R20

III B.TECH II SEM

REGULAR & SUPPLEMENTARY EXAMINATIONS

APRIL 2025

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular/Supple. Examinations, APRIL-2025

Sub Code: R20CC32MC1 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

Time: 3 hours (ECE, EEE, ME, AIML, CS, DS) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	Discuss the role of Indian festivals in promoting cultural harmony and inclusiveness.	K2	1	14M
		OR			
	b	Analyze how the concept of "Unity in Diversity" shapes the social and cultural identity of India	K4	1	14M
2		Unit-II			
	a	Examine the major themes of the Ramayana and explain their relevance today.	K4	2	14M
		OR			
	b	Analyze the Harappan script and compare it with other ancient writing systems.	K4	2	14M
3		Unit-III			
	a	Evaluate the impact of modern theatre and Indian cinema on society.	K4	3	14M
		OR			
	b	How do the architectural styles of Qutub Minar and Humayun's Tomb reflect the culture and art of their time? Compare their designs and explain their importance.	K4	3	14M
4		Unit-IV			
	a	How did Indian traders and missionaries help spread Indian culture in Southeast Asia? Compare their impact with that of teachers and emissaries.	K4	4	14M
		OR			
	b	Explain the causes and significance of cultural exchanges between India and other civilizations.	K4	4	14M
5		Unit-V			
	a	Analyze the development of education in Ancient, Medieval, and Modern India.	K5	5	14M
		OR			
	b	Evaluate the contributions of Indian scientists from ancient times to the modern era.	K5	5	14M

KL: Bloom's Taxonomy Knowledge Level CO: Course Outcome M: Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular/ Supplementary Examinations - APRIL-2025

Sub Code: R20CC32MC2 PROFESSIONAL ETICS AND HUMAN VALUES

Time: 3 hours (CSE, IT, AI) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	Explain the concept of work ethics and discuss the challenges that must be overcome to maintain them.	K5	1	14M
		OR			
	b	Explain the following concepts: A) Commitment B) Living Peacefully C) Self Confidence D) Value of time	K2	1	14M
2		Unit-II			
	a	Define Engineering Ethics and explain the uses of Ethical Theories.	K2	2	14M
		OR			
	b	Discuss the roles of engineers as managers, consultants, and leaders. Explain the key characteristics of engineering professionals.	K4	2	14M
3		Unit-III			
	a	Describe the Professional role & responsibilities of Engineers.	K2	3	14M
		OR			
	b	Explain the Cross Cultural Issues & Occupational Crimes.	K2	3	14M
4		Unit-IV			
	a	Explain the legal tasks in Intellectual Property Law.	K5	4	14M
		OR			
	b	Discuss the Innovations & Inventions in trade related IPR.	K5	4	14M
5		Unit-V			
	a	Discuss the types of Intellectual Property Rights.	K5	5	14M
		OR			
	b	Explain the registration process of Patents.	K5	5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

NAARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CC2OE01 **REMOTE SENSING AND GIS**

Time: 3 hours (CE) Max. Marks: 70

Note: Answer All **FIVE** Questions All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Explain Stefan-Boltzmann's law for the study of radiation and its applications in remote sensing.	K2	1	5M
		ii) Discuss the different types of electromagnetic waves used in remote sensing.	K2	1	5M
		iii) What are the advantages of along-track scanners?	K1	1	4M
		OR			
	b	i) Explain the spectral reflectance curves with a neat diagram.	K2	1	5M
		ii) Write about remote sensing platforms in detail.	K1	1	5M
		iii) What are the major differences between Mie and Rayleigh scattering?	K2	1	4M
		Unit-II			
2	a	i) What are the various elements of visual image interpretation?	K2	2	5M
		ii) Discuss about three most frequently used supervised classification techniques of satellite image classification with suitable illustrations.	K2	2	6M
		iii) Briefly present the concept of FCC in digital remote sensing.	K3	2	3M
		OR			
	b	i) What is the difference between raster and vector overlay operations?	K2	2	5M
		ii) Why do we need pre-processing in digital image interpretation? Explain the types of pre-processing techniques.	K3	2	6M
		iii) Write a short note on Histogram Equalization in digital image processing.	K2	2	3M
		Unit-III			
3	a	i) Explain the concept of visual variables and their application in mapping quantitative data.	K2	3	8M
		ii) Mention the techniques for estimating scale of a map.	K3	3	6M
		OR			
	b	i) Describe different types of coordinate systems.	K2	3	8M
		ii) Describe spaghetti, vertex dictionary and DIME.	K2	3	6M
		Unit-IV			
4	a	i) Discuss different types of geo-databases used in GIS with example and their importance.	K3	4	5M
		ii) Explain run length encoding method.	K4	4	5M
		iii) Briefly discuss about different surface models.	K2	4	4M
		OR			
	b	i) Describe the key elements of an ER diagram used in GIS. Provide an example	K3	4	5M
		ii) Explain block encoding and quadtree data model.	K4	4	5M
		iii) What is TIN? How are they constructed?	K2	4	4M
		Unit-V			
5	a	i) Discuss the importance of Datum Projection in GIS and provide examples.	K3	5	7M
		ii) Explain non-topological GIS file formats, citing examples, advantages, and limitations.	K4	5	7M
		OR			
	b	i) Discuss the integration of GPS data with GIS, highlighting its importance, challenges, and key applications.	K2	5	7M
		ii) Why is topology important in the geospatial data process?	K2	5	7M

NEC NARASARAOPET'A ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025 **R20**

Sub Code: R20CC2OE03 **HYBRID ELECTRIC VEHICLES**

Time: 3 hours (EEE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	With the help of block diagram explain the major components of an electric vehicle.	K2	1	14M
		OR			
	b	i) Explain about Dynamics of vehicle motion	K2	1	7M
		ii) Draw the roadway on the fixed co-ordinate system and explain the importance of roadway fundamentals.	K2	1	7M
2		Unit-II			
	a	i) Define the terms charge Capacity, Discharge rate, State of charge, state of Discharge and Depth of Discharge	K1	2	7M
		ii) Discuss about types of batteries with merits and demerits	K2	2	7M
		OR			
	b	i) Calculate the number of cells needed, battery energy and capacity in battery pack design.	K2	2	7M
		ii) Explain the Properties of Batteries.	K1	2	7M
3		Unit-III			
	a	Elaborate with neat sketch the configuration and control of induction motor	K3	3	14M
		OR			
	b	Explain the working principle, construction of a permanent magnet DC motor	K3	3	14M
4		Unit-IV			
	a	i) With neat sketch explain front wheel and rear wheel drive system	K3	4	7M
		ii) What is gear mechanism? And explain the four principle types of gears	K2	4	7M
		OR			
	b	i)Explain power transmission components used in electric vehicle drivetrain	K2	4	7M
		ii)Explain the importance of clutches EVs	K2	4	7M
5		Unit-V			
	a	With a neat sketch, explain the configuration of parallel hybrid electric drive train.	K3	5	14M
		OR			
	b	i) Analyze the Design procedure of Hybrid Electric Vehicle with basic requirements and considerations.	K2	5	7M
		ii) Explain the scenario of HEV in Indian market.	K1	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CC2OE10 **OOPS THROUGH JAVA**

Time: 3 hours (ECE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Differentiate functional programming and object oriented programming	3	1	7M
		ii) Explain the basic concepts of object oriented programming.	2	1	7M
		OR			
	b	i) Define a class and object. Write syntax to create class and object with an Example	2	1	7M
		ii) Explain any four features of java programming.	2	1	7M
2		Unit-II			
	a	i) What are the primitive data types in Java? Write about type conversions.	2	2	7M
		ii) Write a java program to display all the odd numbers between 1 to 30 using for loop & if statement	3	2	7M
		OR			
	b	i) What is garbage collection in Java ? Explain finalize method in Java.	2	2	7M
		ii) Write a Java program to add a set of numbers passed from the command line.	3	2	7M
3		Unit-III			
	a	i) What is inheritance? Explain different forms of inheritance with suitable program segments.	3	3	14M
		OR			
	b	i) Explain how interface is used to achieve multiple Inheritances in Java.	2	3	7M
		ii) What is exception ? Write a program to accept a password from the user and throw "Authentication Failure" exception if the password is incorrect	3	3	7M
4		Unit-IV			
	a	i) Write a program that includes a try block and a catch clause which processes the arithmetic exception generated by division-by-zero error.	3	4	7M
		ii) Write a program that creates a thread forces preemptive scheduling for lower priority threads	3	4	7M
		OR			
	b	i) Describe the need of thread synchronization. How is it achieved in Java?	2	4	7M
		ii) Write a program to illustrate the use of multiple catch blocks for a try block	3	4	7M
5		Unit-V			
	a	i) Write an applet to display the mouse cursor position in that applet window	2	5	7M
		ii) What is an adapter class? What is their role in event handling?	2	5	7M
		OR			
	b	i) Write a Java program to create AWT radio buttons using check box group.	2	5	7M
		ii) What is the significance of layout managers? Discuss briefly various layout managers.	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks***

