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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

Second Semester M.C.A. (CBCS) Mid Semester Examinations - I, March 2024

22MCA201 Data Communication and Computer Network

Duration: 1 Hour Max. Marks:15

*Note: 1) Answer **One full** question **from each Unit***

Unit – I

			Marks	BT*	CO*	PO*
1.	a)	Explain with neat diagram the working of TCP/IP model.	5	L1	1	1
	b)	Describe and illustrate the concept of data scrambling techniques using relevant examples.	3	L2	1	1
		OR				
2.	a)	Explain the basic data communication model with diagram.	4	L1	1	1
	b)	Define Modulation. Apply Modulation technique for the data **1101011011**	4	L3	1	2

Unit – II

3.	a)	Given **P =110101** and **M =1010001101.** Find the FCS using CRC Polynomial method.	3	L3	1	2
	b)	Define flow control. Explain sliding window flow control with neat diagram	4	L1	2	1
4.	a)	Compare and Contrast Go-back-N and Selective Reject ARQ using examples.	5	L3	2	2
	b)	Differentiate between synchronous and asynchronous transmission.	2	L3	1	2

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

Second Semester M.C.A. (CBCS) Mid Semester Examinations - I, March 2025

22MCA203- OPERATING SYSTEMS WITH UNIX **Section C&D**

Duration: 1 Hour Max. Marks: 15

*Note: Answer **Two full** questions choosing **One full** question from **each Unit***

		Mark	BT*	CO*	PO*
	Unit – I				
1.	What are system calls? Briefly explain its types. Also explain the dual-mode operation of a computer system.	08	L2	1	1
2.	Discuss the services provided by the operating system.	08	L1	1	1
	Unit – II				
3.	Consider the following set of processes with the length of CPU burst time given in msec. Compute the average waiting time and average turnaround time for the below processes using FCFS, SRTF, Non-preemptive priority, scheduling algorithm.	07	L2	2	1

Process	Arrival Time	Burst Time	Priority
P1	0	8	2
P2	1	4	1
P3	2	9	3
P4	3	5	4

4.	Define race condition. Explain critical section problem. What are the requirements that critical section problem must satisfy?	07	L2	2	1

BT* Bloom's Taxonomy Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

First Semester M.C.A. (CBCS) Mid Semester Examinations - I, October 2024

22MCA104 MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

Duration: 1 Hour | Max. Marks:15

*Note: 1) Answer **One full** question **from each Unit***

Unit – I

			Marks	BT*	CO*	PO*
1.	a)	Using set builder notation and truth table prove any one Demorgan's law.	4	L2	1	1
	b)	There are 20000 people living in Defense Colony. Out of them 9000 subscribe to Star TV Network and 12000 to Zee TV Network. If 4000 subscribe to both, how many do not subscribe to any of the two?	4	L3	1	2
2.	a)	Define Generalized union and Generalized intersection with example.	2	L2	1	1
	b)	Find the eigen values and eigen vectors of the following matrix. $\begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$	6	L3	1	1

Unit – II

3.	a)	Represent the statement "Ravi is good in logic when Ravi is good in math" in Inverse, Contrapositive and Converse form.	3	L2	2	1
	b)	Construct a combinatorial circuit using inverters, OR gates, and AND gates that produces the output $((\neg p \vee \neg r) \wedge \neg q) \vee (\neg p \wedge (q \vee r))$ from input bits p, q, and r.	4	L3	2	2
4.	a)	Show that $\neg (p \rightarrow q)$ and $p \wedge \neg q$ are logically equivalent by developing a series of logical equivalence and truth table.	4	L2	2	1
	b)	How can this English sentence be translated into a logical expression? "You can attend the event if you are a member of the club or if you have an invitation, but only if you are not a guest."	3	L2	2	1

