Subject Code:22AM/DS301PC	SET-II	HT NO:			7	R					

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. III Semester Regular/Supply End Examinations, November-2025

DISCRETE MATHEMATICS

Common to CSM, CSD, AIML

Time: 3 Hours **Max. Marks: 60**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 01 = 10 Marks

			Marks	CO	BL
1.	a	Write the disjunctive normal form (DNF) for the given expression $(P \wedge Q) \vee R$	1	CO1	3
	b	What are logical connectives? List their types.	1	CO1	1
	c	Compare injective and surjective functions	1	CO2	2
	d	Define a set and list different methods of representing sets.	1	CO2	1
	e	Outline the basic properties of algebraic systems.	1	CO3	2
	f	What is a lattice? Give an example.	1	CO3	1
	g	Explain is the principle of exclusion	1	CO4	2
	h	Define permutation and combination.	1	CO4	1
	i	State Euler's formula for planar graphs.	1	CO5	1
	j	Define graph and its basic components.	1	CO5	1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Prove that $(p \rightarrow q) \wedge (q \rightarrow r) \rightarrow (p \rightarrow r)$ is a tautology, without using a truth table.	5	CO1	5
	b	Develop a valid proof using rules of inference for the argument: If it rains, the ground will be wet. It is raining. Therefore, the ground is wet.	5	CO1	3
		OR			
3		Compare and contrast propositional logic and predicate logic. Explain the concepts of quantifiers and bound/free variables with suitable examples.	10	CO1	4

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4	a	Explain different types of relations and their properties.	5	CO2	2
	b	Develop an example to show a relation that is reflexive and transitive but not symmetric.	5	CO2	3
		OR			
5	a	Define a partial order relation. Give an example of a set that is partially ordered but not totally ordered.	5	CO2	3
	b	Determine whether the relation R = {(1,1), (2,2), (3,3), (1,2), (2,1)} on set A={1,2,3} is an equivalence relation.	5	CO2	3
6	a	Prove that the set of integers Z is an abelian group under addition but not under multiplication.	5	CO3	5
	b	Simplify the following Boolean expression using algebraic manipulation: x'y'z + x'yz + xy'	5	CO3	3
		OR			
7		Explain the following: Group, Abelian Group, Semi group, and Monoids. Provide a distinct example for each.	10	CO3	3
8	a	Discuss binomial and multinomial theorems with suitable examples.	5	CO4	4
	b	Explain the sum rule and product rule of counting with illustrative examples.	5	CO4	3
		OR			
9	a	Make use of Binomial Theorem to X^2, Y^2 find the expansion of (2x - 3y)^4.	5	CO4	3
	b	Derive the formula for the number of permutations of n objects taken r at a time.	5	CO4	3
10	a	Check whether the given two graphs are isomorphic. Justify your answer.	5	CO5	4
	b	Explain the Four Color Theorem and its significance. Determine the chromatic number of a given map or graph.	5	CO5	3
		OR			
11	a	Discuss spanning trees and their applications in network design.	5	CO5	4
	b	Construct and analyze a binary tree representation for a given set of data.	5	CO5	4

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Subject Code: 22AM302PC	SET-I	HT NO:			7	R					

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. III Semester Regular/Supply End Examinations, November-2025

SOFTWARE ENGINEERING

Common to CSM, AIML

Time: 3 Hours **Max. Marks: 60**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 01 = 10 Marks

			Marks	CO	BL
1.	a	What is software?	1	CO1	L1
	b	What are process frame work activities?	1	CO1	L1
	c	Define user requirements.	1	CO2	L1
	d	What is requirements prioritization?	1	CO2	L1
	e	What is software design?	1	CO3	L1
	f	Define Class and give its graphical representation.	1	CO3	L1
	g	Define the terms a) Testing b) Debugging	1	CO4	L1
	h	List the types of Testing.	1	CO4	L1
	i	Define RMMM.	1	CO5	L1
	j	What are Internal and External Failure Costs?	1	CO5	L1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	What are the software myths? Explain.	5	CO1	L2
	b	Explain spiral model with diagram.	5	CO1	L2
		OR			
3	a	Explain levels in CMMI with neat diagram.	5	CO1	L2
	b	Explain water fall model with neat diagram.	5	CO1	L2
4	a	Explain briefly about non-functional requirements.	5	CO2	L2
	b	What is Feasibility study? Explain.	5	CO2	L2
		OR			
5	a	Explain about Software requirements documentation.	5	CO2	L2
	b	Explain about requirements validation.	5	CO2	L2