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CC2OE13 **DIGITAL MARKETING**

Time: 3 hours Max. Marks: 70

Note: Answer All **FIVE** Questions.s

Q.No		Questions	KL	CO	M
1		**Unit-I**			
	a	i) Outline the concept of Digital Marketing. Explain the various components of Digital Marketing.	4	CO 1	7M
		ii) Examine the merits of various Digital Marketing Platforms.	4	CO 1	7M
		OR			
	b	i) Distinguish between Search Engine Optimization and Search Engine Marketing.	4	CO 1	7M
		ii) Critically narrate the key challenges in Digital Marketing in India.	4	CO 1	7M
2		**Unit-II**			
	a	i) Describe the key elements in Website Marketing.	2	CO 2	7M
		ii) Present the merits and demerits of Online Advertising.	3	CO 2	7M
		OR			
	b	i) Explain the key features of Interactive Marketing.	2	CO 2	7M
		ii) Outline the notable trends in Social Media Marketing.	4	CO 2	7M
3		**Unit-III**			
	a	i) Illustrate the need and importance of Digital Marketing Plan.	3	CO 3	7M
		ii) Discuss the goals and objectives of Digital Marketing Plan.	3	CO 3	7M
		OR			
	b	i) Write about the Pay Per Click and Cost Per Click.	3	CO 3	7M
		ii) Suggest the suitable strategies to SMS Marketing.	2	CO 3	7M
4		**Unit-IV**			
	a	i) Describe the characteristics of Search Engine Marketing.	2	CO 4	7M
		ii) Outline the various payment methods of Online Advertising.	4	CO 4	7M
		OR			
	b	i) List out the merits and demerits of Display Ad.	2	CO 4	7M
		ii) Elucidate the precautions in searching the words in Web.	4	CO 4	7M
5		**Unit-V**			
	a	i) Explain the Sharable Content. Comment on Sharable Content.	2	CO 5	7M
		ii) Explain the Customer Relationship Management Plan.	2	CO 5	7M
		OR			
	b	i) Explain the various ways to Analyzing the Website Performance.	2	CO 5	7M
		ii) Distinguish between Digital Media and Traditional Media.	4	CO 5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Masks

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NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CC2OE16 **CLOUD COMPUTING**

Time: 3 hours (IT, CSE & AI) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i)Explain the essentials of cloud computing	2	1	7M
		ii) Explain the characteristics of cloud computing	2	1	7M
		OR			
	b	i) How to develop a cloud infrastructure. Explain	2	1	7M
		ii)Discuss about vendors of cloud computing	2	1	7M
		Unit-II			
2	a	Explain about storage virtualization, server virtualization and network virtualization	2	1	14M
		OR			
	b	i)Explain the Cloud Computing architecture on the basis of Hypervisor Installed, Migration and Cloud Balancing	2	2	7M
		ii)Explain the Similarities and Differences Between Grid and Cloud Computing,	2	2	7M
		Unit-III			
3	a	i)Explain the importance of IaaS in cloud computing	2	2	7M
		ii) Explain the Platform as a Service (PaaS) in detail	2	2	7M
		OR			
	b	i) Compare and Contrast the Traditional IT Services and Cloud Services	4	2	7M
		ii) Compare and Contrast the public cloud and private cloud with example	4	2	7M
		Unit-IV			
4	a	i) Discuss about Cloud management products	2	3	7M
		ii) Explain the need of web applications in Cloud Computing	2	3	7M
		OR			
	b	i)Discuss about RTO and RPO	2	3	7M
		ii)Explain the the disasters in the Cloud	2	3	7M
		Unit-V			
5	a	i) Compare and contrast the traditional IT model with the Azure cloud model, highlighting the key differences and advantages	4	4	7M
		ii) Discuss the storage and content delivery network (CDN) services provided by Amazon Web Services	2	4	7M
		OR			
	b	i) Discuss the potential disadvantages or challenges of utilizing AWS as a cloud platform.	2	4	7M
		ii) Summarize the key differences and similarities between Microsoft Azure and AWS, highlighting their respective strengths and weaknesses.	2	4	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CCMN34 **SOFTWARE ENGINEERING**

Time: 3 hours (ECE,EEE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) How a software will develop using Spiral model? Explain in detail.	3	1	7M
		ii) Differentiate between Functional and non-functional requirements.	3	1	7M
		OR			
	b	i) Discuss in detail about Evolution and impact of software engineering,	2	1	7M
		ii) Illustrate the processes of Requirement gathering, analysis and specification.	3	1	7M
2		Unit-II			
	a	i)Illustrate the process of SRS documentation.	3	2	7M
		ii) Draw the class and object diagram for ATM application.	2	2	7M
		OR			
	b	i) Explain about workflow analysis in detail.	2	2	7M
		ii) Draw the interaction diagram for Library application	3	2	7M
3		Unit-III			
	a	i) Draw an Activity diagram for two party phone calls with sender, receiver, switch and conversation objects.	3	3	7M
		ii) Discuss in detail about Component Diagrams terms and concepts.	2	3	7M
		OR			
	b	i) Explain about terms and concepts for state machine in detail	2	3	7M
		ii) Elaborate Deployment Diagrams terms and concepts with an example.	2	3	7M
4		Unit-IV			
	a	i) Explain in detail about common modeling techniques for the forward and reverse engineering.	3	4	7M
		ii) How can domain model be used in software engineering? Describe.	3	4	7M
		OR			
	b	i) Explain in detail about various types of analysis patterns.	2	4	7M
		ii) Discuss about the common modeling techniques of activity diagram.	2	4	7M
5		Unit-V			
	a	i)Elaborate the concept of System Design Architecture with a neat sketch.	2	5	7M
		ii) Illustrate the importance of Black box testing techniques with a case study.	3	5	7M
		OR			
	b	i)Differentiate between Dynamic Object Modeling, and Static Object Modeling	3	5	7M
		ii) Elaborate the concept of White box testing techniques.	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

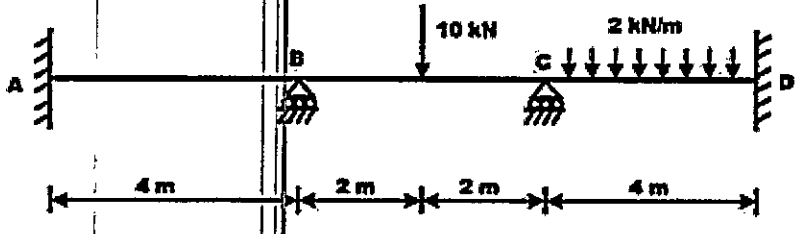
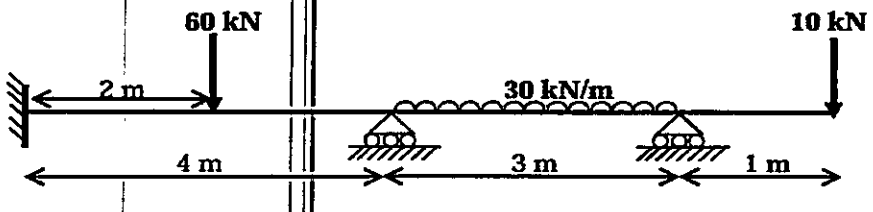
III B.Tech II Semester Regular Examinations, April-2025

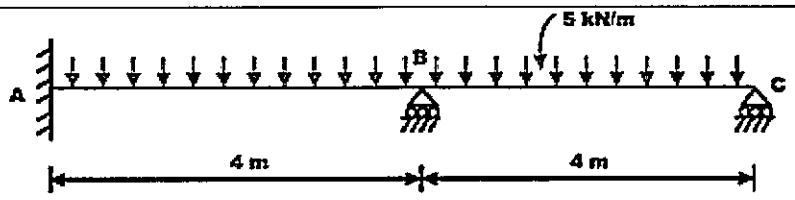
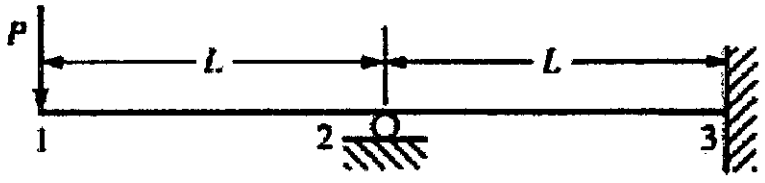
Sub Code: R20CEHN05 MATRIX METHODS OF STRUCTURAL ANALYSIS