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

Second Semester M.C.A. (CBCS) Mid Semester Examinations - I, March 2025

22MCA213 Soft Computing

Max. Marks:15

Duration: 1 Hour

*Note: 1) Answer **One full** question **from each Unit***

		Marks	BT*	CO*	PO*
	Unit - I				
1.	Define fuzzy set with an example. Explain the following membership function with an example for each i) Trapezoidal MF ii) Gaussian MF	8	2	1	3
2.	Define fuzzification and defuzzification. Explain the following Defuzzification methods with an example for each. i) Lambda-cut method ii) MOM	8	2	1	3
	Unit – II				
3. a)	Fuzzy sets A and B are defined as: A={ (2, 0.9), (3, 0.5) , (4, 1) } B={ (2, 0.8), (3, 1) , (4, 0.8) } Evaluate the following operations: i) Complement of union ii) A intersection B iii) Cartesian product of A and B iv) Bounded sum v) Algebraic sum	5	3	2	3
b)	Define Alpha cut with example	2	2	2	3
4.	Explain the different properties a fuzzy set must have to qualify as a fuzzy number with example	7	2	2	3

BT*. Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

Second Semester M.C.A. (CBCS) Mid Semester Examinations - I, March 2025

22MCA222 – HEALTHCARE ANALYTICS

Max. Marks:15

Duration: 1 Hour

*Note: 1) Answer **One full** question **from each Unit***

Unit - I

		Marks	BT*	CO*	PO*
1.	Define descriptive, predictive, and prescriptive analytics in the context of healthcare. Provide examples of how each type of analytics is applied in the healthcare industry.	7	L2	1	1
2.	Explain the role and significance of the Digital Imaging and Communications in Medicine (DICOM) standard in healthcare analytics.	7	L2	1	1

Unit – II

3.	Explain the concept of bio signals in the time domain. Describe the different types of time-domain features commonly used for analyzing biomedical signals	8	L2	2	1
4.	With a neat Diagram explain the Pipeline for rs-fMRI processing.	8	L2	2	1

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

Second Semester MCA (CBCS) Mid Semester Examinations I

March 2025

22MCA202 – ENTERPRISE JAVA

SECTIONS (B, C, D)

Duration: 1 Hours

Max. Marks: 15

Note: Answer **Five full** questions.

Q.No			Marks	BT*	CO*	PO*
		Unit – I				
1.	a)	A developer wants to restrict a class's variables so they are accessible only within the same class but not by any subclasses or outside classes. Which access modifier should they use, and how does this support encapsulation? private	**04**	L2	1	1
	b)	In what ways can static members be accessed in Java? Illustrate with an example. * If its inside main then access directly. * using class name if outside main class.	**04**	L2	1	1
2.	a)	How can the `this` keyword be used to invoke a constructor and a method within the same class? Explain with an example.	**04**	L2	1	1
	b)	A developer wrote multiple methods with the same name in a class but encountered unexpected behavior when calling them. What could be the reasons, and how does Java differentiate between these methods?	**04**	L2	1	1
		Unit – II				
3.		How can total abstraction be achieved in Java? Describe the process of resolving overridden method calls at runtime instead of compile-time with a programming example. DMD	**07**	L3	2	1
4.		A car **"has-a"** engine, and a sports car **"is-a"** car. Explain how these two relationships differ in Java, and why one should be modeled using aggregation while the other should use inheritance. Application of is a & has a.	**07**	L3	2	1

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

Second Semester M.C.A. (CBCS) Mid Semester Examinations - I, March 2025

22MCA205 PROFESSIONAL COMMUNICATION SKILLS

Duration: 1 Hour | Max. Marks:15

*Note: 1) Answer **One full** question from each unit*

			Marks	BT*	CO*	PO*
1.	A	Write a short note on Barriers to Communication	03	L2	01	9,10
	B	Explain the process of communication.	03	L2	01	9,10
	C	**1.** The term Grapevine is used for (Select and Write the correct option) a. Formal communication b. Informal communication c. Written communication d. Oral communication				
		2. What step determines whether understanding has been achieved during the communication process? a. decoding b. feedback c. channel d. encoding e. transmission	01	L2	01	9,10
		OR				
2.	A	Reflect on your understanding of essential Communication skills for a professional.	03	L2	01	9,10
	B	Write a note of types of communication.	03	L2	01	9,10
	C	**1.** Which of these is not an element of non-verbal communication? a) Eye contact b) Posture c) Name of the speaker d) Personal appearance				
		2. When a person receives too many messages at the same time, it is called ___ (Choose and Write the correct option) a. Message overload b. Complex message c. Message distraction d. End message	01	L2	01	9,10
		Unit – II				
3.	A	Explain some email writing etiquette.	03	L2	01	9,10
	B	Enlist a few things which the speaker should not do in an oral presentation.	02	L2	01	9,10
	C	**1** Talking comes under which type of communication? a. Dramatic b. Non-verbal c. Written d. Verbal				
		2. Which of these is essential for clear verbal communication? a. Maintaining eye contact b. Speaking too quickly c. Overloading the message with details d. Using slang				
		3. Oral presentations are an integral part of an engineer's career. a. True False	03	L2	01	9,10
		OR				

