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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations June/July-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 Managerial Economics? Briefly explain the role of managerial economics in business decision making.	**CO1**	**L2**	**6M**
	b	Analyze the significance of managerial economics in decision-making?	**CO1**	**L3**	**6M**
		OR			
2	**a**	What do you mean by elasticity of demand?	**CO1**	**L1**	**6M**
	b	State the different types of elasticity of demand.	**CO1**	**L2**	**6M**
		UNIT-II			
3	**a**	Define production function. Explain production function with one variable input	**CO2**	**L2**	**6M**
	b	Evaluate the Cobb Douglas production function.	**CO2**	**L4**	**6M**
		OR			
4		A Firm has a fixed cost of Rs 50000/- selling price per unit Rs50/- and variable cost per unit Rs 25/- present level of production is 3500/- units i) Determine BEP in terms of volume and also sales value. ii) Calculate the margin of safety. iii) What is the change in BEP and margin of safety if Fixed cost increases from Rs50000/- to Rs60000/-	**CO2**	**L4**	**12M**
		UNIT-III			
5	**a**	Write short notes on skimming strategy.	**CO3**	**L2**	**6M**
	b	Distinguish between monopoly and perfect competition.	**CO3**	**L2**	**6M**
		OR			
6	**a**	Define oligopoly and its features.	**CO3**	**L1**	**6M**
	b	What do you understand by economic liberalization?	**CO3**	**L2**	**6M**
		UNIT-IV			
7		Define capital budgeting. Explain the various methods of Capital Budgeting.	**CO4**	**L2**	**12M**
		OR			
8	**a**	What are advantages and disadvantages of Pay back Method.	**CO4**	**L4**	**6M**
	b	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**
		UNIT-V			
9	**a**	What is meant by Ratio analysis?	**CO5**	**L1**	**6M**
	b	Explain briefly about various types of ratios.	**CO5**	**L2**	**6M**
		OR			
10	**a**	Write short notes on Inventory Turnover Ratio and Inventory holding periods	**CO5**	**L5**	**6M**
	b	Explain Gross profit ratio and Net profit ratio.	**CO5**	**L1**	**6M**

***** END *****

Q.P.Code: (20ME0315) | R20 | H.T.No.

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

B.Tech. II Year I Semester Supplementary Examinations June/July-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 Fourier's law of conduction? State the assumption and essential feature of it.	CO1	L1	6M
	b	Define the following terms i)Thermal Conductivity ii) Thermal Resistance	CO1	L1	6M

OR

2		Derive the general heat conduction equation in Cylindrical coordinate	CO1	L3	12M

UNIT-II

3		An exterior wall of a house may be approximated by a 0.1 m layer of common brick (K=0.7 w/m ◦C) followed by a 0.04 m layer of gypsum plaster (K=0.48w/m ℃).What thickness of loosely packed rock wool insulation (K=0.065 w/moC) should be added to reduce the heat loss trough the wall by 80 percent.	CO2	L4	12M

OR

4	a	What is lumped system analysis? Derive the expression for it.	CO2	L2	6M
	b	A 50 cm x 50 cm copper slab 6.25 mm thick has a uniform temperature of 300℃. Its temperature is suddenly lowered to 36 ℃. Calculate the time required for the plate to reach the temperature of 108. Take ρ = 9000 kg/m3, c = 0.38 kJ/kg℃, k = 370 W/m ℃ and h = 90 W/m2 ℃.	CO2	L4	6M

UNIT-III

5	a	Explain hydrodynamic and thermal boundary layer with reference to flow over flat plate.	CO3	L1	6M
	b	What is convective heat transfer? Distinguish between free and forced convection.	CO3	L1	6M

OR

6	a	Differentiate between laminar and Turbulent flow.	CO3	L3	6M
	b	A horizontal plate measuring 1.5 m x 1.1 m and at 215 ℃, taking upward is placed in still air at 25 ℃. Calculate the heat loss by natural convection. The convective film coefficient for free convection is given by the following empirical relation h =3.05(Tf) 1/4 W/m2 ℃. where Tf is the mean film temperature in degree Kelvin.	CO3	L4	6M

UNIT-IV

7		Explain briefly the various regimes of saturated pool boiling with diagram.	CO4	L3	12M

OR

8	a	Distinguish between Boiling and Condensation.	CO4	L1	6M
	b	What is black body? How is differ from a gray body?	CO4	L1	6M

UNIT-V

9	a	How heat exchangers are classified based on direction of fluid motion. Explain with neat diagram.	CO5	L1	12M

OR

10		Define Fick's law. Explain briefly.	CO5	L1	12M

***** END *****

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

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

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

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

		UNIT-I			
1	**a**	List the types of Buses and Give the function of each Bus.	**CO1**	**L1**	**6M**
	b	Give the Structure of BUS Interface with various devices in computer.	**CO1**	**L2**	**6M**
		OR			
2	**a**	Discuss any two instructions in each group of Data Transfer, Data Manipulation and Program Control Instructions with example.	**CO2**	**L6**	**6M**
	b	Discuss the Following Instructions with example LD, XCH, OUT, POP, DEC, ADDC	**CO2**	**L6**	**6M**
		UNIT-II			
3	**a**	Subtract 1101 and -1001 using 2's complement subtractions.	**CO2**	**L1**	**6M**
	b	Discuss the ASCII Code for the representation of Characters.	**CO2**	**L6**	**6M**
		OR			
4		Develop flowchart for the Multiplication of floating-point number and illustrate with an example.	**CO3**	**L5**	**12M**
		UNIT-III			
5	**a**	Explain the symbols used in Register Transfer Language.	**CO3**	**L2**	**6M**
	b	Construct a 4-line common bus system with a neat diagram.	**CO3**	**L4**	**6M**
		OR			
6	**a**	Draw 4 bit combinational circuit shifter.	**CO3**	**L1**	**6M**
	b	Differentiate between Hardwired Control and Micro-programmed control.	**CO3**	**L3**	**6M**
		UNIT-IV			
7		Explain how memories connected with CPU with diagram.	**CO3**	**L5**	**12M**
		OR			
8	**a**	Define track and sector. Analyze the importance of auxiliary memory?	**CO4**	**L1**	**6M**
	b	What is Virtual Memory? Discuss how address mapping using pages.	**CO4**	**L1**	**6M**
		UNIT-V			
9	**a**	Anticipate three types of hazards (conflicts) in instruction pipelining.	**CO5**	**L4**	**6M**
	b	Define hardware interlock, operand forwarding and delayed load.	**CO5**	**L1**	**6M**
		OR			
10	**a**	Explain the two ways to mitigate the high latency in ring network with neat sketch.	**CO6**	**L2**	**8M**
	b	Explain in detail about the snoopy cache.	**CO6**	**L5**	**4M**

***** END *****

O.P.Code: 20CE0104	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-2025
SURVEYING & GEOMATICS
(Civil Engineering)

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

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

UNIT-I

1	a	Briefly explain the principles of surveying?.	CO1	L2	6M
	b	Define surveying and brief about the primary divisions of surveying	CO1	L2	6M
		OR			
2		What are the different tape correction and how they are applied?	CO1	L2	12M

UNIT-II

3	a	Write short notes on errors in leveling	CO2	L2	6M
	b	Discuss the effects of curvature and refraction in leveling	CO2	L2	6M
		OR			
4		What are the indirect methods of locating a contour? Write about any two methods.	CO2	L1	12M

UNIT-III

5		With neat sketch, write about the parts of a transit theodolite	CO3	L1	12M
		OR			
6		Determine the R.L of the top of a temple from the following data. Station A and B are in line with the top of the temple	CO3	L3	12M

Inst Station	Reading on BM(m)	Vertical Angle	R.L of BM
A	1.085	10°48′	R.L of BM = 150.000m
B	1.265	7°12′	AB=50 m

UNIT-IV

7		With sketch, explain in detail any one method of curve setting by offset from the tangent method	CO4	L2	12M
		OR			
8		Describe with sketch the method of setting a simple circular curve by Rankine's deflection angle method.	CO4	L2	12M

