Examination:	May-June 2018	**Date:**	11/5/2018
Branch:	Computer Engineering	**Subject:**	AM-IV
Class/SEM:	SE/IV	**Paper Code:**	37068

Examination:	May-June 2018	**Date:**	11/5/2018
Branch:	Computer Engineering	**Subject:**	AM-IV
Class/SEM:	SE/IV	**Paper Code:**	40557

Examination:	May-June 2018	**Date:**	17-5-18
Branch:	Computer Engineering	**Subject:**	AOA
Class/SEM:	SE/IV	**Paper Code:**	38841

Examination:	May-June 2018	**Date:**	17-5-18
Branch:	Computer Engineering	**Subject:**	AOA
Class/SEM:	SE/IV	**Paper Code:**	22606

Examination:	May-June 2018	**Date:**	23-5-18
Branch:	Computer Engineering	**Subject:**	COA
Class/SEM:	SE/IV	**Paper Code:**	13084

Examination:	May-June 2018	**Date:**	23-5-18
Branch:	Computer Engineering	**Subject:**	COA
Class/SEM:	SE/IV	**Paper Code:**	39078

Examination:	May-June 2018	**Date:**	23-5-18
Branch:	Computer Engineering	**Subject:**	OS
Class/SEM:	SE/IV	**Paper Code:**	40533

Examination:	May-June 2018	**Date:**	29-5-18
Branch:	Computer Engineering	**Subject:**	CG
Class/SEM:	SE/IV	**Paper Code:**	41848

Examination:	May-June 2018	**Date:**	29-5-18
Branch:	Computer Engineering	**Subject:**	DMS
Class/SEM:	SE/IV	**Paper Code:**	32479

Examination:	May-June 2018	**Date:**	4/6/2018
Branch:	Computer Engineering	**Subject:**	OS
Class/SEM:	SE/IV	**Paper Code:**	38498

Examination:	May-June 2018	**Date:**	4/6/2018
Branch:	Computer Engineering	**Subject:**	TCS
Class/SEM:	SE/IV	**Paper Code:**	37715

Examination:	May-June 2018	**Date:**	8/6/2018
Branch:	Computer Engineering	**Subject:**	CG
Class/SEM:	SE/IV	**Paper Code:**	35838

IT / COMP / IV / CBSGS / AM-IV / 11-5-18

Q. P. Code: 37068

Time Duration: 3Hr **Total Marks: 80**

N.B.: 1) Question no.1 is compulsory.
2) Attempt any three questions from Q.2 to Q.6.
3) Use of statistical tables permitted.
4) Figures to the right indicate full marks.

Maximum Marks

Q1. a) Evaluate $\int_C |z|dz$, where C is the left half of unit circle $|z| = 1$ from $z = -i$ to $z = i$. **[5]**

b) If $A = \begin{bmatrix} 1 & 0 \\ 2 & 4 \end{bmatrix}$, then find the eigen values of $4A^{-1} + 3A + 2I$. **[5]**

c) If the tangent of the angle made by the line of regression of y on x is 0.6 and $\sigma_y = 2\,\sigma_x$, find the correlation coefficient between x and y. **[5]**

d) Construct the dual of the following L.P.P. **[5]**

Minimise $z = x_2 + 3x_3$

Subject to
$2x_1 + x_2 \le 3$
$x_1 + 2x_2 + 6x_3 \ge 5$
$-x_1 + x_2 + 2x_3 = 2$
$x_1, x_2, x_3 \ge 0$

Q2. a) Evaluate $\int_C \frac{e^{2z}}{(z+1)^4}\, dz$, where c is the circle $|z - 1| = 3$. **[6]**

b) Show that the matrix $A = \begin{bmatrix} 7 & 4 & -1 \\ 4 & 7 & -1 \\ -4 & -4 & 4 \end{bmatrix}$ is derogatory. **[6]**

c) For a normal variate with mean 2.5and standard deviation 3.5, find the probability that (i) $2 \le X \le 4.5$, (ii) $-1.5 \le X \le 5.3$. **[8]**

