Chandra sekar

O.P.Code: 19CS0505	R19	H.T.No.										47

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June-2025
C and DATA STRUCTURES
(Common to CSIT & CSE)

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

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

		UNIT-I			
1	**a**	Discuss about while and for loops and write suitable examples.	**CO1**	**L6**	**6M**
	b	Write a program to determine the Greatest Common Divisor (GCD) of two numbers.	**CO1**	**L3**	**6M**
		OR			
2	**a**	Write a program to find sum of individual digits of a given number.	**CO1**	**L3**	**6M**
	b	Explain else-if ladder with the help of flowchart and program.	**CO1**	**L5**	**6M**
		UNIT-II			
3	**a**	What is recursion? What are the advantages and disadvantages of recursion?	**CO2**	**L2**	**6M**
	b	Write a C program to find the factorial of a given number using recursion.	**CO2**	**L3**	**6M**
		OR			
4		What is an array? Explain declaration, initialization and applications of multidimensional array with an example.	**CO2**	**L2**	**12M**
		UNIT-III			
5	**a**	How do you define structure within a structure? Explain with an example.	**CO3**	**L2**	**6M**
	b	Illustrate the use of typedef with suitable example.	**CO3**	**L3**	**6M**
		OR			
6	**a**	Define union and give the general syntax for union. Write suitable example program.	**CO3**	**L6**	**6M**
	b	How to declare and initialize a structure with examples?	**CO3**	**L2**	**6M**
		UNIT-IV			
7		What is a stack? What are various operations that can be performed on them? Explain with an example.	**CO4**	**L2**	**12M**
		OR			
8		What is a queue? What are various operations that can be performed on them? Explain with an example.	**CO4**	**L2**	**12M**
		UNIT-V			
9		Explain the applications of linked lists.	**CO5**	**L2**	**12M**
		OR			
10		What do you mean by Searching? Explain sequential search and binary search with suitable example.	**CO5**	**L2**	**12M**

***** END *****

O.P.Code: 19CS0550 | R19 | H.T.No. | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June-2025
RELATIONAL DATABASE MANAGEMENT SYSTEM
(Open Elective-I)

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

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

UNIT-I

1	a	Explain about various data models.	CO1	L2	6M
	b	Implement the DDL Commands – Table Creation, Altering the table structures, truncating a table and dropping a table.	CO1	L1	6M
		OR			
2	a	Explain about Database users and Administrators.	CO1	L2	6M
	b	Implement the DML Commands – Insert,. Select Commands, update & delete Commands.	CO1	L1	6M

UNIT-II

3		Illustrate different set operations in Relational algebra with an example.	CO2	L2	12M
		OR			
4	a	Discuss about the use of renaming operator.	CO2	L6	6M
	b	Write a short note on Weak Entities and give suitable example.	CO2	L2	6M

UNIT-III

5		Explain about aggregate operators with an example.	CO3	L2	12M
		OR			
6	a	What is outer joins with an examples?	CO3	L1	6M
	b	Discuss about GROUP BY clauses and HAVING clauses.	CO3	L5	6M

UNIT-IV

7		Define normalization. List and Explain different normal forms with examples.	CO4	L2	12M
		OR			
8	a	Write short notes on 3NF with an example.	CO4	L1	6M
	b	Explain about properties of decompositions.	CO4	L2	6M

UNIT-V

9	a	Illustrate classification of storage structure.	CO5	L2	6M
	b	Explain Buffer Management in concurrency control system.	CO5	L2	6M
		OR			
10		Classify various levels of RAID with neat diagrams	CO5	L4	12M

*** END ***

O.P.Code: 19CS0506	R19	H.T.No.										

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Supplementary Examinations June-2025
DATABASE MANAGEMENT SYSTEMS
(Common to CSE & CSIT)

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

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

UNIT-I

1		Explain about Database languages with examples.	CO1	L2	12M
		OR			
2	a	Draw the Architecture of Database.	CO1	L4	6M
	b	Discuss about Database users and Administrators.	CO1	L2	6M

UNIT-II

3		Define Join? Explain different types of joins?	CO2	L2	12M
		OR			
4	a	Explain the working of union, intersection and except operations.	CO2	L2	6M
	b	Distinguish between two set theoretic operations of relational algebra with an example.	CO2	L2	6M

UNIT-III

5	a	Explain about inference rules for functional dependencies and also explain about second normal form.	CO3	L2	6M
	b	Define functional dependencies. How are primary keys related to FD's.	CO3	L1	6M
		OR			
6	a	Explain the following with suitable example: (i) Non- Loss decomposition. (ii) Prime Attributes.	CO3	L3	6M
	b	Explain about demoralization.	CO3	L2	6M

UNIT-IV

7		Explain ACID properties and illustrate them through examples.	CO4	L3	12M
		OR			
8		Determine the deadlock and 2-phase locking to ensure serialziability in concurrency control with locking methods.	CO4	L3	12M

UNIT-V

9	a	Illustrate classification of storage structure.	CO5	L2	6M
	b	Explain concurrency control with lock based protocols.	CO5	L2	6M
		OR			
10		Write about the various levels of RAID with neat diagrams.	CO5	L3	12M

***** END *****

O.P.Code: 19CS0517	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Supplementary Examinations June-2025
DATA WAREHOUSING AND DATA MINING
(CSE)

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

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

UNIT-I

1	a	What is data cleaning? Describe in detail the different methods for data Cleaning.	CO1	L5	6M
	b	How to classify data mining systems? Discuss.	CO1	L1	6M
		OR			
2	a	Discuss the Major issues in Data mining.	CO1	L6	6M
	b	Why do we pre-process the data? Discuss.	CO2	L1	6M

UNIT-II

3		Discuss in brief about schemas in multidimensional data model.	CO2	L6	12M
		OR			
4		Elaborate about Attribute Oriented Induction with example.	CO2	L6	12M

UNIT-III

5	a	Discuss about Basic Concepts of Frequent Itemset mining.	CO3	L6	6M
	b	What are the advantages of FP-Growth algorithm?	CO3	L1	6M
		OR			
6		What are the Draw backs of Apriori Algorithm? Explain about FP Growth Concept in Detail.	CO3	L4	12M

UNIT-IV

7		Outline the concept of Classification by Decision Tree Induction.	CO4	L2	12M
		OR			
8		Discuss about Rule based Classification method.	CO4	L6	12M

UNIT-V

9		What are the basic approaches for generating an agglomerative hierarchical clustering? Explain the algorithm.	CO5	L1	12M
		OR			
10		Discuss in detail about Partitioning methods in clustering with examples.	CO5	L6	12M

***** END *****

O.P.Code: 19CS0544 | R19 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. IV Year I Semester Supplementary Examinations June-2025
SOFT COMPUTING
(Common to CSIT & CSE)

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

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

		UNIT-I			
1	a	Illustrate the basic components of Artificial Intelligence and its applications.	CO1	L3	8M
	b	Compare soft computing and hard computing.	CO1	L5	4M
		OR			
2	a	Distinguish between Supervised Learning and Unsupervised Learning.	CO1	L4	6M
	b	Describe the different activation functions in Neural Networks.	CO1	L5	6M
		UNIT-II			
3	a	Generalize the Adaptive Resonance Theory Neural Network.	CO2	L6	8M
	b	Identify some applications of ART Model.	CO2	L2	4M
		OR			
4		Describe the structure of back propagation neural network and derive the learning rule for the back propagation algorithm.	CO2	L2	12M
		UNIT-III			
5	a	Explain with neat block diagram the various components of a Fuzzy Logic System.	CO3	L2	8M
	b	Differentiate the fuzzy sets and classical sets.	CO3	L4	4M
		OR			
6	a	Demonstrate the membership functions in fuzzy logic.	CO3	L3	6M
	b	Define Fuzzi fication and explain membership value assignment in fuzzy logic.	CO3	L2	6M
		UNIT-IV			
7	a	Analyze Inversion and Deletion Operators in GA.	CO4	L4	6M
	b	Describe the applications of genetic algorithm.	CO4	L1	6M
		OR			
8		Explain the basic terminologies in Genetic Algorithm and illustrate the working of GA?	CO4	L3	12M
		UNIT-V			
9	a	Define Hybrid System and Explain the Classification of hybrid systems.	CO5	L2	6M
	b	Compare Neural Processing and Fuzzy Processing.	CO5	L5	6M
		OR			
10		Demonstrate the architecture of ANFIS network and Explain.	CO6	L3	12M

***** END *****

O.P.Code: 19CS0539	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. IV Year I Semester Supplementary Examinations June-2025

HUMAN COMPUTER INTERACTION

(Common to CSE & CSIT)

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

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

UNIT-I

1		Discuss the popularity of web user interfaces.	CO1	L2	12M
		OR			
2	a	Compare and Contrast the advantages and disadvantages of Graphical Systems.	CO1	L4	6M
	b	What are the benefits of a well-designed interface?	CO1	L1	6M

UNIT-II

3	a	Discuss about interaction of people with computers.	CO2	L2	6M
	b	What are the human considerations in design? Explain.	CO2	L1	6M
		OR			
4	a	Write about the five important interface design goals.	CO2	L1	6M
	b	Justify amount of information in screen designing.	CO2	L5	6M

UNIT-III

5	a	Discuss elaborately various components of a Window.	CO3	L2	6M
	b	What is window in GUI? Explain various types of Windows.	CO3	L1	6M
		OR			
6	a	Illustrate about Text entry/Read Only Controls in user interface design.	CO4	L2	6M
	b	Examine various characteristics of device based controls.	CO4	L3	6M

UNIT-IV

7	a	Illustrate about creation of meaningful graphics, icons and images.	CO5	L2	6M
	b	Discuss various possible problems in choosing colors for screen design?	CO5	L2	6M
		OR			
8		Summarize the test i) purpose of testing ii) importance of testing	CO5	L2	12M

UNIT-V

9	a	Explain in brief, various specification methods for building an interface	CO6	L2	6M
	b	Discuss the features of interface-building tools.	CO6	L2	6M
		OR			
10		Illustrate the following i) Indirect pointing devices ii) Speech recognition iii) Display technology	CO6	L3	12M

*** END ***

O.P.Code: 19CS0529 | R19 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Supplementary Examinations June-2025
Cloud Computing
(Computer Science and Engineering)

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

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

UNIT-I

1	a	Explain in detail about Scalable computing over the Internet.	CO1	L3	6M
	b	Discuss in detail about clusters of cooperative computers.	CO1	L4	6M
		OR			
2	a	Explain system models for distributed and cloud computing.	CO1	L3	6M
	b	List and explain thevarious challenges of cloud computing.	CO1	L3	6M

UNIT-II

3	a	Differences between Infrastructure as a Service and Platform as a Service	CO2	L4	6M
	b	Compare the Iaas and Pass and Saas	CO2	L3	6M
		OR			
4	a	Analyze the Public Cloud and Private Cloud.	CO2	L3	6M
	b	Discuss the Importance about Life Cycle of Service Level Agreement.	CO2	L4	6M

UNIT-III

5	a	Explain the levels of virtualization implementation	CO3	L3	6M
	b	Illustrate Hypervisor and Xen Architecture	CO3	L4	6M
		OR			
6	a	Design the Dynamic Deployment of Virtual Clusters	CO3	L3	6M
	b	Discuss Server Consolidation in Data Centers	CO3	L2	6M

UNIT-IV

7	a	Explain the key issues in the cloud?	CO4	L4	6M
	b	List out the common cloud risks	CO4	L3	6M
		OR			
8	a	Explain about Identity and Access Management Architecture	CO4	L3	6M
	b	Discuss the Network level, Host level and the Application level	CO4	L2	6M

UNIT-V

9	a	Compare mobile computing and cloud computing	CO5	L3	6M
	b	Explain about the types of issues in mobile computing	CO5	L2	6M
		OR			
10	a	Discuss about security for mobile user with privacy	CO5	L3	6M
	b	List out the supporting performance at service level and cloud API	CO5	L2	6M

***** END *****

O.P.Code: 19HS0815	R19	H.T.No.										

