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END SEMESTER EXAMINATION, JUNE- 2024**MCA Semester - II****Course Name: OOP using Java****Course Code: MCA123****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type****(Very short) Attempt all.****(10×2=20)**

a.	Define runtime polymorphism.	CO1	PO1,4
b.	What is encapsulation?	CO1	PO1,4
c.	Here are two proposed alternatives to be used in a method to return false if the object reference 'obj' has the null value. Which statement will work? (a) if (obj == null) return false; (b) if (obj.equals(null)) return false;	CO2	PO1,2
d.	Define final? Could we make a main method as final?	CO1	PO1,2
e.	Write a code to convert String into Int.	CO3	PO1,4
f.	Define Throws and throw.	CO4	PO1,4
g.	What is Applet?	CO4	PO1,4
h.	What will happen when you attempt to compile and run the following code? <pre>public class Bs{ int i = 10; int j; char z= 1; boolean b; public static void main(String argv[]) { Bs b = new Bs(); b.bmethod(); } public void bmethod() { System.out.println(j); System.out.println(b); } }</pre>	CO3	PO1,2
i.	What is thread? can you distinguished between thread and process?	CO2	PO1,2
j.	Define Connection class?	CO5	PO1,2

Q.2. Short notes Type (Attempt any five out of Seven)**(5×4=20)**

a.	Discuss Access Specifiers	CO2	PO1,4
b.	What is Immutable? Also write a program to show that the String is immutable.	CO3	PO1,4
c.	Write a program to implement the concept of jagged array.	CO1	PO1,2,3
d.	Define this and super with example?	CO2	PO1,4
e.	Write a program to implement MYSQL-JDBC connectivity.	CO5	PO1,2,3
f.	What is Event Handling in java? List out the available event classes and listener interfaces with suitable example.	CO4	PO1,4
g.	Explain features of JAVA?	CO1	PO1,4

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Q.3. Structured Question (Attempt any three out of four)

(3×10=30)

a.	(i) Explain AWT and its component (ii) Write a code to implement ActionListener on a Button	CO4	PO1,2,3,5
b.	Define Swing and also write a program to design the LOGIN page with event handling.	CO5	PO1,2,3,4,5
c.	(i) Explain Thread in details (ii) Write a code to show the concept of multithreading	CO2	PO1,2,3,4,5
d.	(i) Explain streams in JAVA with example. (ii) Write a program to write into the file.	CO3	PO1,2,3,4,5

Q.4. Long Answer type (Attempt any two out of three)

(2×15=30)

a.	(i) Define a package, and give the list of steps used to create a package in Java. Explain with a code. (ii) Write a Java program to do multiplication of two input matrices with a user defined method with parameter.	CO1	PO1,2,3,4
b.	(i) What is Synchronization and how can we achieve in JAVA (ii) Explain Layout managers with program code.	CO2,4	PO1,4
c.	(i) Write the Applications of JAVA (ii) Discuss any four methods of String Class	CO5,3	PO1,4

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END SEMESTER EXAMINATION, JUNE- 2024**MCA Semester – II****Course Name: Introduction to Cyber Security****Course Code: MCE122****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type****(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10×2=20)**

		CO	PO
a.	Explain term end point security	1	1,2
b.	Write full form PCIDSS	1	1,2
c.	Define Trojan.	1	1,2
d.	Write full form DDOS	2	1,2
e.	Write full form IDS.	2	1,2
f.	What is snort?	3	1,2,5
g.	How can we avoid plagiarism?	3	1,2,5
h.	What is Spamming.	4	1,2,5
i.	List any two forensic tools	4	1,2,5
j.	Is IT ACT 2000 is sufficient to handle cyber crime (Yes/No)	5	1,2,3,5

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)**(5×4=20)**

a.	What is network security explain with example.	1	1,2
b.	How can organizations defend against Cyber Security ?	1	1,2
c.	What are the primary motivations behind DOS?	2	1,2
d.	Explain the role of Windows firewall.	3	1,2,5
e.	Elaborate the role of IDS	3	1,2,5
f.	What is the primary function of Phishing?	4	1,2,5
g.	What is the role of ISO 27001	5	1,2,3,5

Q.3.Structured Question (Attempt any three out of four)