UNIT-V

9		Explain with sketch the principle of EDM instrument	CO5	L1	12M
		OR			
10		Describe with sketch, the fundamental measurement of angles and distances by total station.	CO5	L2	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 June/July-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	Compare positive feedback and negative feedback.	CO1	L2	6M
	b	Give the classification of basic amplifiers.	CO2	L2	6M
		OR			
2	a	Show that how a negative feedback reduces gain of an amplifier.	CO1	L1	6M
	b	Derive the expression for De-sensitivity (D).	CO1	L3	6M
		UNIT-II			
3	a	Define Oscillator and explain its principle of operation.	CO1	L1	6M
	b	Interpret the various types of oscillators.	CO1	L3	6M
		OR			
4	a	Draw the circuit diagram of Colpitts oscillator using BJT and derive the expression for frequency of oscillations.	CO1	L1	6M
	b	Compare piezoelectric effect and inverse piezoelectric effect with a neat diagram.	CO6	L2	6M
		UNIT-III			
5	a	Explain the basic information and pin configuration of an op-amp.	CO1	L2	6M
	b	What are the four different configurations of differential amplifier?	CO1	L1	6M
		OR			
6	a	What is voltage follower? What are its features and applications?	CO1	L1	6M
	b	Explain the term slew rate and illustrate the importance in op-amp circuits.	CO3	L2	6M
		UNIT-IV			
7	a	Design and explain the operation of non-inverting summing amplifier.	CO3	L3	6M
	b	Explain the operation of differentiator using op-amp with a neat circuit diagram.	CO5	L2	6M
		OR			
8	a	Explain the operation of monostable multivibrator using op-amp ,with a neat circuit and its waveforms.	CO2	L2	6M
	b	Derive the equation for pulse width of the monostable multivibrator using op-amp.	CO4	L3	6M
		UNIT-V			
9	a	Draw the frequency response of filters.	CO1	L1	6M
	b	Explain the first order high pass butter worth filter with a neat circuit diagram.	CO2	L2	6M
		OR			
10	a	Explain in detail about R-2R DAC with a neat diagram.	CO3	L2	6M
	b	Discuss any four specifications of the DAC.	CO1	L2	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 June/July-2025

DATABASE MANAGEMENT SYSTEMS

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

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

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

		UNIT-I			
1	**a**	Explain the Architecture of Database with a neat diagram.	**CO1**	**L2**	**6M**
	b	Differentiate between Database users and administrators.	**CO1**	**L2**	**6M**
		OR			
2		Explain about ER model and ComponentS of ER Diagram.	**CO2**	**L2**	**12M**
		UNIT-II			
3	**a**	Illustrate Set comparison operator.	**CO1**	**L3**	**6M**
	b	Distinguish different types of aggregate operators with examples in SQL.	**CO1**	**L2**	**6M**
		OR			
4	**a**	What are Views in SQL? Give an example.	**CO1**	**L1**	**6M**
	b	Define NULL VALUE? Describe the Disallowing null values in database.	**CO1**	**L2**	**6M**
		UNIT-III			
5	**a**	Discuss about preserving Decomposition.	**CO3**	**L2**	**6M**
	b	Define Decomposition. List out the properties of decomposition.	**CO3**	**L1**	**6M**
		OR			
6	**a**	What is the use of Fourth normal form? Explain by listing some of its major advantages.	**CO3**	**L2**	**6M**
	b	Differentiate between about 4NF/MVD with example.	**CO3**	**L4**	**6M**
		UNIT-IV			
7	**a**	Demonstrate Conflict Serializability in detail.	**CO5**	**L2**	**6M**
	b	Discuss View Serializability in detail	**CO5**	**L2**	**6M**
		OR			
8		Explain ACID properties and illustrate them through examples.	**CO4**	**L2**	**12M**
		UNIT-V			
9	**a**	Explain in detail about Deadlock detection	**CO5**	**L2**	**6M**
	b	What is Deadlock recovery? Explain the different methods in deadlock.	**CO5**	**L2**	**6M**
		OR			
10	**a**	What are the classification of storage.	**CO6**	**L1**	**6M**
	b	Distinguish between fixed length records and variable length records.	**CO6**	**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 June/July-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	a	Define computer networks, Specify Computer Network Types.	CO1	L1	6M
	b	Illustrate what are the data rate limits in computer networks.	CO1	L3	6M
		OR			
2		Explain in detail about TCP/IP Network model.	CO1	L2	12M

UNIT-II

3	a	What is framing? Explain with frame architecture.	CO2	L2	6M
	b	Explain Cyclic Redundancy check method used for error detection.	CO2	L2	6M
		OR			
4		Explain about the Elementary data link protocols.	CO2	L2	12M

UNIT-III

5	a	Explain Flooding concept.	CO3	L2	6M
	b	Sketch and explain in detail about IPV4protocol.	CO3	L3	6M
		OR			
6	a	Explain distance vector routing algorithm.	CO3	L2	6M
	b	Write about BGP– Exterior Gateway routing protocol.	CO3	L4	6M

UNIT-IV

7		Illustrate the different Primitives used for transport service. Elaborate them.	CO4	L3	12M
		OR			
8	a	List and define the elements of transport layer.	CO4	L1	6M
	b	Describe about TCP connection Establishment.	CO4	L2	6M

UNIT-V

9	a	Explain about dynamic webpages.	CO5	L2	6M
	b	Name the basic functions of E-Mail.	CO5	L1	6M
		OR			
10	a	Describe SMTP protocol.	CO5	L2	6M
	b	Summarize in detail about cookies.	CO5	L6	6M

*** END ***

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

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

B.Tech. II Year I Semester Supplementary Examinations June/July-2025
ELECTRICAL MACHINES – I
(Electrical & Electronics Engineering)

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

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

UNIT-I

1	a	Explain the Types of DC Generators.	CO1	L2	6M
	b	A 8 pole dc shunt generator with 778 wave connected armature conductors and running at 500 rpm supplies a load of 12.5 ohm resistance at terminal voltage of 50v. The armature resistance is 0.24 ohm and the field resistance is 250 ohm. Find the armature current, the induced e.m.f and the flux per pole.	CO1	L3	6M

OR

2	a	Explain the uses of compensating winding.	CO1	L3	6M
	b	A 400V 1000A lap wound dc machines has 10 poles and 860 armatures conductors. calculate the number of conductors in the pole face to give full compensation if the pole face covers 70% pole span	CO1	L3	6M

UNIT-II

3	a	Explain the no-load characteristics for self-excited generator.	CO2	L2	6M
	b	Explain the no-load characteristics for separately-excited generator	CO2	L2	6M

OR

4	a	Explain the uses of equalizer bar.	CO3	L3	6M
	b	Discuss about cross connection of field winding of DC generator	CO3	L3	6M

UNIT-III

5	a	What is the significance of Back E.M.F	CO4	L2	6M
	b	A 440 v shunt motor has armature resistance of 0.8 ohm and field resistance of 200. Determine the back emf when giving an output of 7.46kW at 80% efficiency.	CO4	L3	6M

OR

6	a	Explain the armature voltage control method for the Speed control of a DC Motor	CO4	L2	6M
	b	A 200 V dc shunt motor running at 1000 rpm takes an armature current of 17.5A.it is required to reduce the speed to 600 rpm. What must be the value of resistance to be inserted in the armature circuit if the original armature resistance is 0.4 ohm. Take armature current to be constant during this process.	CO4	L3	6M

UNIT-IV

7	a	Explain brake test of DC machine.	CO5	L4	6M
	b	Explain swinburne's test of DC machine and state the advantage and disadvantages.	CO5	L4	6M

OR

8		Explain Hopkinson's test for DC machine and state the merits and demerits.	CO5	L4	12M

UNIT-V

9	a	Explain the torque- speed characteristics of PMBLDC motor.	CO6	L2	6M
	b	Compare PMBLDC with DC motor	CO6	L2	6M

OR

10		Explain construction and working principles of Switched Reluctance Motor(SRM).	CO6	L4	12M

*** END ***

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

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

B.Tech. II Year I Semester Supplementary Examinations June/July-2025
SWITCHING THEORY AND LOGIC DESIGN
(Electronics and Communications Engineering)

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

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

UNIT-I

1	a	What are Universal Gates? Give their truth tables and Graphic symbols.	CO1	L1	6M
	b	List the different Boolean expressions for Two binary Variables.	CO1	L2	6M
		OR			
2	a	State and prove Consensus Theorem and Absorption Theorem of Boolean algebra.	CO1	L3	6M
	b	Identify the Dual of the following Boolean expressions. (i) AB'C+AB'D+A'B' (ii) A'B'C+ABC'+A'B'C'D.	CO1	L2	6M

UNIT-II

3	a	Develop the logic diagram for the following Boolean function using NAND and NOR gates. Y=(AB'+A'B)(C+D').	CO5	L3	6M
	b	Explain the disadvantage of K-Map method of reducing a Boolean function and how to overcome it.	CO1	L2	6M
		OR			
4	a	Simplify the following expression using K-Map and realize with NAND and NOR gates. F = πM (1, 2, 3, 8, 9, 10, 11, 14). πd (7,15).	CO2	L4	6M
	b	Explain the disadvantage of K-Map method of reducing a Boolean function and how to overcome it.	CO1	L2	6M

UNIT-III

5	a	Explain a 2-bit Magnitude comparator and write down its design procedure.	CO3	L2	6M
	b	Design & implement Full Adder using two half adders.	CO4	L3	6M
		OR			
6	a	What is an encoder? Design an octal to binary encoder.	CO6	L3	6M
	b	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).	CO5	L3	6M