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

First Semester M.C.A. (CBCS) Mid Semester Examinations - I, October 2024

22MCA103 COMPUTER ORGANIZATION & ARCHITECTURE (SECTION C)

Duration: 1 Hour

Max. Marks:15

*Note: 1) Answer **One full** question **from each Unit***

Unit - I

			Marks	BT*	CO*	PO*
1.	a)	State and explain De-Morgan's Laws.	4	L2	1	1,12
	b)	Realize the Boolean expression using NAND gates only. Y= ac + b'c +abc'	4	L3	1	2,12
2.	a)	Implement all basic gates using NOR gates.	4	L3	1	1,12
	b)	Convert $(205)_8$ to binary, $(7F)_{16}$ to octal $(110000)_2$ to Octal, $(5050)_{10}$ to Hexadecimal	4	L3	1	2,12

Unit – II

3.	a)	Simplify using K-map y= f(a,b,c,d) = m (0 ,1, 4, 5, 9, 11) + Dc (2, 3, 6, 7)	4	L3	2	1,12
	b)	Implement 8:1 Mux using two 4:1 Mux and one 2:1 Mux	3	L3	2	4,12
4.	a)	Simplify using QM technique y = f(a,b,c,d) = m (0, 2, 4, 6) + Dc (1,11,13,15)	4	L3	2	1,12
	b)	Implement a'b + ab using 4:1 Mux	3	L3	2	2,12

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

First Semester M.C.A. (CBCS) Mid Semester Examinations - I, October 2024

22MCA104 MATHEMATICAL FOUNDATION FOR COMPUTER APPLICATIONS

Duration: 1 Hour | Max. Marks:15

*Note: 1) Answer **One full** question **from each Unit***

Unit – I

			Marks	BT*	CO*	PO*
1.	a)	Using set builder notation and truth table prove any one Demorgan's law.	4	L2	1	1
	b)	There are 20000 people living in Defense Colony. Out of them 9000 subscribe to Star TV Network and 12000 to Zee TV Network. If 4000 subscribe to both, how many do not subscribe to any of the two?	4	L3	1	2
2.	a)	Define Generalized union and Generalized intersection with example.	2	L2	1	1
	b)	Find the eigen values and eigen vectors of the following matrix. $\begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$	6	L3	1	1

Unit – II

3.	a)	Represent the statement "Ravi is good in logic when Ravi is good in math" in Inverse, Contrapositive and Converse form.	3	L2	2	1
	b)	Construct a combinatorial circuit using inverters, OR gates, and AND gates that produces the output $((\neg p \vee \neg r) \wedge \neg q) \vee (\neg p \wedge (q \vee r))$ from input bits p, q, and r.	4	L3	2	2
4.	a)	Show that $\neg (p \rightarrow q)$ and $p \wedge \neg q$ are logically equivalent by developing a series of logical equivalence and truth table.	4	L2	2	1
	b)	How can this English sentence be translated into a logical expression? "You can attend the event if you are a member of the club or if you have an invitation, but only if you are not a guest."	3	L2	2	1

