Shri Shankaracharya Institute of Professional Management and Technology, Raipur Department of Computer Science and Engineering

Time Allowed: 2 Hours Semester: 4th [A & B] Subject: Discrete Mathematics Code: B022411(014) Class Test - II Session: January - June 2023 Month - June 2023 Max Marks: 40

Note: - Attempt any THREE from Unit - III, IV. Atte

Q. N.	Q.N. Question Marks	Marks	Levels of Bloom's	COs
	Ման-ШДV			
	 a) Show that maximum number of edges in simple graph with n vertices is n(n-1)/2 b) b) Give an example of graph which is Hamiltonian but not Eulerian. 	∞	Applying	C04
2	Apply Dijkstra's algorithm to graph and find shortest path from a to f	∞	Evaluating	CO4
ω	Show that set of all positive rational numbers forms an abelian group under the composition defined by $\mathbf{a} * \mathbf{b} = \frac{(ab)}{2}$	∞	Applying	CO3
.4	 a) Define Euler and Hamiltonian graph. b) Draw the undirected graph G corresponding to adjacency matrix [1 2 0 0] [2 0 1 1] [0 1 2 2] [0 1 2 0] 	. ∞	Applying	CO ₄
–	Unit – V a) State Pigeon hole principle b) Show that $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$	∞	Applying	COS
2.	 a) Explain Generating Functions. b) Use generating function to solve recurrence relation a_n - 9a_{n-1} + 20a_{n-2} = 0, a₀ = -3, a₁ = -10 	∞	Evaluating	COS



Shri Shankaracharya Institute of Professional Management and Technology, Raipur Department of Computer Science and Engineering

Class Test - II Session: January - June 2023 Month - June 2023

Time Allowed: 2 Hours Semester: 4th [A & B] Subject: Discrete Mathematics Code: B022411(014) Max Marks: 40

Note: - Attempt any THREE from Unit - III, IV. Attempt any two from Unit V.

1. O. N.	Question Unit — III, IV c) Show that maximum number of edges in simple graph with n vertices is $\frac{n(n-1)}{2}$ d) b) Give an example of graph which is Hamiltonian but not Eulerian. Apply Dijkstra's algorithm to graph and find shortest path from a to f	Marks	Levels of Bloom's Taxonomy Applying	CO ₃
, 19	Apply Dijkstra's algorithm to graph and find shortest path from a to f	∞	Evaluating	CO ₄
μ	Show that set of all positive rational numbers forms an abelian group under the composition defined by $a * b = \frac{(ab)}{2}$	∞	Applying	СОЗ
4.	c) Define Euler and Hamiltonian graph. d) Draw the undirected graph G corresponding to adjacency matrix [1 2 0 0] [2 0 1 1] [0 1 2 2] [0 1 2 0]	∞	Applying	C04
1	c) State Pigeon hole principle d) Show that $1^2 + 2^2 + 3^2 + \dots + n^2 = \frac{n(n+1)(2n+1)}{6}$	∞	Applying	CO3
2.	 c) Explain Generating Functions. d) Use generating function to solve recurrence relation a_n - 9a_{n-1} + 20a_{n-2} = 0, a₀ = -3, a₁ = -10 	∞	Evaluating	COS



Shri Shankaracharya Institute of Professional Management and Technology, Raipur Department of Computer Science and Engineering

Time Allowed: 2 Hours Semester: 4th [C] Subject: Discrete Mathematics Code: B022411(014) Class Test - II Session: January - June 2023 Month - June 2023 Max Marks: 40

Note: - All Questions Compulsory.

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Q. N.	. Question	Marks	Levels of Bloom's Taxonomy	COs
Q1	Define equivalence relation. If R is an equivalence relation in the set A , then prove that R^{-1} is also an equivalence relation.	[2+6]	Apply	CO2
Q2	If $f: X \to Y$ and $g: Y \to Z$ be one-one onto mapping, then prove that the mapping $g \circ f: X \to Z$ is also one-one onto and $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$	[8]	Apply	C02
Q3	Explain the concept of mathematical induction apply to prove $P(n) = \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \dots + \frac{1}{2^n} = 1 - \frac{1}{2^n}$	[2+6]	Apply	C03
Q 4	Find all the solution by recurrence relation: $a_n = 5a_{n-1} - 6a_{n-2} + 2^n + 3n$	[8]	Apply	CO3
Q5	Write Pigeon Hole principle. What is the minimum number of students required in a class to be sure that at least five will receive the same grade if there are four possible grades A, B, C and D.	[2+6]	Apply	CO3

Shri Shankaracharya Institute of Professional Management and Technology, Raipur
Department of Computer Science and Engineering Semester: 4th [C] Subject: Discrete Mathematics Code: B022411(014) Class Test - II Session: January - June 2023 Month - June 2023



Note: - All Questions Compulsory.