Time: 3 hours (CE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		**Unit-I**			
	a	i) What is meant by degree of static indeterminacy and degree of kinematic indeterminacy of structure? Explain them through examples.	K2	CO1	7M
		ii) Compare and contrast the flexibility and stiffness method?	K2	CO1	7M
		OR			
	b	i) Explain the static and kinematic indeterminacy of various structural components.	K3	CO1	7M
		ii) Write the properties of flexibility matrix.	K2	CO1	7M
2		**Unit-II**			
	a	i) Analyze the continuous beam shown Figure 1. Assume that the supports are unyielding. Assume that EI is constant for all members, using Flexibility Method.	K2	CO2	14M
		 Figure 1.			
		OR			
	b	i) Explain the salient features of flexibility method of analysis.	K2	CO2	7M
		ii) How are the basic equations of stiffness matrix obtained? Explain	K2	CO2	7M
3		**Unit-III**			
	a	i) Using the stiffness method, analyse the beam supported and loaded as shown in below Figure. Assume the flexural rigidity is constant.	K3	CO3	14M
					
		OR			
	b	A beam fixed at one end supported by roller at other end has concentrated load 15kN at Centre span. Calculate the deflection under the load by stiffness matrix method. Assume $E=2x10^5 N/mm^2$ and $I=2500cm^4$. Assume length of beam 9m.	K3	CO3	14M

4		Unit-IV			
	a	i) Analyze the continuous beam shown in Figure 3 assume that the supports are unyielding. Assume EI to be constant for all members using direct stiffness method.	K3	CO4	14M
		 Figure 3.			
		OR			
	b	Using the direct stiffness method, solve the problem of the propped cantilever beam subjected to end load P in Figure 4. The beam is assumed to have constant EI and length 2L. It is supported by a roller at midlength and is built in at the right end.	K3	CO4	14M
		 Figure 4.			
5		Unit-V			
	a	i) Explain the step-by-step procedure for the analysis of a plane truss.	K2	CO5	7M
		ii) Flow Chart for the analysis of the Continuous Beam	K2	CO5	7M
		OR			
	b	i) A two bay two storey frame is to be analysed by computer programme of stiffness matrix method. a) Illustrate node numbering and determine the half band width & size of stiffness matrix to be stored. b) prepare flow chart for the programme & state input required for the same.	K2	CO5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC NARASARAOPET'A ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20AMHN04 **PATTERN RECOGNITION**

Time: 3 hours CSE(AIML) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Examine the types of data sets commonly used for pattern recognition tasks.	3	1	7M
		ii) Discuss the various data structures used for representing patterns in pattern recognition.	2	1	7M
		OR			
	b	i) Compare and contrast supervised learning, unsupervised learning, and semi-supervised learning in terms of their applications and limitations.	2	1	7M
		ii) Explain the methods used for evaluating classifiers in pattern recognition.	2	1	7M
		Unit-II			
2	a	i) Explain the distance metrics commonly used in the nearest neighbor (NN) algorithm.	2	2	7M
		ii) Explain the Naive Bayes classifier and the assumptions behind it.	2	2	7M
		OR			
	b	i) Explain the concepts of data reduction and prototype selection in the context of nearest neighbor classifiers.	2	2	7M
		ii) Compare and contrast the Bayes classifier and the nearest neighbor classifier (NNC). Discuss the key differences in terms of assumptions, model complexity and performance.	2	2	7M
		Unit-III			
3	a	i) Define a Hidden Markov Model (HMM). Explain the structure of an HMM	1	3	7M
		ii) Explain the process of mapping input features to class labels using a decision tree.	3	3	7M
		OR			
	b	i) Explain the procedure for classifying test patterns using Hidden Markov Models	2	3	7M
		ii) Describe the concept of pruning in decision trees and how it helps mitigate over fitting.	2	3	7M
		Unit-IV			
4	a	i) Discuss the working principle of Support Vector Machine, including the formulation of the optimization problem to find the optimal hyper plane.	2	4	7M
		ii) Define the concept of combining classifiers? Discuss why it is beneficial to combine multiple classifiers instead of relying on a single classifier.	2	4	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20AIHN04 **SPEECH PROCESSING**

Time: 3 hours (AI) Max. Marks: 70

Note: Answer All **FIVE** Questions All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i)Differentiate speech and natural language processing	L2	CO1	7M
		ii)Discuss the closure properties of regular languages	L2	CO1	7M
		OR			
	b	i)Differentiate deterministic finite and non deterministic finite automata with examples.	L2	CO1	7M
		ii)Describe N gram sensitivity to the training corpus	L2	CO1	7M
2		Unit-II			
	a	i) Find one tagging error in each of the following sentences that are tagged with the Penn Treebank tag set: 1)I/PRP need/VBP a/DT flight/NN from/IN Atlanta/NN 2)Does/VBZ this/DT flight/NN serve/VB dinner/NNS 3)I/PRP have/VB a/DT friend/NN living/VBG in/IN Denver/NNP	L3	CO2	7M
		ii) What are the advantageous and disadvantageous of hidden Marov model	L2	CO2	7M
		OR			
	b	i)Discuss tag indeterminacy and tokenization	L2	CO2	7M
		ii)Explain contextual spelling error correction	L2	CO2	7M
3		Unit-III			
	a	i)With a diagram illustrate major English places of articulation	L3	CO3	7M
		ii)Find the mistakes in the ARPAbet transcription of the following words: 1."three"[dh r I] 2."study"[s t uh d i] 3. "slight"[s l iy t] 4."planning"[p pl aa n ih ng]	L3	CO3	7M
		OR			
	b	i) Discuss the factors influencing phonetic variation.	L2	CO3	7M
		ii)Write short notes phonetic resources	L2	CO3	7M
4		Unit-IV			
	a	i) Implement the text normalization routine that deals with MONEY, i.e. mapping strings of dollar amounts like $45, $320, and $4100 to words (either writing code directly or designing an FST). If there are multiple ways to pronounce a number you may pick your favourite way	L4	CO4	7M
		ii)Illustrate the process of converting graphemes to phonemes	L3	CO4	7M
		OR			
	b	i) Discuss the six steps in building a diphone database.	L2	CO4	7M
		ii)Explain the process of Computing duration from prosodic labels	L2	CO4	7M
5		Unit-V			
	a	i) Define MFCC. How will you obtain feature vector from MFCC for speech recognition.	L2	CO5	7M
		ii)Demonstrate vector quantization	L3	CO5	7M
		OR			
	b	i)Illustrate the a* decoding algorithm	L3	CO5	7M
		ii) Draw and explain HMM based isolated word speech recognition system	L3	CO5	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CSHN04 **AGILE WITH SCRUM**

Time: 3 hours (CSE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) What is the working principle of Agile? What value is provided by Agile? Discuss	L2	CO1	7M
		ii) How to lead multiple Agile teams without sacrificing sanity?	L3	CO1	7M
		OR			
	b	i)What are Agile methods? What are the principles behind the Agile manifesto?	L3	CO1	7M
		ii) Discuss the best practices in Agile project management	L2	CO1	7M
2		Unit-II			
	a	i) Explain various roles in Agile process. How are these roles different from traditional roles	L2	CO2	7M
		ii) Differentiate Agile and Scrum methodology	L2	CO2	7M
		OR			
	b	i)Evaluate and explain about agile project management	L5	CO2	7M
		ii) What is scrum? What is the need of scrum? What values are provided by scrum	L3	CO2	7M
3		Unit-III			
	a	i) Describe Agile lifecycle. What is its impact on testing	L2	CO3	7M
		ii) Discuss the advantageous and disadvantageous of agile testing	L2	CO3	7M
		OR			
	b	i) List the most popular Agile testing tools. Explain any two in detail	L2	CO3	7M
		ii)Describe the pros and cons of test driven development	L2	CO3	7M
4		Unit-IV			
	a	i)What is Liskov substitution principle? Write a simple example of a violation of the LSP	L3	CO4	7M
		ii)What is open closed principle? Discuss the benefits of open closed principle	L2	CO4	7M
		OR			
	b	i)Illustrate the Naïve Layering scheme.	L3	CO4	7M
		ii) How multiple inheritance can be used to achieve interface segregation principle. Illustrate with an example.	L3	CO4	7M
5		Unit-V			
	a	i) Demonstrate the seven agile marketing techniques to help you deliver projects more effectively	L3	CO5	7M
		ii) Compare and contrast Agile marketing and Traditional marketing	L4	CO5	7M
		OR			
	b	i)Explain the following frame works a)scrum framework b)kanban framework	L2	CO5	7M
		ii) Describe three real-life examples of Agile marketing in practice	L2	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20DSHN03 **PRINCIPLES OF DATA SECURITY**

