O.P.Code: 20HS0812 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
(Common to CSE, CSIT & CE)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	What is demand analysis? Discuss in detail.	CO1	L1	6M
	b	The demand for a particular product depends on several factors – Discuss.	CO1	L2	6M
		OR			
2	a	List out the contemporary practices of Managerial Economics.	CO1	L2	6M
	b	Describe the Law of Demand" and its exceptions.	CO1	L1	6M
		UNIT-II			
3	a	What is Marginal rate of technical substitution?	CO2	L2	6M
	b	Evaluate the Cobb Douglas production function.	CO2	L4	6M
		OR			
4		A high-tech rail can carry a maximum of 36,000 passengers per annum at a fare of Rs. 400.The variable cost per passenger is Rs.150 while the fixed costs are 25,00,000 per year. Find the break- even point in terms of number of passengers and also in terms of fare collections.	CO2	L5	12M
		UNIT-III			
5	a	How markets are classified based on degree of competition?	CO3	L4	6M
	b	Define market structure.	CO3	L1	6M
		OR			
6	a	Discuss various characteristics of market.	CO3	L2	6M
	b	State the features of Imperfect competition.	CO3	L1	6M
		UNIT-IV			
7	a	The cost of project-A is Rs 50000 and cost of project-B is Rs1,00,000 the annual cash inflow for the next 4 years are Rs 25000 .What is the Payback period for the Project A & B?	CO4	L5	6M
	b	The cost of a project is Rs.50,000 which has an expected life of 5 years. The cash inflows for next 5 years are Rs.24,000; Rs.26,000; Rs.20,000; Rs.17000 and Rs.16,000 respectively. Determine the Payback period.	CO4	L5	6M
		OR			
8	a	What is capital? Elucidate the over and under capitalization.	CO4	L3	6M
	b	State the Remedial measures of over and under capitalization.	CO4	L2	6M
		UNIT-V			
9	a	A firm"s sales during the year were Rs 4, 00,000 of which 60 percent were on credit basis. The balance of debtors at the beginning and end of the year were 25,000 and15, 000 respectively. Calculate debtor"s turnover ratio of the firm, also find out debt collection period.	CO5	L5	6M
	b	Write a short note on the following Liquidity ratio.	CO5	L2	6M
		OR			
10	a	Write short notes on interest coverage ratio.	CO5	L2	6M
	b	Explain Gross profit ratio and Net profit ratio.	CO5	L1	6M

*** END ***

O.P.Code: 20CS0505	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

DATABASE MANAGEMENT SYSTEMS

(Common to CSIT, CSM, CAD, CAI & CSE)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	**a**	Why is the use of data independence? Explain by listing some of its major advantages.	**CO1**	**L3**	**6M**
	b	What is an Attribute? Explain different types of Attributes.	**CO1**	**L2**	**6M**
		OR			
2	**a**	Create the DDL Commands – Table Creation, Altering the table structures, truncating a table and dropping a table.	**CO1**	**L3**	**6M**
	b	Differentiate between Database users and administrators.	**CO1**	**L2**	**6M**
		UNIT-II			
3	**a**	Illustrate different operations in Relational algebra with an example?	**CO2**	**L3**	**6M**
	b	Evaluate Order by, Group by and Having Clauses with example.	**CO2**	**L3**	**6M**
		OR			
4	**a**	Classify the Relational calculus in detail?	**CO2**	**L2**	**6M**
	b	What are Views in SQL? Give an example.	**CO2**	**L2**	**6M**
		UNIT-III			
5		Outline the terminologies: Partial Dependency, Transitive Dependency, Determinant, MVD, Join Dependency.	**CO3**	**L3**	**12M**
		OR			
6	**a**	What is Normalization? List out the of purpose normalization.	**CO3**	**L2**	**6M**
	b	Compare Trivial and Non – Trivial Functional Dependencies with example.	**CO3**	**L2**	**6M**
		UNIT-IV			
7	**a**	How do you implement Atomicity and Durability.	**CO4**	**L3**	**6M**
	b	What is Schedule? Explain the serial schedule with examples.	**CO4**	**L2**	**6M**
		OR			
8	**a**	Demonstrate Conflict Serializability in detail.	**CO4**	**L3**	**6M**
	b	What is a Transaction? Explain the States of the transaction with a neat sketch.	**CO4**	**L2**	**6M**
		UNIT-V			
9	**a**	Illustrates the basic principle of media recovery on a database.	**CO5**	**L3**	**6M**
	b	Explain in detail about Deadlock detection.	**CO5**	**L3**	**6M**
		OR			
10	**a**	Explain how recovery is done using undo logging and redo logging.	**CO5**	**L3**	**6M**
	b	Describe the deadlock prevention schemes.	**CO5**	**L2**	**6M**

***** END *****

O.P.Code: 20CS0513	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

COMPUTER NETWORKS

(Common to CCC & CIC)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1		Explain in detail about TCP/IP Network model.	CO1	L2	12M
		OR			
2	a	Briefly explain about Coaxial cable.	CO1	L2	6M
	b	Explain in detail about Fiber optic cable.	CO1	L2	6M

UNIT-II

3	a	Write about the services provided by the Data link layer.	CO2	L4	6M
	b	Classify the Data Link Layer Design Issues.	CO2	L4	6M
		OR			
4	a	Write about FDMA protocol.	CO2	L4	6M
	b	Write about TDMA protocol.	CO2	L4	6M

UNIT-III

5	a	Explain distance vector routing algorithm.	CO3	L2	6M
	b	Briefly state what is count to infinity problem.p	CO4	L3	6M
		OR			
6	a	Explain about quality of service in network layer.	CO6	L2	6M
	b	Describe the term internetworking in network layer.	CO4	L2	6M

UNIT-IV

7		Write in detail about User Datagram Protocol (UDP).	CO4	L4	12M
		OR			
8	a	Describe about TCP connection Establishment.	CO4	L2	6M
	b	Describe about TCP Connection Release.	CO4	L2	6M

UNIT-V

9	a	List out the four main properties of HTTP.	CO5	L1	6M
	b	Illustrate in detail about function and structure of e-mail protocol.	CO5	L3	6M
		OR			
10		Write in detail about DNS Name Space and Domain Resource records.	CO6	L4	12M

***** END *****

O.P.Code: 20EE0202	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations October/November-2025
ELECTRICAL MACHINES-I
(Electrical and Electronics Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	Explain the working principle and operation of a DC generator using a single-turn loop generator as an example.	CO1	L2	6M
	b	Explain the distinction between Lap winding and Wave winding in DC machines.	CO1	L2	6M
		OR			
2	a	Derive the EMF equation of a DC generator by clearly stating the assumptions made.	CO1	L3	6M
	b	An 8-pole DC shunt generator having 778 wave-connected armature conductors runs at 500 rpm and supplies a load of 12.5 Ω resistance at a terminal voltage of 50 V. The armature resistance is 0.24 Ω, and the field resistance is 250 Ω. Determine the armature current, induced EMF and flux per pole.	CO1	L3	6M
		UNIT-II			
3		Explain the parallel operation of a DC generators with with a neat and well-labeled diagram.	CO2	L3	12M
		OR			
4	a	Explain the no-load characteristics of a self-excited generator with a suitable diagram.	CO2	L2	6M
	b	Explain the no-load characteristics of a separately excited DC generator with a suitable diagram.	CO2	L2	6M
		UNIT-III			
5	a	Derive the torque equation of a DC motor and explain each term involved.	CO3	L3	6M
	b	Explain the significance of back EMF in DC motors and its effect on motor performance.	CO3	L2	6M
		OR			
6	a	Describe the field flux control method used for speed regulation in DC motors.	CO3	L2	6M
	b	A 250 V DC shunt motor has an armature resistance of 0.25 Ω. Under load, it draws an armature current of 50 A and operates at 750 rpm. Calculate the new speed of the motor when the field flux is reduced by 10%, assuming the load torque remains constant.	CO3	L3	6M
		UNIT-IV			
7		Explain the construction, working principle, and functional significance of a 4-point starter used in DC motors.	CO4	L3	12M
		OR			
8		Describe the procedure for conducting Swinburne's test on a DC machine. Discuss its advantages and limitations.	CO4	L3	12M
		UNIT-V			
9		Explain the constructional features and operating principle of a Permanent Magnet Brushless DC motor. Also highlight its advantages over conventional DC motors.	CO5	L2	12M
		OR			
10	a	Describe the construction and working mechanism of a stepper motor. Explain how it achieves precise angular displacement.	CO5	L2	6M
	b	List and explain key applications of stepper motors.	CO5	L2	6M

***** END *****

31/10/25 AN

O.P.Code: 20EC0403	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
SWITCHING THOERY AND LOGIC DESIGN
(Electronics and Communication Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define Boolean Algebra and list the postulates used in it.	CO1	L1	5M
	b	Simplify the given Boolean expression to a sum of 3 terms. A'C'D' +AC' +BCD + A'CD' + A'BC + AB'C'	CO2	L2	7M
		OR			
2	a	What are Universal Gates? Relialize any two gates from universal gates.	CO1	L1	5M
	b	Simplify the following Boolean expressions: i) (X'+Z')(X+Y'+Z') ii) (X'Y' + Z)' + Z + XY + WZ	CO2	L3	7M