Q3. a) The daily consumption of electric power is a random variable X with probability distribution function $f(x) = \begin{cases} kxe^{-\frac{x}{3}} & , x > 0 \\ 0 & , x \le 0 \end{cases}$ **[6]**

Find the value of k, the expectation of k and the probability that on a given day the electric consumption is more than expected value.

b) Solve the following L.P.P. by simplex method **[6]**

Maximise $z = 4x_1 + 10x_2$

Subject to $2x_1 + x_2 \le 10$
$2x_1 + 5x_2 \le 20$
$2x_1 + 3x_2 \le 18$
$x_1, x_2 \ge 0$

c) Expand $f(z) = \frac{2}{(z-1)(z-2)}$ in the regions (i) $|z| < 1$ (ii) $1 < |z| < 2$ (iii) $|z| > 2$. **[8]**

Q4. a) The incidence of an occupational disease in an industry is such that the workers have 20% chance of suffering from it. What is the probability that out of 6 workers chosen at random 4 or more will be suffering from the disease? **[6]**

b) Calculate the coefficient of correlation between X and Y from the following data. **[6]**

X	3	5	4	6	2
Y	3	4	5	2	6

c) Show that the matrix $A = \begin{bmatrix} -9 & 4 & 4 \\ -8 & 3 & 4 \\ -16 & 8 & 7 \end{bmatrix}$ is diagonalizable. Find the transforming matrix M and the diagonal form D. **[8]**

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Q5.a) Can it be concluded that the average life- span of an Indian is more than 70 years, if a random sample of 100 Indians has an average life span of 71.8 years with standard deviation 8.9 years? [6]

b) Evaluate $\int_0^{2\pi} \frac{d\theta}{3+2\cos\theta}$, using Cauchy's residue theorem. [6]

c) Using the Kuhn – Tucker conditions, solve the following N.L.P.P. [8]

Maximise $z = x_1^2 + x_2^2$

Subject to $x_1 + x_2 - 4 \leq 0$

$2x_1 + x_2 - 5 \leq 0$

$x_1, x_2 \geq 0$

Q6.a) A die was thrown 132 times and the following frequencies were observed. [6]

No obtained	1	2	3	4	5	6	Total
Frequency	15	20	25	15	29	28	132

Test the hypothesis that the die is unbiased.

b) Two independent samples of sizes 8 and 7 gave the following results. [6]

Sample 1	19	17	15	21	16	18	16	14
Sample 2	15	14	15	19	15	18	16	

Is the difference between sample means significant?

b) Using Penalty (Big-M) method solve the following L.P.P. [8]

Maximise $z = 3x_1 - x_2$

Subject to $2x_1 + x_2 \leq 2$

$x_1 + 3x_2 \geq 3$

$x_2 \leq 4$

$x_1, x_2 \geq 0$

ALL THE BEST!

COMP/ IV | CBCGS) AM-IV/ 11.5-18

QP CODE: 40557

(3 hours) **Max. Marks: 80**

N.B. (1) Question No. 1 is compulsory.
(2) Answer any three questions from Q.2 to Q.6.
(3) Use of Statistical Tables permitted.
(4) Figures to the right indicate full marks.

Q.1 **(a)** Find all the basic solutions to the following problem: **05**

$$\text{Maximise} \quad z = x_1 + 3x_2 + 3x_3$$
$$\text{subject to} \quad x_1 + 2x_2 + 3x_3 = 4$$
$$2x_1 + 3x_2 + 5x_3 = 7$$
$$x_1, x_2, x_3 \geq 0$$

(b) Evaluate $\int_0^{1+2i} z^2\, dz$, along the curve $2x^2 = y$ **05**

(c) A random sample of size 16 from a normal population showed a mean of 103.75 cm & sum of squares of deviations from the mean 843.75 cm^2. Can we say that the population has a mean of 108.75? **05**

(d) If $A = \begin{bmatrix} \pi/2 & \pi \\ 0 & 3\pi/2 \end{bmatrix}$, find $\sin A$. **05**

Q.2 **(a)** Evaluate $\int_c \frac{dz}{z^3(z+4)}$, where c is the circle $|z| = 2$ **06**

(b) Memory capacity of 9 students was tested before & after a course of mediation for a month. State whether the course was effective or not from the data below **06**