Time: 3 hours (DS) Max. Marks: 70

Note: Answer All **FIVE** Questions All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) What is the difference between a threat, an attack, and an asset in the context of computer security? Explain	2	1	7M
		ii) Explain the concept of an attack tree. How can attack trees be used to visualize and analyze potential vulnerabilities in a system	2	1	7M
		OR			
	b	i) What is message authentication, and why is it important for ensuring the integrity and authenticity of messages in a communication system?	2	1	7M
		ii) Describe the concept of public-key encryption and how it differs from symmetric encryption. How does public-key encryption solve the key distribution problem?	2	1	7M
2		Unit-II			
	a	i) What is the difference between authentication and authorization in computer security? Explain	2	2	7M
		ii) Describe the lifecycle of a token in a token-based authentication system	2	2	7M
		OR			
	b	i) Define the concepts of subjects, objects, and access rights in an access control system with Example	2	2	7M
		ii) What is Role-Based Access Control (RBAC), and how does it differ from Discretionary Access Control (DAC)? Discuss its benefits	2	2	7M
3		Unit-III			
	a	i) What is a relational database, and how does it organize data into tables, rows, and columns? Discuss the advantages and disadvantages of relational database.	2	3	7M
		ii) What is SQL injection, and how does it exploit vulnerabilities in a web application's database query mechanisms? Explain	2	3	7M
		OR			
	b	i) What are the key security risks in cloud computing? How can organizations mitigate these risks? Explain	2	3	7M
		ii) Discuss how Trojans can be used to deliver payloads or open backdoors into systems.	2	3	7M
4		Unit-IV			
	a	i) What is a Denial-of-Service (DoS) attack, and how does it differ from other types of cyberattacks? Discuss the primary objectives of a DoS attack.	2	4	7M
		ii) Explain the key differences between reflector and amplifier attacks?	2	4	7M
		OR			
		i) Discuss the main software security issues that organizations face in developing and	2	4	7M

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CYHN04 **AUTHENTICATION TECHNIQUES**

Time: 3 hours (CY) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain the stages and steps involved in the authentication process.	2	1	7M
		ii) Discuss the roles of User, Device, and Application as entities in the authentication process. How do they each contribute to the overall security?	2	1	7M
		OR			
	b	i) Compare and contrast the following authentication types: Direct vs Indirect, One-Way vs Mutual, On-demand vs Periodic authentication	4	1	14M
2		Unit-II			
	a	i) Explain physical identification using smart cards.	2	2	7M
		ii) Compare and contrast authentication in Card Present and Card Not Present transactions	4	2	7M
		OR			
	b	i) How is authentication handled in mobile phones? Discuss the different authentication mechanisms available on mobile devices	2	2	7M
		ii) What is Single Sign-On (SSO)? Explain how SSO works and its advantages in terms of user convenience and security.	2	2	7M
3		Unit-III			
	a	i) Describe the use of iris and retinal scanning in biometric authentication.	2	3	7M
		ii) Discuss the benefits and challenges of using multi-modal biometrics in modern authentication systems	2		7M
		OR			
	b	i) Explain how fingerprint biometrics are used for authentication. How secure and reliable is fingerprint-based authentication compared to other biometric methods?	2	3	14M
4		Unit-IV			
	a	i) What is pattern analysis in the context of biometric authentication? What are the key challenges in accurately recognizing biometric patterns?	2	4	7M
		ii) Discuss the significance of the ROC curve in understanding trade-offs between True Accept Rate (TAR) and False Accept Rate (FAR).	2	4	7M
		OR			
	b	i) Explain the X.509 Authentication Service	2	4	7M
		ii) Compare and Contrast HTTP-based authentication and token-based authentication	4	4	7M
5		Unit-V			
	a	i) How are authentication protocols represented using BAN Logic? Describe the steps involved in applying BAN Logic to model an authentication protocol.	2	5	14M
		OR			
	b	i) What is the Random Oracle Model? Discuss the advantages and limitations of the Random Oracle Model in simulating cryptographic operations during the analysis of security protocols.	2	5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

NARASARAOPETA
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(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20ITHN03 **ARTIFICIAL INTELLIGENCE**

Time: 3 hours (IT) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain the characteristics of Production Systems?	2	1	7M
		ii) How do production system characteristics influence the design and implementation of search programs? Explain	2	1	7M
		OR			
	b	i) Explain the concept of state space search in the context of problem-solving in Artificial Intelligence.	2	1	14M
2		Unit-II			
	a	i) Explain the best first search with an example?	2	2	7M
		ii)Explain the constraint satisfaction problem with example	2	2	7M
		OR			
	b	i) Compare and contrast the propositional and predicate logic?	2	2	7M
		ii) Explain the Resolution in knowledge representation.	2	2	7M
3		Unit-III			
	a	i) Describe all the different approaches for Knowledge Representation	2	3	14M
		OR			
	b	i)Discuss about semantic nets	2	3	7M
		ii) What are the components of a Script? Explain with example	2	3	7M
4		Unit-IV			
	a	i)Explain the general learning method with neat sketch	2	4	7M
		ii)Explain the learning in problem solving	2	4	7M
		OR			
	b	i) Define the Markov Decision Problem (MDP) and explain its significance in the context of reinforcement learning. Discuss the key components of an MDP. Give an example	2	4	14M
5		Unit-V			
	a	i) Explain the concept of syntactic processing in natural language processing (NLP). Describe the role of syntax in analyzing the structure and grammatical relationships within sentences. Give an example	2	5	14M
		OR			
	b	i) Explain the principles of statistical natural language processing (NLP) and its reliance on probabilistic models and machine learning algorithms	2	5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CC3201 CRYPTOGRAPHY AND NETWORK SECURITY

Time: 3 hours (CSE, CSE (AI), IT) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain the operations, requirements, components of Network security model	2	1	7M
		ii) Discuss about the security services and security mechanisms in detail	2	1	7M
		OR			
	b	i) Briefly define the monoalphabetic cipher. What is the difference between a monoalphabetic cipher and a polyalphabetic cipher?	2	1	7M
		ii) Construct a Playfair matrix with the key "LARGEST". Encrypt this message: MEET ME AT THE TOGA PARTY	3	1	7M
2		Unit-II			
	a	i)Explain the single round operation of DES	2	2	7M
		ii) Explain the key expansion function of AES algorithm	2	2	7M
		OR			
	b	Briefly explain the block cipher modes of operations?	2	2	14M
3		Unit-III			
	a	i) State and Describe Fermat's theorem.	2	3	7M
		ii) State the Chinese Remainder Theorem and find X for the given set of congruent equations X≡2 mod 3, X≡3 mod 5 and X≡2 mod 7.	3	3	7M
		OR			
	b	i) Perform decryption and encryption using RSA algorithm with p=3, q=11, e=7 and N=5	3	3	7M
		ii) Discuss the following about ElGamal algorithm i) Encryption ii) Efficiency	2	3	7M
4		Unit-IV			
	a	i) Illustrate in detail about the message authentication code and its requirements.	2	4	7M
		ii) Explain the process of deriving eighty 64-bitwords from 1024 bits for processing of a single blocks and also discuss single round function in SHA-512 algorithm. Show the values of W16, W17, W18 and W19.	3	4	7M
		OR			
	b	i) Differentiate digital signature from digital certificate	2	4	7M
		ii) Explain the signing and verification in Digital Signature Algorithm	2	4	7M
5		Unit-V			
	a	i) Why does PGP compress the message? What are the reasons for compressing the signature but before encryption?	2	5	7M
		ii) Compare and Contrast Kerberos 4 and Kerberos 5	4	5	7M
		OR			
	b	i) Explain Secure Electronic Transaction with neat diagram	2	6	7M
		ii) Discuss about different types of firewalls	2	6	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC ENGINEERING COLLEGE

(AUTONOMOUS)