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. IV Year I Semester Supplementary Examinations June-2025
ENTREPRENEURSHIP DEVELOPMENT
(Common to ECE, CSE & CSIT)

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

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

		UNIT-I			
1	**a**	Explain the Functions of an Entrepreneur.	**CO1**	**L1**	**6M**
	b	What are the qualities of entrepreneurship?	**CO1**	**L2**	**6M**
		OR			
2		Entrepreneurs are supporting and developing the economy of a country.-Justify	**CO1**	**L3**	**12M**
		UNIT-II			
3	**a**	What is the Importance's of small business?	**CO2**	**L1**	**6M**
	b	Discuss about Problems of MSMEs.	**CO2**	**L2**	**6M**
		OR			
4	**a**	State the features of Joint stock Company.	**CO2**	**L3**	**6M**
	b	Distinguish Between Sole Trade and Partenership.	**CO2**	**L3**	**6M**
		UNIT-III			
5	**a**	Define Innovation. Explain the concept of Invention and innovation.	**CO3**	**L2**	**6M**
	b	Explain various Methods of generating ideas and Opportunities.	**CO3**	**L2**	**6M**
		OR			
6	**a**	Short note on Trade Mark and Patents.	**CO3**	**L3**	**6M**
	b	Outline the merits of E-Commerce.	**CO3**	**L4**	**6M**
		UNIT-IV			
7	**a**	List out various motivational theories and explain them in detail.	**CO4**	**L3**	**6M**
	b	Outline the EDP and discuss its advantages.	**CO4**	**L4**	**6M**
		OR			
8	**a**	What is venture capital and also mention its advantages?	**CO4**	**L1**	**6M**
	b	Explicate the role of consultancy organization in entrepreneurship development.	**CO4**	**L3**	**6M**
		UNIT-V			
9	**a**	Make note on features of the Project.	**CO5**	**L3**	**6M**
	b	Elucidate the role of project planning in entrepreneurship.	**CO5**	**L3**	**6M**
		OR			
10	**a**	Describe about Project post Feasibility analysis.	**CO5**	**L2**	**6M**
	b	How can feasibility about economic and industry analysis be performed?	**CO5**	**L3**	**6M**

***** END *****

O.P.Code: 19CI0603 | R19 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year I Semester Supplementary Examinations June-2025
SOFTWARE ENGINEERING & TESTING
(Computer Science & Information Technology)

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

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

UNIT-I

1	a	Explain the spiral model of software development. What are the limitations of such model?	CO1	L2	6M
	b	Explain the Halstead theory of software science. Is it significant in today's scenario of software development?	CO1	L2	6M
		OR			
2		Explain in detail the following software metrics with example. i) Function point ii) Information flow metrics	CO1	L2	12M

UNIT-II

3	a	Differentiate functional and non-functional requirements.	CO2	L2	6M
	b	Describe the various steps of requirements engineering. Is it essential to follow these steps?	CO2	L2	6M
		OR			
4	a	What are the components of an activity diagram? Explain their usage with the help of an example.	CO2	L2	6M
	b	Write short notes on Data dictionary.	CO2	L1	6M

UNIT-III

5	a	Discuss the objectives of software design. How do we transform an informal design to a detailed design?	CO3	L2	6M
	b	What is module cohesion? Classify different type of module cohesion.	CO3	L2	6M
		OR			
6		Explain the following software reliability models. i) Basic Execution Time Model ii) Calendar Time Component Model	CO3	L2	12M

UNIT-IV

7		What is the difference between i) Alpha testing & beta testing ii) Functional & structural testing	CO4	L2	12M
		OR			
8	a	What is the purpose of integration testing? How is it done?	CO4	L1	6M
	b	Differentiate between integration testing and system testing.	CO4	L2	6M

UNIT-V

9	a	What is reverse engineering? Discuss levels of reverse engineering.	CO5	L2	6M
	b	What are configuration management activities? Draw the Performa of change request form.	CO5	L2	6M
		OR			
10		Explain the phases of software maintenance with help of a diagram.	CO5	L2	12M

*** END ***

O.P.Code: 19CI0605	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. IV Year I Semester Supplementary Examinations June-2025

CRYPTOGRAPHY & NETWORK SECURITY

(Computer Science & Information Technology)

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

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

		UNIT-I			
1	a	Illustrate different types of Security Attacks and Services in Detail.	CO1	L3	6M
	b	Specify the components of encryption algorithm.	CO1	L2	6M
		OR			
2	a	List and briefly define the fundamental security design principles.	CO1	L2	6M
	b	Categorize the transposition techniques with examples and also identify the best transposition techniques among the list.	CO1	L3	6M
		UNIT-II			
3	a	Formulate the decryption and encryption using RSA algorithm with p=3 q=11 e=7 and N=5.	CO2	L4	6M
	b	Design and develop Triple DES algorithm and explain with neat Sketch.	CO2	L4	6M
		OR			
4	a	Interpret working of AES with example.	CO2	L3	6M
	b	Examine users A and B use the Diffie-Hellman key exchange technique with a common prime q=11 and a primitive root α=7. a. If user A has private key Xa = 3, what is A's public key Ya ? b. If user B has private key Xb=6, what is B's public key Yb ? c. What is the shared secret key?	CO2	L4	6M
		UNIT-III			
5	a	Summarizes the characteristics are needed in a secure hash function.	CO3	L2	6M
	b	Explain about symmetric key distribution using symmetric encryption.	CO3	L2	6M
		OR			
6	a	Consider prime field q=19, it has primitive roots { 2,3,10,13,14,15}, if suppose α=10. Then write key generation by she choose XA=16. And also sign with hash value m=14 and alice choose secret no K=5. Verify the signature using Elgamal digital Signature Scheme.	CO3	L3	6M
	b	Outline the X.509 directory authentication service.	CO3	L3	6M
		UNIT-IV			
7	a	Elaborate different level of awareness of a connection in HTTPS.	CO4	L2	6M
	b	What are the security areas are addressed by IEEE 802.11i? and explain it.	CO4	L2	6M
		OR			
8	a	Describe the basic building block of an 802.11 WLAN.	CO4	L2	6M
	b	Explain about the SSH protocols.	CO4	L2	6M
		UNIT-V			
9	a	How IPSec ESP does provide transport and Tunnel Mode operation? Explain with a neat sketch.	CO5	L2	6M
	b	Discuss in detail about S/MIME.	CO5	L2	6M
		OR			
10	a	What is PGP? Show the message format of PGP.	CO5	L2	6M
	b	Interpret the internet key exchange with suitable example.	CO5	L2	6M

***** END *****

O.P.Code: 19CI0611 | R19 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. IV Year I Semester Supplementary Examinations June-2025
SOFTWARE PROCESS & PROJECT MANAGEMENT
(Computer Science & Information Technology)

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

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

UNIT-I

1	a	Define Principles of Software Process Change. Explain the Six Basic Principles of Software Process Change.	CO1	L2	6M
	b	Differentiate Continuous and Staged Representations of CMMI.	CO1	L2	6M
		OR			
2	a	Explain structure of CMMI in detail.	CO1	L2	6M
	b	Identify Software Process Assessment principles. Justify each.	CO1	L3	6M

UNIT-II

3	a	Explain the predominant cost estimation process.	CO2	L2	6M
	b	Generalize the quality improvements with a modern process.	CO2	L6	6M
		OR			
4	a	Illustrate the inception phase in life cycle process.	CO2	L3	6M
	b	Discriminate the model based software architecture.	CO2	L4	6M

UNIT-III

5	a	Describe major milestone with life-cycle phases.	CO3	L3	6M
	b	Demonstrate the typical minor milestones in life cycle of an iteration.	CO3	L2	6M
		OR			
6	a	Identify sequence of project check points and define it.	CO3	L3	6M
	b	Explain about periodic status assessments.	CO3	L2	6M

UNIT-IV

7	a	Outline the software development team activities.	CO4	L1	6M
	b	Describe the project environment in details.	CO4	L3	6M
		OR			
8		Explain the default pattern of life-cycle metrics evolution.	CO4	L2	12M

UNIT-V

9	a	Explain about The Command Center Processing and Display System-Replacement project.	CO5	L2	6M
	b	Define component evolution. Give an example of a typical component evolution.	CO5	L1	6M
		OR			
10	a	Define indicators in Project Control & Process Instrumentation.	CO5	L1	6M
	b	Summarize the distinguishing characteristics of each CSCI.	CO5	L2	6M

*** END ***

Q.P.Code: 19EC0403 | R19 | H.T.No.

