

Note: Attempt all Sections. In case of any missing data, choose suitably

SECTION A

1. Attempt all questions in brief.

$$2 \times 07 = 14$$

I. Attempt all questions in brief.		CO	Level
Q no	Question		
a	Write the syntax to create a node for a link list		2
b	Differentiate Binary search and Linear search.		3
c	Differentiate paging and segmentation.		3
d	Write down the difference between NPDA and DPDA with example.		3
e	Design a FA to accept the binary number divisible by 3.		3
f	Discuss the capabilities that should be provided by DBMS.		2
g	Write down the difference between centralized and distributed databases.		3

SECTION B

Attempt any *three* of the following:

 $07 \times 3 = 21$

Question	CO	Level																					
Write a program in C to create a linear linked list interactively and print the list and total number of items in the list.	6	6																					
Consider the processes, CPU burst time and arrival time given below:	3	3																					
<table border="1"> <thead> <tr> <th>Process</th> <th>Arrival Time</th> <th>Burst Time</th> </tr> </thead> <tbody> <tr> <td>P₁</td> <td>0</td> <td>8</td> </tr> <tr> <td>P₂</td> <td>1</td> <td>4</td> </tr> <tr> <td>P₃</td> <td>2</td> <td>2</td> </tr> <tr> <td>P₄</td> <td>3</td> <td>1</td> </tr> <tr> <td>P₅</td> <td>4</td> <td>3</td> </tr> <tr> <td>P₆</td> <td>5</td> <td>2</td> </tr> </tbody> </table>	Process	Arrival Time	Burst Time	P ₁	0	8	P ₂	1	4	P ₃	2	2	P ₄	3	1	P ₅	4	3	P ₆	5	2		
Process	Arrival Time	Burst Time																					
P ₁	0	8																					
P ₂	1	4																					
P ₃	2	2																					
P ₄	3	1																					
P ₅	4	3																					
P ₆	5	2																					
Draw the Gantt Chart and calculate the following by using SRTF CPU scheduling algorithm:																							
(i) Average Waiting Time (ii) Average Turn Around Time																							
Define Push down automata. Design a PDA for the following language:	6	6																					
$L = \{wcw^R \mid w = \{a, b\}^*\}$; where w^R is the reverse of w and c is the splitter																							
Construct a Turing Machine which accepts the following language:	6	6																					
$L = \{0^n 1^n \mid n \geq 1\}$																							
Discuss about Normalization. Explain with suitable example about third, fourth and fifth Normal form.	2	2																					

SECTION C

3. Attempt any *one* part of the following:

$$07 \times 1 = 07$$

Q no.	Question	CO	Level
a.	Write an algorithm for Bubble Sort. Show step by step sorting procedure for the following list of elements: 54, 26, 93, 17, 77, 31, 44, 55, 20		4
b.	Discuss about stack. Write C functions to implement push and pop operations on stack.		6

4. Attempt any *one* part of the following:

$$07 \times 1 = 07$$

Q no.	Question	CO	Level
a.	Explain the difference between Internal fragmentation and External fragmentation. Which one occurs in paging and which one occurs in pure segmentation, discuss about it.		4
b.	Discuss the performance criteria for CPU scheduling in detail.		2

5. Attempt any *one* part of the following:

$$07 \times 1 = 07$$

Q no.	Question	CO	Level
a.	Discuss the applications and limitations of FA. Construct the DFA equivalent to the following regular expression: $(x+y)^*xyy$		6
b.	Write CFG for the following languages: (i) $L = \{a^m b^n \mid n \leq m+3, m, n \geq 0\}$. (ii) $L = \{a^m b^n \mid m, n \geq 1\}$		3

6. Attempt any *one* part of the following:

$$07 \times 1 = 07$$

Q no.	Question	CO	Level
a.	Explain the commit protocol with reference to distributed database. How does the 2PC protocol respond to various types of failure.		2
b.	Discuss about transaction. How would you make transaction recovery from transaction failure, explain with suitable example.		2

7. Attempt any *one* part of the following:

$$07 \times 1 = 07$$

Q no.	Question	CO	Level
a.	Design the PDA for the following grammar: $S \rightarrow aA, A \rightarrow aABC bB a, B \rightarrow b, C \rightarrow c$		6
b.	Explain three-tier architecture of database system.		2