UNIT-II

3	a	List the steps involved in simplification of K-Map.	CO3	L1	5M
	b	Simplify the Boolean expression, F=A'+AB+ABD'+AB'D'+C' using Four Variable K-Map and draw the logic diagram using AOI.	CO3	L2	7M
		OR			
4		Simplify the following Boolean function by using Tabulation method. F = Σ (0, 1,2,8,10,11,14, 15)	CO3	L3	12M

UNIT-III

5	a	Design & implement a 4-bit Binary-to-Gray code converter.	CO4	L3	6M
	b	Design a Full Subtractor using truth table.	CO4	L3	6M
		OR			
6		Illustrate the following Boolean functions using decoder and OR gates. F1(A,B,C,D)=∑(2,4,7,9) F2(A,B,C,D)= ∑(10,13,14,15)	CO4	L3	12M

UNIT-IV

7	a	Differentiate between combinational and sequential circuits.	CO1	L1	5M
	b	Convert SR flip flop into JK Flip-Flop. Draw and explain its logic diagram.	CO5	L3	7M
		OR			
8		What is a synchronous counter? Design a 3-bit synchronous up/down counter.	CO5	L3	12M

UNIT-V

9	a	Define Moore model. Explain it with neat diagram.	CO6	L1	6M
	b	Compare ROM and RAM.	CO6	L1	6M
		OR			
10		Illustrate the PLA for the following Boolean function. (i) $F1 = \Sigma m(0,1,3,4)$ (ii) $F2 = \Sigma m(0,1,2,3,4,5)$	CO6	L3	12M

***** END *****

O.P.Code: 20CS0506	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to CSIT, CSE, CCC & CIC)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	Define data type? Discuss the data types available in java.	CO1	L6	6M
	b	Develop a java program to read different data types using scanner.	CO1	L6	6M
		OR			
2	a	What is an array? Classify the types of arrays in java.	CO1	L5	6M
	b	Create a java program to read and display the array elements.	CO1	L5	6M
		UNIT-II			
3	a	Define constructor? Classify the types of constructors in Java?	CO2	L5	6M
	b	Write a java program to illustrate constructor overloading.	CO2	L3	6M
		OR			
4	a	What is an abstract class? Discuss the cases to implement abstract class.	CO2	L6	6M
	b	Give the differences between Abstract class and Interface.	CO2	L4	6M
		UNIT-III			
5	a	Show about creating your own exception clauses.	CO3	L2	6M
	b	Develop a java program to create own exception for negative value exception if the user enter negative value.	CO3	L6	6M
		OR			
6	a	Illustrate creating of thread in Java.	CO3	L3	6M
	b	Write a Java program that creates three threads. First thread displays Good Morning, every one second, the second thread displays Hello, every two seconds and the third thread displays Welcome, every three seconds.	CO3	L2	6M
		UNIT-IV			
7	a	Discuss in detail on collection interfaces and their methods.	CO4	L6	6M
	b	List and describe about collection class in java.	CO4	L2	6M
		OR			
8	a	Interpret how to create a file in java with example program.	CO4	L6	6M
	b	Develop a java program to show read and write a file in java with an example program.	CO4	L2	6M
		UNIT-V			
9		Apply an AWT based calculator with basic operations using java.	CO5	L3	12M
		OR			
10	a	Interpret the usage of Date and Time API with an example program.	CO5	L2	6M
	b	Discuss in detail the operations on Streams.	CO5	L6	6M

***** END *****

Q.P.Code: 20CS0511 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
PYTHON PROGRAMMING
(Common to CSM, CAD & CAI)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	Explain the variable and keywords with suitable example.	CO1	L2	6M
	b	Illustrate the Input and Output statements with example.	CO1	L2	6M
		OR			
2	a	Explain about the Single-Valued data types in python.	CO2	L2	6M
	b	Discriminate about the Multi-Valued Data types with example.	CO2	L5	6M
		UNIT-II			
3	a	Discuss the Membership and Identity operators with example.	CO2	L2	6M
	b	write a python program to find biggest number among three numbers.	CO1	L1	6M
		OR			
4	a	Create a Python program to display Fibonacci series.	CO1	L6	6M
	b	Develop a Python program to Swapping of two numbers with and without using temporary variable.	CO1	L6	6M
		UNIT-III			
5	a	Define function and explain the types of functions with an example.	CO3	L1	6M
	b	Discuss about key word arguments with example.	CO3	L2	6M
		OR			
6	a	What is Polymorphism? How will you perform Method Overloading?	CO4	L1	6M
	b	Illustrate Method Overriding in Python with suitable example.	CO4	L3	6M
		UNIT-IV			
7	a	Describe about name spacing.	CO3	L2	6M
	b	Explain about the import statement in modules.	CO3	L2	6M
		OR			
8	a	Write a python code using try-except-else-finally statement in python.	CO4	L3	6M
	b	Illustrate matching with example program.	CO5	L2	6M
		UNIT-V			
9	a	Discuss about Maps in python.	CO6	L2	6M
	b	Describe the Filters in python.	CO6	L2	6M
		OR			
10	a	What is Data Management and Object Persistence? Explain in detail.	CO5	L1	6M
	b	Describe the Turtle using python program.	CO4	L2	6M

***** END *****

O.P.Code: 20CE0105	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
BUILDING TECHNOLOGY
(Civil Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define foundation? What are the essentials of a good foundation?	CO1	L1	6M
	b	Write the objectives of foundations and list the types of foundation.	CO1	L1	6M

OR

2		Describe briefly spread footing with neat sketch.	CO1	L3	12M

UNIT-II

3		What is the purpose of flooring and what are the materials used for construction?	CO2	L1	12M

OR

4		Write short notes on Timber Flooring.	CO2	L1	12M

UNIT-III

5		What is stair case? What are the technical terms used in construction?	CO3	L1	12M

OR

6	a	State briefly the requirements of good stair case.	CO3	L1	6M
	b	Classify types of stairs and Explain i) Quarter Turn Staircase ii) Half turn staircase	CO3	L1	6M

UNIT-IV

7		Explain why ventilation is required. Describe briefly the factors affecting Ventilation.	CO4	L3	12M

OR

8		Summarize the Natural and Mechanical ventilation with neat sketches.	CO4	L3	12M

UNIT-V

9		Describe briefly the factors to be considered for planning of lift installation invarious civil engineering structures.	CO5	L3	12M

OR

10	a	Explain briefly the machine room and its equipment of lifts.	CO5	L3	6M
	b	List-out the lift safety features and describe briefly.	CO5	L2	6M

*** END ***

O.P.Code: 20ME0304	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025
KINEMATICS OF MACHINERY
(Mechanical Engineering)

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

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1		Explain the inversions of single slider crank chain with neat sketch and list out the practical applications of inversions?	CO1	L1	12M

OR

2	a	Explain the working of beam engine with neat sketch.	CO1	L2	6M
	b	Explain the working principle of quick return mechanisms and also describe the working of Oscillating cylinder engine with neat sketch.	CO1	L2	6M

UNIT-II

3	a	Describe the watt mechanism with a neat sketch.	CO2	L1	6M
	b	Sketch and Describe the Tchebichef mechanism.	CO2	L1	6M

OR

4	a	Differentiate between the Davis and Ackerman's steering mechanism.	CO2	L4	6M
	b	List out the merits and demerits of Davis steering gear mechanism.	CO2	L1	6M

UNIT-III

5	a	What are the various methods used for finding out acceleration of mechanism? Explain one of them.	CO3	L1	6M
	b	How the Velocity of a Point on a Link can find by Relative Velocity Method.	CO3	L1	6M

OR

6	a	What do you understand by the instantaneous centre of rotation in kinematic of machines? Answer briefly.	CO3	L1	6M
	b	Explain the following terms: i) Instantaneous center ii) Body center and space centrode iii) Axode	CO3	L2	6M

UNIT-IV

7	a	Construct the displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion.	CO4	L5	6M
	b	Construct the displacement, velocity and acceleration diagrams for a follower when it moves with uniform Acceleration and retardation.	CO4	L5	6M

OR

8		It is required to set out the profile of a cam to give the following motion to the reciprocating follower with a flat mushroom contact face (i) Follower to have a stroke of 20 mm during 120° of cam rotation (ii) Follower to dwell for 30° of cam rotation ; (iii) Follower to return to its initial position during 120° of cam rotation and (iv) Follower to dwell for remaining 90° of cam rotation. The minimum radius of the cam is 25 mm. The out stroke of the follower is performed with simple harmonic motion and the return stroke with equal uniform acceleration and retardation.	CO4	L4	12M

UNIT-V

9	a	What do you understand by the term 'interference' as applied to gears?	CO5	L1	6M
	b	Define the following terms relates to transmission of motion (i) Gear tooth contact ratio (ii) Condition for constant velocity ratio	CO5	L1	6M