Before	10	15	9	3	7	12	16	17	4
After	12	17	8	5	6	11	18	20	3

(c) Solve the following LPP using Simplex Method **08**

$$\text{Maximise} \quad z = 6x_1 - 2x_2 + 3x_3$$
$$\text{subject to} \quad 2x_1 - x_2 + 2x_3 \leq 2$$
$$x_1 + 4x_3 \leq 4$$
$$x_1, x_2, x_3 \geq 0$$

Q.3 **(a)** Find the Eigen values and Eigen vectors of the following matrix. **06**

$$A = \begin{bmatrix} 4 & 6 & 6 \\ 1 & 3 & 2 \\ -1 & -4 & -3 \end{bmatrix}$$

(b) For a normal distribution 30% items are below 45% & 8% are above 64. Find the mean & variance of the normal distribution. **06**

(c) Obtain Laurent's series for $f(z) = \frac{1}{z(z+2)(z+1)}$ about $z = -2$ **08**

[Turn over

Q.4 **(a)** An ambulance service claims that it takes on an average 8.9 min to reach the destination in emergency calls. To check this the Licensing Agency has then timed on 50 emergency calls, getting a mean of 9.3 min with a S.D. 1.6 min. Is the claim acceptable at 5% LOS? **06**

(b) Using the Residue theorem, Evaluate $\int_0^{2\pi} \frac{\cos 2\theta}{5 + 4\cos\theta}\, d\theta$ **06**

(c) (i) If 10% 0f the rivets produced by a machine are defective, find the probability that out of 5 randomly chosen rivets at the most two will be defective.
(ii) If x denotes the outcome when a fair die is tossed, find M.G.F. of x and hence, find the mean and variance of x. **04+04**

Q.5 **(a)** Check whether the following matrix is Derogatory or Non-Derogatory:

$$A = \begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$ **06**

(b) Justify, if there is any relationship between sex and color for the following data. **06**

Color	Male	Female
Red	10	40
White	70	30
Green	30	20

(c) Use the dual simplex method to solve the following L.P.P **08**

Minimise $z = 2x_1 + x_2$

subject to $3x_1 + x_2 \geq 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 3$

$x_1, x_2 \geq 0$

Q.6 **(a)** Show that the matrix A satisfies Cayley-Hamilton theorem and hence find A^{-1}.

Where $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ **06**

(b) The Probability Distribution of a random variable X is given by **06**

X:	-2	-1	0	1	2	3
P(X = x):	0.1	k	0.2	2k	0.3	k

Find k, mean and variance.

(c) Using Kuhn-Tucker conditions, solve the following NLPP **08**

Maximise $z = 2x_1^2 - 7x_2^2 + 12x_1x_2$

subject to $2x_1 + 5x_2 \leq 98$

$x_1, x_2 \geq 0$

Comp/IV/CBCGS/AoA/17/05/18

Q.P.Code: 38841

(3 Hours) [Total Marks:80]

1. Question No. 1 is compulsory.
2. Attempt any three out of remaining five questions.
3. Make suitable assumptions wherever necessary and justify it.
4. Figures to right indicate full marks.

1 Answer the following

a. Write the difference between greedy method and dynamic programming. 5M

b. Explain the general procedure of divide and conquer method. 5M

c. Determine the frequency counts for all statements in the following algorithm segment. 5M

```
I=1;
While(I<=n)
    {
      X=X+I;
      I=I+1;
    }
```

d. What is backtracking Approach? Explain how it is used in Graph Coloring 5M

2.a. Explain with example how divide and conquer strategy is used in binary search? 10M

b. Solve sum of subsets problem for following 10M
N=6 W={3,5,7,8,9,15} & M =20 Also write the Algorithm for it.

