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MMC101

First Semester MCA Degree Examination, Dec.2024/Jan.2025
Programming and Problem Solving in C

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L:Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the characteristics of C programming language	8	L2	CO1
	b.	Explain the structure of C program	5	L2	CO1
	c.	List the uses of C Language.	7	L2	CO1
		OR			
Q.2	a.	Explain the various forms of if statement with examples	12	L2	CO1
	b.	With example explain while,do-while,for loops	8	L2	CO1
		Module – 2			
Q.3	a.	Define array. Give syntax of 1-D array.Explain the operations on array.	10	L2	CO2
	b.	Give 2-D array syntax. Write C program to multiply two matrices.	10	L2	CO3
		OR			
Q.4	a.	Define string with example. Explain the string taxonomy	08	L2	CO3
	b.	Explain the various string operations	05	L2	CO3
	c.	Write a C program search element in an array using linear search.	07	L2	CO3
		Module – 3			
Q.5	a.	Define a Function. Differentiate between call by value and call by reference.	8	L3	CO4
	b.	Define recursive function .write a C program to find the factorial of function using recursive function.	7	L3	CO4
	c.	Write a C program to swap a two numbers by call by value.	5	L3	CO4
		OR			
Q.6	a.	Write a C program to find the mean of N numbers using arrays and pointers	10	L3	CO3
	b.	Write a C program to add two matrices using pointers.	10	L3	CO3
		Module – 4			
Q.7	a.	Define Structure. Give syntax of Structure.	5	L2	CO5
	b.	Write a C program using structure to read and display student information.	10	L2	CO5
	c.	Explain nested structure with example.	5	L2	CO5
		OR			
Q.8	a.	Define Union. Give the syntax of Union.	5	L2	CO5
	b.	Explain the various storage classes	10	L2	CO5
	c.	Write a short note typedef.	5	L2	CO5

		Module – 5			
Q.9	**a.**	Define a File. List and explain the operations on file	**10**	**L2**	**CO1**
	b.	Write a note on	**10**	**L2**	**CO1**
		1. fscanf() 3.fgetc() **2. fgets() 4. fread()**			
		OR			
Q.10	**a.**	Write a note on : 1. Fprintf() 2. Fputs() 3. Fputc() 4. Fwrite()	**10**	**L2**	**CO1**
	b	Write a note on : 1. Fseek() 2. Ftell() 3. Fgetpos() 4. Fsetpos()	**10**	**L2**	**CO1**

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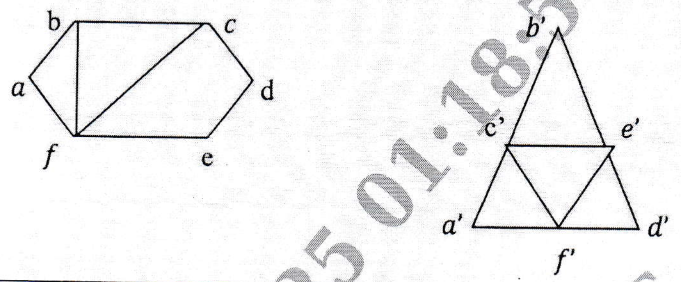
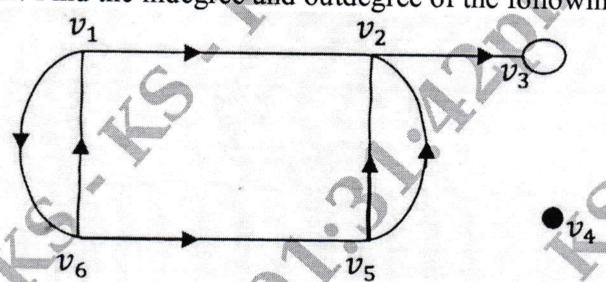
MMC102

First Semester MCA Degree Examination, Dec.2024/Jan.2025
Discrete Mathematics and Graph Theory