(3×10=30)

a.	(i) What distinguishes a white hat hacker from a black hat hacker in cybersecurity (ii) What are the common types of email-related cybercrimes, and what measures can individuals and organizations take to protect themselves against such threats.	2	1,2
b.	(i) What are some common types of cyber-attacks, and what measures can individuals take to protect themselves against them (ii) What are the primary methods hackers use to gain unauthorized access to computer systems?	1	1,2
c.	(i)What are the key intellectual property rights (IPR) considerations in the field of cybersecurity? (ii)How can financial institutions mitigate the risk of phishing attacks targeting their customers' personal information and financial data?	4	1,2,5
d.	What are some commonly used cyber forensic tools in the field of cybersecurity, and how do they contribute to investigations?	5	1,2,3,5

Q.4.Long Answer / Essay type (Attempt any twoout of three)

(2×15=30)

a.	Explain the concept of a firewall in cybersecurity and discuss the different types of firewalls commonly used in network security architectures. Provide examples and describe the strengths and weaknesses of each type.	3	1,2,3
b.	(i) Discuss the various methods used by cybercriminals to distribute malware via email. How can individuals and organizations protect themselves against email-based cyber threats? (ii) Explain the concept of "social engineering" in the context of cybercrime. Provide examples of social engineering techniques used in email-based attacks.	2	1,2
c.	How can banks enhance their cybersecurity measures to protect against evolving cyber threats in today's digital landscape?	4	1,2,3,5

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END SEMESTER EXAMINATION, JUNE- 2024**MCA Semester - II****Course Name: Theory of Automata****Course Code: MCA125****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Objectives Type****(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10×2=20)**

a.	Elaborate language and Grammar and give an example.	CO2	PO1,PO2
b.	Explain transition table and transition graph?	CO1	PO1,PO2
c.	Explain recursively enumerable language?	CO4	PO1,PO2
d.	Define CNF.	CO2	PO1,PO2
e.	What is PDA?	CO3	PO1,PO2
f.	Define Turing machine.	CO4	PO1,PO2
g.	Give an example of undecidable problem.	CO5	PO1,PO2
h.	State the pumping lemma for regular language.	CO1	PO1,PO2
i.	Define Ambiguous grammar.	CO2	PO1,PO2
j.	Give the DFA accepting the language over the alphabet 0, 1 that has the set of all strings beginning with 101.	CO1	PO1,PO2

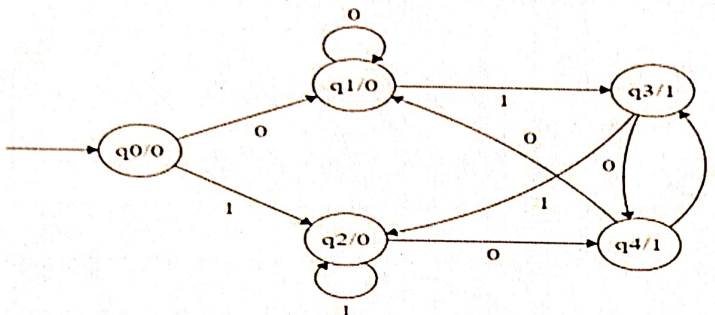
Q.2. Short notes / Short Answer Type (Attempt any five out of Seven)**(5×4=20)**

a.	Difference between DFA and NDFA with their State transition diagram.	CO1	PO1,PO2,PO3
b.	Write about Universal TM.	CO4	PO1,PO2,PO3
c.	Describe linear bounded automaton.	CO4	PO1,PO2,PO3
d.	Remove ϵ productions from the grammar $S \rightarrow ABaC$, $A \rightarrow BC$, $B \rightarrow b/\epsilon$, $C \rightarrow D/\epsilon$, $D \rightarrow d$	CO2	PO1,PO2,PO3
e.	Construct a finite automata for the regular expression $(0+1)^*(00+11)(0+1)^*$.	CO1	PO1,PO2,PO3
f.	Draw a deterministic and non-deterministic finite automata which accept 00 and 11 at the end of a string containing 0, 1 in it.	CO1	PO1,PO2,PO3
g.	Differentiate between leftmost and rightmost derivations.	CO2	PO1,PO2,PO3

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Q.3. Structured Question (Attempt any three out of four)

(3×10=30)

a.	Define Finite Automata. Explain its Types in detail. DFA with $\Sigma = \{0, 1\}$ accepts all strings starting with 1. Write the regular expression for the language starting with a but not having consecutive b's.	CO1	PO1,PO2,PO3
b.	Convert Moore to Mealy Machine 	CO1	PO1,PO2,PO3
c.	Construct PDA from the following Grammar. $S \rightarrow aB$ $B \rightarrow bA/b$ $A \rightarrow Ab$	CO3	PO1,PO2,PO3
d.	From the identities of RE, prove that 1. $10+(1010)^*[\wedge+(1010)^*]=10+(1010)^*$ 2. $(0+011^*)+(0+011^*)(01+0100^*)(01+0100^*)^*=01^*(010^*)^*$ 3.	CO1	PO1,PO2,PO3