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

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

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

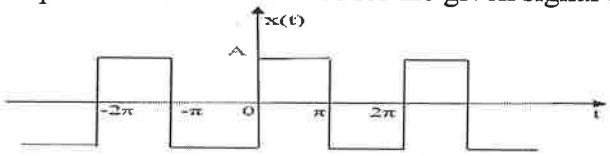
UNIT-I

1		Explain the classification of signals in both continuous time and discrete time with suitable examples.	CO1	L2	12M

OR

2	a	Discuss about Energy and Power signals.	CO1	L6	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		Develop the Exponential Fourier Series for the given signal below. 	CO2	L3	12M

OR

4	a	Explain about Fourier Transform of Periodic Signals.	CO2	L2	6M
	b	Find the Fourier Transform of the following signals using Properties. (i) $e^{-at}\, u(t)$ (ii) $\delta(t+2)+ \delta(t+1)+\delta(t-1+ \delta(t-2)$	CO2	L1	6M

UNIT-III

5	a	Derive the Transfer function and impulse response of an LTI system.	CO3	L3	6M
	b	Define Linear time variant, Linear time-invariant, step response of the system.	CO3	L1	6M

OR

6		Consider a stable LTI system that is characterized by the differential equation $d^2y(t)/dt^2+4dy(t)/dt+3y(t)= dx(t)/dt+2x(t)$ find the response for an input $x(t)=e^{-t}\, u(t)$.	CO3	L4	12M

UNIT-IV

7		Determine the Laplace transform of the following signals using properties of Laplace transform. (i) $x(t)=t\, e^{-t}\, u(t)$ (ii) $x(t)=t\, e^{-2t} \sin 2t\, u(t)$	CO5	L5	12M

OR

8	a	Explain the concept of random variable.	CO6	L2	6M
	b	Examine the distribution function $F_{xx}(x,y)$.	CO6	L1	6M

(X,Y)	(0,0)	(1,2)	(2,3)	(3,2)
P(x,y)	0.2	0.3	0.4	0.1

UNIT-V

9		Define Auto Correlation Function. State and explain any four properties of ACF.	CO6	L2	12M

OR

10	a	Briefly explain the concept of cross power density spectrum.	CO6	L2	6M
	b	Discuss the properties of cross power density spectrum.	CO6	L2	6M

***** END *****

O.P.Code: 19EC0437	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Supplementary Examinations June-2025
DIGITAL IMAGE PROCESSING
(Electronics & Communications Engineering)

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

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

UNIT-I

1	a	State the purpose of the image processing. List out the fundamental steps in digital image processing which can be applied to images.	CO1	L1	6M
	b	Define image processing. Illustrate example fields of its usage.	CO1	L2	6M
		OR			
2	a	Demonstrate the Arithmetic operations on digital images with relevant expressions.	CO1	L2	6M
	b	List out the applications of image subtraction and image multiplication.	CO1	L1	6M

UNIT-II

3	a	Prove the Separable property of 2D – Discrete Fourier Transform.	CO2	L4	6M
	b	Prove the Periodicity property of 2D – Discrete Fourier Transform.	CO2	L4	6M
		OR			
4	a	Define KL Transform and give its applications.	CO2	L1	6M
	b	Compare different Image Transforms.	CO2	L2	6M

UNIT-III

5	a	Define image enhancement and point operations in image enhancement.	CO3	L1	6M
	b	Illustrate the contrast stretching in image enhancement with suitable example.	CO3	L2	6M
		OR			
6	a	Draw the functional block diagram of pseudo colour processing and explain each block.	CO3	L1	6M
	b	Illustrate the method of the smoothing and sharpening of color images.	CO3	L2	6M

UNIT-IV

7	a	Draw the degradation/restoration model in image processing and describe the each part presented on it.	CO4	L1	6M
	b	Explain the Rayleigh noise and Gamma noise with proper PDF expression.	CO4	L1	6M
		OR			
8	a	Define Hough transform with proper equations.	CO5	L1	6M
	b	Explain the concept of Watershed transform for image segmentation.	CO5	L2	6M

UNIT-V

9	a	Define the following terms : Data, Information, Data Redundancy, Data compression and Compression Ratio.	CO6	L1	6M
	b	Explain the Coding Redundancy with suitable example.	CO6	L2	6M
		OR			
10	a	Compare the adaptive transform coding and non- adaptive transform coding.	CO6	L2	6M
	b	Discuss the different Image Formats and compression standards.	CO6	L2	6M

*** END ***

O.P.Code: 19CE0152	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. III Year I Semester Supplementary Examinations June-2025

SOIL MECHANICS

(Agricultural Engineering)

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

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

		UNIT-I			
1	**a**	Explain the phenomenon of formation and transportation of soils.	**CO1**	**L2**	**6M**
	b	Explain with sketches of various types of soil structures.	**CO1**	**L5**	**6M**
		OR			
2	**a**	Explain Relative density.	**CO1**	**L2**	**6M**
	b	How to determine field density by using sand replacement method.	**CO1**	**L1**	**6M**
		UNIT-II			
3		What are the different methods for determination of coefficient of permeability in a laboratory? Explain any one method.	**CO2**	**L1**	**12M**
		OR			
4	**a**	Explain the phenomenon of capillary rise in soil and write an expression for the Capillary rise.	**CO2**	**L2**	**6M**
	b	What is Darcy's law? What are its limitations?	**CO2**	**L1**	**6M**
		UNIT-III			
5		A concentrated load of 2000kN is applied at the ground surface. Determine the vertical stress at a point p which is 6m directly below the load. Also calculated the vertical stress at a point which is at a depth of 6m but at a horizontal a depth of 5m from the axis of the load.	**CO3**	**L4**	**12M**
		OR			
6	**a**	Explain the concept of 'Pressure Bulb' in soils.	**CO3**	**L5**	**6M**
	b	What do you understand by 'Pressure bulb'? Illustrate with sketches plane method.	**CO3**	**L3**	**6M**
		UNIT-IV			
7		Discuss the Terzaghi's theory of consolidation, state the various assumptions and their validity.	**CO4**	**L6**	**12M**
		OR			
8		A clay stratum, 7m thick has an initial void ratio of 2.05 and the effective overburden pressure of 140 kN/m^2 when the sample is subjected to an increases pressure of 140 kN/m^2 the void ratio reduces to 1.44. Determine the volume of compressibility and final settlement of stratum.	**CO4**	**L4**	**12M**
		UNIT-V			
9		What is unconfined compression test? Sketch the apparatus used what are its advantages over triaxial test?	**CO5**	**L1**	**12M**
		OR			
10		A vane, 10.8 cm long, 7.2 cm in diameter, was pressed into a soft clay at the bottom of a bore hole. Torque was applied and the value at failure was 45 N-m. Find the shear strength of the clay on a horizontal plane.	**CO5**	**L4**	**12M**

***** END *****

O.P.Code: 19EE0231	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech. IV Year I Semester Supplementary Examinations June-2025

NEURAL NETWORKS AND FUZZY LOGIC

(Electrical & Electronics Engineering)

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

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

UNIT-I

1	a	How artificial neuron is inspired from the biological neuron? Explain	CO1	L2	6M
	b	Why thresholding function is not used as activation function in Multi-Layer Feed Forward Networks.	CO1	L3	6M
		OR			
2		Discuss different learning mechanisms used in artificial neural networks.	CO1	L2	12M
		UNIT-II			
3	a	Explain back propagation learning.	CO2	L2	6M
	b	How the hidden layer neurons influence representation of neural network?	CO2	L2	6M
		OR			
4		Explain ANN approach to load forecasting problem.	CO2	L2	12M
		UNIT-III			
5	a	Explain in detail recurrent associative memory.	CO4	L3	6M
	b	Construct a BAM with 4 nodes in the first layer and 2 nodes in the second layer and symmetric weights. Establish the following three associations (+1, +1, -1, -1) -> (+1, +1) (+1, +1, +1, +1) -> (+1, -1) (-1, -1, +1, +1) -> (-1, +1)	CO4	L3	6M
		OR			
6		Explain how pattern pair is recalled in BAM with an example.	CO4	L2	12M
		UNIT-IV			
7	a	Explain Operations performed on crisp sets.	CO5	L2	6M
	b	Give the properties of crisp sets.	CO5	L2	6M
		OR			
8		Compare and contrast Fuzzy vs Crisp.	CO5	L2	12M
		UNIT-V			
9		Explain importance of defuzzification in fuzzy logic.	CO6	L3	12M
		OR			
10		Explain Centre of gravity defuzzification method with an example.	CO6	L3	12M

*** END ***

O.P.Code: 19CE0151	R19	H.T.No.										

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June-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	Differentiate kinematic viscosity and dynamic viscosity. Give their dimensions	**CO1**	**L1**	**6M**
	B	A plate 0.025mm at a distance from a fixed plate moves at 60 cm/sec and requires a force of 2 N/m2. Determine viscosity between the plates.	**CO1**	**L2**	**6M**
		OR			
2		Derive the expression for pressure difference in differential manometers with neat sketches	**CO1**	**L2**	**12M**
		UNIT-II			
3	a	Recall Local and convective accelerations.	**CO2**	**L1**	**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**	**L2**	**12M**
		UNIT-III			
5		Explain about orifice meter with neat sketches. Derive expression for rate of flow through orifice meter.	**CO3**	**L2**	**12M**
		OR			
6		Derive the expression for head loss in pipes due to sudden enlargement	**CO3**	**L2**	**12M**
		UNIT-IV			
7	a	Derive an expression for the hydraulic efficiency when a liquid jet strikes a single fixed curved vane	**CO4**	**L2**	**6M**
	b	A jet of 50 mm diameter delivers a stream of water at 20 m/s perpendicular to a plate that moves away from the jet 5 m/s. Find the force on the plate, work done and efficiency of jet	**CO4**	**L4**	**6M**
		OR			
8		A jet of water moving at 12 m/s impinges on vane shaped to deflect the jet through 120° when stationary. If the vane is moving at 5 m/s, find the angle of the jet so that there is no shock at inlet. What is the absolute velocity of the jet at exit in magnitude and direction and the work done per second per unit weight of water striking per second? Assume that the vane is smooth	**CO4**	**L2**	**12M**
		UNIT-V			
9		Explain the Classifications and efficiencies of turbines in detail	**CO5**	**L2**	**12M**
		OR			
10		What is the principle behind a centrifugal pump and derive an expression for work done by the centrifugal pump	**CO5**	**L2**	**12M**

***** END *****

O.P.Code: 19ME0312	R19	H.T.No.										