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	If $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{1,2,3,7\}$, $B = \{4,5,6,7\}$ and $C = \{1,3,6\}$. Compute the following: (i) $\overline{A \cup C}$ (ii) $\bar{A} \cap \bar{B}$ (iii) $A \cap B \cap C$ (iv) $B - A$ (v) $A - B$	6	L1	CO1
	b.	Let $A = \{1,2,3,4,5,6\}$, $B = \{6,7,8,9,10\}$ and $f: A \to B$ be a function defined by $f = \{(1,7)(2,7)(3,8)(4,6)(5,9)(6,9)\}$. Determine $f^{-1}(6)$ and $f^{-1}(9)$. Also if $B_1 = \{7,8\}$, $B_2 = \{8,9,10\}$ then find $f^{-1}(B_1)$ and $f^{-1}(B_2)$.	7	L2	CO1
	c.	Find the eigen values and eigen vectors of the matrix $\begin{bmatrix} 7 & 3 \\ 3 & -1 \end{bmatrix}$.	7	L2	CO1
		OR			
Q.2	a.	For any two sets A and B, prove the Demorgan's laws.	6	L1	CO1
	b.	State pigeon-hole principle. Show that if 50 books in a library contain a total of 27551 pages, one of the books must have atleast 552 pages.	7	L2	CO1
	c.	In a class of 52 students, 30 are studying C++, 28 are studying pascal and 13 are studying both languages. How many in this class are studying at least one of these languages? How many are studying neither of these languages?	7	L2	CO1
		Module – 2			
Q.3	a.	Define tautology. Show that $[(p \vee q) \wedge (p \to r) \wedge (q \to r)] \to r$ is a tautology	7	L2	CO2
	b.	Write the converse, inverse and the contra positive of the conditional statement: "If oxygen is a gas then Gold is compound".	6	L2	CO2
	c.	Prove the following is valid argument : $p \to r$ $\sim p \to q$ $q \to s$ $\therefore \sim r \to s$	7	L2	CO2
		OR			
Q.4	a.	Prove the following using the laws of logic: $p \to (q \to r) \Leftrightarrow (p \wedge q) \to r$	7	L2	CO2
	b.	Negate and simplify: (i) $\forall x, [p(x) \wedge \sim q(x)]$. $\exists x, [\{p(x) \vee q(x)\} \to r(x)]$.	6	L2	CO2
	c.	Give the direct proof of the following statement *"If n is an odd integer, then n^2 is odd."*	7	L2	CO2
		Module – 3			
Q.5	a.	Define graph and explain the types of graph.	8	L1	CO3

	b.	Prove that the number of vertices of odd degree in a graph is always even.	6	L2	CO3
	c.	Define isomorphic graph and verify the following graphs are isomorphic or not. 	6	L2	CO3
		OR			
Q.6	a.	Explain the following graphs: (i) Bi- partite graph (ii) Sub graphs (iii) Walk (iv) Path	10	L1	CO3
	b.	Prove that a simple graph with n vertices and K components can have at most (n-k)(n-k+1)/2 edges.	10	L2	CO3
		Module – 4			
Q.7	a.	State and prove necessary condition of a graph to be a Euler graph.	10	L2	CO4
	b.	List and explain the different operations on graph.	10	L2	CO4
		OR			
Q.8	a.	Define digraph. Find the indegree and outdegree of the following graph: 	8	L2	CO4
	b.	Illustrate the travelling salesman problem using a graph.	6	L2	CO4
	c.	List and explain different digraphs and binary relations.	6	L2	CO4
		Module – 5			
Q.9	a.	Prove that every tree with two or more vertices is 2- Chromatic	10	L2	CO5
	b.	Explain the following for chromatic polynomial: (i) Finding a maximal independent set. (ii) Finding all maximal independent set.	10	L2	CO5
		OR			
Q.10	a.	Prove that the vertices of every planar graph can be properly colored with five colors.	10	L2	CO5
	b.	Explain the Greedy coloring algorithm.	10	L2	CO5

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MMC103

First Semester MCA Degree Examination, Dec.2024/Jan.2025
Database Management Systems (DBMS)