UNIT-IV

7	a	Derive the characteristic equations for D & T Flip-Flops.	CO2	L3	6M
	b	Derive the characteristic equations for D & T Flip-Flops.	CO2	L3	6M
		OR			
8	a	Define a counter and design a 4-bit Ripple counter.	CO6	L1	6M
	b	Explain in brief about a 2-bit synchronous up-counter.	CO6	L2	6M

UNIT-V

9	a	Illustrate the PLA for the following Boolean function. (i) F1= Σm(0,1,3,4) (ii) F2 = Σm(0,1,2,3,4,5).	CO5	L3	6M
	b	Explain in brief about Programmable Read Only Memory (PROM) with a suitable example.	CO2	L2	6M
		OR			
10	a	Define Moore model. Explain it with neat diagram.	CO1	L1	6M
	b	Explain the following related to sequential circuits with suitable examples: i) State diagram ii) State table iii) State assignment.	CO3	L2	6M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-2025
OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to CSE, CSIT, 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	L1	6M
	b	Develop a java program to read different data types using scanner.	CO1	L6	6M
		OR			
2	a	Define iteration statements.	CO1	L4	6M
	b	Explain about the Iteration statements.	CO1	L2	6M
		UNIT-II			
3	a	Define constructor. Classify the types of constructors in Java.	CO2	L1	6M
	b	Write a java program to illustrate constructor overloading.	CO2	L6	6M
		OR			
4	a	What is inheritance?	CO2	L1	6M
	b	Explain types of inheritances.	CO2	L2	6M
		UNIT-III			
5	a	Differentiate between checked and unchecked exceptions?	CO3	L4	6M
	b	Illustrate about try, catch, and throw statements using a java program.	CO3	L3	6M
		OR			
6	a	Define string? Write and explain string handling methods in java.	CO4	L1	6M
	b	Create a java program to check the given string is palindrome or not.	CO4	L6	6M
		UNIT-IV			
7		Illustrate file handling using file class	CO4	L3	12M
		OR			
8	a	Analyze the following concepts with java programs. i) Array list ii) Tree set iii) Linked hash map	CO6	L4	6M
	b	Apply the following interfaces with java programs. i) The collection interface ii) The set iii) The map entry	CO3	L6	6M
		UNIT-V			
9		Develop a java program to design simple registration page window using AWT controls.	CO5	L6	12M
		OR			
10		Explain the following methods in java. a) Default method b) Static method c) For Each()method	CO5	L2	12M

*** END ***

O.P.Code: 20CS0511	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-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**	Elaborate on the concept of REPL in Python and its purpose. Explain how Python scripts are executed.	**CO1**	**L2**	**6M**
	b	Describe sets and illustrate their operations comprehensively.	**CO1**	**L3**	**6M**
		OR			
2	**a**	Explain the variable and keywords with suitable examples.	**CO1**	**L2**	**6M**
	b	Illustrate the Input and Output statements with examples.	**CO1**	**L3**	**6M**
		UNIT-II			
3	**a**	Elaborate on logical operators and illustrate their applications with examples.	**CO2**	**L2**	**6M**
	b	Develop a Python program to swap two numbers with and without using temporary variables.	**CO2**	**L3**	**6M**
		OR			
4	**a**	Rate the order of execution of different Expressions by evaluating them through the Python program.	**CO2**	**L2**	**6M**
	b	Implement a Python program to generate the multiplication table based on user input.	**CO2**	**L3**	**6M**
		UNIT-III			
5	**a**	Explain about Anonymous functions with examples.	**CO3**	**L3**	**6M**
	b	Describe default arguments with a suitable program.	**CO3**	**L3**	**6M**
		OR			
6	**a**	Illustrate the lambda function with an example.	**CO3**	**L3**	**6M**
	b	Define variable-length arguments. Explain with an example.	**CO3**	**L3**	**6M**
		UNIT-IV			
7	**a**	Analyze the term PIP. Explain installing packages via PIP.	**CO4**	**L2**	**6M**
	b	Explain how the Modules are used in Python program with an example.	**CO4**	**L3**	**6M**
		OR			
8	**a**	Classify Errors and Exception Handling in Python programming.	**CO4**	**L2**	**6M**
	b	Elaborate on the concept of user-defined exceptions and their use in error handling.	**CO4**	**L3**	**6M**
		UNIT-V			
9	**a**	Describe how maps work in Python and their applications.	**CO5**	**L2**	**6M**
	b	Explain the usage and significance of filters in Python programming.	**CO5**	**L3**	**6M**
		OR			
10	**a**	Express about mathematical functions in Python.	**CO5**	**L2**	**6M**
	b	Showcase your understanding of GUI programming with an emphasis on rectangle creation.	**CO5**	**L3**	**6M**

***** END *****

O.P.Code: 20EE0203	R20	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-2025
GENERATION OF ELECTRICAL POWER
(Electrical and Electronics Engineering)

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

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

UNIT-I

1		Explain the function of the following in thermal power plant and explain the principle of operation of each. i) Super heater ii) Cooling tower iii)Boilers	CO1	L3	12M
		OR			
2	a	What are the differences between thermal and hydro power plant?	CO1	L1	6M
	b	What are the factors considered, while selecting the site for a Hydro power station?	CO2	L2	6M

UNIT-II

3	a	Explain Nuclear chain Reaction.	CO3	L3	6M
	b	State the advantages and disadvantages of Nuclear power plant.	CO3	L2	6M
		OR			
4		State the types of reactors used in nuclear power station. Explain about the boiling water reactor.	CO3	L3	12M

UNIT-III

5	a	Explain the construction of Flat plate collectors with neat diagram.	CO4	L3	6M
	b	Describe the different types of wind mills.	CO4	L2	6M
		OR			
6	a	What is the role and potential of wind energy? Explain in detail.	CO4	L2	6M
	b	What is the need for solar thermal energy storage?	CO4	L1	6M

UNIT-IV

7	a	How biomass conversion takes place?	CO5	L3	6M
	b	Explain the factors affecting bio-digestion of gas.	CO5	L3	6M
		OR			
8		Draw schematic diagram of geothermal system and explain the working principle.	CO5	L3	12M

UNIT-V

9	a	What is load? Explain different types of loads.	CO6	L2	6M
	b	The maximum demand of a consumer is 20 A at 220 V and his total energy consumption is 8760 kWh. If the energy is charged at the rate of 20 paise per unit for 500 hours use of the maximum demand per annum plus 10 paise per unit for additional units, calculate : (i) annual bill (ii) equivalent flat rate.	CO6	L4	6M
		OR			
10	a	What is Tariff ? What are the Desirable Characteristics of a Tariff?	CO6	L3	6M
	b	What do you understand by 'Economics of power generation'?	CO6	L2	6M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations June/July-2025

SIGNALS, SYSTEMS AND RANDOM PROCESSES

(Electronics and Communications Engineering)

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

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

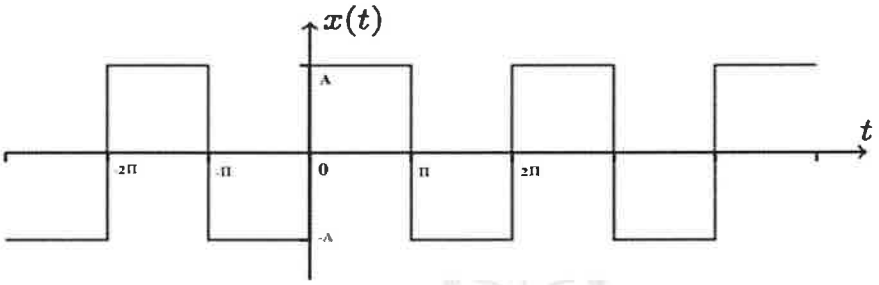
UNIT-I

1	a	Define signal. Explain various elementary signals and indicate them graphically.	CO1	L2	6M
	b	Sketch the following signals. (i) x(t)=2 u(t+2)- 2 u(t-3) ii) x(t)=r(t)-r(t-1)-r(t-3)+r(t-4)	CO1	L3	6M

OR

2	a	Define the following Systems (i) Linear and Non- Linear (ii) Time invariant and time variant. (iii) Static and dynamic (iv) Causal and Non-causal	CO2	L1	6M
	b	Find whether the following system is (i) Linear or Non- Linear ii) Static and dynamic. $d^3y(t)/dt^3 + 2d^2y(t)/dt^2 + 4dy(t)/dt + 3y^2(t) = x(t+1)$	CO2	L3	6M

UNIT-II

3		Develop the Exponential Fourier Series for the given signal below 	CO2	L3	12M

OR

4	a	List the properties of Continuous time Fourier transform.	CO2	L1	6M
	b	State and prove the Linearity and Time Shifting properties of Continuous time Fourier transform.	CO2	L3	6M

UNIT-III

5	a	State and Prove the Following Properties of LTI System. (i) Distributive Property ii) Associative Property	CO2	L3	6M
	b	Derive the Transfer function of LTI system	CO2	L3	6M

