(06 Marks)**

8 a. Write and explain the control sequences for execution of an unconditional branch instruction. **(10 Marks)**

b. Explain with block diagram the basic organization of a microprogrammed control unit. **(08 Marks)**

c. What are the modifications required in the basic organization of a microprogrammed control unit to support conditional branching in the microprogram. **(02 Marks)**

* * * * *

SKIT LIBRARY