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year I Semester Supplementary Examinations June-2025
MACHINE TOOLS
(Mechanical Engineering)

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

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

UNIT-I

1	a	Define the following terms i) 'Metal cutting' ii) cutting ratio.	CO1	L1	6M
	b	Explain briefly orthogonal and oblique cutting with neat sketch.	CO1	L2	6M
		OR			
2	a	What are the conditions for producing continuous chips?	CO1	L1	6M
	b	During orthogonal cutting a bar of 90mm diameter is reduced to 87.6mm. If the mean length of the cut is 88.2mm and rake angle is 15°, calculate: (i) Cutting ratio (ii) Shear angle.	CO1	L3	6M

UNIT-II

3	a	Explain work done in metal cutting process.	CO2	L2	6M
	b	Define cutting speed, feed, and depth of cut.	CO2	L1	6M
		OR			
4		Describe the factors affecting tool life and give Taylor' tool life equation.	CO2	L2	12M

UNIT-III

5		Name the different types of the lathes. Discuss the importance of the each lathe.	CO3	L1	12M
		OR			
6	a	List the common tools and attachments used on Turret and Capstan lathes.	CO4	L1	6M
	b	List the Turret lathe operations and explain any one operation with neat sketch.	CO4	L1	6M

UNIT-IV

7	a	What do you understand by the term "Boring"? How are boring machines classified?	CO5	L2	6M
	b	Discuss briefly with neat sketch, a horizontal boring machine.	CO5	L2	6M
		OR			
8	a	Write short notes on (i) Face milling (ii) Straddle milling and (iii) End milling.	CO5	L2	6M
	b	Explain briefly plain indexing and differential indexing with suitable example.	CO5	L2	6M

UNIT-V

9	a	What is an abrasive? How are abrasive classified?	CO6	L2	6M
	b	Write short notes on: i) Silicon carbide ii) Aluminium oxide iii) Abrasive size.	CO6	L2	6M
		OR			
10		Compare the center and center-less grinding machine.	CO6	L1	12M

***** END *****

O.P.Code:19ME0337	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. IV Year I Semester Supplementary Examinations June-2025
MECHATRONICS & ROBOTICS
(Mechanical Engineering)

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

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

UNIT-I

1	List out the displacement transducers. Explain with neat sketch any one of displacement transducer.	CO1	L3	12M

OR

2	Explain the various components in mechatronics system with neat sketch.	CO1	L3	12M

UNIT-II

3	Define actuator. Actuators plays a primary role in mechatronics system explains it.	CO2	L4	12M

OR

4	Illustrate the characteristics of actuator.	CO2	L4	12M

UNIT-III

5	What are the supporting elements include in microcontrollers with block diagram?	CO3	L3	12M

OR

6	What are the supporting elements include in microcontrollers with block diagram?	CO3	L2	12M

UNIT-IV

7	Briefly explain the D-H notation joint coordinates with diagram.	CO4	L3	12M

OR

8	Write short notes on following: i)Forward transformation (ii) Reverse transformation	CO4	L2	12M

UNIT-V

9	Explain detail manual lead through programming method in robot application.	CO5	L3	12M

OR

10	Classify various programming languages used in computer controlled robots.	CO5	L2	12M

***** END *****

O.P.Code: 19ME0340	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Supplementary Examinations June-2025
ADVANCED WELDING PROCESSES
(Mechanical Engineering)

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

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

UNIT-I

1		Explain the types of flames produced in gas welding with neat sketches.	CO1	L2	12M
		OR			
2	a	Classify the arc welding consumables.	CO1	L1	6M
	b	What are the main purposes of electrode coatings?	CO1	L1	6M

UNIT-II

3		Discuss the process variables in SAW	CO2	L2	12M
		OR			
4	a	Discuss MIG welding setup and process with neat sketch.	CO2	L2	6M
	b	Give the area of application and advantages of MIG welding.	CO2	L3	6M

UNIT-III

5	a	Give the desired characteristics of a welding power source.	CO3	L1	6M
	b	Explain the general characteristics of a transformer.	CO3	L2	6M
		OR			
6		Describe the LASER beam welding process with neat sketch.	CO4	L2	12M

UNIT-IV

7		Classify the sold state welding process and explain friction welding with neat sketch.	CO5	L2	12M
		OR			
8		Explain the process variables and its effects in explosive welding.	CO5	L2	12M

UNIT-V

9		Describe the brazing process and explain the steps used in brazed joint.	CO6	L1	12M
		OR			
10		With suitable diagram explain the ultrasonic welding process.	CO6	L2	12M

***** END *****

O.P.Code: 19ME0327	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech IV Year I Semester Supplementary Examinations June-2025

AUTOMOBILE ENGINEERING

(Mechanical Engineering)

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

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

		UNIT-I			
1	a	Explain in detail about different types of Automobiles.	CO1	L2	6M
	b	Explain with neat sketch about Abnormal Combustion Process.	CO1	L2	6M
		OR			
2	a	Explain the different types of Combustion Chamber in S.I Engine	CO1	L2	6M
	b	What are the materials used for the Components of I.C engine?	CO1	L1	6M
		UNIT-II			
3	a	Explain the fuel supply system in diesel engine with line diagram.	CO5	L2	6M
	b	Explain the working of turbocharger with a neat sketch.	CO1	L2	6M
		OR			
4		Explain the working of three way catalytic converter with a neat sketch.	CO1	L2	12M
		UNIT-III			
5		Name various types of components in Lighting System used in automobile with neat sketch.	CO5	L6	12M
		OR			
6		Write the uses of various components used in Horn System.	CO5	L1	12M
		UNIT-IV			
7	a	Discuss about over drive in detail.	CO6	L1	6M
	b	Explain in details about Rear Axle with neat diagram.	CO6	L2	6M
		OR			
8		Explain in details about Differential used in automobile with neat diagram.	CO1	L2	12M
		UNIT-V			
9	a	Elucidate about Torque Bar.	CO3	L2	6M
	b	Discuss clearly how the Pneumatic braking system works.	CO6	L2	6M
		OR			
10		Explain about Rigid Axle Suspension system with the help of a neat layout.	CO6	L2	12M

***** END *****

O.P.Code: 19ME0326	R19	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech IV Year I Semester Supplementary Examinations June-2025

MODERN MACHINING METHODS

(Mechanical Engineering)

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

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

		UNIT-I			
1		With a block diagram, discuss the classification of Non-Traditional Machining Processes.	**CO1**	**L2**	**12M**
		OR			
2	**a**	Explain the working principle of water jet machining (WJM)?	**CO1**	**L4**	**6M**
	b	What are the applications, advantages and disadvantages of water jet machining (WJM)?	**CO1**	**L1**	**6M**
		UNIT-II			
3	**a**	Explain the working principle of wire cut EDM.	**CO2**	**L2**	**6M**
	b	With a neat sketch, explain the construction and working of a Wire Electrical Discharge Machining Process (WEDM).	**CO2**	**L1**	**6M**
		OR			
4	**a**	Give a brief note on the advantages and limitations of the Electrical Discharge Grinding (EDG) process.	**CO2**	**L4**	**6M**
	b	Give a brief note on applications of the Electrical Discharge Grinding (EDG) process.	**CO2**	**L2**	**6M**
		UNIT-III			
5		Draw the schematic layout of the Electro Chemical Machining (ECM) set up and explain the major elements in it.	**CO3**	**L2**	**12M**
		OR			
6	**a**	What are the different types of electrolytes used in Electro Chemical Machining (ECM)?	**CO3**	**L1**	**6M**
	b	Discuss the surface finish, accuracy and economic aspects of Electro Chemical Machining (ECM).	**CO3**	**L1**	**6M**
		UNIT-IV			
7		Write the advantages, disadvantages Electron Beam Machining (EBM)	**CO4**	**L2**	**12M**
		OR			
8		Draw the schematic layout of Plasma Arc Machining (PAM) set up and explain the major elements in it.	**CO4**	**L2**	**12M**
		UNIT-V			
9		Explain about the Micro Fabrication Technique - Lithography with neat Lithography flow diagram.	**CO5**	**L1**	**12M**
		OR			
10		Discuss briefly about the its advantages, disadvantages and applications	**CO6**	**L2**	**12M**

***** END *****

O.P.Code: 19ME0325 | R19 | H.T.No. | | | | | | | | | | |

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

B.Tech IV Year I Semester Supplementary Examinations June-2025
OPERATION RESEARCH
(Mechanical Engineering)

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

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

UNIT-I

1	a	Solve the following LPP using Simplex method Maximize Z=3X1+5X2+4X3 , Subjected to: 2X1+3X2 ≤ 8 , 2X2+5X3 ≤ 10, 3X1+2X2+4X3≤15 and X1,X2,X3 ≥ 0	CO1	L3	6M
	b	i. What are the characteristics of operation Research ii. Discuss the types of operation Research models iii. Explain the procedure to solve the LPP	CO1	L2	6M

OR

2	a	Solve the following LPP Minimize Z= X1 - 3X2+3X3 Subjected to 3X1-X2+2X3 < 7, 2X1+4X2> -12, - 4X1+3X2+8X3<10 and X1,X2,X 3> 0	CO1	L3	6M
	b	A. Define operations research. How OR is useful for decision makers B. Discuss the importance model in the solution of OR problem C. What are the limitations of linear programming technique	CO1	L2	6M

UNIT-II

3	a	Solve the following transportation problem	CO2	L3	6M

	A	B	C	D	Available
P	4	6	8	13	50
Q	13	11	10	8	70
R	14	4	10	13	30
S	9	11	13	8	50
Required	25	35	105	20	

Determine the Shipping scheme by the Northwest corner Rule and Test the above solution for Optimality.

	b	There are three parties who supply the following quantities of coal and three consumers who require the coal as follows Find the minimum transportation cost	CO2	L3	6M

Party1	14 tons	Consumer A	6 tons
Part2	12 tons	Consumer B	10 tons
Part3	5tons	Consumer c	15 tons

The cost matrix is a shown below

	A	B	C
1	6	8	4
2	4	9	3
3	1	2	6

OR

4 a Consider the problem of assigning five operators to five machines. The assignment costs are given in following Table **CO2 L3 6M**

	M1	M2	M3	M4	M5
A	7	7	-	4	8
B	9	6	4	5	6
C	11	5	7	-	5
D	9	4	8	9	4
E	8	7	9	11	11

b Solve the following transportation problem to maximize profit **CO2 L3 6M**

	A	B	C	D	Supply
P	40	25	22	23	100
Q	44	35	30	30	30
R	38	38	28	30	70
Demand	25	35	105	20	

UNIT-III

5 a Find the saddle point following GAME **CO3 L3 6M**

Player A	Player B				
	I	II	III	IV	V
I	9	3	1	8	0
II	6	5	4	6	7
III	2	4	4	3	8
IV	5	6	2	2	1

b i. What is game theory? What are the various types of games? **CO3 L2 6M**
ii What is Queuing Theory and what are the elements of Queuing system?
iii Explain Pure strategy and Mixed strategy

OR

6 a Solve the following GAME, using the Dominance Principle **CO3 L3 6M**

Firm A	Firm B				
	4	6	5	10	6
	7	8	5	9	10
	8	9	11	10	9
	6	4	10	6	4

b i) State briefly the applications of queuing models. **CO3 L2 6M**
ii) What are the limitations for Applications of queuing Theory.