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define the following terms: i. DBMS ii. Entity & Attribute iii. Relational data model iv. Schema and Schema Diagram v. Primary key and Foreign key	10	L1	CO1
	b.	Discuss the different applications of DBMS.	5	L2	CO1
	c.	Explain three schema architecture with neat diagram.	5	L2	CO1
		OR			
Q.2	a.	Explain components of DBMS.	10	L2	CO1
	b.	Discuss the different types of Relationship types.	5	L2	CO1
	c.	Draw ER-Diagram for Company database which contains entity type Employee, Department, Project and Dependent.	5	L3	CO1
		Module – 2			
Q.3	a.	Explain the following relational algebra operations i. Selection ii. Projection	10	L2	CO2
	b.	Describe the following DDL and DML commands. i. Create ii. Insert iii. Delete iv. Update v. Drop	10	L2	CO2
		OR			
Q.4	a.	Explain the following clauses i. select ...From…Where clause ii. Group by and Having clause	10	L2	CO3
	b.	Elaborate the importance of views.	5	L2	CO3
	c.	Discuss about Procedures.	5	L2	CO3
		Module – 3			
Q.5	a.	Explain 1NF and 2NF with an example.	10	L2	CO3
	b.	Discuss 3NF and Boyce codd with an example.	10	L2	CO3
		OR			
Q.6	a.	Explain 4NF and 5NF with an example.	10	L2	CO3
	b.	Discuss the following with an Example. i. Functional dependency ii. Dependency Preservation Property	10	L2	CO3
		Module – 4			
Q.7	a.	Describe the following i. ACID Properties of transaction ii. Different states for transaction execution	10	L2	CO2
	b.	Discuss two-phase locking system with an example.	10	L2	CO2
		OR			
Q.8	a.	Explain the implementation of Isolation level.	10	L2	CO2
	b.	Discuss Multiple Granularity with an example.	10	L2	CO2
		Module – 5			
Q.9	a.	How the log can be used to recover from a system crash and to roll back transactions during normal operation?	10	L1	CO2
	b.	Illustrate Checkpoints and Fuzzy Check pointing with an example.	10	L3	CO2
		OR			

Q.10	**a.**	Describe the Buffer Management with an example.	**10**	**L2**	**CO2**
	b.	Define Undo and Redo options. The log states are mentioned below. Determine the use of Undo and Redo options to ensure the atomicity in below mentioned examples. (i) <T_o start> < T_o , A, 1000, 950> < T_o , B, 2000, 2050> (ii) <T_o start> < T_o , A, 1000, 950> < T_o , B, 2000, 2050> <T_o commit> <T_1 start> < T_1 , C, 700, 600> (iii) <T_o start> < T_o , A, 1000, 950> < T_o , B, 2000, 2050> <T_o commit> <T_1 start> < T_1 , C, 700, 600> <T_1 commit>	**10**	**L3**	**CO2**

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MMC104

First Semester MCA Degree Examination, Dec.2024/Jan.2025
Operating System

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is the significance of Operating System? Illustrate various services provided by the Operating System.	10	L2	CO1
	b.	What is the purpose of system calls? Describe different types of system calls used in Operating system with examples.	10	L2	CO1
		OR			
Q.2	a.	Illustrate the following operating system architectures with a neat diagram: (i) Microkernel (ii) Layered	10	L2	CO1
	b.	Illustrate with a neat diagram various states of process. Also discuss the significance of process control block (PCB).	10	L2	CO1
		Module – 2			
Q.3	a.	"CPU scheduling ensures proper execution of processes". Justify. Illustrate different scheduling criteria used by CPU scheduling algorithms.	10	L2	CO1
	b.	Discuss how dining philosophers problem is solved using semaphores.	10	L3	CO1
		OR			
Q.4	a.	What do you mean by Critical Section Problem? Explain the solution to the critical-section problem using mutex locks.	10	L2	CO1
	b.	Consider the set of processes with Arrival Time, CPU burst time (in milliseconds) and priority as shown below. (Lower number represents higher priority).	10	L3	CO1

Process	Arrival Time	Burst Time	Priority
P1	0	10	3
P2	1	1	1
P3	2	2	4
P4	3	1	5
P5	4	5	2

Draw the Gantt Chart and calculate the Average waiting time and Average Turnaround time using
1) SJF Scheduling (Non Pre-emptive)
2) Priority Scheduling (Non Pre-emptive)

(Note: Consider Arrival Time for both algorithms.)