OR

10		Explain briefly the differences between simple, compound, and epicyclic gear trains. What are the special advantages of epicyclic gear trains?	CO5	L1	12M

*** END ***

O.P.Code: 20EC0404	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
SIGNALS, SYSTEMS AND RANDOM PROCESSES
(Electronics & Communications Engineering)

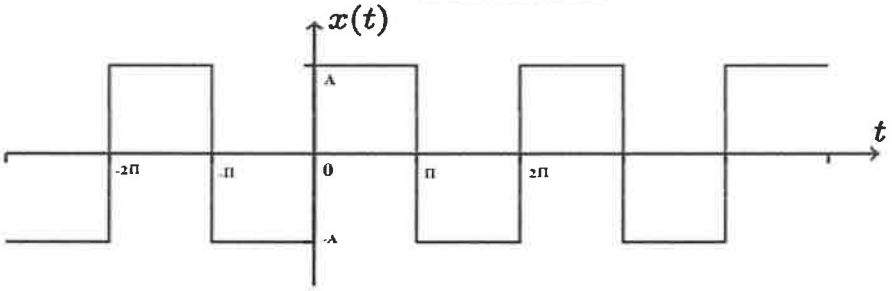
Time: 3 Hours **Max. Marks: 60**

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1		Define and Explain the Following with an example.(i) Continuous time and Discrete time signals(ii) Energy and Power Signal.(iii) Periodic and Aperiodic Signal(iv) Deterministic and Non-Deterministic Signal.	CO1	L1	12M
		OR			
2	a	Define Stable and Unstable systems with an example.	CO1	L2	6M
	b	Determine whether the following systems are stable or not. (i) $y(t)= (t+5)\, u(t)$ (ii) $h(n)=a^n$ for $0<n<11$	CO1	L3	6M

UNIT-II

3	a	Explain about Fourier Transform of Periodic Signals.	CO2	L2	6M
	b	State and prove the Linearity and Time Shifting properties of Continuous time Fourier transform.	CO2	L3	6M
		OR			
4		Develop the Exponential Fourier Series for the given signal below 	CO2	L3	12M

UNIT-III

5	a	Define linear time invariant and linear time variant system with necessary equations.	CO2	L2	6M
	b	State and Prove the Following Properties of LTI System. (i) Distributive Property (ii) Associative Property.	CO2	L3	6M
		OR			
6		Consider a causal LTI system with frequency response $H(\omega)=1/4+j\omega$, for a input x(t), the system is observed to produce the output $y(t)=e^{-2t}u(t)- e^{-4t}u(t)$. Find the input x(t).	CO2	L3	6M

UNIT-IV

7		Illustrate the inverse Laplace transform of the following. (i) $X(s) = 1/ s(s+1)(s+2)(s+3)$ (ii) $X(s)=s/(s+3)(s2+6s+5)$	CO5	L3	12M

O.P.Code: 20CI0601 | R20 | H.T.No. | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

PRINCIPLES OF OPERATING SYSTEMS

(Computer Science & Information Technology)

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

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1	a	Explain how operating system services are provided by system calls.	CO1	L2	6M
	b	Difference between Monolithic kernel and Micro kernel.	CO1	L2	6M

OR

2	a	Discuss in detail the layers of the operating system structures.	CO1	L2	6M
	b	Describe in detail about computing environments with a neat diagram.	CO1	L2	6M

UNIT-II

3	a	Examine the different multithreading models along with their issues.	CO2	L2	6M
	b	For the following processes with their CPU burst times, calculate the average waiting time and average turnaround time using Shortest Job Next scheduling.	CO2	L3	6M

Process	Burst Time (ms)
P1	6
P2	3
P3	9
P4	4

OR

4	a	Describe the Inter Process Communication in client-server systems.	CO2	L2	6M
	b	Consider the following processes for scheduling.	CO2	L3	6M

Process	Burst Time (ms)	Priority
P1	10	3
P2	4	1
P3	2	5
P4	1	4
P5	5	2

Calculate the average waiting time and turnaround time for the processes using the Round Robin scheduling with a time quantum of 1 ms.

UNIT-III

5	a	What is Process synchronization? Explain the critical-section problem with a solution.	CO3	L2	6M
	b	Discuss about Synchronization Hardware	CO3	L2	6M

OR

6	a	Explain in detail producer producer-consumer problem.	CO3	L2	6M
	b	Describe about the recovery from deadlock.	CO3	L2	6M

UNIT-IV

7	a	Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 1. How many page faults would occur for the LRU and optimal page replacement algorithms, assuming two frames?	CO4	L3	6M
	b	Write a short note on Virtual Memory.	CO4	L2	6M

OR

8	a	For the given page reference string 2, 1, 0, 3, 4, 0, 0, 0, 2, 4, 2, 1, 0, 3, 2. How many page faults would occur if the working set policy were used with a window size of 47? Show when each page fault would occur.	CO4	L3	6M
	b	Difference between External fragmentation and Internal fragmentation? How to solve the fragmentation problem using paging?	CO4	L2	6M

UNIT-V

9	a	Explain about disk structure.	CO5	L2	6M
	b	Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. The drive is currently serving a request at cylinder 143, and the previous was at cylinder 125. The queue of pending requests: 86, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. What is the total distance that the disk arm moves to satisfy all the requests for FCFS disk-scheduling algorithm?	CO5	L3	6M

OR

10	a	Compare the C-LOOK and C-SCAN disk scheduling algorithms.	CO5	L2	6M
	b	Consider the queue of requests: 55, 58, 39, 18, 90, 160, 150, 38, 184, 27, 129, 110, 186, 147, 41, 10, 64, 120. The head is currently at 100 and is moving in the direction of decreasing track number. Perform the analysis for C-LOOK algorithm.	CO5	L3	6M

*** END ***

O.P.Code: 20CS0507	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
OPERATING SYSTEMS
(Common to CSE, CSM, CAD, CAI, CCC & CIC)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	Evaluate different types of system calls in operating system.	CO1	L5	6M
	b	Write notes on system programs.	CO1	L1	6M
		OR			
2	a	Explain Micro Kernel Operating system.	CO1	L2	6M
	b	Determine concept of virtual machines.	CO1	L3	6M
		UNIT-II			
3	a	Explain the Structure of user level thread and kernel level thread.	CO2	L4	6M
	b	List the Advantages of ULT and KLT.	CO2	L1	6M
		OR			
4	a	Discuss about Thread Libraries.	CO2	L2	6M
	b	Difference between ULT and KLT.	CO2	L2	6M
		UNIT-III			
5	a	Describe in detail deadlock prevention.	CO3	L3	6M
	b	Justify what is deadlock avoidance, explain briefly.	CO3	L4	6M
		OR			
6	a	Summarize between Deadlock Detection and Recovery.	CO3	L2	6M
	b	Explain Banker's Algorithm.	CO3	L2	6M
		UNIT-IV			
7	a	Classify demand paging with example.	CO4	L4	6M
	b	Dissect pagereplacement with example.	CO4	L4	6M
		OR			
8	a	Compare all disk scheduling algorithms.	CO4	L5	6M
	b	Describe about disk management.	CO4	L2	6M
		UNIT-V			
9	a	Describe in detail about Threats.	CO5	L2	6M
	b	Discuss in detail about intruders.	CO5	L1	6M
		OR			
10	a	Explain about secret key and public key cryptography.	CO5	L2	6M
	b	Justify digital signature in detail.	CO5	L6	6M

***** END *****

O.P.Code: 20CE0109	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
FLUIDMECHANICS
(Civil Engineering)

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

(Answer all Five Units **5 x 12** = **60** Marks)

		UNIT-I			
1		Explain the following: i) Surface Tension ii) Vapour Pressure iii) Compressibility	**CO1**	**L2**	**12M**
		OR			
2	**a**	State Pascal's law and Derive pressure variation in liquid at rest.	**CO1**	**L2**	**6M**
	b	Define the following terms : i).Atmospheric Pressure ii).Absolute Pressure iii).Gauge pressure iv).Vacuum pressure.	**CO1**	**L2**	**6M**
		UNIT-II			
3		Explain in detail about Velocity Potential Function and write its properties.	**CO2**	**L2**	**12M**
		OR			
4		Derive Continuity Equation in 3-Dimensional flow.	**CO2**	**L3**	**12M**
		UNIT-III			
5		Derive the Bernoulli's energy equation with assumptions	**CO3**	**L3**	**12M**
		OR			
6		Derive the Expression for velocity measurement by Pitot tube and pitot static tube.	**CO3**	**L3**	**12M**
		UNIT-IV			
7		An oil of specific gravity 0.7 flowing through a pipe of 300mm at the rate of 50lit/s. find the head lost due to friction and power required to maintain the flow for a length of 1000m & Take kinematic viscosity 0.29 stoke?	**CO5**	**L3**	**12M**
		OR			
8		Three pipes of lengths 800m, 500m & 400m & of dia 500mm, 400mm & 300mm respectively are connected in series. These pipes are replaced by a single pipe of length 1700m. Find the dia of the single pipe.	**CO5**	**L3**	**12M**
		UNIT-V			
9		What is dimensionless number? Explain different types of numbers.	**CO6**	**L2**	**12M**
		OR			
10		Calculate i) pressure gradient along flow ii) average velocity iii) discharge for an oil of viscosity 0.02 Ns/m2 flowing between two stationary parallel plates 1m wide maintained 10mm apart. The velocity between plates is 2m/s.	**CO6**	**L2**	**12M**