UNIT-IV

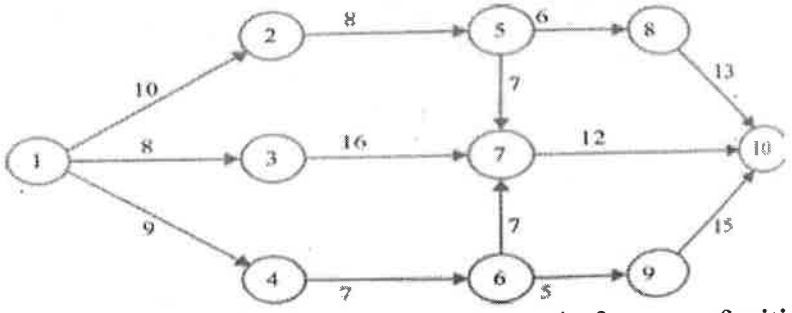
7 a A project has the following schedule. Construct PERT network and compute the total float for each activity. Find critical path with its duration **CO4 L3 6M**

Activity	Time in month	Activity	Time in month	Activity	Time in month
1-2	2	3-6	8	6-9	5
1-3	2	3-7	5	7-8	4
1-4	1	4-6	3	8-9	3
2-5	4	5-8	1		

b Explain the following i) critical event ii) critical activity iii) Total float iv) Free float **CO4 L2 6M**

OR

8 **a** Determine the early start (Tr) and Late start (TL) in respect of all node points and identify the critical path in respect of the following network. **CO4 L3 6M**



b What is meant by critical path and explain the main features of critical path. **CO4 L2 6M**

UNIT-V

9 **a** Describe the various types of replacement situations and explain about group replacement. **CO5 L2 6M**

b The cost of a machine is Rs6100 and its scrap value is Rs. 100.The maintenance costs found from experience are as follows. When should the machine be replaced? **CO5 L3 6M**

Year (n)	1	2	3	4	5	6	7	8
Running M/C cost in Rs	100	250	400	600	900	1200	1600	2000

OR

10 **a** What is mean by sequencing Problem and Define total elapsed time. **CO5 6M**

b Find the sequence that minimizes the total elapsed time required to complete the following Tasks on the machines in the order 1 – 2 – 3. Find also the minimum total elapsed time and the ideal times on the machines. **CO5 6M**

		A	B	C	D	E	F	G
Tasks time on machines	1	3	8	7	4	9	8	7
	2	4	3	2	5	1	4	3
	3	6	7	5	11	5	6	12

***** END *****

O.P.Code:19ME0314 | R19 | H.T.No.

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

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

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

UNIT-I

1	a	Explain the working principle of single stage single acting reciprocating air compressor.	CO1	L2	6M
	b	Mention single stage compressor equation for work, if neglecting clearance volume.	CO1	L2	6M

OR

2	a	Construct the multi stage compressor equation for work with perfect inter cooling.	CO1	L3	6M
	b	Explain the working of Roots Blower compressor with neat sketch	CO1	L2	6M

UNIT-II

3		A gas turbine unit receives air at 100 kPa and 300 K and compresses it adiabatically to 620 kPa with efficiency of the compressor 88%. The fuel has a heating value of 44180KJ/Kg and the Fuel/air ratio is 0.017 kg fuel /kg air. The turbine internal efficiency is 90%. Calculate the Compressor work , turbine work and thermal efficiency. Take Cp= 1.005KJ/Kg K.	CO2	L3	12M

OR

4	a	Explain about the open cycle and closed cycle turbines with neat sketches and also draw the P-V & T-S diagrams.	CO2	L2	6M
	b	Define gas turbine and classification?	CO2	L1	6M

UNIT-III

5		Define Steam nozzle and also explain about expansion of steam in nozzle with neat sketch.	CO3	L1	12M

OR

6		In a convergent nozzle initial velocity 5 m/s dry sat steam at a pressure of 10 bars and 250 0c is expanded Isentropically until the dryness fraction reaching 0.9. Find the final pressure of the steam and exit velocity of steam during the nozzle. By using Mollier diagram.	CO3	L3	12M

UNIT-IV

7	In a D-level turbine, the steam enters the wheel through a nozzle with a velocity of 500 m/s and at an angle of 20 0 to the direction of motion of the blade. The blade speed is 200 m/s and the exit angle of the moving blade is 25°. Find the inlet angle of the moving blade, exit velocity of steam and its direction and work done per kg of steam.		**CO4**	**L3**	**12M**

OR

8	Explain about the various methods of Governing steam turbines with neat sketches.		**CO4**	**L2**	**12M**

UNIT-V

9	The following observations were recorded in a test of one hour duration on a single cylinder oil engine working on four stroke cycle.Bore = 300mm, Stroke = 450 mm, Fuel used = 8.8 kg, Calorific value of fuel = 41800 kJ/kg, Average speed = 200 rpm, m.e.p. = 5.8 bar, Brake friction load = 1860 N, Quantity of cooling water = 650 kg, Temperature rise = 22oC, Diameter of the brake wheel = 1.22 m. Calculate: i). Mechanical efficiency, ii). Brake thermal efficiency. Draw the heat balance sheet.		**CO5**	**L3**	**12M**

OR

10	**a**	Explain the working of 4-stroke Petrol engine.	**CO5**	**L2**	**6M**
	b	Show the theoretical and actual valve-timing diagram for Petrol engine.	**CO5**	**L2**	**6M**

***** END *****

O.P.Code: 19ME0311 | R19 | H.T.No. | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year I Semester Supplementary Examinations June-2025
DESIGN OF MACHINE ELEMENTS - I
(Mechanical Engineering)

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

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

UNIT-I

1	a	What do you mean by preferred numbers and explain the applications?	CO1	L1	6M
	b	What is meant by factor of safety? Explain how it can be used in design applications.	CO1	L1	6M
		OR			
2		A mild steel shaft of 50 mm diameter is subjected to a bending moment of 2000 N-m and a torque T. If the yield point of the steel in tension is 200 MPa, find the maximum value of this torque without causing yielding of the shaft according to 1. The maximum principal stress; 2. The maximum shear stress; and 3. the maximum distortion strain energy theory of yielding.	CO1	L3	12M

UNIT-II

3	a	Define the term "stress concentration" with suitable diagram and "stress concentration factor" also.	CO2	L1	6M
	b	A machine component is subjected to a fluctuating stress that varies from 40N/mm^2 to 100 N/mm^2. The corrected endurance limit of the machine component is 270 N/mm^2. The ultimate stress and yield point stress of the material are 600 and 400 N/mm^2 respectively. Find the factor of safety using: (i) Gerber formula. (ii) Solderberg line. (iii) Goodman line.	CO2	L3	6M
		OR			
4		A hot rolled steel shaft is subjected to a torsional moment that varies from 330 N.m clockwise to 110 N.m counter clockwise and an applied bending moment at a critical section varies from 440N-m to-220 N-m. The shaft is of uniform cross-section and no key way is present at the critical section. Determine the required shaft diameter. The material has an ultimate strength of 550 MN/m^2 and yield strength of 410 MN/m^2. Take the endurance limit as half the ultimate strength, factor of safety of 2, size factor of 0.85 and surface finish factor of 0.62.	CO2	L3	12M

UNIT-III

5	a	Mentioned the important terms used in screw threads with a neat sketch	CO3	L2	6M
	b	Describe the initial stresses in screw fasteners due to screwing up forces	CO3	L3	6M
		OR			
6	a	Write advantages and disadvantages of welded joint over riveted joints	CO3	L2	6M
	b	Discuss the standard location of elements of a welding symbol	CO3	L2	6M

UNIT-IV

7		Design and draw a cotter joint to support a load varying from 30 kN in compression to 30 kN in tension. The material used is carbon steel for which the following allowable stresses may be used. The load is applied statically. Tensile stress = compressive stress = 50 MPa ; shear stress = 35 MPa and crushing stress = 90 MPa.	CO4	L2	12M
		OR			
8		A shaft is supported by two bearings placed 1 m apart. A 600 mm	CO4	L3	12M

diameter pulley is mounted at a distance of 300 mm to the right of left hand bearing and this drives a pulley directly below it with the help of belt having maximum tension of 2.25 kN. Another pulley 400 mm diameter is placed 200 mm to the left of right hand bearing and is driven with the help of electric motor and belt, which is placed horizontally to the right. The angle of contact for both the pulleys is 180° and $\mu = 0.24$. Determine the suitable diameter for a solid shaft, allowing working stress of 63 MPa in tension and 42 MPa in shear for the material of shaft. Assume that the torque on one pulley is equal to that on the other pulley

UNIT-V

9	Design and draw a protective type of cast iron flange coupling for a steel shaft transmitting 15 kW at 200 r.p.m. and having an allowable shear stress of 40 MPa. The working stress in the bolts should not exceed 30 MPa. Assume that the same material is used for shaft and key and that the crushing stress is twice the value of its shear stress. The maximum torque is 25% greater than the full load torque. The shear stress for cast iron is 14 MPa.	**CO5**	**L1**	**12M**

OR

10	Design and draw a cast iron flange coupling for a mild steel shaft transmitting 90 kW at 250 r.p.m. The allowable shear stress in the shaft is 40 MPa and the angle of twist is not to exceed 1° in a length of 20 diameters. The allowable shear stress in the coupling bolts is 30 MPa.	**CO5**	**L3**	**12M**

***** END *****

O.P.Code: 19ME0319 | R19 | H.T.No. | | | | | | | | | | |

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

B.Tech. III Year I Semester Supplementary Examinations June-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	Enumerate the some important areas which are covered under the discipline of heat transfer.	CO2	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 ^{0}C and surface temperature are steady at 150 ^{0}C and 45^{0}C, determine i).Heat transfer across the plane wall, ii).Temperature gradient in the flow direction	CO1	L4	6M
		OR			
2	a	Distinguish between conduction, convection and radiation modes of heat transfer	CO1	L3	6M
	b	Define the following terms. i).Thermal Conductivity ii).Thermal Resistance	CO1	L1	6M
		UNIT-II			
3		The inner surface of a plane wall is at 60 ◦C and the over surface is at 35 ◦C. Calculate the rate of heat transfer per m^2 of surface area of the wall, which is 220 mm thick. Take thermal conductivity of the brick is 0.51 W/ m ◦C.	CO2	L4	12M
		OR			
4	a	Derive an expression for heat conduction through a plane wall	CO2	L1	6M
	b	Calculate the critical radius of insulation for asbestos (k = 0.172 W/m K) surrounding a pipe and exposed to room air at 300 K with h = 2.8 W/m K.Calculate the heat loss from a 475 K, 60 mm diameter pipe when covered with the critical radius of insulation and without insulation.	CO2	L4	6M
		UNIT-III			
5	a	What is the physical significance of the Nusselt number? How is it defined.	CO3	L1	6M
	b	Assuming that a man can be represented by a cylinder 350 mm in diameter and 1.65 m high with a surface temperature of 28 ^{0}C. Calculate the heat he would lose while standing in a 30 km/h wind at 12 ^{0}C	CO3	L4	6M
		OR			
6		In a straight tube of 60 mm diameter, water is flowing at a velocity of 12 m/s. The tube surface temperature is maintained at 70^{0}C and the following water is heated from the inlet temperature 15^{0}C to an outlet temperature of 45^{0}C. taking the physical properties of water at its mean bulk temperature, Calculate the following: i. The heat transfer coefficient from the tube surface to the water ii. The heat transferred iii. The length of the tube	CO3	L4	12M
		UNIT-IV			
7	a	What are the applications of boiling and condensation process?	CO4	L1	6M
	b	A vertical tube of 60 mm outside diameter and 1.2 m long is exposed to steam at atmospheric pressure. The outer surface of the tube is maintained at a temperature of 50 ^{0}C by circulated cold water through the tube. Calculate the following i). The rate of heat transfer to the coolant, and ii). The rate of condensation of steam.	CO4	L4	6M