Subject Code: 22AM302PC	SET-I	HT NO:			7	R					

6	a	What are the fundamental Design Concepts? Explain.	5	CO3	L2
	b	Explain a) Class Diagram b) Use Case Diagram.	5	CO3	
		OR			
7	a	Explain a) Data-Centered Architecture b) Data-flow Architecture	5	CO3	L2
	b	Explain a) Things b) Common Mechanisms in Conceptual Model of UML..	5	CO3	L2
8	a	Demonstrate the Test Strategies for Conventional Software.	5	CO4	L2
	b	Explain Metrics for Software Quality.	5	CO4	L2
		OR			
9	a	Differentiate Unit Testing and Integration Testing.	5	CO4	L2
	b	Explain the principles of Software Measurement.	5	CO4	L2
10	a	Illustrate the types of Software Risk.	5	CO5	L2
	b	Explain the concept of Software Reviews.	5	CO5	L2
		OR			
11	a	Compare Reactive Vs Proactive Risk Strategies.	5	CO5	L2
	b	Discuss ISO 9000 Quality Standards.	5	CO5	L2

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281+7 (298)

Subject Code:22CS/AM/DS/IT/CY303PC | SET-I

HT NO: | | | 7 | R | | | | | |

CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. III Semester Regular/Supply End Examinations, November-2025
PROGRAMMING WITH PYTHON
Common to CSE, CSM, CSD, IT, CSIT, CSC, AIML

Time: 3 Hours **Max. Marks: 60**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 01 = 10 Marks

			Marks	CO	BL
1.	a	List any two features of Python	1	CO1	1
	b	Explain the various data types available in Python with examples	1	CO1	2
	c	How to split strings and what function is used to perform that operation?	1	CO2	2
	d	What are the two operators that are used in string functions?	1	CO2	1
	e	Compare tuple and list	1	CO3	2
	f	Mention the features of lists in python	1	CO3	2
	g	List some built in modules in python.	1	CO4	1
	h	How do you handle exceptions in Python?	1	CO4	1
	i	Construct a regex that matches both cat and cats.	1	CO5	3
	j	Explain constructor function in python class with example.	1	CO5	1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Explain in detail about Control flow structures in python.	5	CO1	2
	b	Write a Python program to print prime number series up to N.	5	CO1	3
		OR			
3	a	Develop a program to find the largest among three numbers	5	CO1	3
	b	List various types of operators in Python and write any 4 types of operators in detail.	5	CO1	2

4	a	Demonstrate Array methods with suitable examples.	5	CO2	2
	b	Explain the importance of reshaping and flattening a numpy array with suitable example.	5	CO2	2
		OR			
5	a	Differentiate del, remove and pop on Python Arrays.	5	CO2	3
	b	Write a python program to accept a string and display each word and its length	5	CO2	3
6	a	Explain lambda function with an example.	5	CO3	3
	b	Discuss the following dictionary methods a)fromkeys() b) setdefault() c) update()	5	CO3	3
		OR			
7	a	Explain pop() and sort() methods of list with suitable examples of each.	5	CO3	3
	b	Describe parameter passing in functions using examples.	5	CO3	2
8		Write a syntax for Handling Exceptions with example i try ii try-except iii try-except-else iv try-except-else-finally	10	CO4	3
		OR			
9	a	Difference between Raising and User defined exceptions in python	5	CO4	2
	b	Write a Python program to copy a file's content to another file.	5	CO4	3
10	a	Compare method overloading and overriding.	5	CO5	2
	b	Compare class and object with python code.	5	CO5	3
		OR			
11	a	What is inheritance? Illustrate types of inheritance with python code	5	CO5	2
	b	How do you implement abstract classes and methods in Python?.	5	CO5	3

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Subject Code: 22CS/IT/AM/DS/CY304PC | SET-I | HT NO: | | | 7 | R | | | | | |

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. III Semester Regular/Supply End Examinations, November-2025

COMPUTER ORGANIZATION AND ARCHITECTURE

Common to CSE, CSM, CSD, IT, CSIT, CSC, AIML

Time: 3 Hours **Max. Marks: 60**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 01 = 10 Marks

			Marks	CO	BL
1.	a	List any two arithmetic micro operations.	1	CO1	L1
	b	Identify the role of the arithmetic logic shift unit in a CPU.	1	CO1	L4
	c	Define Register and list different types of registers	1	CO2	L2
	d	What is an instruction cycle?	1	CO2	L2
	e	Distinguish between program control and data manipulation instructions.	1	CO3	L4
	f	Explain the purpose of instruction formats.	1	CO3	L2
	g	What is cache memory?	1	CO4	L1
	h	Demonstrate how DMA improves I/O performance.	1	CO4	L3
	i	What does RISC stand for?	1	CO5	L1
	j	What is vector processing?	1	CO5	L1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.		**Explain** the architecture of a digital computer with a neat block diagram.	10	CO1	L1
		OR			
3	a	Compare arithmetic, logic and shift micro-operations.	5	CO1	L4
	b	Evaluate the advantages of using complements in binary arithmetic.	5	CO1	L5