OR

6	a	Demonstrate the Procedure to perform convolution graphically.	CO4	L2	6M
	b	Examine the convolution of the following signals by graphical method. $x(t)=e^{-3t}u(t)$ and $h(t)=u(t+3)$	CO4	L3	6M

UNIT-IV

7	a	State and prove the Time Reversal Property of Laplace transform	CO2	L2	6M
	b	Derive the Laplace transform of any three standard signals.	CO3	L3	6M

OR

8	a	Explain the concept of Joint probability.	CO6	L2	6M
	b	Explain the concept of Conditional probability	CO6	L2	6M

UNIT-V

9	a	Define and Differentiate the Distribution and Density functions of a Random Process.	CO6	L2	6M
	b	Define and explain Stationary and Statistical Independence of Random process.	CO6	L2	6M

OR

10		Explain the concept of cross power density spectrum. List the properties of cross power spectral density.	CO6	L2	12M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations June/July-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	Discuss about User and Operating System Interface.	CO1	L2	6M
	b	Write a short note on System programs.	CO1	L2	6M
		OR			
2	a	What is System Call? Explain different types of system calls.	CO1	L2	8M
	b	Discuss about the functionality of system boot with respect to operating system.	CO1	L2	4M
		UNIT-II			
3	a	Explain in detail about operations of process.	CO2	L3	6M
	b	What is CPU scheduling? Explain types of Scheduling and Scheduling Criteria in detail.	CO2	L3	6M
		OR			
4	a	Discuss about Multilevel Queue Scheduling and First come First Serve with example.	CO3	L2	6M
	b	What are Threads? Write about Types of Threads.	CO3	L1	6M
		UNIT-III			
5	a	Explain in detail Classical problems of synchronization.	CO3	L3	6M
	b	What is Dead lock? Explain the advantages of dead lock.	CO3	L3	6M
		OR			
6	a	Explain in detail about producer consumer problem.	CO3	L3	6M
	b	Write the properties and limitations of semaphores.	CO3	L1	6M
		UNIT-IV			
7	a	Explain any two page replacement algorithms.	CO4	L5	6M
	b	Explain the concept of segmentation in detail.	CO4	L3	6M
		OR			
8	a	Explain Structure of page table.	CO4	L3	6M
	b	Explain the concept of Thrashing.	CO4	L3	6M
		UNIT-V			
9	a	Explain stable storage management.	CO5	L3	6M
	b	Explain about disk structure.	CO5	L3	6M
		OR			
10	a	Explain File access methods in detail.	CO5	L3	6M
	b	What is Directory? Explain Directory implementation.	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 June/July-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	Define System call. List different types of system calls.	CO1	L1	6M
	b	List and discuss the different functions of an operating system.	CO1	L2	6M
		OR			
2	a	Discuss the services provided by an operating system.	CO1	L2	8M
	b	Write notes on system programs.	CO1	L1	4M

UNIT-II

3	a	List the advantages of ULT and KLT.	CO2	L1	6M
	b	Name and draw five different process states with proper definition.	CO2	L1	6M
		OR			
4	a	Give below Processes table, calculate the average waiting time for the algorithms:First Come First Serve (FCFS).	CO2	L2	6M

Process	Arrival Time	Burst Time
P1	0	7
P2	2	5
P3	4	2
P4	5	4
P5	3	2

	b	What is threading and multithreading in OS?	CO2	L1	6M

UNIT-III

5	a	Write short notes on Dead Lock Characteristics.	CO3	L3	6M
	b	Describe in detail deadlock prevention.	CO3	L3	6M
		OR			
6	a	What is critical section problem? Explain with example.	CO4	L1	6M
	b	What is Monitor? Explain with syntax.	CO4		6M

UNIT-IV

7	a	What is disk scheduling. List the different Disk scheduling algorithms with their comparisons.	CO5	L4	6M
	b	Define Memory management. What is Swapping? Explain with structure.	CO5	L2	6M
		OR			
8	a	List different types of page replacement algorithms. Explain with examples.	CO5	L2	6M
	b	Classify demand paging with example.	CO5	L4	6M

UNIT-V

9	a	Enlist different types of directory structure.	CO6	L1	6M
	b	Classify access matrix and its implementation.	CO6	L4	6M
		OR			
10	a	Discuss the various file allocation methods.	CO6	L2	6M
	b	Define Authentication. explain types of authentications.	CO6	L1	6M

***** END *****

Q.P.Code: 20CE0109 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-2025
FLUID MECHANICS
(Civil Engineering)

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

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

UNIT-I

1	a	Explain the phenomenon of capillarity. Obtain an expression for capillary rise of a liquid.	CO1	L2	6M
	b	Calculate the capillary rise in a glass tube of 2.5mm diameter when immersedvertically in a) water & b) mercury. Take surface tension is 0.0725 N/m^2 for water And 0.52 N/m^2 for mercury in contact with air. The specific gravity for mercury is given as 13.6 & angle of contact is 130^o	CO1	L3	6M
		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	L1	12M
		OR			
4		Explain about the stream function with definition in Two-dimensional flow and polar co-ordinates. Also write its properties.	CO2	L1	12M

UNIT-III

5		Derive the Expression for velocity measurement by Pitot tube and pitot static tube.	CO4	L3	12M
		OR			
6	a	Derive an expression for the discharge over a rectangular notch.	CO4	L2	6M
	b	A rectangular notch 2m wide as a constant head of 500mm. Find the discharge over the notch, if co-efficient of discharge for the notch is 0.62 and g = 9.81?	CO4	L2	6M

UNIT-IV

7		The rate of flow water through a horizontal pipe of 0. 25m m^3/s. The dia of the pipe which is 200mm is suddenly enlarged to 400mm. the pressure intensity in the smaller pipe is 11.772 N/cm^2. Determine i) Loss of head due to sudden enlargement ii) Pressure intensity in the large pipe iii) power lost due to enlargement?	CO5	L3	12M
		OR			
8		Briefly explain about Hardy cross method.	CO5	L2	12M

UNIT-V

9	a	Derive the expression for resistance of smooth pipes.	CO6	L3	6M
	b	Derive the expression for resistance of rough pipes.	CO6	L3	6M
		OR			
10		Water is flowing through a rough pipe of 500mm diameter and length 4000m at the rate of 0.5 m^3/s. find the power required to maintain this flow. Take average height of roughness as k= 0.4mm.	CO6	L3	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 June/July-2025

THERMAL ENGINEERING

(Mechanical Engineering)

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

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

UNIT-I

1	a	A two stage air compressor compresses air from 1 bar and 20°C to 42 bar. If the law of compression is $pv^{1.3}$ = constant and the inter cooling is perfect. Find per kg of air (i) The work done in compression.	CO1	L3	6M
	b	Derive the relation for work done on single stage reciprocating compressor without Clearance.	CO1	L2	6M

OR

2		An air compressor cylinder has 150mm bore and 150mm stroke and the clearance is 15%. It operates between 1 bar, 270C and 5 bar. Take polytropic exponent n=1.3 forcompression and expansion processes. Find (i). Cylinder volume at the various salient points of in cycle. (ii). Flow rate in m3/min at 720 rpm. (iii). Volumetric efficiency.	CO1	L3	12M

UNIT-II

3		Derive the expression for the efficiency of Brayton cycle in terms cycle parameters.	CO2	L3	12M

OR

4		In a Gas turbine plant, the air is compressed in a single stage compressor from 1 bar to 9 bar and from an initial temperature of 300K.The same air is then heated to a temperature of 800K and then expanded in the turbine. The air is then reheated to a temperature of 800K and then expanded in the second turbine. Find the maximum power that can be obtained from the installation, if the mass of air circulated per second is 2Kg. Take Cp=1 KJ/Kg.	CO2	L3	12M

UNIT-III

5	a	Explain about super saturated flow in nozzles with neat sketch. And represent in H-S diagram.	CO3	L2	6M
	b	What are the effects of friction on flow through nozzle?	CO3	L2	6M

OR

6		Classify the non-mixing type condensers and explain them in brief.	CO3	L2	12M

UNIT-IV

7		Explain Compounding and its types with appropriate sketches.	CO4	L2	12M

OR

8		Explain Nozzle Governing and Bypass Governing in steam turbines with neat sketches.	CO4	L2	12M

UNIT-V

9		Compare 2-stroke engine with 4-stroke engine.	CO5	L3	12M

OR

10		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	L3	12M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-2025
ELECTRO MAGNETIC FIELDS
(Electrical & Electronics Engineering)

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

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

UNIT-I

1		i).Express vector B in cartesian system. $B= (10/r)\, a_r + r\cos\theta\, a_\theta + a_\phi$. ii). From the above expression evaluate B at (-3,4,0).	CO1	L1	12M

OR

2		Find the gradient of the following scalar fields: i) $V= e^{-z} \sin 2x \cosh y$, ii) $U= r^2 z \cos\phi$ and iii) $W= 10r \sin^2\theta \cos\phi$	CO1	L3	12M