***** END *****

O.P.Code: 20ME0305	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
THERMAL ENGINEERING
(Mechanical Engineering)

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

(Answer all Five Units 5 x 12 = 60 Marks)

		UNIT-I			
1		Derive the relation for Volumetric efficiency of a single stage reciprocating Compressor.	CO1	L3	12M
		OR			
2	a	Explain the working of any two Rotary compressors with neat sketch.	CO1	L2	6M
	b	Derive the relation for work done on single stage reciprocating compressor without Clearance.	CO1	L3	6M
		UNIT-II			
3		Derive the expression for the efficiency of Brayton cycle in terms cycle parameters.	CO2	L3	12M
		OR			
4		Explain various methods of Improving Brayton Cycle Efficiency.	CO2	L2	12M
		UNIT-III			
5		Determine the throat area, exit area and exit velocity for a steam nozzle to pass 0.2kg/s when the inlet conditions are 12 bar and 2500C and final pressure is 2bar.Assume that the expansion is isentropic and inlet velocity is negligible. Take n=1.3 for superheated steam.	CO3	L3	12M
		OR			
6	a	Explain about super saturated flow in nozzles with neat sketch. And represent in H-S diagram.	CO3	L2	6M
	b	Derive an expression for critical pressure ration through nozzle.	CO3	L3	6M
		UNIT-IV			
7		Draw the combined velocity triangle of Impulse turbine and explain the salient features.	CO4	L1	12M
		OR			
8	a	Derive an expression for work done in impulse turbine.	CO4	L3	6M
	b	Draw and explain the velocity triangle of reaction turbine.	CO4	L1	6M
		UNIT-V			
9		Briefly explain the method of Measuring the following (i) Fuel Consumption. (ii) Air intake (iii) Exhaust gas composition (iv) Brake power (v) Indicated power (vi) Friction power.	CO5	L5	12M
		OR			
10	a	Write a brief note on the heat balance sheet.	CO5	L2	6M
	b	Explain the Working Principle of 2-Stroke Engine.	CO5	L2	6M

***** END *****

O.P.Code: 20EE0204	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
ELECTROMAGNETIC FIELDS
(Electrical & Electronics Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1		Transform the vector A= 3i-2j-4K at P (x=2, y=3, Z=3) to cylindrical coordinates.	CO1	L3	12M
		OR			
2		If B= y ax + (x+z) ay and a point Q is located at (-2,6,3) express B in spherical coordinates.	CO1	L3	12M

UNIT-II

3	a	State and prove Gauss's law and write limitations of Gauss's law?	CO2	L3	6M
	b	Determine the force between the two charge Q1=4*10-4 C at A(2,3,4) Q2=-2*10-4C at B(3,0,3) in vaccum.	CO2	L3	6M
		OR			
4	a	A circular disc of 10 cm radius is charged uniformly with total charge of 100μc . Find E at a point 20cm on its axis.	CO2	L3	6M
	b	Two pint charges 1.5nC at (0,0,0.1) and -1.5nC at (0,0,-0.1) are in free space.Treat the two charges as a dipole at the origin and find the potential at p(0.3,0,0.4).	CO2	L4	6M

UNIT-III

5	a	Derive the point form of ohms law.	CO3	L4	6M
	b	Derive the continuity equation. What is its physical significance?	CO3	L3	6M
		OR			
6		Two parallel conducting discs are separated by distance 5 mm at z=0 and z=5 mm. If V=0 and V=100 v at z=5 mm, find the charge densities on the disc.	CO3	L3	12M

UNIT-IV

7		Derive the expression for self-inductance of solenoid, toroid and coaxial cable.	CO4	L4	12M
		OR			
8		Calculate the inductance of a 10 m length of coaxial cable filled with a material for which μr = 80 and radii inner and outer conductors are 1 mm and 4 mm respectively.	CO4	L3	12M

UNIT-V

9		Explain faradays law of electromagnetic induction and there from derive maxwell's equation in differential and integral form.	CO5	L3	12M
		OR			
10		What is displacement current? Explain physical significance of displacement current.	CO5	L3	12M

*** END ***

O.P.Code: 20EC0405	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025
ANALOG COMMUNICATIONS
(Electronics & Communications Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	Explain the elements of communication system with a neat block diagram.	CO1	L2	6M
	b	Define Amplitude Modulation. Derive expression for AM wave and sketch its frequency spectrum.	CO1	L2	6M
		OR			
2	a	Explain the need for Modulation.	CO1	L2	4M
	b	Explain the generation of AM wave using square-law modulator along with suitable diagram and analysis.	CO1	L3	8M
		UNIT-II			
3	a	What is DSB-SC Modulation? Explain the time and frequency domain expressions of DSB-SC wave.	CO1	L2	8M
	b	Define Hilbert Transform and List its properties.	CO1	L2	4M
		OR			
4	a	With a neat block diagram explain the operation of phase discrimination method using SSB and list the drawbacks.	CO1	L2	8M
	b	List the applications of VSB and its features	CO1	L2	4M
		UNIT-III			
5	a	Define angle modulation. Classify different types of angle modulation and write their mathematical expressions.	CO1	L2	4M
	b	Explain the block diagram of indirect method in FM generation.	CO1	L3	8M
		OR			
6	a	Compare between the AM & PM.	CO1	L2	4M
	b	Demonstrate the working principle of PLL.	CO1	L3	8M
		UNIT-IV			
7	a	Sketch and explain the functionality of each block in Super-heterodyne FM receiver.	CO1	L2	8M
	b	Define Noise and its classification.	CO1	L2	4M
		OR			
8		Derive the expression for figure of merit of AM (DSB-FC) system.	CO1	L3	12M
		UNIT-V			
9	a	Define Analog pulse modulation and its classification.	CO1	L2	4M
	b	Explain the generation of PAM with mathematical analysis.	CO1	L2	8M
		OR			
10	a	List the comparisons among PAM, PWM and PPM.	CO1	L2	4M
	b	An analog signal band limited to 10KHZ is quantized eight levels of a PCM system with probabilities 1/2, 1/4, 1/5, 1/5, 1/10, 1/10, 1/20, 1/20. Find Entropy & Rate of information.	CO1	L3	8M

*** END ***

O.P.Code: 20HS0864	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

HUMAN VALUES AND PROFESSIONAL ETHICS

(Common to AGE, CE, CSM, CIC, CCC, CSE, CAD, CAI & CSIT)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	What is service learning? Why is service learning important?	CO1	L1	6M
	b	What are the important characteristics of service learning?	CO1	L1	6M
		OR			
2	a	List some time wasters identified by Engineers.	CO1	L1	6M
	b	What is meant by spirituality? How does it differ from religion?	CO1	L1	6M
		UNIT-II			
3	a	Outline ethics. Describe any four disciplines of ethics.	CO2	L2	6M
	b	Why is it necessary for engineering students to study engineering ethics?	CO2	L1	6M
		OR			
4	a	Describe utilitarianism and two versions of utilitarianism.	CO2	L2	6M
	b	What are the similarities between duty ethics and right ethics?	CO2	L1	6M
		UNIT-III			
5	a	Write any five ways in which of promoting ethics by the engineering societies.	CO3	L1	6M
	b	What are the objections of codes of ethics?	CO3	L1	6M
		OR			
6	a	What are the problems associated with the laws in engineering?	CO3	L1	6M
	b	Enumerate the correct role of law in engineering.	CO3	L3	6M
		UNIT-IV			
7	a	Write the factors that influence the perception of risk.	CO4	L1	6M
	b	What are the job related risks?	CO4	L1	6M
		OR			
8	a	What are occupational crimes? Explain.	CO4	L1	6M
	b	Define whistle blowing. What are the categories of whistle blowing?	CO4	L2	6M
		UNIT-V			
9	a	Write about Sentient-Centered ethics and IEEE code of Ethics.	CO5	L1	6M
	b	Write about Human-Centered environmental ethics.	CO5	L1	6M
		OR			
10	a	What is meant by computer ethics? Explain how the computers can be used as the instrument of unethical behavior.	CO5	L1	6M
	b	Write short notes on Hacking and Computer virus.	CO5	L1	6M

***** END *****

O.P.Code: 20CS0504	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
COMPUTER ORGANIZATION &ARCHITECTURE
(Common to CSE, CSM, CIC, CAD, CCC, CSIT & CAI)

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

(Answer all Five Units **5 x 12 = 60** Marks)