III B.Tech II Semester Regular&Supple. Examinations, April-2025

Sub Code: R20CC3204 **MACHINE LEARNING**

Time: 3 hours (CSE, IT) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Define Supervised Learning and explain how it differs from other forms of machine learning. Provide examples of applications where Supervised Learning is commonly used.	K2	CO1	7M
		ii) What is the Vapnik-Chervonenkis (VC) Dimension, and how does it relate to the capacity of a learning algorithm to generalize from training data?	K2	CO1	7M
		OR			
	b	i) Define simple linear regression and multiple linear regression in the context of Supervised Learning. Provide examples of scenarios where each regression technique would be appropriate.	K2	CO1	14M
		Unit-II			
2	a	i) What is Maximum Likelihood Estimation (MLE), and how does it apply to probability density functions such as Bernoulli, multinomial, and Gaussian distributions?	K2	CO2	7M
		ii) Discuss techniques such as cross-validation and regularization methods for selecting the optimal model from a set of candidates.	K2	CO2	7M
		OR			
	b	i) Explore the Bias-Variance Dilemma in tuning model complexity. What is the relationship between model bias, model variance, and model complexity?	K2	CO2	14M
		Unit-III			
3	a	i) Discuss the challenges and limitations of Subset Selection as a technique for dimensionality reduction.	K2	CO2	7M
		ii) Describe Principal Components Analysis (PCA) and its role in dimensionality reduction.	K5	CO3	7M
		OR			
	b	i) Explain Linear Discriminant Analysis (LDA) and its utility in dimensionality reduction and classification tasks.	K5	CO3	7M
		ii) Describe the Apriori Algorithm for mining frequent itemsets in transaction databases. How does the Apriori Algorithm generate association rules based on the frequency of item co-occurrences?	K5	CO3	7M
		Unit-IV			
4	a	i) Explain the k-Means Clustering algorithm and its basic principles for partitioning data into clusters. Discuss the role of the k parameter and its impact on the clustering outcome.	K5	CO3	7M
		ii) Describe the Expectation Maximization (EM) algorithm and with tossing a coin example	K5	CO3	7M

	b	i) Discuss he challenges and limitations of clustering algorithms	K4	CO4	10M
		ii) Discuss the advantages and disadvantages of Hierarchical Clustering.	K4	CO4	4M
5		Unit-V			
	a	i) Describe the concept of Decision Trees and differentiate between classification trees and regression trees.	K4	CO5	7M
		ii) Describe the Random Forest Algorithm and its step-by-step process for building an ensemble of decision trees.	K5	CO5	7M
		OR			
	b	i) Illustrate the different appropriate problems for decision tree learning	K4	CO5	7M
		ii) Explore the concept of Learning Rules from Data and its relevance in machine learning.	K5	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CC3205 **ADVANCED JAVA AND WEB TECHNOLOGIES**

Time: 3 hours CSE, CSE(AI) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i)Distinguish between GenericServlet and HttpServlet and explain the life cycle methods of Servlet.	K4	CO1	7M
		ii) Implement a servlet by extending HttpServlet.	K3	CO1	7M
		OR			
	b	i) Explain the Deployment descriptor in detail.	K4	CO1	7M
		ii) Summarize in how many ways session tracking can be done in servlets. Describe the concept of Cookies.	K2	CO1	7M
		Unit-II			
2	a	i)Illustrate all the directive elements in JSP through example code.	K4	CO2	7M
		ii)Explain JSP standard action tags.	K4	CO2	7M
		OR			
	b	i) Explain any 5 implicit JSP objects.	K4	CO2	7M
		ii) Analyze what are the advantages of JSPs when compared with servlets.	K4	CO2	7M
		Unit-III			
3	a	i) Illustrate request, response and out JSP implicit objects.	K4	CO3	7M
		ii) Determine how to pass the data between JSP pages using session object?	K3	CO3	7M
		OR			
	b	i) Explain how to pass control and data between JSP pages.	K4	CO3	7M
		ii) Explain scope of JSP Objects.	K4	CO3	7M
		Unit-IV			
4	a	i) Determine all the types of JDBC Drivers and explain.	K3	CO4	7M
		ii) Implement a JSP page to insert data into database table.	K3	CO4	7M
		OR			
	b	i) Sketch JDBC Architecture and explain in detail.	K3	CO4	7M
		ii) Implement a JSP page to retrieve the data from the database.	K3	CO4	7M
		Unit-V			
5	a	i) Analyze PHP Associative Arrays and Multidimensional arrays	K4	CO5	7M
		ii) Explain any 5 string functions in PHP.	K4	CO5	7M
		OR			
	b	i) Implement PHP code to create a database in MySQL.	K3	CO6	7M
		ii) Explain the concept of Form validation in PHP.	K4	CO6	7M

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CC3206 **BIG DATA ANALYTICS**

Time: 3 hours (CSE, IT) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain about Google File System	2	1	7M
		ii) Explain the following i) Job tracker ii)Task tracker	2	1	7M
		OR			
	b	i) List and explain the important features of Hadoop	2	1	7M
		ii) Build a distributed file system by installing hadoop in pseduo distributed mode	2	1	7M
2		Unit-II			
	a	i) With a neat diagram, explain the anatomy of Map Reduce job.	2	2	7M
		ii) Write a Map-Reduce program to count number of words in a file	2	2	7M
		OR			
	b	i) Write an application to find the maximum temperature, using a combiner function for efficiency?	2	2	7M
		ii) With a neat sketch explain the logical data flow for map reduce?	2	2	7M
3		Unit-III			
	a	i) Explain the working of spark with the help of its architecture	2	3	7M
		ii) Write about the element wise transformations and explain each with an example	2	3	7M
		OR			
	b	i) Analyse the concept of RDD and state how we can create RDDs in Apache spark	4	3	7M
		ii) Explain different actions with examples on transformations	2	3	7M
4		Unit-IV			
	a	i) With a neat diagram explain the Pig architecture in detail?	2	4	7M
		ii) Discuss about four types in its data model of Pig Latin?	2	4	7M
		OR			
	b	i) Consider the Departmental Stores data file (stores.txt) in the following format customerName, deptName, purchaseAmount. i) Write a Pig script to list total sales per departmental store. ii) Write a Pig script to list total sales per customer.	2	4	7M
		ii) Explain the operators supported in Pig Latin with examples	2	4	7M
5		Unit-V			
	a	i) With a neat diagram explain the components of Apache Hive architecture?	2	5	7M
		ii) Compare and contrast SQL and Hive QL.	4	5	7M
		OR			
	b	i) Discuss the Hive QL features.	2	5	7M
		ii) Explain any three Hiveql commands with their syntax and example.	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
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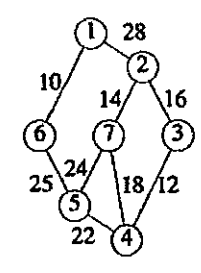
III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CC3208 **DESIGN AND ANALYSIS OF ALGORITHMS**

Time: 3 hours CSE(DS), CSE(AIML) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i)Explain the characteristics of Algorithm	K2	1	7M
		ii)Describe time and Space complexity	K2	1	7M
		OR			
	b	i) Illustrate asymptotic notations and derive asymptotic notations for $f(n)=3n^2+4n+1$	K2	1	14M
2		Unit-II			
	a	i)Explain the control abstraction of Divide and conquer	K2	2	7M
		ii) Apply the algorithm with an example 310,285,179,652,351, 423,861,254 ,450, 420 . Write an algorithm for Merge sort Algorithms.	K3	2	7M
		OR			
	b	i)Describe Strassen's matrix multiplication	K2	2	7M
		ii)Write algorithm for Merge Sort		2	7M
3		Unit-III			
	a	Explain Greedy fractional knapsack problem for the following data bag capacity m=20 ,n=3 (m1,m2,m3)=(18,15,10) and (p1,p2,p3)=(25,24,15). Find the optimal solution.	K4	3	14M
		OR			
	b	i) Apply Prism algorithm for the following graph? 	K3	3	14M
4		Unit-IV			
	a	i) Find the minimum number of operations required for matrix multiplication using dynamic programming. A(4x3) * B(3x5) * C(5x3) * D(3x6)	K4	4	14M
		OR			
	b	i) Construct an optimal binary search tree for the following data: n=4, (a1,a2,a3,a4)=(do, if, int, while), p(1:4)= (3,3,1,1) and q(0:4)= (2,3,1,1,1).	K4	4	14M

		Unit-V			
5	a	i) Write the algorithm for N queens problem using backtracking	K2	5	7M
		ii)Explain graph coloring problem with suitable example	K4	5	7M
		OR			
	b	i)Describe 0/1 knapsack problem using Branch and Bound	K2	5	7M
		ii)Illustrate Hamiltonian Cycle	K2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CE3201 **DESIGN AND DRAWING OF STEEL STRUCTURES**