UNIT-II

3	a	State and prove Gauss's law and write limitations of Gauss's law.	CO2	L2	6M
	b	Determine the Electric filed intensity at P(-0.2, 0, -2.3) m due to a point chargeof 5 nc at Q (0.2,0.1, -2.5) m in air.	CO2	L3	6M

OR

4	a	Explain the concept of divergence theorem.	CO2	L2	4M
	b	Given that $A= 30\, e^{-r}\, ar^{-2}\, z\, az$ in the cylindrical co-ordinates. Evaluate both sides of the divergence theorem for the volume enclosed by r=2, z=0 and Z=5.	CO2	L3	8M

UNIT-III

5		Explain the boundary conditions of two perfect dielectrics materials.	CO3	L2	12M

OR

6		In a a parallel plate capacitor A=100 Cm^2, d=4 mm and ε_r=10. i). Evaluate the capacitance. ii). By connecting 30 V battery across the Capacitors, Calculate E, D, Q and the total stored energy. iii).If the source is disconnected and the dielectric is carefully withdrawn from between. Again, Calculate E, D, Q and the energy. iv). Potential Difference between the plates.	CO3	L4	12M

UNIT-IV

7	a	State and explain ampere's circuital law.	CO4	L2	6M
	b	Find the flux passing the portion of the plane $\phi=\pi/4$ defined by $0.01<r<0.05$ m and $0<z<2$ m. A current filament of 2.5 A is along the z axis in the az direction in free space.	CO4	L3	6M

OR

8	a	Explain the Stokes theorem.	CO4	L2	4M
	b	Evaluate both sides of the stokes theorem for the filed $H=6xy\, ax - 3y^2\, ay$ A/m and the rectangular path around the region $2<x<5$, $-1<y<1$, Z=0 . Let the positive direction of ds be a_z.	CO4	L4	8M

UNIT-V

9		Explain faradays law of electromagnetic induction and there from derive maxwell's equation in differential and integral form?	CO5	L4	12M

OR

10		What is displacement current? Explain physical significance of displacement current?	CO5	L2	12M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations June/July-2025

HUMAN VAUES AND PROFESSIONAL ETHICS

(Common to CSIT, 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	Explain why the study of human values is essential to engineers. List a few important human values and sub-values.	CO1	L2	6M
	b	What is work ethic? Discuss briefly the various elements of it.	CO1	L2	6M
		OR			
2	a	Write short notes on the following. (i) Respect for others (ii) Living peacefully (iii) Caring (iv) Sharing	CO1	L2	6M
	b	Explain the concept of spirituality in work place.	CO1	L2	6M

UNIT-II

3	a	Write short notes on 'senses or dimensions of engineering ethics.	CO2	L1	6M
	b	Write down the various approaches to engineering ethics.	CO2	L1	6M
		OR			
4	a	Mention the uses of ethical theories?	CO2	L1	6M
	b	Write down the attributes of a profession?	CO2	L1	6M

UNIT-III

5	a	What are the various roles and functions of codes of ethics?	CO3	L1	6M
	b	Explain about conscientiousness.	CO3	L1	6M
		OR			
6	a	Define the term standardization. What are the facilities provided by standards?	CO3	L1	6M
	b	What are the problems associated with the laws in engineering?	CO3	L1	6M

UNIT-IV

7	a	Outline safety. Enumerate criteria for ensuring safe design.	CO4	L2	6M
	b	Define risk. What are the factors influencing risk?	CO4	L2	6M
		OR			
8	a	What are the benefits of Intellectual property rights?	CO4	L2	6M
	b	Explain in brief about Professional and Employee rights.	CO4	L2	6M

UNIT-V

9	a	Who are the consultants? List out the areas where the consultants works.	CO5	L1	6M
	b	List out various conflicts faced by Managers and also Enlist the principles used by the managers to resolve them.	CO5	L1	6M
		OR			
10	a	Explain the duties of engineers as expert witnesses.	CO5	L1	6M
	b	Explain the role of engineers as advisors in planning and policy making.	CO5	L1	6M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. II Year I Semester Supplementary Examinations June/July-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	Define Amplitude Modulation. Derive expression for AM wave and sketch its frequency spectrum.	CO1	L1	8M
	b	Determine the Modulation index & Bandwidth of AM	CO1	L2	4M
		OR			
2	a	Illustrate the Amplitude modulation for single tone information	CO2	L2	6M
	b	modulating signal 10 $sin\ (2\pi\times103t)$ is used to modulate a carrier signal 20 $sin\ (2\pi\times104t)$. Compute the modulation index, % of modulation index, frequency of sideband components and their amplitudes. What will be the bandwidth of modulated signal?	CO3	L3	6M

UNIT-II

3	a	Explain the functionality of Ring modulator for generation of DSB-SC wave.	CO2	L2	8M
	b	Calculate the Transmission bandwidth of DSB-SC wave & power saving.	CO3	L3	4M
		OR			
4	a	What are the advantages and disadvantages of SSB-SC signal?	CO2	L1	6M
	b	The power of an SSB transmission is 10kW. This transmission is to be replaced by a standard AM signal with the same power content. Calculate the power content of the carrier and each of the sidebands when the percentage modulation is 80%.	CO2	L4	6M

UNIT-III

5	a	Explain the working principle of Varactor Diode Modulator.	CO4	L2	6M
	b	Explain the block diagram of indirect method in FM generation.	CO4	L5	6M
		OR			
6	a	Explain and draw the block diagram of FM transmitter.	CO2	L2	6M
	b	A single-tone FM is represented by the voltage equation as: $v(t)=12\cos(6\times10\text{^}6t+5\sin1250t)$. Determine the following: (i) Carrier frequency (ii) Modulating frequency (iii) Modulation index (iv) What power will this FM wave dissipate in 10Ω resistors?	CO3	L4	6M

UNIT-IV

7	a	What are the advantages & disadvantages of super heterodyning?		L1	5M
	b	For a broadcast Super-heterodyne AM receiver having no RF amplifier, the loaded Quality factor of the antenna coupling circuit is 100. Now, if the intermediate frequency is 455kHz, determine the image frequency and its rejection ratio at an incoming frequency of 1000kHz.	CO4	L4	7M
		OR			
8		Derive the expression for figure of merit of AM (DSB-FC) system.	CO5	L3	12M

UNIT-V

9		With a neat sketch, explain the modulation & demodulation of Pulse Duration Modulation.	CO3	L2	12M

OR

10	a	Explain about information content of message and information rate.	CO6	L5	6M
	b	A source produces one of four possible symbols during each interval having probabilities P(x1) = 1/2, P(x2) = 1/4, P(x3) = P(x4) = 1/8. Obtain the information content of each of these symbols.	CO6	L4	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 June/July-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 double slider crank chain with neat sketch and list out the practical applications of inversions.	CO1	L2	12M

OR

2	a	Explain the working of beam engine with neat sketch	CO1	L2	4M
	b	Explain the working principle of quick return mechanisms and also describe the working of Oscillating cylinder engine with neat sketch.	CO1	L2	8M

UNIT-II

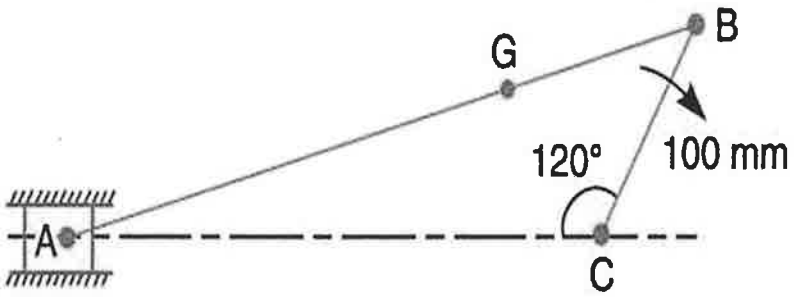
3		Sketch and Describe the Scott-Russell and Robert's straight-line motion mechanisms.	CO2	L1	12M

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		An engine mechanism is shown in Fig. 8.5. The crank CB = 100 mm and the connecting rod BA = 300 mm with centre of gravity G, 100 mm from B. In the position shown, the crankshaft has a speed of 75 rad/s and an angular acceleration of 1200 rad/s2. Find: 1. Velocity of G and angular velocity of AB, and 2. acceleration of G and angular acceleration of AB	CO3	L1	12M



OR

6	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

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		Design a cam for operating the exhaust valve of an oil engine. It is required to give equal uniform acceleration and retardation during opening and closing of the valve each of which corresponds to 60° of cam rotation. The valve must remain in the fully open position for 20° of cam rotation. The lift of the valve is 37.5 mm and the least radius of the cam is 40 mm. The follower is provided with a roller of radius 20 mm and its line of stroke passes through the axis of the cam.	CO4	L5	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	L2	12M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-2025
MECHANICS OF SOLIDS
(Common to ME & AGE)