		UNIT-I			
1	a	Sketch the basic functional units of computer.	CO1	L3	4M
	b	Explain the functional units in the computer.	CO2	L2	8M
		OR			
2	a	Identify and explain various Phases of instruction cycle.	CO1	L3	10M
	b	List the Classification of Computer Instructions.	CO2	L2	2M
		UNIT-II			
3		Explain the Flow chart for Addition and Subtraction.	CO1	L2	12M
		OR			
4		Develop flowchart for the addition/subtraction of floating-point number and illustrate with an example.	CO3	L4	12M
		UNIT-III			
5	a	Construct a 4-line common bus system with a neat diagram.	CO3	L3	6M
	b	Explain Bus line with three state buffers.	CO3	L2	6M
		OR			
6	a	What is Hardwired Control? Explain in detail with a neat diagram.	CO6	L2	8M
	b	Differentiate between Hardwired Control and Micro-programmed Control.	CO6	L2	4M
		UNIT-IV			
7		Explain how memories connected with CPU with diagram.	CO3	L2	12M
		OR			
8	a	What is cache memory What is hit and miss in the cache memory.	CO4	L3	8M
	b	List and Explain different mapping in Cache memory.	CO4	L2	4M
		UNIT-V			
9	a	Construct 4-segment Instruction Pipeline and explain.	CO5	L3	6M
	b	Explain the three major difficulties caused by the branch instruction in the instruction pipeline.	CO1	L2	6M
		OR			
10	a	Explain cross bar switch with neat sketch.	CO6	L2	6M
	b	Explain 2D mesh network with neat diagram.	CO6	L2	6M

***** END *****

O.P.Code: 20CE0160	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
FLUID MECHANICS & HYDRAULIC MACHINERY
(Mechanical engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Explain the terms of compressibility and bulk modulus.	CO1	L2	6M
	b	Obtain an expression for capillary rise of a liquid.	CO1	L2	6M

OR

2		Derive the expression for pressure difference in U-tube differential manometer and Inverted U-tube differential manometer with neat sketches.	CO1	L3	12M

UNIT-II

3		Explain different types of flow in detail.	CO2	L2	12M

OR

4		Water flows through a pipe AB 1.2 m diameter at 3 m/s and then passes through a pipe BC 1.5 m diameter. At C, the pipe branches. Branch CD is 0.8 m in diameter and carries one third of the flow in AB. The flow velocity in branch CE is 2.5 m/s. Find the volume rate of flow in AB, the velocity in BC, the velocity in CD and the diameter of CE.	CO2	L3	12M

UNIT-III

5		Explain about Venturimeter with neat sketches. Derive expression for rate of flow through Venturimeter.	CO3	L2	12M

OR

6		Explain about orifice meter with neat sketches. Derive expression for rate of flow through orifice meter.	CO3	L2	12M

UNIT-IV

7		A jet of water of diameter 50mm moving with a velocity of 25 m/s impinges on a fixed curved plate tangentially at one end at an angle of 30° to the horizontal. Calculate the resultant force of the jet on the plate if the jet is reflected through an angle of 50°. Take g = 10 m/s2	CO4	L3	12M

OR

8		Explain the various elements of hydroelectric power station with a neat sketch.	CO4	L2	12M

UNIT-V

9		Explain the working principle of a Pelton wheel with a neat sketch and also derive equation for hydraulic efficiency.	CO5	L2	12M

OR

10		What is the working principle and design specifications of a Kaplan turbine? Explain.	CO5	L1	12M

***** END *****

O.P.Code: 20EC0446	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
ANALOG ELECTRONIC CIRCUITS
(Electrical & Electronics Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define feedback and illustrate the basic concept of Feedback with suitable block diagram.	CO1	L2	6M
	b	List different types of feedback and discuss.	CO1	L1	6M
		OR			
2	a	Show that how a negative feedback reduces gain of an amplifier.	CO1	L2	6M
	b	An amplifier has open loop gain 1000 and feedback ratio of 0.04, if the open loop gain changes by 10% due to temperature, find the percentage change in the gain of the amplifier feedback.	CO1	L2	6M

UNIT-II

3	a	Define Oscillator and explain its principle of operation.	CO1	L2	6M
	b	Illustrate the condition for oscillation with suitable diagram.	CO1	L1	6M
		OR			
4	a	Explain in detail about the crystal oscillator and mention the expression for its frequency of oscillation.	CO1	L2	8M
	b	Compare piezoelectric effect and inverse piezoelectric effect with a neat diagram.	CO6	L2	4M

UNIT-III

5	a	Derive the expression for gain of inverting amplifier.	CO5	L3	6M
	b	What is voltage follower? What are its features and applications?	CO1	L1	6M
		OR			
6	a	Define the terms differential mode gain, common mode gain, CMRR.	CO2	L1	6M
	b	Explain DC characteristics of op-amp.	CO3	L2	6M

UNIT-IV

7	a	Design and explain the operation of non-inverting summing amplifier.	CO3	L3	6M
	b	Draw the circuit of a subtractor using op-amp and derive the expression for voltage gain.	CO1	L3	6M
		OR			
8	a	Explain the operation of integrator using op-amp with a neat circuit diagram.	CO5	L3	6M
	b	Explain the operation of monostable multivibrator using op-amp ,with a neat circuit and its waveforms.	CO2	L2	6M

UNIT-V

9	a	Draw the frequency response of filters.	CO1	L3	6M
	b	Explain the first order high pass butter worth filter with a neat circuit diagram.	CO2	L2	6M
		OR			
10	a	Explain about the flash type ADC using op-amp.	CO1	L2	6M
	b	Summarize the truth table for a flash type op-amp ADC using 8 by 3 priority encoder.	CO4	L2	6M

***** END *****

O.P.Code: 20EC0402	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
ELECTRONIC DEVICES AND CIRCUITS
(Electronics & Communications Engineering)

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

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1	a	Describe the construction of PN Junction Diode.	CO1	L1	3M
	b	Define the terms i) Doping ii) Depletion region iii) Barrier Potential	CO1	L1	3M
	c	Illustrate the working of a PN Junction diode under forward bias and reverse bias with neat schematic diagrams	CO1	L1	4M
	d	Sketch the V-I Characteristics of a PN Junction Diode.	CO3	L2	2M
		OR			
2	a	Explain Breakdown mechanisms in PN Junction Diode.	CO3	L2	6M
	b	Draw the circuit symbol of Zener diode and label its terminals.	CO1	L1	2M
	c	Sketch and explain the V-I characteristics of Zener Diode and mention its application.	CO3	L3	4M

UNIT-II

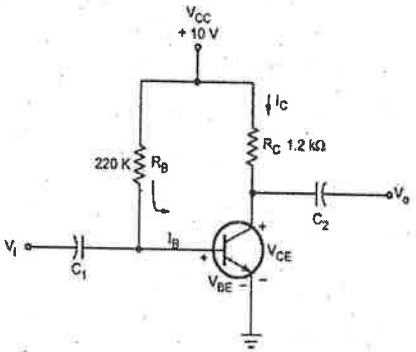
3	a	Draw the circuit diagram of a Full Wave Rectifier and with the help of waveforms describe its operation.	CO4	L1	6M
	b	Derive the expressions for Average DC current, RMS Value of Current, DC Power Output and AC Power input for a Full Wave Rectifier. List the advantages.	CO5	L3	4M
	c	List the advantages and disadvantages of FWR and HWR.	CO1	L1	2M
		OR			
4	a	Give the classification of LCD based on construction and explain. List the advantages and applications of LCD.	CO1	L2	6M
	b	With neat diagram, explain the working of LED and list its advantages and applications.	CO3	L3	6M

UNIT-III

5	a	Evaluate the relation between α and β of a Transistor.	CO2	L3	6M
	b	With a neat diagram, explain how a transistor acts as an amplifier.	CO3	L1	6M
		OR			
6	a	Explain the characteristics of N-Channel enhancement type MOSFET.	CO1	L2	6M
	b	Compare the performance of JFET with MOSFET.	CO1	L1	6M

UNIT-IV

7	a	Explain Collector to Base bias of a Transistor with neat circuit diagram and determine Q-point.	CO5	L2	6M
	b	For the circuit shown in the Figure, solve I_B, I_C, V_{CE}, V_B , V_C and V_{BC}. Assume that $V_{BE} = 0$ and $\beta = 50$.	CO5	L3	6M



OR

8	a	Estimate the condition for achieving Thermal Stability.	CO4	L2	6M
	b	If the various parameters of a CE amplifier which uses the self bias method are V_{CC}=12v, R_1=10KΩ,R_2=5KΩ,R_c=1KΩ, R_E=2KΩ & β=100, find the operating point. Assume Si Transistor.	CO6	L3	6M

UNIT-V

9	a	Using low frequency h-parameter model, evaluate the expressions forvoltage gain, current gain, input impedance and output admittance for a BJT Amplifier in CE configuration.	CO4	L2	6M
	b	A CE amplifier is driven by a voltage source of internal resistance R_s = 800Ω and the load impedance of R_L=1000Ω. The h-parameters are h_{ie}=1k, h_{fe}=50, h_{oe} = 25μA/V and h_{re} = 2 x 10^{-4}. Find current gain, voltage gain, input impedance and output impedance using exact analysis.	CO5	L3	6M
		OR			
10	a	Define JFET parameters and establish relation between them.	CO2	L1	4M
	b	Summarize the expressions for input impedance, output impedance and voltage gain of JFET Common Drain amplifier with neat diagram.	CO5	L2	8M