Module – 3

Q.5	**a.**	Illustrate deadlocks with their necessary conditions.	**10**	**L2**	**CO2**
	b.	Describe the working principles of Banker's algorithm for the following snapshot and find either the system is in safe state or not.	**10**	**L2**	**CO2**

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P_0	0	0	1	2	0	0	1	2	1	5	2	0
P_1	1	0	0	0	1	7	5	0				
P_2	1	3	5	4	2	3	5	6				
P_3	0	6	3	2	0	6	5	2				
P_4	0	0	1	4	0	6	5	6				

OR

Q.6	**a.**	Discuss deadlock detection with a neat diagram.	**10**	**L2**	**CO2**
	b.	Explain different methods used for recovering from a deadlock in an operating system.	**10**	**L2**	**CO2**

Module – 4

Q.7	**a.**	Describe in detail the concept of Paging with a neat diagram.	**10**	**L3**	**CO3**
	b.	Differentiate between internal and external fragmentation.	**10**	**L2**	**CO3**

OR

Q.8	**a.**	Consider the page reference string: 1,0,7,1,0,2,1,2,3,0,3,2,4,0,3,6,2,1 for a memory with three frames. Determine the number of page faults using the FIFO, Optimal, and LRU replacement algorithms. Which algorithm is most efficient?	**10**	**L3**	**CO3**
	b.	Interpret the concepts of demand paging with neat diagram.	**10**	**L2**	**CO3**

Module – 5

Q.9	**a.**	Illustrate the following access methods. i) Sequential access ii) Direct access	**08**	**L2**	**CO3**
	b.	Illustrate in detail the various operations performed on a file.	**08**	**L2**	**CO3**
	c.	Explain the following: i) Bit vector ii) Linked list	**04**	**L2**	**CO3**

OR

Q.10	**a.**	Illustrate various levels of directory structures.	**10**	**L2**	**CO3**
	b.	List the different file allocation methods and explain any two methods in detail.	**10**	**L2**	**CO3**

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MMC105

First Semester MCA Degree Examination, Dec.2024/Jan.2025
Web Technologies

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Define HTTP. Explain the different Phases of HTTP.	10	L2	CO1
	b.	Discuss the basic structure of XHTML document. Also explain the rules to be followed to make use of HTML elements in XHTML document.	10	L2	CO1
		OR			
Q.2	a.	Briefly explain the following: 1. URL 2. MIME 3. web server 4. web browser	10	L2	CO1
	b.	Explain the following tags with examples 1. Heading tag 2. Hypertext link tag 3. Image tag 4. Progress tag	10	L2	CO1
		Module – 2			
Q.3	a.	Discuss on the different ways of including CSS style information to a HTML document.	10	L2	CO2
	b.	Name any five CSS selectors and explain their uses with a suitable example.	10	L3	CO2
		OR			
Q.4	a.	Explain the various ways of creating arrays in javascript. Mention any 5 array methods and explain their use.	10	L2	CO2
	b.	Write javascript program that accepts. 1. Input : A number n Output : The first n Fibonacci numbers 2. Input : A number n Output : A table of numbers from 1 to n and their squares	10	L3	CO2
		Module – 3			
Q.5	a.	Explain Document object model (DOM) with an example.	10	L2	CO3
	b.	Write a javascript program to show handling of events from textbox and password elements.	10	L3	CO3
		OR			
Q.6	a.	Briefly describe Window object's properties and methods.	10	L2	CO3
	b.	Discuss Event handling. Explain it with an example.	10	L2	CO3

Module – 4

Q.7	a.	Briefly explain the following with examples: 1. AngularJS Numbers 2. AngularJS Strings 3. AngularJS Objects 4. AngularJS Arrays	10	L2	CO4
	b.	Discuss the use of filters in Angular JS with an example.	10	L2	CO4
OR					
Q.8	a.	What is Angular JS? Explain the following Angular JS directives: (i) ng_app (ii) ng_model (iii) ng_bind	10	L2	CO4
	b.	Explain AngularJS expressions. Write an Angular JS program to use expressions.	10	L3	CO4

Module – 5

Q.9	a.	What is Angular JS Services? Explain them with examples.	10	L2	CO4
	b.	Write an Angular JS program to demonstrate client-side form validation.	10	L3	CO4
OR					
Q.10	a.	Briefly explain about AngularJS Events with an example.	10	L3	CO4
	b.	Explain AngularJS Forms and its elements.	10	L3	CO4

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