OR

8		The effective temperature of the body having an area of 0.12 m^2 is 527 °C. Calculate the following i) The total rate of energy emission ii) The wave length of maximum monochromatic emissive power	**CO4**	**L4**	**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.	**CO5**	**L2**	**6M**
	b	List out the application of Mass Transfer.	**CO5**	**L1**	**6M**

***** END *****

O.P.Code: 19ME0304	R19	H.T.No.										54

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

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

KINEMATICS OF MACHINERY

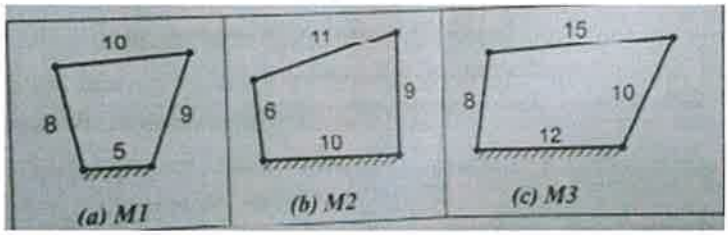
(Mechanical Engineering)

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	L1	12M
		OR			
2	a	Define Greshof's law and identify the mechanism produced by the following linkage.	CO1	L4	6M



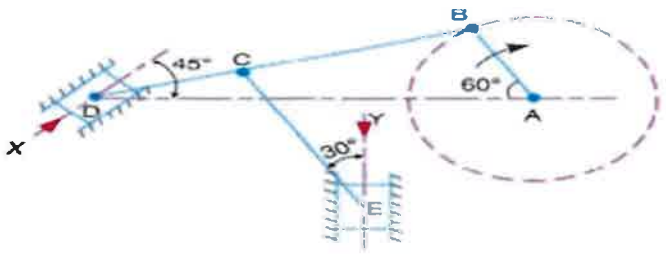
	b	Explicate the working of Oscillating cylinder engine with neat sketch.	CO1	L2	6M

UNIT-II

3	a	Sketch and explain the working of Grasshopper straight line mechanism	CO2	L2	6M
	b	Sketch and Describe the working of Peaucellier mechanism	CO2	L1	6M
		OR			
4		Describe the working of any two of exact straight line mechanisms, With neat sketch.	CO2	L2	12M

UNIT-III

5		The dimensions of the mechanism, as shown in Fig. 7.30, are as follows: AB = 0.45 m; BD = 1.5 m: BC = CE = 0.9 m. The crank AB turns uniformly at 180 r.p.m. in the clockwise direction and the blocks at D and E are working in frictionless guides. Draw the velocity diagram for the mechanism and find the velocities of the sliders D and E in their guides. Also determine the turning moment at A if a force of 500 N acts on D in the direction of arrow X and a force of 750 N acts on E in the direction of arrow Y.	CO3	L3	12M



OR

6		Explain with sketch the instantaneous centre method for determination of velocities of links and mechanisms.	CO4	L2	12M

UNIT-IV

7		A cam is to give the following motion to a knife-edged follower : 1. Outstroke during 60° of cam rotation ; 2. Dwell for the next 30° of cam rotation ; 3. Return stroke during next 60° of cam rotation, and 4. Dwell for the remaining 210° of cam rotation. The stroke of the follower is 40 mm and the minimum radius of the cam is 50 mm. The follower moves with uniform velocity during both the outstroke and return strokes. Draw the profile of the cam when (a) the axis of the follower passes through the axis of the cam shaft, and (b) the axis of the follower is offset by 20 mm from the axis of the cam shaft.	CO5	L2	12M

OR

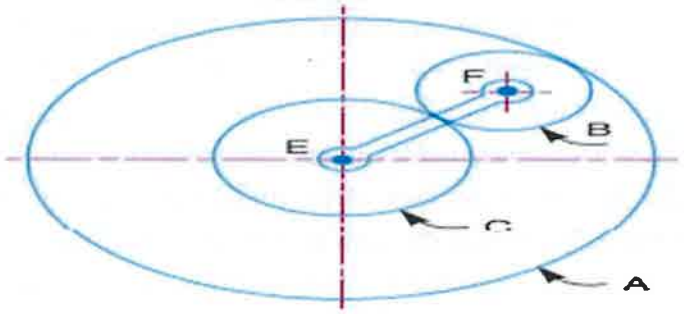
8	a	Draw the displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion.	CO5	L2	6M
	b	Draw the displacement, velocity and acceleration diagrams for a follower when it moves with uniform Acceleration and retardation.	CO5	L2	6M

UNIT-V

9	a	Explain the terms :(i) Module, (ii) Pressure angle, and (iii) Addendum	CO6	L2	6M
	b	State and prove the law of gearing. Show that involute profile satisfies the conditions for correct gearing.	CO5	L5	6M

OR

10		An epicyclic gear consists of three gears A, B and C as shown in Fig. 13.10.The gear A has 72 internal teeth and gear C has 32 external teeth. The gear B meshes with both A and C and is carried on an arm EF which rotates about the center of A at 18 r.p.m.. If the gear A is fixed, determine the speed of gears B and C.	CO6	L3	12M



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O.P.Code: 19EE0212	R19	H.T.No.										

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations June – 2025

CONTROL SYSTEMS

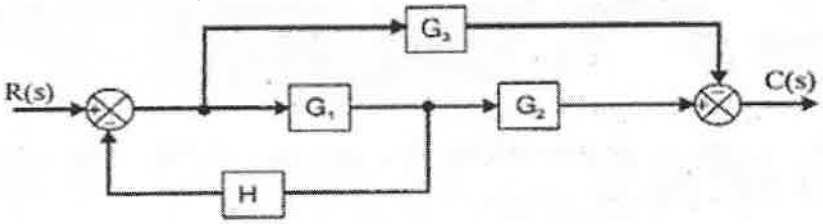
(EEE)

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

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

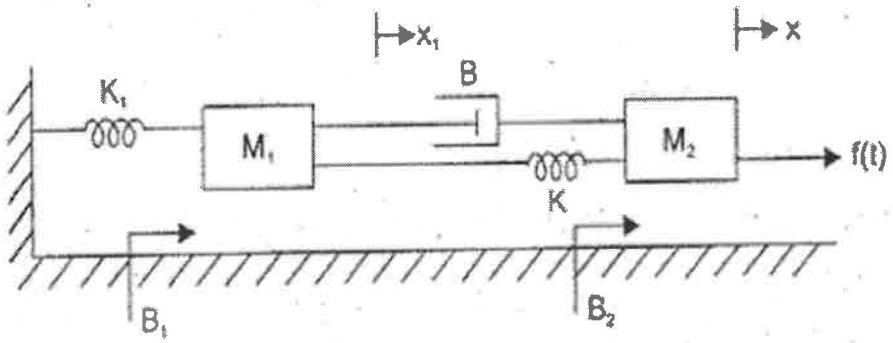
UNIT-I

1		Convert the block diagram to signal flow graph and determine the transfer function C(S)/R(S).	CO1	L1	12M



OR

2		Write the differential equation governing the mechanical system shown in figure and determine the transfer function.	CO1	L1	12M



UNIT-II

3		List out the time domain specifications and derive the expressions for Rise time, Peak time and Peak overshoot.	CO2	L1	12M

OR

4	a	A For servo mechanisms with open loop transfer function given below what type of input signal give rise to a constant steady state error and calculate their values. $$G(S)H(S) = \frac{20\,(S+2)}{S\,(S+1)(S+3)}$$	CO2	L3	6M
	b	Find all the time domain specifications for a unity feedback control system whose open loop transfer function is given by $G(S) = \frac{25}{S\,(S+5)}$.	CO2	L1	6M

UNIT-III

5		With the help of Routh's stability criterion find the stability of the following systems represented by the characteristic equations: (i) $S^4 + 8S^3 + 18S^2 + 16S + 5 = 0$ (ii) $S^6 + 2S^5 + 8S^4 + 12S^3 + 20S^2 + 16S + 16 = 0$	CO3	L1	12M

OR

6		Develop the root locus of the system whose open loop transfer function is $G(S)\,H(S) = \frac{K}{S\,(S^2+4S+13)}$.	CO3	L3	12M

UNIT-IV

7	a	Define and derive the expression for resonant frequency	CO4	L1	6M
	b	Given $\xi = 0.7$ and Wn = 10 rad / sec. Find resonant peak, resonant frequency and bandwidth.	CO4	L5	6M

OR

8		Obtain the transfer function of Lead Compensator, draw pole – zero plot and write the procedure for design of Lead Compensator using Bode Plot.	CO4	L5	12M

UNIT-V

9		A state model of a system is given as: $\dot{X} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix} X + \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} U$ and $Y = [1 \quad 0 \quad 0]X$. Determine: (i) The Eigen Values. (ii) The State Transition Matrix	CO5	L2	12M

OR

10	a	Explain the properties of STM.	CO5	L2	4M
	b	Derive the expression for the transfer function from the state model. $\dot{X} = AX + BU \; and \; Y = CX + DU$	CO5	L3	8M

*** END ***

O.P.Code: 19EE0211	R19	H.T.No.											39

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations June-2025

ELECTRICAL POWER GENERATION & TRANSMISSION SYSTEMS

(Electrical and Electronics Engineering)

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

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

UNIT-I

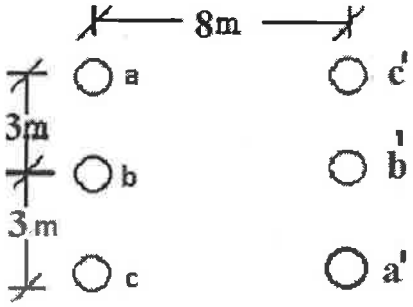
1	**a**	What factors are taken into account while selecting the site for a thermal power station?	**CO1**	**L2**	**6M**
	b	Explain the function of chimney and precipitator.	**CO1**	**L2**	**6M**
		OR			
2		Draw a neat schematic diagram of a hydro-electric plant and explain the functions of various components.	**CO1**	**L3**	**12M**

UNIT-II

3	**a**	What are the classification of nuclear reactors?	**CO2**	**L2**	**6M**
	b	Explain about the boiling water reactor.	**CO2**	**L3**	**6M**
		OR			
4		Compare thermal, hydro and nuclear power plants on the basis of technical, mechanical and economical aspects.	**CO2**	**L2**	**12M**

UNIT-III

5	**a**	Derive the expression for the inductance of a three phase double circuit flat vertical spacing configuration.	**CO3**	**L3**	**6M**
	b	Calculate the inductance for a three phase double circuit line as shown in figure. Diameter of each conductor is 1.5cm	**CO3**	**L3**	**6M**