3 a. Obtain the solution to knapsack problem by Greedy method n=7,m=15 (p1, p2,...p7)=(10,5,15,7,6,18,3), (w1,w2,...w7)=(2,3,5,7,1,4,1) 10M

b. Sort the list of the elements 10,5,7,6,1,4,8,3,2,9 using merge sort algorithm and show its computing time is O(n log n). 10M

4.a. Explain different string matching algorithms. 10 M

b. What do you understand by NP Complete? Explain Is Subset sum problem NP complete? If so explain. 10M

Q. 5.a. Write a detailednote on Hamiltonian cycles. 10 M

b. Explain how backtracking is used for solving n- queens problem. Show the state space tree. 10M

Q.6 Write Short Note on (any 2) 20 M

a. Job sequencing with deadlines

b. 8 queens problem

c. Longest common subsequence

Comp/IV / CBSGS/AOA / 17/05/16
Comp(old to CBSGS)

Q. P. Code: 22606

Time: 3 Hours **Marks: 80**

N.B
1. **Question no. 1 is compulsory.**
2. **Attempt any 3 from the remaining questions.**
3. **Assume suitable data if necessary.**
4. **Figures to right indicate full marks.**

Q.1 a. Consider the instance of knapsack problem where n=6, M=15, Profits are (P1,P2,P3,P4,P5,P6)=(1,2,4,4,7,2) and weights are (W1,W2,W3,W4,W5,W6) = (10,5,4,2,7,3). Find Max Profit using Fractional Knapsack. 08

b. Compute worst case complexity of following program segment 02

```
sum = 0;
for( i = 0; i < n; i++ )
    for( j = 0; j < i; j++ )
        sum++;
```

c. Write Quicksort algorithm using Divide and Conquer approach. Derive its complexity for all the three cases. 10

Q.2 a. Explain Divide and Conquer approach. Write a recursive algorithm to determine the max and min from given elements and explain. 20
Derive the time complexity of this algorithm and compare it with a simple brute force algorithm for finding max and min.
For the following list of elements trace the recursive algorithm for finding max and min and determine how many comparisons have been made.
22,12,-5,-8,15,60,17,31,47

Q.3 a. What is optimal binary search tree? Let n = 3 and {a1,a2,a3} ={do,if,while}. Let p(1:3) ={0.5,0.1,0.05} and q(0:3) = {0.15,0.1,0.05,0.05}. Compute and construct OBST for above value using Dynamic Programming. 12

b. Solve 8 puzzle problem by Branch and Bound. Draw State space tree. 08

1	2	3
5	6	
7	8	4

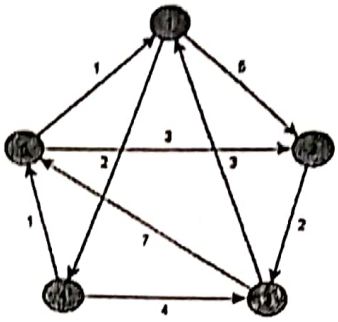
Initial state

1	2	3
5	8	6
7	4	

Final State

Q.4 Write and Explain the algorithm to compute all pair source shortest path using dynamic programming and prove that it is optimal. 20
For the following graph determine the all pairs source shortest path

TURN OVER



Q.5 a. Write an algorithm to determine the sum of subsets for a given Sum and a Set of numbers. Draw the tree representation to solve the subset sum problem given the numbers set as {3,5,6,7,2} with sum = 15. Derive all the subsets. Comment on the complexity of the algorithm. 15

Q.5 b. An algorithm takes 0.5ms for input size 100. How long will it take for an input size 500. If the running time is following 05

1) Linear 2) Quadratic 3) Cubic 4) $\sqrt{n}$ 5) $n\log_2 n$

Q.6 A Explain the idea behind backtracking? Write an algorithm for N-queen problem. Draw state space tree for 4-queen problem. 12

b What is LCS? Find LCS for string S = "ABAZDC" and T= "BACBAD" 08

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COMP / Sem IV / COA / CBSGS / 23-05-18

Q.P. Code :13084

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question no 1 is compulsory.
2. Attempt any three questions from remaining five questions.
3. Assume suitable data if necessary
4. Figures to right indicate marks.