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

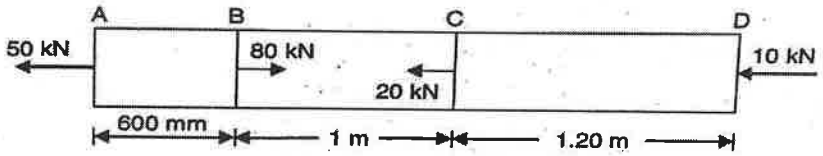
(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	a	Define stress and strain. Explain different types of stresses and strains.	CO1	L1	6M
	b	Draw and explain Stress-strain curve for a mild steel bar.	CO1	L1	6M

OR

2	A brass bar, having cross-sectional area of 1000 mm^2, is subjected to axial forces as shown in figure. Find the total elongation of the bar. Take $E=1.05x10^5$ N/mm^2.	CO1	L3	12M



UNIT-II

3	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	12M

OR

4	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	12M

UNIT-III

5	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	12M

OR

6	a	State the difference between twisting moment and bending moment.	CO3	L1	4M
	b	A solid steel shaft has to transmit 75 KW at 200 rpm. Taking allowable shear stress as 70 N/mm^2, find suitable diameter for the shaft, if the maximum torque transmitted at each revolution exceeds the mean by 30%.	CO3	L3	8M

UNIT-IV

7	A beam of uniform rectangular section 200 mm wide and 300 mm deep is simply supported at its ends. It carries a uniformly distributed load of 9 KN/m run over the entire span of 5 m. If the value of E for the beam material is 1×10^4 N/mm^2, find: (i) The slope at the supports and (ii) Maximum deflection.	CO4	L4	12M

OR

8	Determine: (i) slope at the left support, (ii) deflection under the load and (iii) maximum deflection of a simply supported beam of length 5 m, which is carrying a point load of 5 KN at a distance of 3 m from the left end. Take E= 2×10^5 N/mm^2 and I =1×10^8 mm^4.	CO4	L4	12M

UNIT-V

9	A cylindrical shell 100mm long 200mm internal diameter having thickness of a metal as 10mm is filled with a fluid at atmospheric pressure. If an additional $200mm^3$ pumped into the cylinder, Take E = 2×10^5 N/mm^2 and Poisson's ratio is 0.3. Find (i) The pressure exerted by the fluid on the cylinder and (ii)The hoop stress induced.	CO6	L4	12M

OR

10	Derive an expression for hoop and radial stresses across thickness of the thick cylinder.	CO6	L2	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 June/July-2025
STRENGTH OF MATERIALS
(Civil Engineering)

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

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

UNIT-I

1	a	Derive the relationship between load, shear force, and bending moment for beam.	CO1	L1	6M
	b	A 10 m long simply supported beam carries two point loads of 10 kN and 6 kN at 2 m and 9 m respectively from the left end. It has a uniformly distributed load of 4 kN/m run for the length between 4 m and 7 m from the left hand end. Draw shear force and bending moment diagrams.	CO1	L2	6M

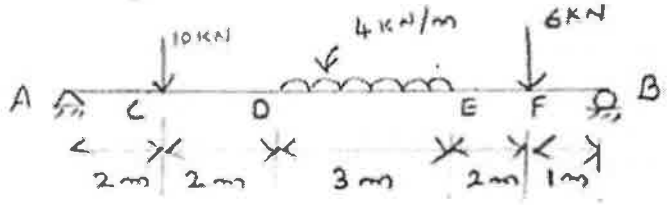


Fig:

OR

2	a	List and explain different types of beams based on support conditions.	CO1	L2	4M
	b	A cantilever of 14 m span carries loads of 6 kN, 4 kN, 6 kN and 4 kN at 2 m, 4 m, 7 m and 14 m respectively from the fixed end. It also has a uniformly distributed load of 2 kN/m run for the length between 4 m and 10 m from the fixed end. Draw the shear force and bending moment diagrams.	CO1	L4	8M

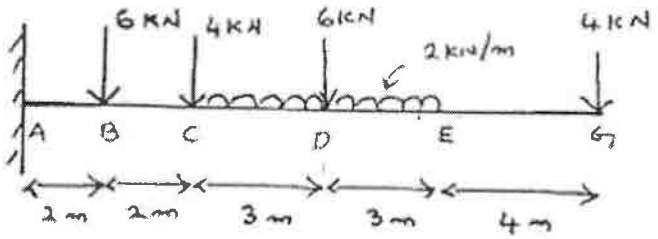
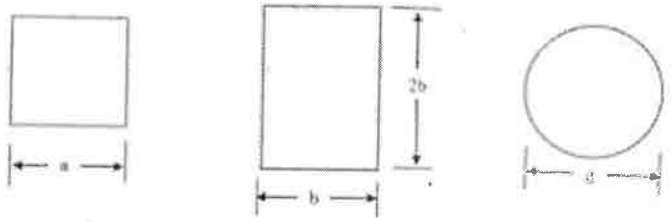


Fig:

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	L3	12M



OR

4		Draw the shear stress distribution for an I section which is symmetrical about both the axis. The width of flanges being 'B' and web 'b'. The overall depth 'D' and depth of web 'd'.	CO2	L3	12M

UNIT-III

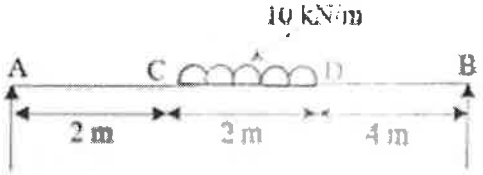
5		Derive the relation for a circular shaft when subjected to torsion as below: $\frac{T}{J} = \frac{\tau}{R} = \frac{C\theta}{L}$ Where T = torque transmitted, J = Polar moment of inertia, τ = Maximum shear stress, R = Radius of the shaft, C = Polar moment of inertia, Θ = Ange of twist, and L = Length of the shaft.	CO3	L3	12M

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 15^0 . 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	12M

UNIT-IV

7		A beam AB of span 8 m is simply supported at the ends A and B and is loaded as shown in Figure. If E = 200 x 10^6 kN/m^2 and I = 120 x 10^{-6} m^4 determine: (i)Deflection at the mid span (ii) Maximum deflection (iii) Slope at the end A.	CO4	L4	12M



OR

8		State the assumptions and derive the equation $M = EI \frac{d^2y}{dx^2}$.	CO4	L3	12M

UNIT-V

9	a	What are the assumptions made in Euler's theory?	CO5	L2	2M
	b	Find the ratio of buckling strength of a solid column to that of a hollow column of the same material and having the same cross –sectional area. The internal diameter of the hollow column is half of its external diameter. Both the columns are hinged and the same length.	CO5	L3	10M

OR

10	a	A rectangular section of width b and thickness d, find out limit of eccentricity and draw the kernel.	CO5	L2	6M
	b	In a tension specimen 13 mm in diameter the line of pull is parallel to the axis of the specimen but is displaced from it. Determine the distance of the line of pull from the axis, when the maximum stress is 15% greater than the mean stress on a section normal to the axis.	CO5	L3	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 June/July-2025
ELECTRONIC DEVICES AND CIRCUITS
(Electronics and Communications Engineering)

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

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

UNIT-I

1	a	Derive the expression for forward dynamic resistance of a PN junction diode.	CO2	L3	7M
	b	Calculate the forward resistance of a PN Junction Diode when the forward current is 5mA at T = 300 K. Assume Silicon diode.	CO2	L4	5M
		OR			
2	a	Derive the expression for transition capacitance of a PN JunctionDiode.	CO2	L3	6M
	b	Explain about a Combination Clipper and sketch its input-output waveforms.	CO4	L2	6M

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	A Full Wave Rectifier circuit is fed from a transformer having a center-tapped secondary winding. The RMS voltage from either end of secondary to center tap is 30V. If the diode forward resistance is 2Ω and that of the half secondary is 8Ω, for a load of 1 KΩ. Calculate DC power delivered to the load, efficiency of rectification and Transformer Utilization Factor (TUF) of secondary.	CO5	L4	6M
		OR			
4	a	Demonstrate the working principle of LC filter with neat circuit diagram and derive the expression for its ripple factor. List its advantages and disadvantages.	CO3	L4	6M
	b	With neat diagram, explain the working of LED and list its advantages and applications.	CO3	L3	6M

UNIT-III

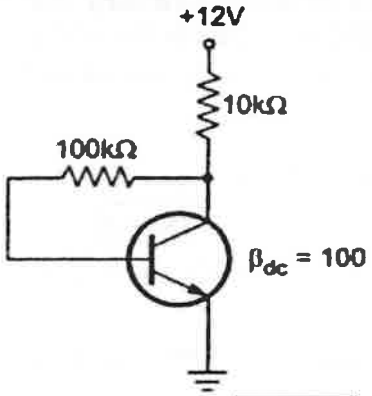
5	a	With neat diagram, explain the Input and Output characteristics ofa BJT in CB Configuration. Explain Early effect.	CO3	L2	6M
	b	Explain the construction and working principle of N-ChannelJFET.	CO3	L2	6M
		OR			
6	a	List the differences between Depletion and EnhancementMOSFETs.	CO2	L2	6M
	b	Explain the operation of N-Channel depletion type MOSFET with diagram.	CO3	L2	6M