OR

6	**a**	Derive the expression for the capacitance of a single phase two wire line.	**CO3**	**L3**	**6M**
	b	A single phase transmission line has two parallel conductors 3m apart, radius of each conductor being1cm. Calculate the capacitance of the line per km.	**CO3**	**L2**	**6M**

UNIT-IV

7		Derive the ABCD constants of medium transmission line by using nominal-T and nominal Π methods.	**CO4**	**L3**	**12M**
		OR			
8		A 3-phase, 50Hz overhead transmission line 100km long has the following constant: Resistance/km/phase= 0.1 ohm, Inductive reactance/km/phase= 0.2 ohm, Capacitive susceptance/km/phase = 0.04×10^{-4} siemen. Determine (i) sending end current (ii) sending end voltage (iii) sending end power factor (iv) transmission efficiency when supplying a balanced load of 10,000kW at 66kV, 0.8 power factor lagging. Use nominal-T method.	**CO4**	**L3**	**12M**

UNIT-V

9	a	What are the factors affecting corona? And derive the expressions for critical disruptive and visual critical voltage.	CO5	L2	6M
	b	Determine the corona characteristics of a 3-phase line 160km long, conductor diameter 1.036cm, 2.44m delta spacing, air temperature 26.67°C, altitude 2440m, corresponding to an approximate barometric pressure of 73.15cm of Mercury, operating voltage 110kv at 50Hz. Assume data if required.(irregularity factor etc.)	CO5	L3	6M
		OR			
10	a	Explain about the improvement of string efficiency by grading of units and guard Ring.	CO5	L3	6M
	b	An overhead line has a span of 150 m between level supports. The conductor has a cross sectional are of $2cm^2$. The ultimate strength is $5000kg/cm^2$ and safety factor is 5. The specific gravity of the material is $8.9gm/cm^3$. The wind pressure is 1.5kg/m. calculate the height of the conductor above the ground level at which it should be supported if a minimum clearance of 7m is to be left between the ground and the conductor.	CO5	L3	6M

***** END *****

O.P.Code: 19EE0240	R19	H.T.No.										

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech II Year I Semester Supplementary Examinations June-2025
BASIC ELECTRICAL & ELECTRONICS ENGINEERING
(Mechanical Engineering)

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

*Note: Answer **PART-A** from pages **2 to 20** and **PART-B** from **21 to 39.**

(Answer all Six Units **6 X 10 = 60** Marks)

PART-A

UNIT-I

1		Discuss about various energy sources in detail	CO1	L1	10M
		OR			
2		Define : (i) RMS value (ii) average value (iii) form factor (iv) peak factor (v) Prove that the form factor of the sinusoidal wave is 1.11	CO1	L1	10M
		UNIT-II			
3	a	State Thevenin's theorem.	CO2	L1	2M
	b	Find the Thevenin's equivalent circuit across AB for the circuit shown	CO2	L3	8M
		OR			
4	a	Explain in detail about Impedance parameters.	CO2	L3	5M
	b	Briefly discuss about Admittance parameters .	CO2	L2	5M
		UNIT-III			
5	a	Derive Torque equation of dc motor.	CO3	L2	5M
	b	The counter emf of Shunt motor is 227 V. The field resistance is 160Ω and field current 1.5A. If the line current is 36.5A, find the armature resistance also find armature current when the motor is stationary.	CO3	L3	5M
		OR			
6	a	Derive EMF equation of a transformer.	CO3	L2	5M
	b	Explain constructional details of transformer.	CO3	L3	5M

PART-B

UNIT-IV

7		Describe the working of a PN junction diode when it is connected in forward bias and reverse bias. Draw VI Characteristics of PN Junction Diode.	C04	L3	10M

OR

8	a	Draw the circuit diagram of a Bridge Rectifier and explain its operation with input and output waveforms.	CO4	L3	5M
	b	Discuss the operation of full wave rectifier with capacitor filter.	CO4	L1	5M

UNIT-V

9	a	Describe in detail the working of an NPN bipolar junction transistor. Why is it called Bipolar.	CO5	L2	4M
	b	Explain with the help of diagrams various types of circuit configurations, which can be obtained from a bipolar junction transistor.	CO5	L3	6M

OR

10	a	Write the application of a transistor and explain the transistor acts a switch.	CO5	L1	5M
	b	Explain in detail how a transistor working as an amplifier.	CO5	L3	5M

UNIT-VI

11	a	Explain the construction and principle of operation of N-channel JFET.	CO6	L3	5M
	b	Explain the output characteristics of JFET.	CO6	L3	5M

OR

12	a	Write the JFET applications.	CO6	L1	5M
	b	Explain how the JFET working as a switch.	CO6	L3	5M

***** END *****

O.P.Code: 19CE0150	R19	H.T.No.										

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

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

STRENGTH OF MATERIALS

(Common to MECH & AGE)

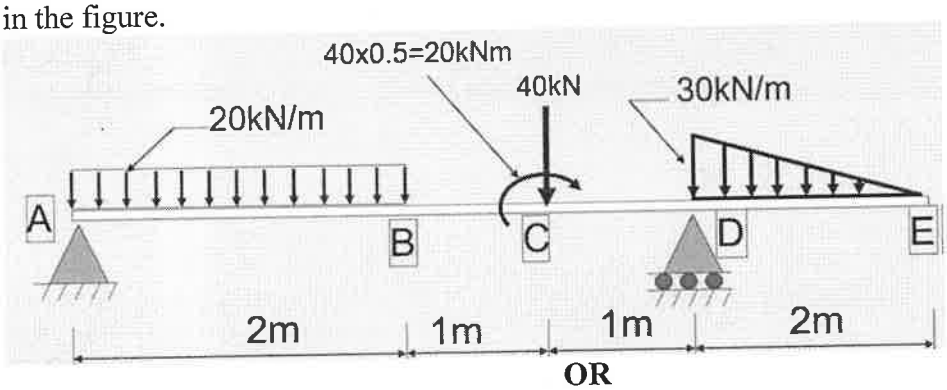
Time: 3 Hours **Max. Marks: 60**

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

UNIT-I

1	Derive the relation between Young's Modulus (E), Rigidity Modulus (G) and Bulk Modulus (K).	CO1	L2	12M
	OR			
2	Determine the diameter of a bolt which is subjected to axial pull of 9 kN together with a transverse shear force of 4.5 kN using : (i) Maximum principal stress theory. (ii) Maximum principal strain theory. Given the elastic limit in tension = 225 N/mm2, factor of safety = 3 and Poisson's ratio = 0.3.	CO1	L3	12M

UNIT-II

3	Draw the bending moment and shear force diagrams for the beam shown in the figure. 	CO2	L3	12M
	OR			
4	Derive pure bending equation with assumptions.	CO2	L2	12M

UNIT-III

5	Define shear stress and derive shear stress distribution formula for rectangular and circular section with a neat sketch.	CO3	L1	12M
	OR			
6	The stiffness of a close-coiled helical spring is 1.5 N/mm of compression under a maximum load of 60 N. The maximum shearing stress produced in the wire of the spring is 125 N/mm2. The solid length of the spring (when the coils are touching) is given as 5 cm.	CO3	L3	12M

UNIT-IV

7	Derive an expression for crippling load when both ends of the column are hinged.	CO5	L2	12M
	OR			
8	A column of timber section 15 cm x 20 cm is 6 metre long both ends being fixed. If the Young's modulus for timber =17.5 kN/mm2, determine : (i) Crippling load and (ii) Safe load for the column if factor of safety = 3.	CO5	L3	12M

UNIT-V

9	A copper cylinder, 90 cm long, 40 cm external diameter and wall thickness 6 mm has its both ends closed by rigid blank flanges. It is initially full of oil at atmospheric pressure. Calculate additional volume of oil which must be pumped into it in order to raise the oil pressure to 5 N/mm2 above atmospheric pressure. For copper assume E= 1.0 x 105 N/mm2 and Poisson's ratio 1/3. Take bulk modulus of oil as K= 2.6 x 103 N/mm2.	**CO6**	**L3**	**12M**

OR

10	A steel cylinder of 300 mm external diameter is to be shrunk to another steel cylinder of 150 mm internal diameter. After shrinking, the diameter at the junction is 250 mm and radial pressure at the common junction is 28 N/mm2 . Find the original difference in radii at the junction. Take E = 2 x 105 N/mm2.	**CO6**	**L3**	**12M**

***** END *****

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

B.Tech II Year I Semester Supplementary Examinations June-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	Two cards are selected at random from 10 cards numbered 1 to 10. Find the probability that the sum is even if (i) The two cards are drawn together (ii) The two cards drawn one after other with replacement	CO1	L2	6M
	b	Out of 15 items 4 are not in good condition 4 are selected at random. Apply the probability that (i) All are not good (ii) Two are not good	CO1	L2	6M

OR

2	a	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) $P(A^c \cap B^c)$ (v) $P(A^c \cap B)$	CO1	L3	6M
	b	The probability that students A, B, C, D solve the problem are $\frac{1}{3}$, $\frac{2}{5}$, $\frac{1}{5}$ and $\frac{1}{4}$ respectively. If all of them try to solve the problem, what is the probability that the problem is solved.	CO1	L2	6M

UNIT-II

3		Find a positive root of $f(x) = e^x - 3$ correct to two decimal places by Bisection method	CO2	L3	12M

OR

4	a	Using Newton's forward interpolation formula and the given table of values, Obtain the value of $f(x)$ when $x=1.4$.	CO2	L2	6M

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

	b	Use Newton's backward interpolation formula to find $f(32)$ given $f(25)=0.2707, f(30)=0.3027, f(35)=0.3386, f(40)=0.3794$.	CO2	L3	12M

UNIT-III

5		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	12M

OR

6	a	Calculate $\int_0^4 e^x dx$ by Simpson's $\frac{3}{8}$ rule with 12 sub divisions.	CO3	L2	6M
	b	Evaluate $\int_3^7 x^2 \log x dx$ by Trapezoidal rule by taking 10 sub divisions.	CO3	L3	6M

UNIT-IV

7	**a**	Find the Laplace transform of $f(t)=\frac{1-\cos at}{t}$	**CO4**	**L2**	**6M**
	b	Find $L^{-1}\left\{\frac{3s-2}{s^2-4s+20}\right\}$ by using first shifting theorem	**CO4**	**L2**	**6M**

OR

8		Applying Laplace transform method to solve $y^{11}-3y^1+2y=4t+e^{3t}$ where $y(0)=1, y^1(0)=1$	**CO4**	**L3**	**12M**

UNIT-V

9	**a**	Determine the value of $Z\left[(-2)^n\right]$	**CO5**	**L2**	**6M**
	b	Evaluate $Z^{-1}\left[\frac{z^2}{(z-1)(z-3)}\right]$, Using Convolution theorem.	**CO5**	**L3**	**6M**

OR

10		Applying the Z –transform, solve $y_{n+2}-6y_{n+1}+8y_n=2^n+6n$	**CO5**	**L3**	**12M**

***** END *****

O.P.Code: 19CE0101	R19	H.T.No.										