Time: 3 hours (CE) Max. Marks: 70

Answer any ONE Question from Part – A & Any THREE Questions from Part – B

Q.No	Questions	KL	CO	Marks
	PART A			
1	Design a gantry girder for an industrial building to carry an electric overhead traveling crane with the following data. Crane capacity is 300 kN. Weight of crane excluding crab is 200kN. Weight of crab is 5 kN. Span of crane between rails is18 m. Minimum hook approach is 1.0 m. Wheel base is 3.0 m. Span of gantry girder is 9 m. Weight of rail section is 30 kg/m. Assume any missing data. Draw to scale the cross section and longitudinal section.	3	5	[28M]
	OR			
2	Design a column of effective length 6 m. It is subjected to a factored axial compressive load of 2100 kN. Provide two channels back to back connected with battens by site welded connection. Draw to scale the cross-section and sectional elevation of the column with batten details.	3	4	[28M]
	PART B			
3	a) Write the Advantages and disadvantages of steel structures(7m) b) Design a connection to joint two plates of size 200 mm x 10 mm of grade Fe 410 to mobilize full plate tensile strength using shop fillet welds if (i) a lap joint is used (ii) a double cover butt joint is used. (7m)	3	1	[14M]
4	Design a compression member of two channels placed toe-to-toe. The length of the compression member is 12m and carries a load of 1500kN The width over the backs of channels is 450mm. The channels are connected by double lacing. Sketch the cross-section of the column.	3	2	[14M]
5	Design a beam of span 5.0 m, 6 m and 5.0 m carrying a total uniformly distributed load of 30 kN/m and laterally unrestrained with a bearing length of 100 mm	3	3	[14M]
6	Design the suitable slab base for a column having one and two cover plates of 350 mm x 25 mm. The column carries an axial load of 2400 kN. Assume the permissible baring stress for slab base as 1890 kg/cm2 .	3	4	[14M]
7	The main tie of a building roof truss has to carry a maximum axial tension of 200kN. Design a suitable section for the member as per IS specifications. Design the section as two angles placed back to back of a gusset plate.	3	5	[14M]

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

NEC ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CE3202 **ENVIRONMENTAL ENGINEERING**

Time: 3 hours (CE) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Explain in detail about the population forecasting methods.	K2	C01	7M
		ii) What are the fluctuations in water demand?	K2	C01	7M
		OR			
	b	i) Write in detail about the water quality standards.	K3	C01	7M
		ii)List out the factors affecting per capita water demand.	K1	C01	7M
		Unit-II			
2	a	i) Explain the different mechanisms of filtration.	K3	C02	7M
		ii) What are the components of a water supply system? Explain in detailed.	K1	C02	7M
		OR			
	b	i) What is the purpose of coagulation? List out four coagulants used in treatment of water.	K2	C02	7M
		ii) Describe with a neat sketch the working of a pressure filter.	K1	C02	7M
		Unit-III			
3	a	i) Explain in detail the Ultimate disposal of sewage	K2	C03	7M
		ii))For a waste water sample, the 6 day BOD at 20^0 C is 220 mg/l and is 76% of the ultimate. What will be 5-day BOD at 30^0 C.	K3	C03	7M
		OR			
	b	i) Explain self-purification of rivers in detailed with neat sketch.	K2	C03	7M
		ii) Write about Collection and conveyance of sewage	K2	C03	7M
		Unit-IV			
4	a	i) Explain the design and working principles of septic tank.	K4	C04	7M
		ii) Explain various systems of sanitary plumbing. Write down the main characteristics of each system	K3	C04	7M
		OR			
	b	i) Describe in brief about oxidation ditches	K2	C04	7M
		ii) Prove that depth is not a theoretical criterion in designing a plain sedimentation tank.	K2	C04	7M
		Unit-V			
5	a	i) Explain about the low cost waste treatment methods.	K4	C05	7M
		ii) Explain the principal and working of the Activated Sludge Processes.	K2	C05	7M
		OR			
	b	i) What do you understand by digestion of sludge ?	K4	C05	7M
		ii) Differentiate between aerobic and anaerobic digestion. Explain the mechanism of anaerobic digestion.	K2	C05	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular&Supple. Examinations, April-2025

Sub Code: R20CE3203 **HYDROLOGY AND IRRIGATION ENGINEERING**

Time: 3 hours (CE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Explain the storage and transportation components using Horton's Hydrological cycle.	2	1	4M
		ii) The average annual rainfall of 6 rain gauge stations in a basin is 89, 68, 54. 45, 41 and 55 cm. If the error in the estimation of basin rainfall should not exceed 10%. How many additional rain gauges should be installed in the basin?	3	3	10M
		OR			
	b	i) List the importance of hydrology with emphasis on global water availability.	2	1	7M
		ii) Describe the depth-area-duration (DAD) and Intensity-duration-frequency (IDF) curves.	3	2	7M
		Unit-II			
2	a	i) What are the factors affecting the infiltration? Explain the double-ring infiltrometer with a neat sketch.	2	1	7M
		ii) What is the evaporation if 4.80 litres of water is removed from an evaporation pan of 1.22 m and the simultaneous rainfall measurement is 9.0 mm?	3	3	7M
		OR			
	b	i) What do you mean by abstractions from precipitation? Explain in detail.	2	1	7M
		ii) Define evapotranspiration. Explain in brief the 'Lysimeter method' of estimating the same in the field.	2	1	7M
		Unit-III			
3	a	i) A 6 hour storm produce rainfall intensities of 7, 18, 25, 12, 10 and 3 mm/hr in successive one hour intervals over a basin of 800 sq. km. If the resulting run-off is observed to be 2500 hectare-m, find the -index for the basin.	4	3	7M
		ii) Define Hydrograph. With neat sketch explain component parts of hydrograph.	2	4	7M
		OR			
	b	i) Define the following: Direct runoff; drainage density; form factor and overland flow.	2	1	8M
		ii) Given the ordinates of a 4-hour unit hydrograph. Derive the ordinates of a 12-hour unit hydrograph for the same catchment. What is the peak value of discharge and the corresponding time interval observed in 4-h and 12-h unit hydrograph?	4	3	6M
		Unit-IV			
4	a	i) Distinguish between transmissibility coefficient and intrinsic permeability. Two aquifers were found to be connected by a water-bearing stratum, which is 32 km apart. The thickness of the strata is 30 m, and it inclines 20 m/km. The hydraulic gradient between the aquifer is 0.2 m/km. Determine the transmissibility of the stratum. It takes 20,000 years for the movement of groundwater through the stratum.	4	5	7M

Time (hrs)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinates of 4-h UH (cm^3/s)	0	20	80	130	150	130	90	52	27	15	05	0

		ii) A well penetrates into an unconfined aquifer having a saturated depth of 50m. The discharge is 250 lpm at 8m drawdown. What would be the discharge at a 10m drawdown? The radius of influence in both cases may be taken as the same.	4	5	7M
		OR			
	b	i) Describe the recuperation test for the estimation of the yield of an aquifer.	2	5	5M
		ii) State and explain Darcy's law. Calculate the seepage velocity for the following data: Time taken for a tracer to move from one well to another 25 m apart is 5 hours, the porosity of the aquifer is 20% and head loss during travel is 0.5m.	3	5	9M
		Unit-V			
5	a	i) Explain the various types of irrigations and efficiencies.	2	1	7M
		ii) The gross commanded area for a distributor is 20000 hectares. 75% of which can be irrigated. The intensity of irrigation for the Rábi season is 40%, and for the Kharif season 10%. If the Kov period is four weeks for Rabi and 25 weeks for Kharif. Determine the outlet discharge. Outlet factors for Rabi and Kharif may be assumed as 1800 hectares/cumecs and 775 hectares/cumec. Also, calculate the delta for each crop.	4	1	7M
		OR			
	b	i) Explain the benefits and ill effects of irrigation.	2	1	7M
		ii) After how many days is water supply required to ensure a good yield if the field capacity of soil is 30%, the permanent wilting point is 12%, the density of soil is 1.4g/cc, the effective depth of root zone is 80cm, daily consumptive use if 15mm and readily available moisture is 85% of available moisture.	3	1	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20CE3204 **FOUNDATION ENGINEERING**