*** END ***

O.P.Code: 20CE0164	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

MECHANICS OF SOLIDS

(Common to AGE & ME)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Draw and explain Stress-strain curve for a mild steel bar.	CO1	L1	6M
	b	Explain maximum shear stress theory.	CO1	L2	6M

OR

2	a	Two brass rods and one steel rod together support a load as shown in **figure 1**. If the stresses in brass and steel are not to exceed 60 N/mm^2 and 120 N/ mm^2 , find the safe load that can be supported. Take E for steel = 2x10^5 N/ mm^2 and for brass =1x10^5 N/ mm^2 . The cross-sectional area of steel rod is 1500 mm^2 and of each brass rod is 1000 mm^2	CO1	L3	8M

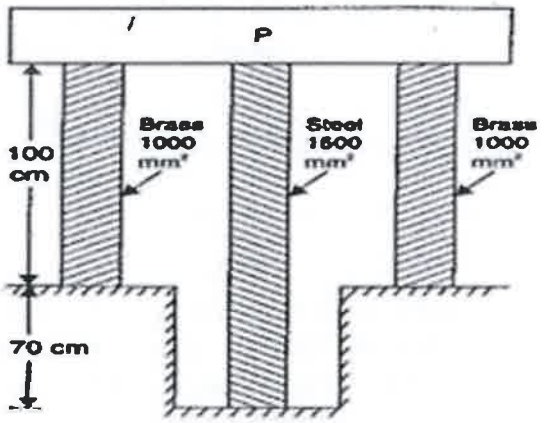


Fig:1

	b	Explain maximum principal strain theory.	CO1	L2	4M

UNIT-II

3	a	A cantilever beam of length 3 m carries a uniformly distributed load of 1.5 kN/m run over a length of 2 m from the free end. Draw SFD and BMD for the beam.	CO2	L3	6M
	b	Draw the shear force and bending moment diagram for a simply supported beam of length 9m and carrying a uniformly distributed load of 10 kN/m for a distance of 6 m from the left end. Also calculate the maximum bending moment in the section.	CO2	L3	6M

OR

4	a	State the assumptions made in the theory of simple bending.	CO2	L2	4M
	b	A square beam 20 mm x 20 mm in section and 2 m long is supported at the ends. The beam fails when a point load of 400 N is applied at the centre of the beam. What uniformly distributed load per metre length will break a cantilever of the same material 40 mm wide, 60 mm deep and 3 m long?	CO2	L3	8M

UNIT-III

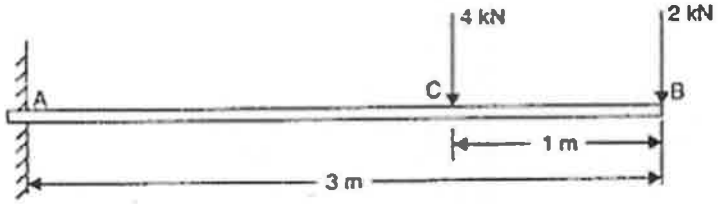
5	a	Derive shear stress distribution formula for circular section with a neat sketch.	CO3	L2	6M
	b	A timber beam of rectangular section is simply supported at the ends and carries a point load at the centre of the beam. The maximum bending stress is 12 N/mm^2 and maximum shearing stress is 1 N/mm^2 , find the ratio of the span to the depth.	CO3	L3	6M

OR

6	a	Derive pure torsion equation for a circular shaft with assumptions.	CO3	L2	6M
	b	A hollow shaft, having an inside diameter 60% of its outer diameter, is to replace a solid shaft transmitting the same power at the same speed. Calculate the percentage saving in material, if the material to be used is also the same.	CO3	L3	6M

UNIT-IV

7		A cantilever of length 3 in carries two-point loads of 2 KN at the free end and 4 KN at a distance of 1 m from the free end. Find the deflection at the free end. Take E = 2 x $10^5 N/mm^2$ and I = 10^8 mm^4	CO4	L3	12M



OR

8		A solid round bar 3 m long and 5 cm in diameter is used as a strut with both ends hinged. (Take E = 2.0 x 10^5 N/mm^2). Determine the crippling load, when the given strut is used with the following conditions: (i) One end of the strut is fixed and the other end is free (ii) Both the ends of strut are fixed (iii) One end is fixed and other is hinged. (iv) Both the ends of strut are hinged	CO4	L3	12M

UNIT-V

9	a	Derive expression for circumferential stress in thin cylinder.	CO5	L2	6M
	b	A cylindrical pipe of diameter 1.5m and thickness 1.5cm is subjected to an internal fluid pressure of 1.2 N/mm^2 . Determine: (i) Longitudinal stress developed in the pipe, and ii) Circumferential stress developed in the pipe.	CO5	L3	6M

OR

10		A closed cylindrical vessel made of steel plates 4 mm thick with plane and, carries fluid under a pressure of 3 N/mm^2 . The dia. of cylinder is 30 cm and length is 80 cm, calculate the longitudinal and hoop stresses in the cylinder wall and determine the change in diameter, length and volume of the cylinder. Take E = 2 X 10^5 N/mm^2 and Poisson's ratio is 0.286.	CO5	L3	12M

***** END *****

O.P.Code: 20CE0103	R20	H.T.No.										

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

STRENGTH OF MATERIALS

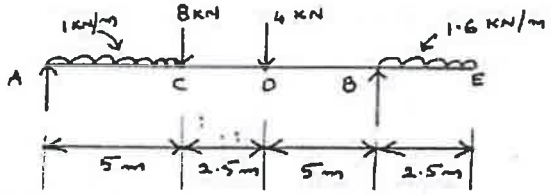
(Civil Engineering)

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

(Answer all Five Units **5 x 12** = **60** Marks)

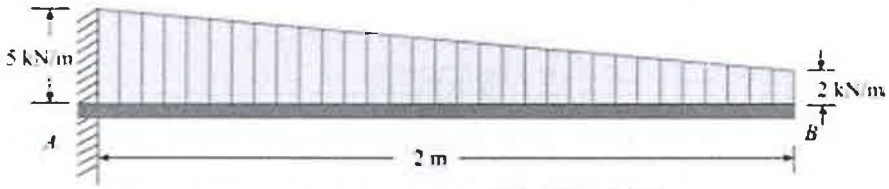
UNIT-I

1		Draw shear force and bending moment diagrams for the beams shown in figure. Indicate the numerical values at all important sections.	CO1	L3	12 M



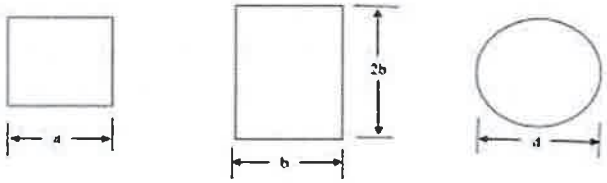
OR

2	a	Define shear force and bending moment.	CO1	L1	4 M
	b	A cantilever beam of 2 m span is subjected to a gradually varying load from 2kN/m to 5 KN/m as shown in figure. Draw the shear force and bending moment diagrams for the beam.	CO1	L3	8 M



UNIT-II

3		Three beams have the same length, the same allowable stress and the same bending moment. The cross-section of the beams, are a square, a rectangle with depth twice the width and a circle as shown in Figure. Find the ratios of weights of the circular and the rectangular beams with respect to the square beam.	CO2	L4	12 M



OR

4	a	Derive the formula for horizontal shearing when a beam is subjected to transverse loading.	CO2	L2	6 M
	b	Draw the shear stress distribution for a rectangular section of width 'b' and depth 'd'.	CO2	L3	6 M

UNIT-III

5		A solid circular shaft transmits 75 kW power at 200 r.p.m. Calculate the shaft diameter, if the twist in the shaft is not to exceed 1^o in 2 metres length of shaft, and shear stress is limited to 50 N/mm^2. Take C = 1 x 10^5 N/mm^2.	CO3	L3	12 M

OR

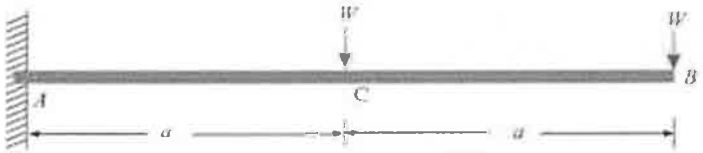
6	An open coil helical string made of 10 mm diameter wire and mean diameter of 100 mm has 12 coils, angle of helix being 15°. Determine the axial deflection and the intensities of bending and shear stresses under an axial load of 500 N. Take C as 80 GPa and E as 200 GPa.	CO3	L3	12 M