Q.4. Long Answer / Essay type (Attempt any two out of three)

(2×15=30)

a.	Convert the following grammar into Greibach normal form. $S \rightarrow AA/a$ $A \rightarrow SS/b$	CO2	PO1,PO2,PO3
b.	Construct a Turing machine that recognizes the language $L=\{a^n b^n, n>1\}$. Show an ID for the string 'aabb' with tape symbols.	CO4	PO1,PO2,PO3
c.	Construct a CFG equivalent to the following PDA. $PDA=\{(p, q), (0, 1), \delta, p, q, (Z, X)\}$, where p is initial state, q is final state. δ is defined as $\delta(p, 0, Z)=(p, XZ)$, $\delta(p, 0, X)=(p, XX)$, $\delta(p, 1, X)=(q, \epsilon)$, $\delta(p, 1, X)=(p, \epsilon)$, $\delta(p, \epsilon, Z)=(p, \epsilon)$.	CO3	PO1,PO2,PO3

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END SEMESTER EXAMINATION, JUNE- 2024
MCA Semester - II

Course Name: Data Structures Using 'C'**Course Code: MCA122**

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Q.1. Attempt All questions. Each carries equal marks.**(10X2=20)**

a.	What is stack?	CO1	PO1
b.	What is complexity of merge sort.	CO5	PO2
c.	Define heap.	CO5	PO1
d.	Define complete binary tree.	CO4	PO1
e.	Define graph.	CO4	PO1
f.	Define level and height of a tree.	CO4	PO2
g.	What is a dequeue?	CO2	PO1
h.	Define complete binary tree.	CO4	PO1
i.	FIFO stands for.....	CO2	PO2
j.	What is the time complexity of merge sort?	CO5	PO2

Q.2. Attempt any five questions. Each carries equal marks**(5X4=20)**

a.	Define stack. Perform the following operations on stack: PUSH (15), PUSH (10), PUSH (8), POP, POP, PUSH (5), PUSH (4), POP, PUSH (20), POP.	CO1	PO3
b.	Define single linked list. Represent the following polynomial using linked list: $3X^2 + 4x - 5$.	CO3	PO2
c.	Perform the insertion and deletion operations on linked list. Write an algorithm to create a singly and doubly linked list.	CO3	PO3
d.	Define stack. List out the applications of stack.	CO5	PO1
e.	Define queue. Explain insertion and deletion in a queue.	CO2	PO1
f.	Explain asymptotic notations used for the time complexity. Describe worst case, best case and average case time complexity.	CO3	PO2
g.	Explain Linked list and its types.	CO3	PO1

P.T.O./-

Q3. Attempt any three questions. Each carries equal marks.

(3X10=10)

a.	Write an algorithm and C function to perform PUSH and POP operations. Also explain what will be TOS (Top of stack) element after performing following operations: PUSH (15), PUSH (14), POP, PUSH (18), PUSH (12), POP, PUSH (10), POP.	CO2	PO3
b.	Define quick sort. Consider following elements in an array- M, E, R, G, E, S, O, R, T show the array instance till second partition using quicksort. (Assume first element as pivot element.	CO3	PO2
c.	Write an algorithm to convert the postfix arithmetic expression to infix notation. Also evaluate the postfix expression: 82-4+567-+*	CO3	PO1
d.	Write a short note on doubly linked list and explain the insertion and deletion of a node from the doubly linked list. Write an algorithm for insertion in linked list.	CO3	PO3

Q4. Attempt any two questions. Each carries equal marks.

(2X15=30)

Q. Attempt any two questions. Each carries equal marks. (2X15=30)											CO1	PO1
a.	Given the set of symbols and corresponding frequency table as below, explain the steps to find the Huffman Code.											
	Symbol	A	B	C	D	E	F	G	H	I		
	Frequency	7	6	4	6	5	1	10	7	8		
b.	Explain merge and quick sorting. Sort the following values using merge sort. 15, 21, 5, 9, 2, 18, 10. Write an algorithm for merge sort.										CO5	PO3
c.	Explain binary search tree. Construct binary search tree for the given list of numbers. 45, 38, 77, 55, 33, 66, 88, 22, 57, 89, 99, 46										CO4	PO2

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END SEMESTER EXAMINATION, JUNE- 2024
MCA Semester – II