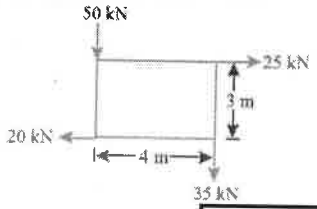
SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. I Year I Semester Supplementary Examinations June-2025
ENGINEERING MECHANICS
(Common to CE, AGE & ME)

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

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

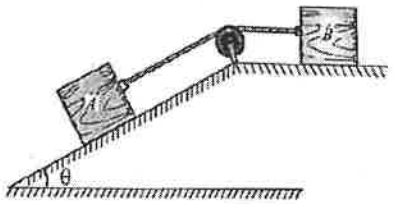
UNIT-I

1		State and prove Varignon's theorem.	CO1	L4	12M
		OR			
2	a	State and prove parallelogram law of forces	CO1	L4	6M
	b	A system of forces are acting at the corners of a rectangular block as shown in the figure below. Determine the magnitude and direction of the resultant force.	CO1	L4	6M



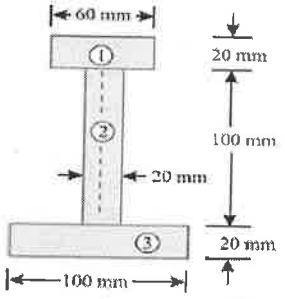
UNIT-II

3		A screw jack raises a load of 40 kN. The screw is square threaded having three threads per 20 mm length and 40 mm in diameter. Calculate the force required at the end of a lever 400 mm long measured from the axis of the screw, if the coefficient of friction between screw and nut is 0.12	CO2	L4	12M
		OR			
4		Find the value of 'Θ' if the blocks 'A' and 'B' shown in the figure below have impending motion. Given block A = 20 kg, block B = 20 kg, $\mu_A = \mu_B = 0.25$.	CO2	L3	12M



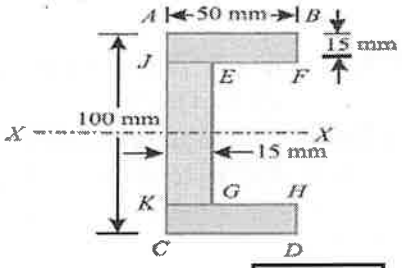
UNIT-III

5		An I-section is made up of three rectangles as shown in the figure below. Find the moment of inertia of the section about the horizontal axis passing through the centre of gravity of the section.	CO3	L4	12M



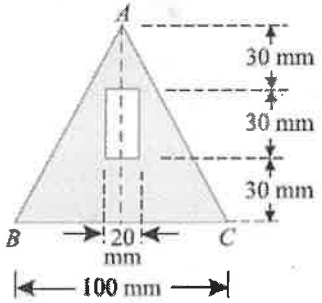
OR

6		Find the centre of gravity of a channel section 100 mm × 50 mm × 15 mm as shown in the figure below.	CO3	L4	12M



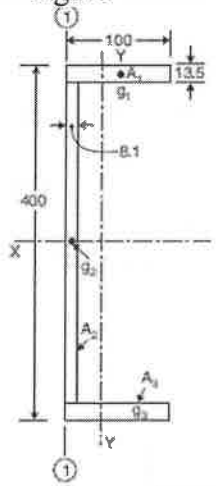
UNIT-IV

7	A rectangular hole is made in a triangular section as shown in the figure below. Determine the moment of inertia of the section about X-X axis passing through its centre of gravity and the base BC.	**CO4**	**L4**	**12M**



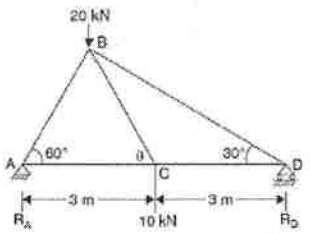
OR

8	Find the moment of inertia about the centroidal X-X and Y-Y axes of the angle section shown in the figure below.	**CO4**	**L4**	**12M**



UNIT-V

9	Determine the forces in all the members of the truss shown in the figure below.	**CO5**	**L4**	**12M**



OR

10	Explain the procedure to find forces in members of truss by using method of joints.	**CO5**	**L2**	**12M**

***** END *****

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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech I Year I Semester Supplementary Examinations June-2024

ALGEBRA AND CALCULUS

(Mechanical Engineering)

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

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

UNIT-I

1	a	Reduce the matrix $A=\begin{bmatrix}1&2&3&2\\2&3&5&1\\1&3&4&5\end{bmatrix}$ into Echelon form by using row transformations and find its rank.	CO1	L1	6M
	b	Find whether the following equations are consistent if so solve $x+y+2z=4,\ 2x-y+3z=9,\ 3x-y-z=2.$	CO1	L1	6M

OR

2		Reduce the Quadratic form $3x^2+3y^2+3z^2+2xy+2xz-2yz$ into the sum of squares formed by Orthogonal transformation.	CO1	L3	12M

UNIT-II

3	a	State and verify Rolle's Theorem for the function $f(x)=\log\left[\frac{x^2+ab}{x(a+b)}\right]$ in $[a,b],(x\neq 0)$.	CO2	L4	6M
	b	Show that $1+x<e^x<1+xe^x, \forall x>0$ using Lagrange's mean value theorem	CO2	L3	6M

OR

4	a	Expand $f(x)=\sin x$ in powers of $\left(x-\frac{\pi}{2}\right)$ up to the term containing $\left(x-\frac{\pi}{2}\right)^4$ assigning Taylor's series.	CO2	L6	6M
	b	Obtain the Maclaurin's series expression for the function $f(x)=\log(1+x)$	CO2	L6	6M

UNIT-III

5	a	If $u=\tan^{-1}\left[\frac{2xy}{x^2-y^2}\right]$ then prove that $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0$.	CO3	L5	6M
	b	Prove that $JJ'=1$ for the functions $x=u(1-v), y=uv$.	CO3	L5	6M

OR

6	a	Verify if are functionally dependent $u=2x-y+3z,\ v=2x-y-z,\ w=2x-y+z$ and if so, find the relation between them.	CO3	L5	6M

	b	Using Lagrange's method of undetermined multipliers, find the minimum value of $x^2+y^2+z^2$ subject to the condition $x+y+z=1$.	**CO3**	**L3**	**6M**

UNIT-IV

7	**a**	Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{x+y+z}\, dz\, dy\, dx$.	**CO4**	**L5**	**6M**
	b	Evaluate $\int_0^a \int_0^{\sqrt{a^2-x^2}} y\sqrt{x^2+y^2}\, dy\, dx$ by changing into polar coordinates.	**CO4**	**L5**	**6M**

OR

8	**a**	Evaluate $\int\int\left(x^2+y^2\right)dx\,dy$ in the positive quadrant for which $x+y\le 1$.	**CO4**	**L5**	**6M**
	b	By changing the order of integration, evaluate the double integral $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dy\, dx$	**CO4**	**L3**	**6M**

UNIT-V

9	**a**	Prove that by using Beta function $\int_0^1 \frac{x}{\sqrt{1-x^2}}\, dx = \frac{1}{2}\beta\left(1, \frac{1}{2}\right)$	**CO5**	**L5**	**6M**
	b	Define Beta and Gamma functions and Prove that $\Gamma(1)=1$	**CO5**	**L3**	**6M**

OR

10	**a**	Show that $\int_0^1 \frac{x^2}{\sqrt{1-x^4}}dx \times \int_0^1 \frac{1}{\sqrt{1-x^4}}dx = \frac{\pi}{4}$	**CO5**	**L2**	**6M**
	b	Show that $\int_0^\infty x^4 e^{-x^2} dx = \frac{3\sqrt{\pi}}{8}$	**CO5**	**L2**	**6M**

***** END *****

O.P.Code: 19HS0834	R19	H.T.No.										

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

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

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

UNIT-I

1	Find the root of the equation $x\log_{10}(x)=1.2$ by Regula-falsi method correct to three decimal palces.	CO1	L3	12M

OR

2	Estimate the values of $f(42)$ from the following data:	CO1	L4	12M

x	20	25	30	35	40	45
f(x)	354	332	291	260	231	204

UNIT-II

3	Determine the value of $y(x)$ by the 4th order Runge-Kutta method when $x=0.2$ and $x=0.4$ given that $y(0)=1$, $\frac{dy}{dx}=\frac{y^2-x^2}{y^2+x^2}$.	CO2	L3	12M

OR

4	Evaluate $\int_4^{5.2}\log x dx$ by (a) Trapezoidal rule (b) Simpson's 1/3 rule (c) Simpson's 3/8 rule and compare with actual value.	CO2	L3	12M

UNIT-III

5	a	Using Laplace transform evaluate the integral $\int_0^{\infty}\frac{\cos at-\cos bt}{t}dt$	CO3	L3	6M
	b	$L^{-1}\left(\frac{1}{(s^2+1)(s^2+9)}\right)$ using Convolution theorem.	CO3	L3	6M

OR

6	Solve the following differential equation using Laplace transform: $y''+2y'+5y=3e^{-t}\sin t;\quad y(0)=0, y'(0)=3$	CO3	L4	12M

UNIT-IV

7	a	Find the Fourier series of the function $f(x)=x^2;\ 0\le x\le 2\pi$	CO4	L2	6M
	b	Obtain the Fourier series expansion of $f(x)=(\pi-x)^2$ in $0<x<2\pi$. Hence show that $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\ldots\ldots=\frac{\pi^2}{6}$	CO4	L3	6M

OR

8	a	Find the Fourier cosine series of the function $f(x)=\cos x, 0\le x\le\pi$.	CO4	L3	6M
	b	Find the half range sine series expansion of $f(x)=x(2-x);\ 0<x<2$	CO4	L3	6M

UNIT-V

9	a	Find the Fourier transform of $f(x)=\begin{cases}1-x^2 & for\ |x|\le 1\\ 0 & for\ |x|>1\end{cases}$	CO5	L3	6M
		Hence evaluate $\int_0^{\infty}\frac{x\cos x-\sin x}{x^3}\cos\frac{x}{2}$			
	b	Find the Fourier transform of $f(x)=e^{\frac{x^2}{2}}$; $-\infty<x<\infty$	CO5	L3	6M

OR

10	a	Show that $F_s[x\,f(x)]=-\frac{d}{ds}\{F_c(s)\}$	CO5	L2	6M
	b	Find the Fourier cosine transform of $f(x)=\begin{cases}x, & for\ 0<x<1\\ 2-x, & for\ 1<x<2\\ 0, & for\ x>2\end{cases}$	CO5	L2	6M

*** END ***