S.E.(Sem-IV)(CBSGS) COMP.

Sub: Analysis of Algorithm.

QP Code : 3542

(3 Hours) [Total Marks : 80

N.B. (1) Question No. **1** is **compulsory**.
(2) Attempt any **three** from the remaining **five** question.
(3) Assume **suitable** data if **required**.

1. (a) Write abstract algorithm for greedy design method. 5
   (b) Which are different factors considered for sorting elements. 5
   (c) Explain flow shop scheduling technique. 5
   (d) Explain three cases of master theorem. 5

2. (a) Write and explain sum of subset algorithm for 10
   n = 5, W = {2, 7, 8, 9, 15} M = 17
   (b) Explain randomized version of Quick sort and derive its complexity 10

3. (a) Implement the bubble sort Algorithm and derive its best case and worst case 10
   complexity.
   (b) Find the Huffman code for the following message. 10
   "COLLEGE OF ENGINEERING"

4. (a) What is Hamiltonian cycle ? Write an algorithm to find all Hamiltonian cycles. 10
   (b) Suppose you are given n number of coins, in that one coin is faulty, its weight 10
   is less than standard coin weight. To find the faulty coin in a list using proper
   searching method. What will be the complexity of searching method.

5. (a) Explain Job sequencing with deadliner for the given instance. 10
   n = 5, {P_1, P_2, P_3, P_4, P_5} = {20, 15, 10, 5, 3}
   & {d_1, d_2, d_3, d_4, d_5} = {2, 2, 1, 3, 3}
   (b) Explain naive string matching algorithm with example. 10

6. Write note on : (any **two**) 20
   (a) Rabin karp algorithm
   (b) 15-puzzle problem
   (c) Travelling sales person problem
   (d) Strassen's matrix multiplication.

JP-Con. : 9993-15.

S.E. (Sem-IV) (CBSGS) (COMP. & I.T.)

Sub:- Computer Organization & Architecture

QP Code : 3546

(3 Hours) Total Marks: 80

N.B.:- (1) **Question no.1 is compulsory.**
    (2) Solve any **three** questions out of remaining **five** questions.
    (3) Assume suitable data if necessary.

1. (a) What are applications of Microprogramming?   3
   (b) What is stored program concept in digital computer?   3
   (c) List the Flynn's Classification of Parallel Processing Systems.   3
   (d) Draw flowchart for Booth's Algorithm for Twos Complement Multiplication.   3
   (e) What is Associative memory?   4
   (f) Explain in brief Programmed I/O.   4

2. (a) Explain with diagram functioning of Hardwired Control Unit.   8
   (b) Using Unsigned Binary Division method, divide 7 by 3.   6
   (c) Explain IEEE 754 standards for Floating Point number representation.   6

3. (a) Describe what are the features of cache design?   8
   (b) What are the differences between RISC and CISC processors?   6
   (c) Explain concepts of Nano programming.   6

4. (a) What are major requirements for an I/O module?   6
   (b) Explain in details Virtual Memory, Segmentation and Paging.   7
   (c) Explain in details Cache Coherency.   7

5. (a) What is instruction pipelining? What are advantages of pipelining?   6
   (b) Explain DMA based data transfer technique for I/O devices.   7
   (c) Explain Microinstruction sequencing and execution.   7

6. Write short note on:
   (a) Pipeline Hazards.   7
   (b) Scanner.   7
   (c) Interrupt driven I/O.   6

JP-Con. 10819-15.

QP Code : 3552

(3 Hours) [Total Marks : 80

N.B. (1) Question No. 1 is compulsory
(2) Attempt any **three** out of remaining **five** questions
(3) Assumptions made shoud be clearly stated
(4) Figures to the right indicate full marks
(5) Assume sutaible data whenever required but justify that.