Time Allowed: 2 Hours

Max Marks: 40

0	0	ρ	0	Q1	0
Q5	Q4	Q ₃	Q2	1	Q. N.
Write Pigeon Hole principle. What is the minimum number of students required in a class to be sure that at least five will receive the same grade if there are four possible grades A, B, C and D.	Find all the solution by recurrence relation: $a_n = 5a_{n-1} - 6a_{n-2} + 2^n + 3n$	Explain the concept of mathematical induction apply to prove $P(n) = \frac{1}{2} + \frac{1}{2^2} + \frac{1}{2^3} + \dots + \frac{1}{2^n} = 1 - \frac{1}{2^n}$	If $f: X \to Y$ and $g: Y \to Z$ be one-one onto mapping, then prove that the mapping $g \circ f: X \to Z$ is also one-one onto and $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.	Define equivalence relation. If R is an equivalence relation in the set A , then prove that R^{-1} is also an equivalence relation.	Question
[2+6]	[8]	[2+6]	[8]	[2+6]	Marks
Apply	Apply	Apply	Apply	Apply	Levels of Bloom's Taxonomy
CO3	СОЗ	СОЗ	C02	C02	COs

Shri Shankaracharya Institute of Professional Management & Technology, Raipur



Department of Computer Science & Engineering

Class Test-II Session - Jan - June, 2023 Month - June

Sem-CSE 4th (A) Subject-Name-Computer System ArchitectureSubject-Code- B022412(022)
Time Allowed: 2 hrs

Note: - All Questions are compulsory.

5.	.4	3.	2.		Q.N.	Note: -
Consider the execution of the program 15000 instruction a linear pipeline processor with a clock rate of 25MHz. Assume that the instruction pipeline has 5 stages and that one instruction is issued per clock cycle. Calculate 1. Speed up factor 2. Efficiency 3. Throughout	The access time of cache memory is 100 ns and that of main memory 1000 ns. It is estimated that 80% of the memory request for read and remaining for write. The hit ratio for read access only is 0.9 A write through procedure is used 1. What is the average access time of system considering only memory read? 2. What is the average access time of system for both read and write required?	With a neat sketch explain the working principle of DMA.	With the help of schematic diagram, explain how virtual memory can be realized.	Calculate the Following problems using Booth's Algorithm: a) (+13) x (-6) b) (-13) x (+6)	Questions	Note: - Au Questions are compaisory.
[8]	[8]	[8]	[8]	[8]	Marks	
Apply	Apply	Understanding	Understanding	Apply	Levels of Bloom's taxonomy	
COS	CO3	C04	C03	C02	COs	

Shri Shankaracharya Institute of Professional Management & Technology, Raipur



Department of Computer Science & Engineering

Class Test – II Session – Jan – June, 2023 Month – June
CSF 4th (A) Subject-Name - Computer System ArchitectureSubject-Code - B022

Sem- CSE 4th (A) Subject-Name- Computer System ArchitectureSubject-Code- B022412(022)
Time Allowed: 2 hrs

Note: - All Questions are compulsory.

.5	.4	3.	2.	·	Q.N.	
Consider the execution of the program 15000 instruction a linear pipeline processor with a clock rate of 25MHz. Assume that the instruction pipeline has 5 stages and that one instruction is issued per clock cycle. Calculate 1.Speed up factor 2.Efficiency 3.Throughout	The access time of cache memory is 100 ns and that of main memory 1000 ns. It is estimated that 80% of the memory request for read and remaining for write. The hit ratio for read access only is 0.9 A write through procedure is used 1. What is the average access time of system considering only memory read? 2. What is the average access time of system for both read and write required?	With a neat sketch explain the working principle of DMA.	With the help of schematic diagram, explain how virtual memory can be realized.	Calculate the Following problems using Booth's Algorithm: a) (+13) x (-6) b) (-13) x (+6)	Questions	
[8]	[8]	[8]	8	[8]	Marks	
Apply	Apply	Understanding	Understanding	Apply	Levels of Bloom's taxonomy	
Cos	C03	C04	CO3	C02	COs	

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Shri Shankaracharya Institute of Professional Management & Technology Department of Computer Science & Engineering

-II Session - Jan - June, 2023 Month - June

Sem-CSE 4th (B & C) Subject-Name- Computer System Architecture Subject-Code- B022412(022)