UNIT-IV

7	a	List the different types of Biasing a Transistor and explain the Fixed Bias of a Transistor.	CO3	L2	6M
	b	Determine the expression for stability factor, S for fixed bias circuit and list its disadvantages.	CO5	L3	6M

OR

8	a	Define and Explain Thermal Runaway and Thermal Resistance.	CO2	L2	6M
	b	Determine the Q-point for the circuit shown in the Figure	CO6	L3	6M



UNIT-V

9	a	What is a small signal low frequency transistor amplifier?	CO2	L1	6M
	b	Define h-parameters and draw the generalized h-parameter model of a Transistor. Why hybrid model is used for the analysis of BJT amplifier at low frequencies?	CO2	L2	6M

OR

10	a	For a CB transistor, amplifier driven by a voltage source of internal resistance R_s = 1200Ω, the load Impedance of R_L = 1000Ω. The h-parameters are h_{ib} = 22Ω, h_{rb} = 3 x 10^{-4}, h_{fb} = - 0.98, h_{ob} = 0.5μA/V. Find current gain, voltage gain, input impedance and output impedance using approximate analysis.	CO6	L3	6M
	b	Analyze CE amplifier with emitter resistance using simplified h-parameter model.	CO5	L4	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 June/July-2025
FLUID MECHANICS & HYDRAULICS MACHINERY
(Mechanical Engineering)

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

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

UNIT-I

1	a	Define surface tension. Derive the expression for surface tension on liquid droplet.	CO1	L1	8M
	b	The surface tension of water in contact with air at 200 C is 0.072 N/m. The pressure inside of water droplet of water is to be 0.02 N/cm2 greater than the outside pressure. Calculate the diameter of the droplet of water.	CO1	L3	4M

OR

2	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

UNIT-II

3	a	The diameters of a pipe at the sections 1 & 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5 m/s. Determine also the velocity at section 2.	CO2	L3	6M
	b	Define the following terms: Velocity potential function, stream function and flow net.	CO2	L1	6M

OR

4		Derive Bernoulli's equation and state assumptions.	CO2	L3	12M

UNIT-III

5		List out minor losses in pipe flow and write the equations for all minor losses.	CO3	L1	12M

OR

6	a	Recall the concept of pipes in series and parallel.	CO3	L1	6M
	b	Find the head lost due to friction in a pipe of diameter 300 mm and length 50m, through which water is flowing at a velocity of 3 m/s using Darcy formula.	CO3	L3	6M

UNIT-IV

7	a	Determine the expression for force and the efficiency by the jet when it strikes at the centre of moving curved plate?	CO4	L3	6M
	b	A 7.5 cm diameter jet having a velocity of 30 m/s strikes a flat plate, the normal of which is inclined at 45° to the axis of the jet. Calculate the normal pressure on the plate when (i) the plate is stationary, and (ii) when the plate is moving with a velocity of 15 m/s and away from the jet.	CO4	L3	6M

OR

8		A jet of water having a velocity of 40 m/s strikes a curved vane, which is moving with a velocity of 20 m/s. The jet makes an angle of 30° with the direction of motion of vane at inlet and leaves at an angle of 90° to the direction of the motion of the vane at outlet. Draw the velocity triangles at inlet and outlet and determine the vane angles at inlet and outlet so that the water enters and leaves the vane without shock.	CO4	L4	12M

UNIT-V

9		Explain Definitions of Heads and Efficiencies of a centrifugal pump.	CO5	L2	12M

OR

10		The following data is given for the Francis turbine. Net head H = 60 m, Speed N = 700 r.p.m., Shaft Power = 294.3 kW, ηo = 84 % ηh = 93 %, flow ratio = 0.2, breadth ratio n = 0.1, outer diameter of the runner = 2 X inner diameter of the runner. The thickness of vane occupies 5% of circumferential area of the runner, velocity of flow is constant at inlet and outlet and discharge is radially at outlet. Determine: (i) Guide blade angle, (ii) Runner vane angles at inlet and outlet, (iii) Diameters of runner at inlet and outlet, and (iv) Width of wheel at inlet.	CO5	L3	12M

***** END *****

O.P.Code: 20HS0834	R20	H.T.No.									

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

Time: 3 Hours **Max. Marks: 60**
Answer all Five Units **5 x 12 = 60** Marks

UNIT-I

1		State Newton–Raphson formula for solution of polynomial and transcendental equations. Using the Newton-Raphson method *(i)* Find the square root of **48**. *(ii)* Find the reciprocal of **12**.	**CO2**	**L3**	**12M**
		OR			
2	**a**	From the following table, the values of x and $y = \cos x$. Interpolate values of y when $x = 0.12$.	**CO1**	**L5**	**6M**

x	0.10	0.15	0.20	0.25	0.30
y	0.995	0.988	0.980	0.969	0.955

	b	Use Newton's backward interpolation formula to find $f(32)$ given $f(25) = 0.2707,\ f(30) = 0.3027,\ f(35) = 0.3386,\ f(40) = 0.3794$.	**CO1**	**L3**	**6M**

UNIT-II

3		Solve $y' = x^2 - y$ using R –K method of 4^{th} order, given that $y(0) = 1$. Find $y(0.1)$ and $y(0.2)$.	**CO3**	**L3**	**12M**
		OR			
4	**a**	Evaluate $\int_0^4 e^x\,dx$ by Simpson's rule with **12** sub–divisions.	**CO3**	**L5**	**6M**
	b	Evaluate $\int_0^{\pi/2} \sin x\,dx$ using Trapezoidal rule and Simpson's **1/3** rule and compare with the exact value.	**CO3**	**L5**	**6M**

UNIT-III

5	**a**	Find the Laplace transform of $f(t) = t^2 e^{2t} \sin 3t$.	**CO4**	**L3**	**6M**
	b	Find the Laplace transform of $f(t) = e^{-4t} \int_0^t \frac{\sin 3t}{t}\,dt$.	**CO4**	**L3**	**6M**
		OR			
6	**a**	Find $L^{-1}\left[\log\left(\frac{s-a}{s+b}\right)\right]$	**CO4**	**L3**	**6M**
	b	Using the Convolution theorem, Find $L^{-1}\left[\frac{s}{(s^2+a^2)^2}\right]$	**CO4**	**L3**	**6M**

UNIT-IV

7	a	Solve the D.E. $y''+2y'+y=3te^{-t}$ using Laplace Transform given that $y(0)=4,\ y'(0)=0$.	CO5	L3	6M
	b	Obtain the Fourier series expansion of $f(x)=(\pi-x)^2$ in $[0,\ 2\pi]$. Hence show that $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}----=\frac{\pi^2}{6}$	CO5	L3	6M

OR

8	a	Expand $f(x)=\lvert x\rvert$ as a Fourier series in the interval $(-2,\ 2)$.	CO5	L2	6M
	b	Find the half-range cosine series expansion of $f(x)=x^2$ in $0<x<4$.	CO5	L1	6M

UNIT-V

9	a	Find the Fourier cosine transform of $f(x)=\begin{cases}x, & 0<x<1\\ 2-x, & 1<x<2\\ 0, & x>2\end{cases}$	CO6	L1	6M
	b	Prove that $F_s[xf(x)]=-\frac{d}{dp}[F_c(p)]$	CO6	L5	6M

OR

10		Find the Fourier transform of $f(x)=\begin{cases}a^2-x^2, & \lvert x\rvert<a\\ 0, & \lvert x\rvert>a>0\end{cases}$ Hence show that $\int_0^\infty \frac{\sin x-x\cos x}{x^3}\,dx=\frac{\pi}{4}$.	CO6	L1	12M

***** END *****

Q.P.Code: 20HS0832 | R20 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-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	The probability that John hits a target is $\frac{1}{2}$. He fires 6 times, find the probability that he hits the target (i) Exactly 2 times (ii) At lest one	CO1	L1	6M
	b	Average number of accidents on any day on a national high way is 1.8. Determine the probability that the number of accidents are (I) at least one (ii) at most one	CO1	L1	6M

OR

2		Of the three men, the chances that a politician, a business man or an academician will be appointed as a vice-chancellor of university are 0.5, 0.3, 0,2, respectively. Probability that research is promoted by these persons if they are appointed as VC are 0.3, 0.7, 0.8, respectively. (i) Determine the probability that research is promoted (ii) If research is promoted, what is the probability that V.C is an academician?	CO1	L3	12M