[Total Marks : 80

Q.1	(a)	Differentiate between NFA and DFA	[5M]
	(b)	State and Explain closure properties of Context Free Language	[5M]
	(c)	Explain with an example the Chomsky hierarchy	[5M]
	(d)	Compare recursive and recursively enumerable languages.	[5M]

Q.2 (a) Construct PDA accepting the language L={$a^n b^n$ |n>0} [10M]

(b) Design minimized DFA for accepting strings ending with 100 over alphabet (0,1). [10M]

Q.3 (a) Convert (0+ε) (10)*(ε+1) into NFA with ε-moves and obtain DFA [10M]

(b) Construct Turing machine that accepts the string over Σ={0,1} and converts every occurrence of 111 to 101. [10M]

Q.4 (a) Convert following Grammar to CNF and GNF [10M]
S →ASB/a/bb
A → aSA/a
B → SbS/bb

(b) Design PDA to accept language L={ $a^{n-1} b^{2n+1}$ |n≥ 1} [10M]

Q.5 (a) Design Moore Machine to generate output A if string is ending with abb, B if string ending with aba and C otherwise over alphabet (a,b).And Convert it to Mealy machine. [10M]

(b) Construct TM to check wellformed ness of parenthesis [10M]

Q.6 Write short note on [20M]

(a) Rice theorem

(b) Variant of TM

(c) Applications of Regular Expression

(d) Difference between PDA and NPDA

JP-Con. 12401-15.

Q.P. Code : 3555

(3 Hours) [Total Marks : 80]

N.B.: (1) Question No. 1 is compulsory.
   (2) Attempt any three of remaining five questions.
   (3) Assume any suitable data if necessary and clearly state it.

1. (a) What are aliasing and antialiasing? Explain any one antialiasing method. [05]
   (b) What are the disadvantages of DDA algorithm? [05]
   (c) What is viewing transformation? [05]
   (d) Define Shearing and give example. [05]

2. (a) Explain the midpoint circle generating algorithm. [08]
   (b) Explain the steps used in rotation of 2-D object about an arbitrary axis and derive the matrices for same. [12]

3. (a) Expain Liang – Barsky line clipping algorithm with suitable example. [10]
   (b) Explain Sutherland – Hodgeman polygon clipping algorithm in detail. [10]

4. (a) What are Parallel and Perspective projections and derive the matrix for perspective projection. [10]
   (b) Explain the properties of Bezier curves. [10]

5. (a) What is the use of Scan line method and explain all the steps. [10]
   (b) Define Koch curve? How do you construct the Koch curve? [10]

6. Write a short note on any four of the following [20]
   (a) OpenGL
   (b) Area Subdivision method
   (c) Composite transformation
   (d) Sweep representations
   (e) Flood fill algorithm

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JP-Con. 12649-15.

S.E. (Sem-IV) (OLD) - COMP.
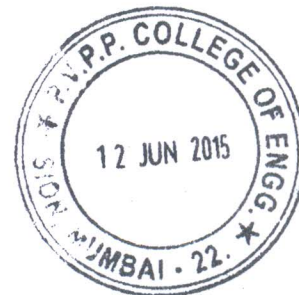
Sub:- Computer Graphics.

(OLD COURSE) **QP Code :4054**

(3 Hours) [Total Marks : 100]
[OLD] [R-2007]

N.B. : (1) Question No. 1 is compulsory
(2) Attempt any four questions from Q. No. 2 to 7
(3) Assume suitable data if necessary

1. (a) What do you mean by term Computer Graphics? State various applications   5
of it.
(b) Explain different color models.   5
(c) Explain Z-buffer algorithm   5
(d) Clearly differentiate between random scan and raster scan system   5

2. (a) What is 3D clipping? Derive equations for all the planes (left , right , top ,   10
bottom, front , back)
(b) Derive the mathematical equations for Bresenham's line drawing algorithm.   10

3. (a) Define fractals ? Give classification of fractals. What is fractal dimension?   10
(b) Explain Cohen Sutherland Line clipping algorithm.   10

4. (a) Explain computer assisted animation and frame-by-frame animation.   10
(b) What do you understand by parallel & perspective projection.   10

5. (a) Explain Warnock's method of area sub-division method to remove hidden surface.   10
(b) Compare boundary fill and flood fill algorithm. Illustrate one example with   10
Diagram.

6. (a) Draw matrices for representing three basic transformations and show that two   10
successive rotations are additive, i.e, $R(\theta_1) * R(\theta_2) = R(\theta_1+\theta_2)$.
(b) Explain Mid-Point Ellipse algorithm along this explain all mathematical derivation.   10

7. Write short notes on following (Any four)   20
a) Shading Algorithms
b) Antialiasing Technique
c) Dithering Technique
d) Character generation method
e) B-spline and Bezier Curve

**RJ-Con.:10838-15.**

QP Code : 4059

(Old Course)
(3 Hours)   [Total Marks: 100

N. B.: 1. Question no. 1 is compulsory.
       2. Solve any four from remaining questions.
       3. Figures to right indicate marks.