Time Allowed: 2 hrs Max Marks: 40

	4.		3	2			. Q.N	Note: -
Consider a cache of 256 blocks in size, each block has 24 words. The main memory size is 2 ¹² blocks, each block has 2 ⁴ words. How many bits are required for each of the TAG,	There are intermediate storage buffers after each stage and the delay of each buffer is 1 nsec. A program consisting of 12 instructions 11, 12,, 112 is executed in the pipelined processor. Instruction 14 is the only branch instruction and its branch target is 19. If the branch is taken during the execution of this program, the time needed to complete the program is?	An instruction in pipeline has five stages without any branch prediction and these stages are Instruction Fetch (IF), Instruction Decode (ID), Operand Fetch (OF), Execute (EX) and Operand Write (OW). The stage delays for IF, ID, OF, EX and OW phases are 5 nsec, 7 nsec, 10 nsec, 8 nsec and 6 nsec, respectively.	With a neat sketch explain the working principle of DMA.	With the help of schematic diagram, explain how associative memory can be realized.	a) (+13) x (-6) b) (-13) x (+6)	Calculate the Following problems using Booth's Algorithm:	Questions	Note: - All Questions are compulsory.
[8]	8			[8]	[8]		Marks	
Apply	Apply		Understanding	Understanding	Apply		Levels of Bloom's taxonomy	
CO3	COS		CO4	C02	C02		COs	

	Sem-CSE 4	S. Branca	SSIPMT A	4S
	* (B & C)	Class		ri Shankarı
Time.	Subject-Nan	Test - II	epartment	acharya Insi
Allowed: 2 hrs	e- Computer S	Session - Jan	of Computer	itute of Prof
Time Allowed: 2 hrs Max Marks: 40	Sem-CSE 4th (B & C) Subject-Name-Computer System Architecture	Class Test - II Session - Jan - June, 2023 Month - June	Department of Computer Science & Engineering	Shri Shankaracharya Institute of Professional Management & Technology
: 40		Month -	ngineering	agement &
	ject-Code-	June		t Technolog
	Subject-Code- B022412(022)			Ų

N.O Note: - All Questions are comp An instruction in pipeline has five stages without any branch prediction and these stages are Instruction Fetch (IF), Instruction Decode (ID), Operand Fetch (OF), Execute (EX) and Operand Write (OW). The stage delays for IF, ID, OF, EX Calculate the Following problems using Booth's Algorithm: With a neat sketch explain the working principle of DMA. With the help of schematic diagram, explain how associative memory can be realized. Consider a cache of 256 blocks in size, each block has 24 words. The main memory size is 2¹² blocks, each block has 24 words. How many bits are required for each of the TAG, SET/BLOCK, WORD fields for different mapping techniques? of this program, the time needed to complete the program is? branch target is 19. If the branch is taken during the execution instructions I1, I2, ..., I12 is executed in the pipelined processor. Instruction I4 is the only branch instruction and its There are intermediate storage buffers after each stage and the delay of each buffer is 1 nsec. A program consisting of 12 respectively. and OW phases are 5 nsec, 7 nsec, 10 nsec, 8 nsec and 6 nsec, Wherever needed, assume that there are 8 ways in each set. a) (+13) x (-6) b) (-13) x (+6) Questions Marks 8 4 8 <u>@</u> [8] Levels of Bloom's taxonomy Understanding Understanding Apply Apply Apply C02 cos C04 C02 SS CO3



Class Test – II Session- Jan-June, 2023 Month-June Sem- 4th (A B & C) Subject- Database Management System Code-B022413(022) Shri Shankaracharya Institute of Professional Management & Technology Department of Computer Science and Engineering

Time Allowed: 2 hrs

 Note: -	Note: - All questions are compulsory.			
Q. N.	Questions	Marks	Levels of Bloom's taxonomy	COs
2	Illustrate the basic steps of query processing with neat diagram	8	Apply	CO3
Q2	Demonstrate the different approaches of storage strategies in DBMS	[8]	Apply	C03
Q3	Evaluate how view serializability is different from conflict serializability in database transaction	[8]	Evaluate	C04
2	Describe Multi-version and Concurrency control scheme	[8]	Analyze	CO4
Q.	Compare DAC, MAC and RBAC the three pillars of security in detail	[8]	Analyze	COS



Max Marks: 40

Time Allowed: 2 hrs

Shri Shankaracharya Institute of Professional Management & Technology

Sem- 4th (A B & C) Subject- Database Management System Code-B022413(022) Department of Computer Science and Engineering Class Test - II Session-Jan-June, 2023 Month-June

Max Marks: 40

Note: - All questions are compulsory.