Q.1 Solve any four out of five. 20

A. Write a note on scanner.

B. What are the functions of following registers?

i) IR ii) SP iii) MAR IV) MDR V) PC

C. Compare SRAM & DRAM?

D. What the help of diagram, explain Von-Neumann's architecture?

E. What are the major requirements of I/O module?

Q.2 A. Divide 7 by 3 using non-restoring division algorithms. 10

B. Explain various pipeline hazards with example. 10

Q.3 A. Multiply (-5) and (2) using Booth's Algorithm. 10

B. Consider the string 9,8,2,3,2,9,5,9,8,2,6,7,5,3,8,2,3,2,8 Find the page faults for 3 frames using FIFO, OPT, & LRU page replacement policies. 10

Q.4 A. Explain various cache mapping functions. 10

B. Draw and explain instruction cycle with interrupt execution. 10

Q.5 A. Discuss the functions of 8089 I/O processor. 05

B. Explain the memory hierarchy. 05

C. Describe the register organization within the CPU. 10

Q.6 A. What is bus arbitration? Explain its techniques. 10

B. What is TLB? Explain its working. 10

COMP / sem IV / CO&A / CBCGS / 23-05-18

Q. P. Code: 39078

(3 Hours) **Total Marks: 80**

N.B.

1. Question No.1 is compulsory
2. Solve any three questions from the remaining questions
3. Assume suitable data if required

1a.	Compare Von Neumann architecture and Harvard Architecture	10
1b.	Explain IEEE 754 floating point representation formats and represent $(34.25)_{10}$ to single precision format.	10
1c	Explain memory hierarchy in the computer system.	
1d	Explain the requirements of the I/O modules.	
2a.	Draw the flowchart of Booth's algorithm. Perform following multiplication using Booth's algorithm $M = (-9)_{10}$ $Q = (6)_{10}$	10
2b.	Explain the restoring method of binary division with algorithm. Divide $(7)_{10}$ by $(4)_{10}$ using restoring method of binary division.	10
3a.	What is the necessity of cache memory? Explain set associative cache mapping	10
3b.	Explain the page address translation in case of virtual memory and explain TLB	10
4a.	Explain interrupt driven I/O method of data transfer.	10
4b.	Explain DMA method of I/O data transfer	10
5a.	Explain the superscalar architecture.	10
5b.	State the functions of control unit. Explain Micro-programmed control unit	10
6	Write short notes on (any two) :-	20
a.	Principle of locality of reference	
b.	Instruction Pipelining and its hazards	
c.	Flynn's Classification	
d.	Bus arbitration	

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IT / sem IV / OS / CBCGS / 23-05-18

Q.P.Code: 40533

(3 hours) [80 marks]

OTE: Question No 1 is compulsory
Attempt any three questions from remaining.
Assume suitable data if necessary.

).1. a) What are the major activities of an Operating system with regard to file management and memory management? 10M

b) Compare and contrast stateless and stateful service with the help of an example. 10M

).2. a) Explain with the help of an example, which of the following scheduling algorithms could result in starvation? 10M

a. First-come, first-served
b. Shortest job first
c. Round robin
d. Priority

b) What resources are used when a thread is created? How do they differ from those used when a process is created? 10M

).3. a) Show that, if the wait () and signal () semaphore operations are not executed atomically, then mutual exclusion may be violated. 10M

b) Consider the following snapshot of a system: 10M

	Allocation	*Max*	*Available*
	ABCD	*ABCD*	*ABCD*
Po	0012	0012	1520
pl	1000	1750	
p2	1354	2356	
p3	0632	0652	
p4	0014	0656	

Answer the following questions using the banker's algorithm:
a. What is the content of the matrix *Need*?
b. Is the system in a safe state?
c. If a request from process P1 arrives for (0,4,2,0), can the request be granted immediately?

a) With the help of a neat labeled diagram, explain the hardware support with TLB for paging. 10M

b) Consider the following page reference string: 10M

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, and seven frames?

Remember that all frames are initially empty, so your first unique pages will cost one fault each.

- LRU replacement
- FIFO replacement
- Optimal replacement

.5. a) Justify the statement: Demand paging can significantly affect the performance of computer system. 10M

b) Compare and contrast given allocation methods: Contiguous allocation, Linked allocation, Indexed allocation. 10M

.6. Write Short Notes on: (Any four) 20M

a) Just-in-time compiler.
b) Memory segmentation
c) Deadlock avoidance in distributed system.
d) Operating System Schedulers
e) File system organization
f) Two-phase locking protocol

COMP/IV/CBCGS / CG / 29-5-18

Q.P.Code: 21848

[3 Hours] [Total Marks: 80]

Please check whether you have got the right question paper.