UNIT-IV

7	A timber beam of rectangular section has a span of 4.8 m and is simply supported at its ends. It is required to carry a total load of 45 KN uniformly distributed over the whole span. Find the value of the breadth (b) and depth (d) of the beam, if maximum bending stress is not to exceed 7 Mpa and maximum deflection is limited to 9.5 mm. Take E for the timber as 10.5 GPa.	CO4	L3	12 M

OR

8	A cantilever of length 2a is carrying a load of W at the free end, and another load of W at its centre as shown in the figure. Determine, by Moment Area Method, the slope and deflection of the cantilever at the free end.	CO4	L3	12 M

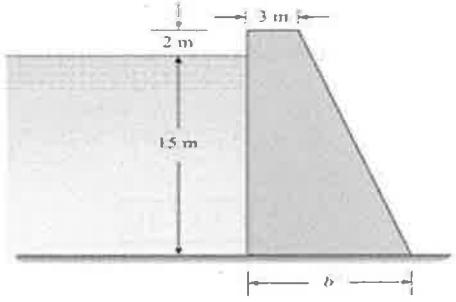


UNIT-V

9	A bar of length 4 m when used as a simply supported beam and subjected to a UDL of 30 KN/m over the whole span, deflects 15 mm at the centre. Determine the crippling loads when it is used as a column with following end conditions: (i) Both ends pin- joined ii) One end fixed and other end hinged (iii) Both ends fixed.	CO5	L3	12 M

OR

10	A concrete dam has its upstream face vertical and a top width of 3 m. Its downstream face has a uniform batter. It stores water to a depth of 15 m with a free board of 2 m as shown in figure. The weights of water and concrete may be taken as 10 KN/m^3 and 25 KN/m^3. Calculate (a) the minimum dam width at the bottom for no tension in concrete. Neglect uplift. (b) the extreme intensities of pressure on the foundation, when reservoir is empty.	CO6	L3	12 M



***** END *****

Q.P.Code: 20HS0834 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
NUMERICAL METHODS AND TRANSFORMS
(Electronics & Communications Enigneering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Describe the formula for square root of a number by Newton-Raphson formula.	CO2	L1	4M
	b	Find a positive root of $x^3 - x - 1 = 0$ correct to two decimal places by Bisection method.	CO2	L3	8M

OR

2	a	Write the formula for Newton's forward interpolation formula.	CO2	L1	2M
	b	From the following table values of x and $y=tan\ x$. Interpolate values of y when $x=0.12$ and $x=0.28$	CO2	L3	10M

x	0.10	0.15	0.20	0.25	0.30
y	0.1003	0.1511	0.2027	0.2553	0.3093

UNIT-II

3	a	State Taylor's series formula for first order differential equation.	CO3	L1	2M
	b	Tabulate y(0.1), y(0.2) and y(0.3) using Taylor's series method given that $y^1 = y^2 + x$ and y(0) = 1.	CO3	L3	10M

OR

4		Evaluate $\int_0^1 \frac{1}{1+x}dx$ (i) by Trapezoidal rule and Simpson's $\frac{1}{3}$ rule. (ii) using Simpson's $\frac{3}{8}$ rule and compare the result with actual value.	CO3	L5	12M

UNIT-III

5	a	What is the linear property of Laplace transform. Find the Laplace transform of $f(t) = e^{3t} - 2e^{-2t} + sin2t + cos3t + sinh3t - 2cosh4t + 9.$	CO4	L1	6M
	b	Find the Laplace transform of $f(t) = cosh\ at\ sin\ bt.$	CO4	L3	6M

OR

6	a	Find the Inverse Laplace transform of $\frac{1}{s(s^2+a^2)}$.	CO4	L3	6M
	b	Find $L^{-1}\left\{s\log\left(\frac{s-1}{s+1}\right)\right\}$.	CO4	L5	6M

UNIT-IV

7		Using Laplace transform method to solve $y^{11} - 3y^1 + 2y = 4t + e^{3t}$ where $y(0) = 1, y^1(0) = 1$.	CO5	L5	12M

OR

8 Find a Fourier series to represent the function $f(x) = e^x$ for $-\pi < x < \pi$. CO5 L3 12M
And hence derive a series for $\frac{\pi}{sinh\pi}$.

UNIT-V

9 Find the Fourier transform of $f(x) = \begin{cases} 1; |x| < a \\ 0, |x| > a \end{cases}$ and hence evaluate CO6 L3 12M

$i) \int_{-\infty}^{\infty} \frac{sinap\ cospx}{p} dp$ $ii) \int_{-\infty}^{\infty} \frac{sinp}{p} dp$ $iii) \int_{0}^{\infty} \frac{sinp}{p} dp.$

OR

10 Find the Fourier sine and cosine transforms of $f(x)=e^{-ax}, a > 0$ and hence deduce the integrals (i) $\int_0^\infty \frac{p \sin px}{a^2 + p^2} dp$ (ii) $\int_0^\infty \frac{\cos px}{a^2 + p^2} dp$. CO6 L5 12M

*** END ***

O.P.Code: 20HS0832	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

PROBABILITY, NUMERICAL METHODS AND TRANSFORMS

(Electrical & Electronics Engineering)

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

(Answer all Five Units **5 x 12** = **60** Marks)

UNIT-I

1	a	State and prove addition theorem on probability.	CO1	L2	6M
	b	Two dice are thrown. Let A be the event that the sum of the point on the faces is 9. Let B be the event that at least one number is 6. Find (i) $P(A \cap B)$ (ii) $P(A \cup B)$ (iii) $P(A^c \cup B^c)$ (iv) $P(A^c \cap B^c)$ and (v) $P(A^c \cap B)$	CO1	L2	6M

OR

2	a	State the Bayes' theorem.	CO1	L1	6M
	b	In a bolt factory machines M_1, M_2, M_3 manufacture 25%, 35% and 40% of the total. Of their output 5%, 4% and 2% are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machines A,B,C ?	CO1	L3	6M

UNIT-II

3		Find a root of the equation $x \log_{10} x = 1.2$, using the Newton's Raphson method correct to 4 decimal places.	CO2	L3	12M

OR

4		Using Newton's forward & backward interpolation formulae, find y(3.2) and y(8.8)	CO2	L4	12M

x	3	4	5	6	7	8	9
y	4.8	8.4	14.5	23.6	36.2	52.8	73.9

UNIT-III

5		Apply Taylor's series method, $\frac{dy}{dx} = 2x + y^2$; $y(0) = 1$, find the values of $y(0.1)$ and $y(0.2)$.	CO3	L3	12M

OR

6		Evaluate $\int_4^{5.2} \log x dx$ by (a) Trapezoidal rule b) Simpson's 1/3 rule (c) Simpson's 3/8 rule	CO3	L3	12M

x :	4	4.2	4.4	4.6	4.8	5.0	5.2
$y = \log x$	1.3863	1.4351	1.4816	1.5261	1.5686	1.6094	1.6487

UNIT-IV

7	a	Find the Laplace transforms of (i) $t^5 e^{-2t}$ and (ii) e^{3t} cost	CO4	L3	6M
	b	Find the Laplace transforms of $f(t) = \int_0^t e^{-t} \cos t \, dt$	CO4	L3	6M

OR

8	a	Find $L^{-1}\left(\frac{3s-2}{(s^2-4s+20)}\right)$	CO4	L3	6M
	b	Using Convolution theorem, Find $L^{-1}\left(\frac{1}{(s+a)(s+b)}\right)$	CO4	L3	6M

UNIT-V

9		Solve the following differential equation using Laplace transform: $y''+2y'+y=3te^{-t} \quad y(0)=4;\ y'(0)=0$	CO5	L4	12M

OR

10	a	Find the Z-transform of the following : (i) na^n (ii) n^2a^n (iii) $\cos n\theta$	CO5	L3	6M
	b	Find the inverse Z-transform of the $\frac{2z^2+3z}{(z+2)(z-4)}$	CO5	L3	6M

***** END *****

O.P.Code: 20HS0833	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

NUMERICAL METHODS, PROBABILITY & STATISTICS

(Mechanical Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Find a real root of the equation $3x = e^x$ by Bisection method up to 9 iterations.	CO1	L1	6M
	b	Find a positive real root of $x\log_{10} x = 1.2$ using Regula-Falsi method in three iterations.	CO1	L2	6M

OR

2	a	Using Newton-Raphson method, find the square root of 28.	CO2	L2	6M
	b	Use Newton's backward interpolation formula to find f(32) given that f(25)=0.2707, f(30)=0.3027, f(35)=0.3386, f(40)=0.3794.	CO1	L3	6M

UNIT-II

3		Find the values of $y(0.1)$, $y(0.2)$ and $y(0.3)$ using Taylor series method given that $y' = y^2 + x$, $y(0) = 1$	CO3	L3	12M

OR

4		Apply the fourth order R-K method to find the values of $y(0.1)$ and $y(0.2)$, given that $\frac{dy}{dx} = xy$, $y(0) = 1$.	CO3	L3	12M