Course Name: Data Base Management Systems**Course Code: MCA121****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	What is a primary key?	CO2	PO1
b.	Define the term data and information?	CO1	PO1
c.	Define transaction.	CO5	PO1
d.	Why we need constraints?	CO3	PO1,2
e.	Define the word Durability.	CO5	PO1
f.	What are the main components used in E-R diagram design?	CO2	PO1,3
g.	What do you mean by derived attribute? Explain with an example	CO2	PO1
h.	What are anomalies?	CO4	PO1
i.	Differentiate between delete and drop command.	CO3	PO1,2
j.	Why do we need normalization?	CO4	PO2

Q.2. Attempt any five out of Seven.**(5×4=20)**

QN	Questions	CO	PO
a.	What is Database? Explain three levels of architecture of database system.	CO1	PO1
b.	List and discuss the six-inference rule for functional dependencies.	CO4	PO1
c.	Explain GROUP BY and ORDER BY command with example.	CO3	PO1
d.	Define the term Aggregation with example.	CO2	PO1
e.	Define a functional dependency with example.	CO4	PO1
f.	What is multi-valued dependency & 4NF?	CO4	PO1,2
g.	What do you mean by data independence? Explain types.	CO1	PO1

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Q.3. Attempt any three out of four.

(3×10=30)

QN	Questions	CO	PO
a.	Write SQL queries for the following - (10) Employee (e_id, e_name, e_city, e_sal) I. Add new column age to Employee. II. Retrieve all records for employee who belongs to a particular city. III. Assign value to age for each record. IV. Change e_sal of all employee to 30000 if e_sal range between 25000 to 30000. V. Write a query to find the e_sal citywise.	CO4	PO1,2
b.	Attempt all. (5+5) (i) Check whether the given schedule S is conflict serializable or not? S : R1(A) , R2(A) , R1(B) , R2(B) , R3(B) , W1(A) , W2(B)? (ii) Explain various types of attributes in E-R model with example.	CO5 CO2	PO2 PO1,3
c.	Attempt all. (5+5) (i) What are Triggers & their types? Why they are required? Give syntax to create it. (ii) Explain various type of data model. Compare and contrast.	CO3 CO1	PO1,2 PO1,2
d.	Write Short notes on-. (3+3+4) (i) Referential Integrity (ii) Join (iii) Key	CO2 CO3 CO2	PO1 PO1 PO1

Q.4. Attempt any two out of three.

(2×15=30)

QN	Questions	CO	PO
a.	(i) Explain various type of relational algebra operation from set theory with example. (ii) Discuss the ACID property with example?	CO2 CO5	PO1,2 PO1
b.	(i) Design an E-R diagram for college management system consisting of student, department, faculty, course and hostel. Clearly highlight the entities, relationships, primary key and the mapping constraints. (ii) Explain the following commands insert, create, drop, update by writing their syntax.	CO2 CO3	PO1,2,3 PO1,2
c.	(i) What is lossless decomposition? Explain how it is achieved by taking a suitable example. (ii) Consider the following schedules involving two transactions. Check whether the given schedules are conflict serializable or not- S1: R1(A) , R2(A) , R1(B) , R2(B) , R3(B) , W1(A) , W2(B) S2: R1(B), R3(C), R1(A),W2(A),W1(A),W2(B),W3(B),W1(B),W3(B),W3(C)	CO3 CO5	PO1,2 PO1,2,3

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END SEMESTER EXAMINATION, JUNE- 2024**MCA Semester – II/ B. Tech. (CSE) Semester – VI****Course Name: Operating Systems****Course Code: MCA124/CCS363****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Q.1. Attempt all.****(10×2=20)**

QN	Questions	CO	PO
a.	Explain different types of OS?	1	2
b.	What is Process?	2	1
c.	Explain types of thread.	3	2
d.	What is an Interrupt?	2	2
e.	What are the requirements that a solution to the critical section problem must satisfy?	2	1
f.	Define: Mutual Exclusion?	2	2
g.	What is Deadlock?	2	1
h.	What is Virtual Memory?	3	2
i.	Give the functions of following UNIX commands: cat, cp, pwd.	2	2
j.	What is a dispatcher?	2	1

Q.2. Attempt any five out of Seven.**(5×4=20)**

QN	Questions	CO	PO
a.	What are multiprocessor systems? Give advantages	1	2
b.	What is the purpose of the system calls & system programs?	2	1
c.	What are semaphores? Explain two primitive semaphore operations. What are its advantages?	3	2
d.	Describe necessary conditions for a deadlock situation to arise.	2	2
e.	What are the methods of handling the page faults?	2	1
f.	Consider a logical address space of 8 pages of 1024 words each, mapped on to a physical memory of 32 frames. i. how many bits are there in the logical address? ii. How many bits are there in the physical address?	2	2
g.	Explain various disk scheduling algorithms?	2	1