Time: 3 hours (CE) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	Describe the wash boring method of advancing a bore hole. What are its advantages and limitations ?	2	1	14M
		OR			
	b	Distinguish between i) Undisturbed and Disturbed Samples ii) Area Ratio and Inside Clearance iii) Core Recovery	2	1	7M
		ii) Describe the procedure for conducting a standard penetration test (SPT). What are the corrections to be applied?	2	1	7M
		Unit-II			
2	a	How do you distinguish a finite slope from an infinite slope? What are the various types of failures that are likely to occur in finite slopes? Under what circumstances do they occur? Explain with sketches.	2	2	14M
		OR			
	b	i) Explain Taylor's Stability Number	2	2	7M
		ii) Discuss stability analysis by Swedish arc method	2	2	7M
		Unit-III			
3	a	i) Write about a)Bearing capacity b)Ultimate bearing capacity	2	3	7M
		ii) Explain about "Terzaghi" Theory used in Bearing Capacity evaluation of soils.	2	3	7M
		OR			
	b	i) Determine allowable load carrying capacity of a Circular footing of 3m diameter installed in medium sand (γ = 18 kN/m^2, γ sat = 19 kN/m^2 N =25) deposit at a depth of 1.5 m below ground level if i) permissible settlement should not exceed 30mm and ii) factor safety against shear failure in soil should be 2.5. The ground Water table is at 1m below ground level.	3	3	7M
		ii) Write the factors influencing bearing capacity	2	3	7M
		Unit-IV			
4	a	i) Differentiate Between "Safe Bearing Capacity" and "Allowable Bearing Capacity". Describe a field test used in determination of allowable bearing capacity of foundations.	2	4	7M
		ii) Write the different types of foundation and their determination	2	4	7M
		OR			
	b	Determine the consolidation settlement of a square footing of size 2m x 2m transmitting a load of 250kN, founded at a depth of 1.5m below ground level in a saturated clay deposit (Liquid Limit =42%, NMC=28%, G=2.70, γ sat = 20kN/m^3). The water table is at ground surface and the saturated clay deposit is 6m thick and underlain by bed rock. The clay deposit is over consolidated.	3	4	14M
		Unit-V			
5	a	i) What is the basis on which the dynamic formulae are derived? Mention two well-known dynamic formulae and explain the symbols involved?	2	5	7M
		ii) Discuss the construction aspects of well foundation. What are the tilts and shift? What are the remedial measures to control these?	2	5	7M
		OR			
	b	i)What are the various components of a well foundation? Discuss them in detail.	2	5	7M
		ii)State the problems associated with well sinking and its remedial measures	2	5	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20EE3201

MICROPROCESSOR AND MICROCONTROLLERS

Time: 3 hours (EEE) Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i)Present the physical memory organization of 8086 with neat diagram and explain.	K3	CO2	7M
		ii)Categorize the names of all the registers present in 8086 and explain the purpose of each and every register.	K4	CO2	7M
		OR			
	b	i)Explain the architecture of 8085 microprocessor with neat diagram.	K4	CO1	7M
		ii) Summarize the architecture of Pentium processor.	K2	CO1	7M
		Unit-II			
2	a	Distinguish between maximum mode and minimum mode operations of 8086 and explain the pin configuration of 8086 in detail.	K4	CO2	14M
		OR			
	b	i) Explain all the addressing modes of 8086 in detail.	K4	CO3	7M
		ii) Sketch the memory read cycle for 8086 in minimum mode.	K3	CO3	7M
		Unit-III			
3	a	i) Interpret what is Assembler Directive and explain any 7 assembler directives of 8086.	K2	CO3	7M
		ii) Explain Data Transfer instructions and Arithmetic instructions of 8051.	K4	CO5	7M
		OR			
	b	i)Implement program to copy a block of 10 bytes of data from 35H to 60H in 8051 microcontroller.	K3	CO5	7M
		ii)Implement an assembly language program for 8086 to add two numbers.	K3	CO3	7M
		Unit-IV			
4	a	i)Explain different modes of operation of 8255.	K4	CO4	7M
		ii)Explain the working of 8257 DMA Controller with neat diagram.	K4	CO4	7M
		OR			
	b	Explain Programmable Interrupt Controller 8259 in detail with neat diagrams.	K4	CO4	14M
		Unit-V			
5	a	Sketch the Architecture of 8051 micro controller and explain in detail.	K3	CO2	14M
		OR			
	b	i)Explain the memory organization of 8051 in detail.	K4	CO2	7M
		ii)Interpret the interrupt structure of 8051.	K2	CO2	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

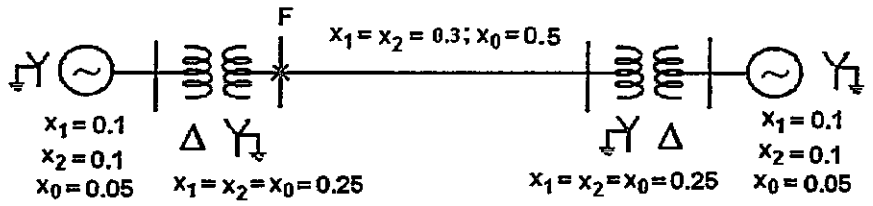
Sub Code: R20EE3202 **POWER SYSTEM ANALYSIS**

Time: 3 hours (EEE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) What are the advantages of per unit system?	K1	1	7M
		ii) A 40 MVA, 20 / 400 kV single phase transformer has the following impedances. Zp = 0.9 + j1.8 ohms and Zs = 128+j288 ohms. Find: i. p.u impedance of the transformer referred to HV ii. p.u impedance of the transformer referred to LV.	K2	1	7M
		OR			
	b	i)Discuss how to form Y Bus by direct inspection with a suitable example	K1	2	7M
		ii)The Y_{bus} of a 3 bus system is given by $Y_{bus} = \begin{bmatrix} -j10 & j5 & j5 \\ j5 & -j10 & j5 \\ j5 & j5 & -j10 \end{bmatrix}$ A shunt capacitor of admittance j0.5 pu is connected at bus 3. Find the modified Y_{bus} matrix.	K2	2	7M
2		**Unit-II**			
	a	i) How do you classify the buses in power system and what is its necessity.	K1	3	7M
		ii) What are the assumptions in static load flow equations and derive the approximate load flow equations.	K2	3	7M
		OR			
	b	i) Explain the formulation of Newton Raphson load flow method in polar form. Derive the equations to determine elements of Jacobian matrix in this case	K2	3	14M
3		**Unit-III**			
	a	i) What is the importance to study the short circuit analysis? Discuss the possible causes of short circuits in the power system	K2	4	7M
		ii)Determine short circuit MVA at the bus bars of a generating station 500 MVA and other station is 200 MVA. The generated voltage of each station is 12 kV. Also find the possible short circuit MVA at each station when they are linked by an inter connected cable with a reactance of 0.6 Ω	K3	4	7M
		OR			
	b	i) What are symmetrical components? Explain the symmetrical component transformation.	K2	4	7M
		ii) In an unbalanced three phase system, phase current $I_a = 1 \angle 90^o$ p.u, negative sequence current $I_{b2} = 4 \angle -150^o$ p.u, zero sequence current $I_{co} = 3 \angle 90^o$ p.u. Calculate the magnitude of phase current I_b	K3	4	7M
4		**Unit-IV**			
	a	i) Derive an expression for the positive sequence current Ia_1 of an unloaded generator when it is subjected to a double line to ground fault.	K2	4	7M

		ii) For the system shown in figure. A LLG fault occurs at point F. Find fault current 	K2	4	7M
		OR			
	b	i) Derive an expression for the fault current for a line-to- ground fault at an unloaded generator.	K2	4	7M
		ii) A 50 MVA, 11 kV, 3 phase alternator was subjected to different types of faults. The magnitude of the fault currents are as below Three phase fault: 1870 A Line to line fault: 2590 A Single line to ground fault: 4130 A The neutral of the alternator is solidly grounded. Calculate the negative sequence reactance of the alternator	K3	4	7M
5		Unit-V			
	a	i) Define power system stability and explain how it is classified based on the nature of disturbance.	K1	5	7M
		ii) What is power angle curve? Derive the necessary equation and show that the criterion for system to be steady state stable is $\frac{d\delta}{dp}>0$	K2	5	7M
		OR			
	b	i)Derive the swing equation for a single machine connected to infinite bus system. State the assumptions if any and state the usefulness of this equation. Neglect the damping	K2	5	7M
		ii) Discuss the various methods for improving steady state stability and transient stability	K2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20EE3203 MEASUREMENTS AND INSTRUMENTATION

Time: 3 hours (EEE) Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		**Unit-I**			
	a	i) Illustrate briefly about different types static errors in a measuring instrument.	K2	1	7M
		ii)Explain briefly the different types of Digital Voltmeters.	K1	1	7M
		OR			
	b	i) Explain briefly about the dynamic characteristics in a measuring instrument.	K2	1	7M
		ii) Explain briefly about accuracy and precision in a measuring instrument.	K2	1	7M
2		**Unit-II**			
	a	i) Illustrate the working principle of a single phase induction type energy meter and aslo derive torque equation	K3	2	14M
		OR			
	b	i) Explain the working of a 3 phase dynamometer wattmeter.	K1	2	7M
		ii)Illustrate in detail about instrument transformers.	K2	2	7M
3		**Unit-III**			
	a	i) Explain briefly the procedure for determining the unknown resistance with the help of kelvin's Double bridge.	K3	3	7M
		ii) Resistances of the ratio arms of a Wheatstone bridge are 300 Ω and 30Ω. The fourth arm is connected to an unknown resistor. Find the value of the unknown resistance if the third arm has a resistance of 250Ω in a balanced condition?	K3	3	7M
		OR			
	b	i) With the help of circuit diagram explain how unknown inductance value can be determined using Maxwells inductance bridge?	K2	3	7M
		ii)Explain in detail about the grounding techniques.	K2	3	7M
4		**Unit-IV**			
	a	i) Explain the major parts of CRT with a block diagram.	K1	4	7M
		ii)Discuss in detail about Data loggers.	K1	4	7M
		OR			
	b	i)Illustrate briefly the working principle of a Cathode ray oscilloscope.	K2	4	7M
		ii)Write a short note on a) Digital plotters b) Recorders	K2	4	7M
5		**Unit-V**			
	a	i) Explain briefly the working principle of resistive pressure transducer.	K2	5	7M
		ii) What is hall effect? Explain the working principle of a hall effect sensor.	K3	5	7M
		OR			
	b	i) Explain the working principle of a capacitve transducer.	K2	5	7M
		ii) What is transducer? Briefly explain the procedure for selecting a transducer	K1	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course OutcomeM:Marks