4	a	**Design** a micro-program , control unit	5	CO2	L6
	b	Explain the instruction cycle and its phases	5	CO2	L2
		OR			
5		Explain the design and working of a microprogrammed control unit. How does address sequencing work in this context?	10	CO2	L2
6		**Evaluate** Booth's multiplication algorithm and **illustrate** the steps for multiplying two signed binary numbers	10	CO3	L3
		OR			
7		**Explain** various addressing modes and **demonstrate** their use with instruction examples.	10	CO3	L2
8	a	Analyse the differences between synchronous and asynchronous data transfer	5	CO4	L4
	b	Illustrate DMA and explain its importance in I/O operations	5	CO4	L3
		OR			
9		Design a priority interrupt handling mechanism for a system with multiple I/O devices.	10	CO4	L6
10		**Evaluate** characteristics of multiprocessors and **illustrate** cache coherence mechanisms.	10	CO5	L5
		OR			
11	a	List the characteristics of RISC architecture.	5	CO5	L1
	b	Explain instruction pipelining with a neat diagram	5	CO5	L2

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1140

Subject Code: 22AM305PC	SET-I	HT NO:			7	R					

CMR TECHNICAL CAMPUS

UGC AUTONOMOUS

B. Tech. III Semester Regular/Supply End Examinations, November-2025

OPERATING SYSTEMS

Common to CSM, AIML

Time: 3 Hours **Max. Marks: 60**

Note

i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 01 = 10 Marks

			Marks	CO	BL
1.	a	What is meant by Time-sharing Systems?	1	CO1	L1
	b	List the services provided by an Operating System?	1	CO1	L4
	c	Define schedulers	1	CO2	L1
	d	Give the condition necessary for a deadlock situation to arise	1	CO2	L1
	e	What operations can be performed on a semaphore?	1	CO3	L1
	f	What is Critical Section problem?	1	CO3	L1
	g	What is External Fragmentation?	1	CO4	L2
	h	What is the basic approach of Page Replacement?	1	CO4	L2
	i	List the various File Attributes	1	CO5	L4
	j	What are the operations that can be performed on a Directory?	1	CO5	L1

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Define process. Illustrate the life cycle of a process with neat diagram.	5	CO1	L2
	b	What is an operating system? Explain different types of operating system in detail?	5	CO1	L1
		OR			
3	a	Explain Process Control Block with neat diagram.	5	CO1	L2
	b	Demonstrate system calls and different types of system calls.	5	CO1	L2
4	a	What is context switching? What information is saved during context switching? Explain the actions taken by a kernel to	5	CO2	L3

context switch between processes.

	b	How do you use deadlock avoidance with multiple instances of resource types? Explain your answer with one illustrative example.	5	CO2	L3
		OR			
5	a	Consider the following five processes, with the length of CPU burst time given below:	7	CO2	L4

Process	Burst Time
P1	24
P2	3
P3	3

i) Consider a Gantt chart illustrating the execution of these job using FCFS CPU scheduling.
ii) Calculate the average waiting time and average turnaround time.

	b	Explain the different ways to be used for the Recovery from Deadlock.	3	CO2	L4
6	a	What is Process synchronization? Explain Critical-section problem with solution?	5	CO3	L3
	b	What is meant by Starvation in Dining philosopher problem? Suggest a solution to solve this problem using Semaphores.	5	CO3	L3
		OR			
7	a	Explain the working of IPC between processes on different systems with illustrative example.	5	CO3	L4
	b	What is Semaphores and types of semaphores?	5	CO3	L2
8	a	What is contiguous and noncontiguous memory allocation? Explain the swapping mechanism with a neat diagram.	3	CO4	L2
	b	Consider the following page reference string: 1,2,3,4,2,1,5,6,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the LRU, FIFO, LFU and Optimal page replacement algorithms, assuming two and five frames?	7	CO4	L5
		OR			
9	a	What is the need for page replacement in Paging? Explain any 3 page replacement algorithms with examples.	5	CO4	L3
	b	Explain the concept of Virtual memory?	5	CO4	L2
10	a	Explain the different disk scheduling algorithms with neat diagrams.	5	CO5	L3
	b	Summarize FCFS Disk Scheduling and SCAN Scheduling with example.	5	CO5	L3
		OR			
11	a	Explain different types of files accessing methods.	5	CO5	L2
	b	Explain the usage of open, create, read, write, close, lseek, stat, ioctl system calls.	5	CO5	L2