UNIT-III

5	a	The weights of 6 competitors in a game are given below 58,62,56,63,55,61 kgs. Find arithmetic mean, mode and median of weight of competitors.	CO4	L2	6M
	b	The first four moments of a distribution about the value 5 of the variables are 2, 20, 40 and 50. Calculate mean, variance, β_1 and β_2 of the distribution.	CO4	L5	6M

OR

6	a	State and prove the Addition theorem of probability	CO4	L2	6M
	b	In a certain town 40% have brown hair, 25% have brown eyes and 15% have both brown hair and brown eyes. A person is selected at random from the town. i) If he has brown hair, what is the probability that he has brown eyes also? ii) If he has brown eyes, determine the probability, that he does not have brown hair?	CO4	L2	6M

UNIT-IV

7		A random variable x has the following probability distribution function	CO5	L3	12M

x	-3	-2	-1	0	1	2	3
$P(x)$	k	0.1	k	0.2	2k	0.4	2k

Find i) k ii) Mean iii) Variance iv) $P(-3 \le x \le 2)$

OR

8		The Probability density function of a random variable x is $f(x) = \begin{cases} 2e^{-2x}, for\ x > 0 \\ 0, for\ x \le 0 \end{cases}$. Find the mean, the Probabilities that it will take on a value (i) Between 1 & 3 (ii) Greater than 0.5.	CO5	L4	12M

UNIT-V

9	In a sample of 1000 cases, the mean of certain test is 14 and standard deviation is 2.5. Assuming the distribution to be normal find (i) how many students score between 12 and 15. (ii) How many students score above 18? (iii) How many students score below 18?	CO5	L3	12M
	OR			
10	Find two regression equations from the following data:	CO6	L3	12M

x	10	25	34	42	37	35	36	45
y	56	64	63	58	73	75	82	77

***** END *****

O.P.Code: 20ME0315	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations October/November-2025

HEAT & MASS TRANSFER

(Agricultural Engineering)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	What is conduction heat transfer? Explain its parameters	CO1	L1	6M
	b	A plane wall is 150 mm thick and its wall area is 4.5 m^2. If its conductivity is 9.35 W/m °C and surface temperature are steady at 150°C and 45 °C, determine i). Heat transfer across the plane wall, ii). Temperature gradient in the flow direction.	CO1	L4	6M
		OR			
2		Derive the general heat conduction equation in Cylindrical coordinate.	CO1	L3	12M

UNIT-II

3	a	Obtain the expression of heat conduction through hollow cylinder	CO2	L3	6M
	b	A spherical shaped vessel of 1.4 m diameter is 90 mm thick. Find the rate of heat leakage, if the temperature difference between the inner and outer surface is 220 °C. Thermal conductivity of the material of the sphere is 0.083 W/m °C.	CO2	L4	6M
		OR			
4	a	Write short note on transient heat conduction	CO2	L1	6M
	b	A steel ingot (large in size) heated uniformly to 745 °C is hardened by quenching it in an oil bath maintained at 20 °C. Determine the length of time required for the temperature to reach 595 °C at a depth of 12 mm. The ingot may be approximated as a flat plate. For steel ingot take α (thermal diffusivity) = 1.2×10^{-5} m^2/s.	CO2	L4	6M

UNIT-III

5		Air at 20 °C and at a pressure of 1 bar is flowing over a flat plate at a velocity of 3 m/s. If the plate is 280 mm wide and at 56 °C. Calculate the following quantities at x = 280 mm, given that properties of air at the bulk mean temperature °C are ρ = 1.1374 kg/m^3, k = 0.02732 W/m °C, cp = 1.005 kJ/kg K, υ = 16.76×10^{-6} m^2/s, Pr = 0.7. i) Boundary layer thickness ii) Local friction coefficient iii) Average friction coefficient iv) Thickness of the boundary layer v) Local convective heat transfer vi) Average convective heat transfer vii) Rate of heat transfer by convection viii) Rate of convective heat transfer	CO3	L4	12M
		OR			
6		A cylinder body of 300 mm diameter and 1.6 m height is maintained at a constant temperature of 36.5 °C. The surrounding temperature is 13.5 °C. Find out the amount of heat to be generated by the body per hour if ρ = 1.025 kg/m^3, ν = 15.06 x 10^{-6} m^2/s, cp = 0.96 kJ/kg °C and k = 0.0892kJ/mh °C and β=1/298 K^{-1}. Assume $Nu=0.12(Gr.Pr)^{1/3}$.	CO3	L4	12M

UNIT-IV

7	a	Mention correlation in boiling with proper expression	CO4	L3	6M
	b	Discuss the different types of processes for condensation of vapours on a solid surface.	CO4	L3	6M

OR

8		Calculate the following for an industrial furnace in the form of black body and emitting radiation at 2500 °C. (i) Monochromatic emissive power at 1.2 μm length, (ii) Wave length at which the emission is maximum, (iii) Maximum emissive power, (iv) Total emissive power, (v) Total emissive power of the furnace if the assumed as a real surface with emissivity equal to 0.9.	CO4	L5	12M

UNIT-V

9		Derive the expression for Logarithmic Mean Temperature Difference (LMTD) in case of counter flow.	CO5	L3	12M

OR

10	a	Explain correlation for mass transfer.	CO6	L2	6M
	b	List out the application of Mass Transfer.	CO6	L1	6M

***** END *****

Q.P.Code: 20HS0845 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations October/November-2025
MATHEMATICAL AND STATISTICAL METHODS
(Common to CSM, CAI, CIC, CAD & CCC)

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

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define the greatest integer function.By using the principle of mathematical induction, prove $1^3+2^3+3^3+----+n^3=\left(\frac{n(n+1)}{2}\right)^2$.	CO1	L5	6M
	b	By the principle of mathematical induction, show that $3^{4n+2}+5^{2n+1}$ is a multiple of 14, for all positive integral value of n including zero.	CO1	L1	6M

OR

2	a	Using Euclidean algorithm express 4076 and 1024 has a linear combination.	CO1	L2	6M
	b	Define division algorithm and find the gcd (414, 662) using Euclidean algorithm.	CO1	L3	6M

UNIT-II

3		The remainder 2 when divided by 5, 4 divided by 6, 5 divided by 11, 6 divided by 16. Write equations and solve it.	CO2	L3	12M

OR

4	a	Solve the congruence $6x \equiv 3 \pmod 9$.	CO2	L3	6M
	b	Define congruence. Find all solutions of $9x \equiv 12 \pmod{15}$.	CO2	L3	6M

UNIT-III

5		The mean of a random sample is an unbiased estimate of the man of population 3, 6, 9, 15, 27. (a) List of all possible samples of size 3 that can be taken without replacement from the finite population? (b) Calculate the mean of each of the sample listed in (a) and assigning each sample a probability of 1/10. Verify that the mean of these X is equal to 12, which is the mean of the population parameter θ. Prove that $\bar{x}$ is an unbiased estimate of θ	CO3	L3	12M

OR

6	a	Define the tolerance interval and explain exact tolerant interval and exact nonparametric tolerance interval.	CO3	L1	6M
	b	Drying times for paint 3.4, 2.5, 4.8, 2.9, 3.6, 2.8, 3.3, 5.6, 3.7, 2.8, 4.4, 4.0, 5.2, 3.0, 4.8. Find a 95% prediction interval for drying of the next trail of paint.	CO3	L3	6M

UNIT-IV

7	a	Three boys A, B, C are throwing a ball to each other. A always through the ball to B and B always throws to C but C is just as likely to throw the ball to B as to A. show that the process is Markovian. Find the transition matrix and classify the states.	CO4	L4	6M

	b Find the nature of the states of the Markov chain with the transition probability matrix $P=\begin{bmatrix} 0 & 1 & 0 \\ \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & 1 & 0 \end{bmatrix}$	CO4	L3	6M
	OR			
8	There are two boxes, box I contains 2 white balls and box II contains 3 red balls. A each step of the process, a ball is selected from each box and the 2 balls are Interchanged. Thus box 1 always contains 2 balls and box II always contains 3 balls. The states of the system represent the number of red balls in box I after the interchange. Find (i) the transition matrix of the system (ii) the probability that there are 2 red balls in the box I after 3 steps and (iii) the probability that, in the long run there are 2 red balls in box I.	CO4	L3	12M
	UNIT-V			
9	A one person barber shop has six chairs to accommodate people waiting for haircut. Assume that customers who arrive when all the six chairs are full leave without entering the shop. Customers arrive at the average of 3 per hr and spend an average of 15minutes for service. Find (a) The probability that a customer can get directly into the barber chair upon arrival. (b) Expected number of customers waiting for a haircut. (c) Effective arrival rate. (d) The time a customer can expect to spend in the barber shop.	CO5	L3	12M
	OR			
10	A car servicing station has two bays where service can be offered simultaneously. Due to space limitation only four cars are accepted for servicing. The arrival pattern is Poisson with 12 cars per day. The service time in both the bays is exponentially distributed with $\mu=8$ cars per day per bay. Find the average number of cars in the service station the average number of cars waiting to be serviced and the average time spends in the system.	CO5	L3	12M

***** END *****