&	2	ଷ	Q2	Q1	Q. v.	Note: -
Compare DAC, MAC and RBAC the three pillars of security in detail	Describe Multi-version and Concurrency control scheme	Evaluate how view serializability is different from conflict serializability in database transaction	Demonstrate the different approaches of storage strategies in DBMS	Illustrate the basic steps of query processing with neat diagram	Questions	Note: - Au questions are compulsory.
[8]	[8]	8	8	[8]	Marks	
Analyze	Analyze	Evaluate	Apply	Apply	Levels of Bloom's taxonomy	
COS	C04	C04	CO3	CO3	COs	

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Shri Shankaracharya Institute of Professional Management & Technology, Raipur Department of Computer Science and Engineering

Class Test - II Session- Jan - June, 2023 Month- June

Sem- 4th[A, B & C]Subject- Object Oriented Programming (with JAVA)Course Code: B022414(022) Time Allowed: 2 hrs Max Marks: 40

Note: - All the questions are compulsory.

Q	Q	Q3	Q2	Q1	Q.N
Illustrate generic method and class with suitable example.	Illustrate socket and serversocket. Write a program to show the client server communication.	Describe four types of JDBC driver. Write a program to explain the steps of database connectivity.	Explainlife cycle of thread. Write programs for - 1- Thread creation using Runnable interface 2- Thread creation using thread class	Explain the Byte stream and Character stream with suitable program.	Questions
•	~	∞	. ~	∞	Marks
	Apply	Apply	Apply	Apply	Levels of Bloom's taxonomy
3	CO4	C04	C03	CO3	COs

SSIPMT

Shri Shankaracharya Institute of Professional Management & Technology, Raipur Department of Computer Science and Engineering

Class Test - II Session- Jan - June, 2023 Month- June

Sem- 4th[A, B & C]Subject-Object Oriented Programming (with JAVA) Course Code: B022414(022)
Time Allowed: 2 hrs Max Marks: 40

Note: - All the questions are compulsory.

	The survey of th			
Q.N.	Questions	Marks	Levels of Bloom's taxonomy	COs
Q1	Explain the Byte stream and Character stream with suitable program.	, &	Apply	C03
8	Explain life cycle of thread. Write programs for - 1- Thread creation using Runnable interface 2- Thread creation using thread class	8 .	Apply	CO3
Q3	Describe four types of JDBC driver. Write a program to explain the steps of database connectivity.	∞	Apply	CO4
2	Illustrate socket and serversocket. Write a program to show the client server communication.	~	Apply	C04
S	Illustrate generic method and class with suitable example.	∞	Apply	C05



Shri Shankaracharya Institute of Professional Management & Technology Department of Computer Science & Engineering Class Test—II Session-Jan-June. 2023 Month-June

Class Test - II Session- Jan-June, 2023 Month- June Sem- B. Tech-IVth Subject-Design and Analysis of Algorithms Subject Code- B022415(022)

Max Marks: 40

Time Allowed: 2 hrs

Q.N.	Q.N. Questions	Marks	Levels of Bloom's taxonomy	çç,
2	Using the KMP algorithm find out the pattern in the Text. T=abbabaabacadba P=acadba	8	Applying	CO3
8	Apply Longest Common subsequence algorithm and find out the LCS of X and Y, Where: X=A, B, C, B, D, A, B and Y=B, D, C, A, B, A.	[8]	Applying	C03
Q	Write the rules of 8-queen problem. Find any one solution of 8-queen problem by using backtracking.	[8]	Applying	C04
2	What is the Subset problem? Given set S= {3,4,5,6}and x=9 obtain the subset sum problem using backtracking approach?	[8]	Applying	CO4
Q	Solve the 0/1 knapsack problem using Branch and Bound algorithm with following data: Items Weight Value II 3 4 I2 4 5 I3 5 6 where W= 7	[8]	Applying	COS



Shri Shankaracharya Institute of Professional Management & Technology Department of Computer Science & Engineering

Class Test - II Session- Jan-June, 2023 Month- June

Sem- B. Tech-IVth Subject-Design and Analysis of Algorithms Subject Code- B022415(022)
Time Allowed: 2 hrs

Max Marks: 40

Note: - Attempt All Questions. All carry equal marks.

Q.N.	Questions	Marks	Levels of Bloom's taxonomy	SO ²
Q1	Using the KMP algorithm find out the pattern in the Text. T=abbabaabacadba P=acadba	8	Applying	соз
8	Apply Longest Common subsequence algorithm and find out the LCS of X and Y, Where: X=A, B, C, B, D, A, B and Y=B, D, C, A, B, A.	[8]	Applying	C03
8		[8]	Applying	CO4
Q4	What is the Subset problem? Given set S= {3,4,5,6} and x=9 obtain the subset sum problem using backtracking approach?	[8]	Applying	CO4
Q	Solve the 0/1 knapsack problem using Branch and Bound algorithm with following data: Items Weight Value Items 4 11 3 4 12 4 5 13 5 6 where W= 7.	[8]	Applying	COS