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

First Semester MCA (CBCS) Mid Semester Degree Examinations – I, October 2024

22MCA102 – ADVANCED DATABASE SYSTEMS

Duration: 1 Hours | Max. Marks: 15

*Note: 1) Answer **One full question** **from each Unit***

			Marks	BT*	CO*	PO*
		Unit – I				
1.	a)	How to separate the user applications from the physical database? Explain with a neat diagram.	04	L2	1	1
	b)	Draw the ER diagram for the student examination system with entity types such as Student, Subject, Exam and Result. Identify the relationships, cardinality ratios and participation constraints.	04	L3	1	1
2.	a)	With example, explain intension and extension with respect to ER Modelling. Draw the schema diagram for the student examination system with entities such as Student, Subject, Exam, Result by representing necessary constraints.	04	L3	1	1
	b)	What are the implications of using Database approach? Explain.	04	L2	1	1
		Unit – II				
3.	a)	Consider the Following Relations Student(Id, Name, Age, Email) Subject(Sid, sname, credit) Exam(Eid, Date, Duration, Subject_id) Result(Rid, Marks_obtained, Student_id, Exam_id) Write the queries to the following 1. Find all exams scheduled for a specific subject (e.g., "Mathematics"). 2. Retrieve a list of students who scored above 75 marks in any exam, including their names, exam dates, and the corresponding subject names.	04	L3	2	2
	b)	Explain TO_CHAR() function with syntax and example.	03	L2	2	2
4.	a)	Consider the tables in Qno 3.a and write the queries to the following. 1. List the students who have scored between 60 and 80 marks in any exam, along with their marks and the exam date. 2. List the exams that have a duration of more than 2 hours.	04	L3	2	2
	b)	Explain Left Join and Right Join with example.	03	L3	2	2

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

First Semester M.C.A. (CBCS) Mid Semester Examinations - I, October 2024

22MCA101 DATA STRUCTURES WITH ALGORITHMS (Section: B & C)

Duration: 1 Hour | Max. Marks:15

*Note: 1) Answer **One full question from each Unit***

Unit - I

			Marks	BT*	CO*	PO*
1.	a)	Write an algorithm to convert an infix expression to postfix and apply it on the following expression. (A+B) * D+E/F	4	L3	1	2
	b)	Implement the PUSH and POP operation on STACK Data Structure.	4	L2	1	1
2.	a)	Define the structure named EMPLOYEE in C with fields: employee id, name, basic salary, dearness allowance (DA), and tax. Write functions for the following operations: i) Read the details for 3 employees from user input. ii) Display employee ID, name, and net salary for 3 employees. (Note: Net salary = basic salary + DA - tax).	4	L2	1	1
	b)	Write an algorithm for postfix expression evaluation. Apply this algorithm to evaluate the following postfix expression: 342*+8-	4	L3	1	2

Unit – II

3.	a)	Explain the difference between ordinary queue and circular queue.	4	L2	2	1
	b)	Write a function to insert an element to the circular queue.	3	L1	2	1
4.	a)	Explain the advantages of circular queue over ordinary queue.	3	L2	2	1
	b)	Write a recursive function to calculate the factorial of a given number n and trace it for n = 3.	4	L3	2	2

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte(Deemed to be University)

First Semester M.C.A. (CBCS) Mid Semester Examinations - I, October 2024

22MCA105 SOFTWARE ENGINEERING AND TESTING

Duration: 1 Hour | Max. Marks:15

*Note: 1) Answer **One full** question **from each Unit***

Unit – I

			Marks	BT*	CO*	PO*
1.	a)	Define and discuss the attributes of a good software.	4	L2	1	1
	b)	Discuss the issues related to professional responsibilities of a software engineer.	4	L1	1	1
2.	a)	Discuss the testing phases in a plan driven software process (V model).	4	L2	1	1
	b)	Write a note on incremental development and delivery.	4	L2	1	1

Unit – II

3	a)	What is a user story?explain with help of Task cards.	3	L2	2	2
	b)	Mention the activities in Requirement Engineering Process.	4	L2	2	2
4.	a)	With help of neat diagram explain the different types of Non Functional Requirements.	4	L2	2	2
	b)	Describe Pair Programming.	3	L1	2	2

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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NMAM INSTITUTE OF TECHNOLOGY, NITTE

Off-Campus Centre of Nitte (Deemed to be University)

First Semester M.C.A. (CBCS) Mid Semester Examinations - I, October 2024

22MCA106 RESEARCH METHODOLOGY AND PUBLICATION ETHICS

Duration: 1 Hour | Max. Marks:15

*Note: 1) Answer **One full question from each Unit***

Unit - I

			Marks	BT*	CO*	PO*
1.	a)	Define Research and state its key Objectives.	4	L1	1	1
	b)	What are the Criteria of a Good research	3	L1	1	2
2.	a)	Give a brief description of Research process. With a neat block diagram.	7	L2	1	2

Unit – II

3.	a)	Elaborate on the techniques involved in defining the research problem.	8	L2	2	2
4.	a)	What is a research problem? Explain the key components of research problem	8	L2	2	1

BT* Bloom's Taxonomy, L* Level; CO* Course Outcome; PO* Program Outcome

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