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

Q 1	a)	Explain CSG method for solid modeling.	5
	b)	What is aliasing and Explain any one antialiasing method.	5
	c)	Compare Raster Scan and Random Scan displays.	5
	d)	Prove that two successive rotations are additive i.e. $R1(\theta_1) * R2(\theta_2) = R(\theta_1 + \theta_2)$	5
Q 2	a)	Explain Bresenham line drawing algorithm with proper mathematical analysis and identify the pixel positions along a line between A(10,10) and B(18,16) using it.	10
	b)	Explain the steps for 2D rotation about arbitrary point and provide a composite transformation for the same.	10
Q 3	a)	Explain Liang Barsky line clipping algorithm. Apply the algorithm to clip the line with coordinates (30,60) and (60,20) against window(xmin,ymin)=(10,10) and (xmax,ymax)=(50,50).	10
	b)	Explain Sutherland Hodgman polygon clipping algorithm with suitable example and comment on its shortcoming.	10
Q 4	a)	What is window and viewport? Derive the window to viewport transformation and also identify the geometric transformation involved.	10
	b)	Explain what is meant by Bezier curve? State the various properties of Bezier curve.	10
Q 5	a)	What is meant by parallel and perspective projection? Derive matrix for oblique projection.	10
	b)	Explain Z Buffer algorithm for hidden surface removal.	10
Q 6		Write short notes on(any two)	20
	a)	Koch curve	
	b)	Sweep representation and Octree representation	
	c)	Gouraud and phong shading	
	d)	Halftoning and Dithering.	

COMP/IV/CBSGS/DMS/29-5-18

Q. P. Code : 32479

Time: 3 hours

Marks: 80

N.B. : (1) Question Number 1 is compulsory
(2) Solve any three Questions from the remaining.
(3) Make suitable assumptions if needed

1. (a) Construct an E-R diagram for a Library Management System. Convert the E-R Diagram to Tables. 10

(b) Explain Authorization in SQL. 5

(c) List four significant differences between file processing system and database management system 5

2. (a) Explain Types of Integrity Constraints with example. 10

(b) Write SQL queries for the given database 10

Employee(eid,emp-name,street,city)

Works(eid,cid,salary)

Company(cid,comp-name, city)

Manager (eid, manager-name)

(i) Find the names of all the employees having 'S' as first letter in their Names

(ii) Display the annual salary of all the employees.

(iii) Find the name, street and city of all employees who work for "Accenture" and earn more than 30,000.

(iv) Give total number of employees

3. (a) What is an attribute? Explain different types of attributes with examples. 10

(b) What is Normalization? Explain 1NF, 2NF, 3NF and BCNF. 10

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4. (a) Explain following terms with examples 10

(i) Weak Entity Set

(ii) Data Independence

(iii) Extended ER features

(iv) Total and Partial participation

(b) Explain any five Relational Algebra Operators in detail. 10

5 (a) What is Transaction? Discuss the ACID properties of Transaction. 10

(b) Describe the Overall architecture of DBMS with suitable Diagram. 10

6 (a) Explain log based recovery. 10

(b) Write a note on 10

1) Armstrong axioms
2) Thomas write rule

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4 / sem IV / CBCGS / OS / 04/06/18

Q. P. Code: 38498

Duration: 3hours **Marks: 80**

(1) Question no. 1 is compulsory.
(2) Attempt any three out of remaining five questions.
(3) Assume data if required

Q-1 Attempt **any FOUR**

a Explain the difference between monolithic kernel and micro kernel. 5
b What is mutual exclusion? Explain its significance. 5
c Discuss various scheduling criteria. 5
d Explain various file allocation techniques 5
e Explain the disk cache. 5

2-a What is operating system? Explain various functions and objectives. 10
What is deadlock? Explain the necessary and sufficient condition for deadlock. What is the difference between deadlock avoidance and prevention? 10

3-a Explain the following in brief: 10
(a) Process synchronization (b)Inter-Process Communication
b Consider the following set of processes, assuming all are arriving at time 0. 10

process	Burst time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	5
P5	5	3

Calculate average waiting time and turn-around time for FCFS, SJF (Non-Pre-emptive), Priority and RR (Quantum=2).