Q.3. Attempt any three out of four.**(3×10=30)**

Q N	Questions	CO	PO
a.	I. Describe the differences among short- term, medium-term and long-term scheduling with suitable example II. Enumerate the different operating system structure and explain with neat sketch. III. What is meant by 'starvation' in operating system?	2	2
b.	I. Explain the differences in the degree to which the following scheduling algorithms discriminate in favor of short processes: (i) RR (ii) Multilevel feedback queues. II. State the effect of Thrashing in an operating system?	2	1

P.T.O./-

c.	I.	When do page faults occur? Consider the reference string: 1,2,3,4,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults and page fault rate occur for the FIFO, LRU and optimal replacement algorithms, assuming one, two, three, four page frames?	3	2
	II.	What is demand paging? Describe the process of demand paging in OS.		
d.	I.	Explain about the dual mode operation in OS with a neat block diagram.	3	2
	II.	Explain about Scheduling Criteria		
	III.	Explain producer consumer problem using semaphore?		

Q.4. Attempt any two out of three.

(2×15=30)

QN	Questions	CO	PO																												
a.	Consider the following snapshot of a system: <table><tr><td></td><td>ALLOCATION</td><td>MAX</td><td>AVAILABLE</td></tr><tr><td></td><td>A B C D</td><td>A B C D</td><td>A B C D</td></tr><tr><td>PO</td><td>0 0 1 2</td><td>0 0 1 2</td><td>1 5 2 0</td></tr><tr><td>P1</td><td>1 0 0 0</td><td>1 7 5 0</td><td></td></tr><tr><td>P2</td><td>1 3 5 4</td><td>2 3 5 6</td><td></td></tr><tr><td>P3</td><td>0 6 3 2</td><td>0 6 5 2</td><td></td></tr><tr><td>P4</td><td>0 0 1 4</td><td>0 6 5 6</td><td></td></tr></table> ANSWER THE FOLLOWING QUESTIONS USING BANKER'S ALGORITHM: I. What is the content of the matrix need? II. Is the system in a safe state? III. If a request from process p1 arrives for (0 4 2 0) can the request be granted immediately?		ALLOCATION	MAX	AVAILABLE		A B C D	A B C D	A B C D	PO	0 0 1 2	0 0 1 2	1 5 2 0	P1	1 0 0 0	1 7 5 0		P2	1 3 5 4	2 3 5 6		P3	0 6 3 2	0 6 5 2		P4	0 0 1 4	0 6 5 6		2	1
	ALLOCATION	MAX	AVAILABLE																												
	A B C D	A B C D	A B C D																												
PO	0 0 1 2	0 0 1 2	1 5 2 0																												
P1	1 0 0 0	1 7 5 0																													
P2	1 3 5 4	2 3 5 6																													
P3	0 6 3 2	0 6 5 2																													
P4	0 0 1 4	0 6 5 6																													
b.	I. Consider following processes with length of CPU burst time in milliseconds <table><tr><td>Process</td><td>Burst time</td></tr><tr><td>P1</td><td>5</td></tr><tr><td>P2</td><td>10</td></tr><tr><td>P3</td><td>2</td></tr><tr><td>P4</td><td>1</td></tr></table> All process arrived in order p1, p2, p3, p4 all time zero a) Draw Gantt charts illustrating execution of these processes for SJF and round robin (quantum=1) b) Calculate waiting time for each process for each scheduling algorithm. c) Calculate average waiting time for each scheduling algorithm. II. Explain Dead lock detection with Example Write down the algorithm of safe state and request resource algorithms?	Process	Burst time	P1	5	P2	10	P3	2	P4	1	3	2																		
Process	Burst time																														
P1	5																														
P2	10																														
P3	2																														
P4	1																														
c.	I. Process P1,P2,P3,P4 having arrival time of 0,1,5,6 microseconds and burst time 2,2,3,4 microseconds, draw Gantt chart and calculate average turnaround time, average waiting time ,average response time, CPU utilization and throughput using FCFS. II. A system has three types of resources R1 R2 R3 and their number of units are 3, 2, 2 respectively. Four processes P1 P2 P3 p4 are currently competing for these resources in following number. 1. P1 is holding one unit of R1 and is requesting for one unit of R2. 2. P2 is holding two units of R2 and is requesting for one unit each of R1 and R3. 3. P3 is holding one unit of R1 and is requesting for one unit of R2. 4. P4 is holding two units of R3 and requesting for one unit of R1. Determine which if any of the processes are deadlock in this state.	3	2																												