UNIT-II

3	a	Find the first approximation of the root of the equation x-$cos\ x$=0 by Bisection method	CO2	L3	6M
	b	Find the first approximation of the root of the equation $xe^x = 2$ by Regula-Falsi method	CO2	L3	6M

OR

4		Consider the following data Find the value of f(1.2) and f(2.0) using Newton's forward and backward interpolation formulas.	CO2	L3	12M

X	1	1.4	1.8	2.2
f(x)	3.49	4.82	5.96	6.5

UNIT-III

5		Using modified Euler's method , find $y(0.2)$ and $y(0.4)$ given $y' = y + e^x, y(0) = 0.$	CO3	L3	12M

OR

6	Apply Runge-Kutta method to evaluate y(0.2) and y(0.4) given that $y'=1+y^2,\ y(0)=0$.	CO3	L3	12M

UNIT-IV

7	a	Find the Laplace transform for $f(t)=\left(\sqrt{t}-\frac{1}{\sqrt{t}}\right)^3$	CO4	L3	6M
	b	Find the Inverse Laplace transform of $\frac{s+3}{s^2-4s+13}$	CO4	L1	6M

OR

8	If $L\{f(t)\}=\bar{f}(s)$ then prove that $L\{t^n f(t)\}=(-1)^n \frac{d^n}{ds^n}\left[\bar{f}(s)\right]$	CO4	L3	12M

UNIT-V

9	Solve $\frac{d^2x}{dt^2}+9x=\cos 2t$ if $x(0)=1, x\left(\frac{\pi}{2}\right)=-1$	CO5	L3	12M

OR

10	Solve $y_{n+2}-2y_{n+1}-y_n=0,\ y_1=0, y_2=1$	CO5	L3	12M

***** END *****

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June/July-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	State Newton – Raphson formula for solution of polynomial and transcendental equations.	CO1	L1	3M
	b	Estimate a real root of the equation $xe^x - \cos x = 0$ by using Newton – Raphson method.	CO1	L5	9M

OR

2	a	Apply Newton's forward interpolation formula and the given table of values	CO1	L3	6M

x	1.1	1.3	1.5	1.7	1.9
f(x)	0.21	0.69	1.25	1.89	2.61

Obtain the value of $f(x)$ when $x=1.4$.

	b	Use Newton's backward interpolation formula to find f(32), given f(25) = 0.2707, f(30) = 0.3027, f(35) = 0.3386, f(40) = 0.3794.	CO1	L3	6M

UNIT-II

3	a	Solve $y^1 = x + y$, given y (1) = 0 find y(1.1) and y(1.2) by Taylor's series method.	CO3	L3	6M
	b	Solve by Euler's method $\frac{dy}{dx} = \frac{2y}{x}$ given y(1)=2 and find y(2).	CO3	L3	6M

OR

4		Evaluate $\int_0^1 \frac{1}{1+x}\,dx$ by (i) by Trapezoidal rule and Simpson's1/3 rule. (ii) Using Simpson's 3/8 rule and compare the result with actual value.	CO5	L5	10M

UNIT-III

5	a	Define Measures of Central tendency.	CO4	L1	3M
	b	The weights of 6 competitors in a game are given below 58,62,56,63,55,61 kgs. Find the median of the following values.	CO4	L1	4M
	c	Find arithmetic mean to the following data.	CO4	L1	5M

Marks	10-20	20-30	30-40	40-50	50-60
frequency	5	8	25	22	10

OR

6	a	State Baye's theorem.	CO4	L1	3M
	b	In a certain college 25% of boys and 10% of girls are studying mathematics.The girls Constitute 60% of the student body. i) What is the probability that mathematics is being studied? (ii) If a student is selected at random and is found to be studying mathematics,find the probability that the student is a girl? (iii) a boy?	CO4	L3	9M

UNIT-IV

7 A random variable X has the following probability function. **CO5 L5 12M**

X	0	1	2	3	4	5	6	7
P(x)	0	K	2K	2K	3K	K^2	$2K^2$	$7K^2+K$

Determine (i) K (ii) Mean iii) variance. (iv) if $P(X \leq K) > 1/2$, find the Minimum value of K.

OR

8 For the continuous probability function $f(x) = \{kx^2e^x, when\ x \geq 0$ **CO5 L1 12M**
0 ; elsewhere

Determine i) k ii) Mean iii) Variance.

UNIT-V

9 Out of 800 families with 5 children each, how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3boys iv) At least one boy. **CO5 L2 12M**

OR

10 Ten competitors in a musical test were ranked by the three judges A,B and C in thefollowing order: **CO6 L3 12M**

Ranks by A	1	6	5	10	3	2	4	9	7	8
Ranks by B	3	5	8	4	7	10	2	1	6	9
Ranks by C	6	4	9	8	1	2	3	10	5	7

Using rank Correlation coefficient method, discuss which pair of judges has the nearest approach to common likings in music.

***** END *****

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

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

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

UNIT-I

1	a	Prove that sum of the first 'n' Fibonacci number is $\sum_{k=1}^{n} F_k = F_{n+2} - 1$ and use Binet's formula to find 14^{th} term of Fibonacci sequence.	CO1	L5	8M
	b	Find the gcd and lcm of 504 and 540.	CO1	L3	4M

OR

2	a	Find the general solution of $63x - 23y = -7$. Using Euclidean algorithm.	CO1	L3	6M
	b	Examine Whether the Linear Diophantine equation (LDE) $12x + 13y = 14$ is solvable. Write general solution if solvable	CO1	L4	6M

UNIT-II

3	a	Solve system of linear equations $3x + 4y \equiv 5 \pmod{13}$, $2x + 5y \equiv 7 \pmod{13}$.	CO2	L3	6M
	b	Solve system of linear equations $3x + 13y \equiv 8 \pmod{55}$, $5x + 21y \equiv 34 \pmod{55}$.	CO2	L3	6M

OR

4	a	Find $\sigma(200)$ and $\tau(200)$, where $\sigma(n)$ denotes sum of the divisors and τ(n) denotes number of divisors.	CO2	L3	6M
	b	If $\phi(n)$ denotes the number of positive integers less than or equal to n, then find (i) $\varphi(28)$ (ii) $\varphi(1000)$.	CO2	L3	6M

UNIT-III

5	a	Let $X_1, X_2, X_3 ..... X_n$ be a random sample from the Poisson population with probability mass function $p(r) = \frac{e^{-\lambda}\lambda^r}{r!}$. Show that $\overline{X}$ is the most efficient estimator of θ.	CO3	L1	6M
	b	Show that $ns^2/n-1$ is a consistent estimator of σ^2.	CO3	L1	6M

OR

6	a	Find the Maximum Likelihood estimator of the parameter θ of the distribution given by $f(x,\theta) = \frac{1}{\alpha!\,\theta^{\alpha+1}} x^{\alpha} e^{\frac{-x}{\theta}}, 0 < x < \infty$ Where α is known, based on a sample of size n.	CO4	L3	6M
	b	Obtain the maximum likelihood estimation of θ in $f(x,\theta) = (1+\theta)\, x^{\theta}$, $0 < x < 1$ based on an independent sample of size n. Examine whether this estimate is sufficient for θ.	CO4	L4	6M

UNIT-IV

7	**a**	Define Stochastic process and Markov process.	**CO5**	**L1**	**6M**
	b	Suppose a communication system transmits the digits 0 and 1 through many stages. At each state the probability that the same digit will be received by the next stage as transmitted, is 0.75. What is the probability that a 0 is entered at the first stage is received as a 0 in the 5^{th} stage?	**CO5**	**L1**	**6M**

OR

8		Let $\{X_n : n = 1,2,3....\}$ be a Markov chain with state space S = {0, 1, 2} and one step transition probability matrix $P = \begin{bmatrix} 0 & 1 & 0 \\ \frac{1}{4} & \frac{1}{4} & \frac{1}{2} \\ 0 & 1 & 0 \end{bmatrix}$ (i) Is the chain ergodic? Explain (ii) Find the invariant probabilities.	**CO5**	**L2**	**12M**

UNIT-V

9	**a**	The stenographic is attached to 5 officers or whom she performs stenographic work. She gets call from the officers at the rate of 4 per hour and takes on the average 10 min to attend to each call. If arrival rate is Poisson and service time exponential find (a) the average number of waiting calls (b) the average waiting time for an arriving call and(c) the average time an arriving call spends in the system.	**CO6**	**L3**	**8M**
	b	Define Birth and Death process.	**CO6**	**L1**	**4M**

OR

10		Arrival rate of telephone calls at a telephone booth are according to Poisson distribution with an average tome of 12 min between two consecutive call arrivals. The length of telephone calls is assumed to be exponential distributed with mean 4 minutes. Find (i) Find the average queue length that forms from time to time. (ii) Probability that a caller arriving at the booth will have to wait. (iii) What is the probability that an arrival will have to wait for more than 15 minutes before the phone is free. (iv)Find the fraction of a day that the phone will be in use.	**CO6**	**L3**	**12M**

***** END *****