4-a What is paging? Explain LRU, FIFO and Optimal page replacement policy for the following string. Page frame size is 4. 10
1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2
b Explain banker's algorithms in detail. 10

5-a What is system call? Explain any five system call in details. 10
b Explain paging hardware with TLB along with protection bits in page table. 10

Q-6 Write short notes on: **(any two):** 20
(a) Linux Virtual file system
(b) Process control block
(c) Readers and writer problem using Semaphore
(d) Explain disk scheduling algorithms.

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mp/comIV / CBSGS / TCS / 04/06/17

Q.P. Code: 37715

Duration : 3 hours Total marks : 80

N.B.: (1) Question No. 1 is Compulsory

(2) Attempt any three questions out of remaining five questions

(3) Assume suitable data wherever required but justify that

(4) Assumptions should be clearly stated.

1 a Differentiate between DFA and NFA. [5]

b Show that L= {(0^n1^n| n>0) is not regular using pumping lemma. [5]

c Define FA. List down the applications of FA. [5]

d Explain Recursively Enumerable Language. [5]

2 a Construct the NFA with €-moves for the regular expression [10]

a) for the language which ends in either 01 or 101 over ∑ = { 0,1 }

b) for the R.E ($a^*b^*+(ab)^*$) over ∑ = { a,b }

b Construct the DFA that accepts the language represented by 0*1*2*. [10]

3 a Convert the given grammar into Griebach Normal Form [10]

S → ABA|AB|BA|AA|A|B

A→ aA|a

B→bB|b

b Design Mealy Machine for the language represented as (0+1)*(00+11) [10]

4 a State and prove pumping lemma for context free languages. [10]

b Write Short note on [10]

i) Post Correspondence problem

ii) Chomsky Heirarchy

5 a Design PDA that accepts the language L={$a^nb^ma^n$ |m,n>=1} [10]

b Design turing machine to accept languages over ∑={0,1} where L={$0^n 1^n$, n ≥ 0} [10]

6 a Draw a parse tree for the string aabbaa for the CFG given by G where [10]

P= { S→aAS|a

A→SbA |SS|ba

Perform both leftmost and rightmost derivation.

b Briefly Explain the types of Turing Machine. [10]

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omp/ sem IV /CBSGS/CG/ 08/06/18

Q. P. Code: 35838

3 Hours

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 justify the same.

1. (a) Describe the Open GL basic primitives. [05]
   (b) Explain inside outside test used in filling algorithm. [05]
   (c) What are the disadvantages of DDA algorithm? [05]
   (d) Prove that two successive rotations are additive. [05]

2. (a) Explain the midpoint circle generation algorithm. [10]
   (b) Explain Liang-Barsky line clipping algorithm. Apply the algorithm to the line with coordinates p1(x1, y1) = (3, 3) and p2(x2, y2) = (12, 9) against the window (xwmin, ywmin) = (4, 4) and (xwmax, ywmax) = (9, 8) [10]

3. (a) Differentiate between parallel and perspective projections. [10]
   (b) Rotate a triangle ABC by an angle 30°, where the triangle has the coordinates A(0, 0), B(10, 2), and C(7, 4). Calculate new coordinates of the triangle. [10]

4. (a) Explain Bezier curve with its properties and construct the Bezier curve of order three with four vertices of the control polygon P0(0,0) , P1(1,2), P2(3,2) and P3(2,0). [10]
   (b) Define window, viewport and derive window to viewport transformation. [10]

5. (a) Explain any one polygon clipping algorithm. [10]
   (b) Explain Gouraud and Phong shading methods along with their advantages and disadvantages [10]

6. Write a short note on any two of the following [20]
   (a) Bresenham's line drawing algorithm.
   (b) Back Face removal algorithm
   (c) 3-D object representation methods

X