Q. 1. a) Explain growth of function (Big-Oh, Omega, Theta) notation with an   10
          example of each.
Q. 1. b) Write algorithm for Merge Sort. Give its Worst, Average, and Best case   10
          complexity.

Q. 2. a) Explain Strassen's matrix multiplication algorithm with an example.   10
          Give its complexity.
Q. 2. b) Find an optimal solution using Job sequencing with deadlines algorithm.   10
          Let n = 4,
          $(p_1, p_2, p_3, p_4) = (100, 10, 15, 27)$ and
          $(d_1, d_2, d_3, d_4) = (2, 1, 2, 1)$.

Q. 3. a) Calculate variable length Huffman code for following frequencies   10
          A = 2, B = 6, C = 4, D = 15, E = 7, F = 22, G = 9, H = 17.
Q. 3. b) Consider the knapsack instance   10
          n = 3, m = 6,
          (w1, w2, w3) = (2, 3, 4), and
          (p1, p2, p3) = (1, 2, 5).
       Find solution using dynamic approach.

Q. 4. a) Explain 8-queen problem. Write an algorithm using backtracking to solve   10
          this problem.
Q. 4. b) Explain graph coloring algorithm with an example.   10

Q. 5. a) Explain LC branch and bound with an example.   10
Q. 5. b) With suitable example explain difference in pattern matching techniques of   10
          Brute Force and Knuth-Morris-Pratt Algorithm.

Q. 6. a) Perform Radix sort on the following set of data   10
          85, 26, 12, 15, 48, 55, 92, 9, 28, 79, 17
       (Give the output at every stage).
Q. 6. b) Find the minimum cost spanning tree for the following graph using   10
          Prim's algorithm.
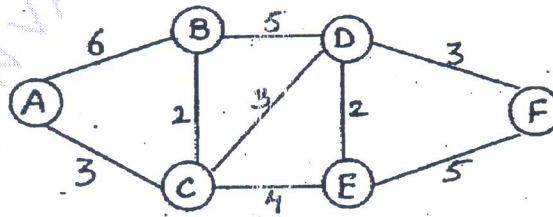
Q. 7. Write short note on following (Any four).   20
Q. 7. a) Optimal storage on tapes.
Q. 7. b) Flow shop scheduling
Q. 7. c) Sum of subsets
Q. 7. d) 15 Puzzle
Q. 7. e) Tries

RJ-Con. 12338-15.

(OLD COURSE)   Q.P. Code : **4062**

(3 Hours)   [Total Marks : 100

N.B. : (1) Question No.1 is **compulsory**.
(2) Out of remaining questions, attempt any **four** questions.
(3) Assume **suitable** data wherever required but **justify** the same.
(4) **All** questions carry **equal** marks.
(5) Answer to each **new question** to be started on a **fresh page**.
(6) **Figure** to the **right** in brackets indicate **full** marks

1. (a) Draw the architecture of RTOS and explain the function of each block.   10
   (b) What is the use of system calls FORK()? Explain it with its syntax. Give one   10
       illustration.

2. (a) What is PCB? How and where OS use it?   10
   (b) Explain various page replacement policies. Implement LRU, OPT, FIFO for   10
       the page frame sequence 0,1,2,1,4,2,3,7,2,1,3,4,7,5,3,2,7 where page frame
       size is 4. Also calculate the hit ratio.

3. (a) What is ZOMBIE? How it is removed?   10
   (b) What are the various file structures? Explain each one in detail.   10

4. (a) Explain any shortest seek disk scheduling algorithm with an example.   10
   (b) What is the virtual memory? Explain with neat diagram the translation of virtual   10
       address into physical address in a segmentation/paging system.

5. (a) Explain deadlock prevention and avoidance techniques.   10
   (b) Why there is need for communication between two processes? Explain various   10
       modes of communication.

6. (a) Explain Double Buffering with an example.   10
   (b) Explain how file-systems store files in a linked-list fashion. What are the   10
       limitations? and advantages of this approach?

7. Write Short note on (any **two**).   20
   (a) Applications of NOS.
   (b) Micro Kernels.
   (c) System Call for Directory Listing.
   (d) Resource Graph Models.
   (e) Inode Structure.

RJ-Con. 12625-15.