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20EE3205 **ELECTRIC DRIVES**

Time: 3 hours (EEE) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i)How can you differentiate active and passive load torques? Compare these two torques	1	1	7M
		ii)List out the advantages of electric drive. What is the concept of load equalization?	2	1	7M
		OR			
	b	i)What are the advantages of electric drives than mechanical drives? With a neat block diagram, explain different components of an electric drive.	1	1	7M
		ii)What are the advantages of electric braking? Explain the dynamic and plugging electric braking methods.	2	1	7M
2		Unit-II			
	a	With the help of waveforms, explain in detail about single phase fully controlled rectifier control of DC separately excited motor in continuous and discontinuous conduction mode	2	2	14M
		OR			
	b	i)Explain the operation of dual converter controlling the separately excited DC motor.	2	2	7M
		ii)Draw and explain the speed-torque characteristics at different firing angles for a fully converter feeding a DC series motor.	2	2	7M
3		Unit-III			
	a	i)Explain the four-quadrant operation of dc drive using chopper	2	3	7M
		ii)A 220 V, 1500 rpm, 2 kW dc separately excited motor has the armature resistance and inductance of 1 Ω and 50 mH respectively. It is controlled by a chopper. The chopper operating frequency is 400 Hz at a load whose torque is proportional to the speed. At δ=0.9, the motor runs at 1320 rpm. What will be the value of δ and the current ripple at 1000 rpm?	3	3	7M
		OR			
	b	i)Explain the operation of a two-quadrant class-A separately excited dc motor drive along with output waveforms and speed-torque characteristics	3	3	14M
4		Unit-IV			
	a	i)What are the disadvantages of using AC voltage controllers when they are used in induction motor control?	1	4	4M
		ii)A 440V, 3 phase, 50Hz 6 pole 945 rpm delta connected induction motor has the following parameters referred to the stator. Rs=2.0W, ' Rr = 2.0W, Xs = 3W, Xr = 4W. When driving a fan load at rated voltage, it runs at rated speed. The motor speed is controlled by stator voltage control. Determine motor terminal voltage, current and torque at 600 rpm	4	4	10M
		OR			
	b	i)Explain the slip-power recovery scheme of induction motor using commutator-less Kramer drive.	2	4	7M
		ii)A three-phase, 440 V, 50 Hz, 6-pole Y-connected induction motor is driving 300 N.m constant torque load. The motor has rotational losses of 1 kW. The motor is driven by a slip-energy recovery system. The triggering angle of the dc to ac converter is adjusted to 1000 , Calculate: (i) motor speed (ii) rotor RMS current (iii) stator RMS current, and (iv) power returned back to the source.	4	4	7M

5		Unit-V			
	a	i)Explain closed-loop speed control of self-controlled synchronous motor drive fed from voltage source inverter	2	5	7M
		ii)Describe the merits and demerits of separate and self-control operations of synchronous motor	3	5	7M
		OR			
	b	i)Explain in detail the basic operation of permanent magnet synchronous motor	2	5	7M
		ii)Explain the advantages of the self-control scheme of synchronous motor?	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20ME3201 **DESIGN OF MACHINE ELEMENTS-II**

Time: 3 hours (ME) Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Define Bearing Modulus. Derive the expression for bearing modulus and explain its significance in the design of journal bearings.	K3	C01	7M
		ii) Compare Rolling Contact Bearings and Sliding Contact Bearings. Discuss their advantages, disadvantages, and applications.	K3	CO1	7M
		OR			
	b	A full journal bearing and a partial journal bearing are subjected to the same load and speed conditions. Compare the power loss due to friction in both cases, given that the coefficient of friction in the full bearing is 0.0025 and in the partial bearing is 0.0018. Shaft diameter is 50 mm and speed is 1500 rpm. Assume bearing length = shaft diameter.	K3	CO2	14M
2		Unit-II			
	a	i) Discuss the various forces acting on a connecting rod during engine operation. Include inertia forces, gas pressure forces, and explain how these affect the design.	K3	CO2	7M
		ii) Describe the role of a crank and crankshaft in an IC engine. With a neat sketch, explain the crank mechanism and how motion is transmitted.	K3		7M
		OR			
	b	At a certain instant, the pressure on the piston is 2 MPa and the crank angle is 30°. The cylinder bore is 80 mm, and crank radius is 60 mm. Design a connecting rod.	K3	CO3	14M
3		Unit-III			
	a	i) Discuss the materials used for manufacturing pistons. Justify your selection based on thermal conductivity, strength-to-weight ratio, and wear resistance. Compare aluminium alloy and cast iron pistons.	K3	CO3	7M
		ii) What are piston rings? Discuss the material used, number of rings required, and how they are fitted.	K3		7M
		OR			
	b	i) Calculate the **thickness of a cylinder wall** for a liner made of cast iron and design the cylinder for the following data Given:Maximum pressure = 5 MPa, Bore = 90 mm, Allowable tensile stress = 70 Mpa. Reboring allowance = 2 mm	K3	CO3	14M

4		Unit-IV			
	a	i) Explain the difference between curved beams and straight beams in terms of stress distribution. List real-world applications where curved beam theory must be used over straight beam theory.	K3	CO4	7M
		ii) Discuss important design considerations in curved beams under load.	K3	CO4	7M
		OR			
	b	i) A curved beam has a **circular cross-section** of 50 mm diameter. The **inner radius of curvature** is 75 mm. It is subjected to a load of 10 kN at the free end. Calculate the **maximum stress** using the curved beam formula and find the location of the neutral axis.	K3	CO4	14M
5		Unit-V			
	a	i) Discuss the factors that affect the selection of belt drives in power transmission. How do load, speed, distance between shafts, and service conditions influence the choice?	K3	C05	7M
		ii) List and explain at least five advantages and five disadvantages of belt drive systems compared to other mechanical transmission systems like gears or chain drives.	K3	CO5	7M
		OR			
	b	A **rope drive** transmits 40 kW at 500 rpm using a pulley of 1.5 m diameter. Angle of contact = 160°, Coefficient of friction = 0.28 Max tension per rope = 1200 N Calculate: a) Power transmitted per rope b) Number of ropes required (Use appropriate formula for rope tension ratio and power)	K3	CO5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
NEC
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20ME3202 **HEAT TRANSFER**

Time: 3 hours (ME) Max. Marks: 70

Note: Answer All FIVE Questions.
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Derive the general conduction equation for Cylindrical co-ordinates, the system being with uniform heat generation and unsteady state.	K4	CO1	14M
		OR			
	b	i) A spherical container of negligible thickness holding a hot fluid at 140°C and having an outer diameter of 0.4m is insulated with three layers of each 50mm thick insulation of k_1 = 0.02, k_2 = 0.06 and k_3 = 0.16W/mK (starting from inside). The outside surface temperature is 30°C. Determine: (i) the heat loss, and (ii) Interface temperatures of insulating layers.	K3	CO1	7M
		ii) Analyze the concept of critical radius of insulation and apply it to derive the equation for a cylindrical system.	K2	CO1	7M
		Unit-II			
2	a	i) Derive the expression for temperature distribution and heat dissipation in a straight fin with a rectangular profile, assuming insulation at the fin's tip.	K4	CO2	7M
		ii) A long steel cylinder 12 cm in diameter and initially at 20°C is placed into a furnace at 820°C with local heat transfer coefficient of 140W/m²K. Calculate the time required for the axis temperature to reach 800°C. Also calculate the corresponding temperature at radius of 5.4 cm. $\alpha = 6.11 \times 10^{-6}$ m²/s, k = 21W/mK	K3	CO2	7M
		OR			
	b	i) Derive an expression for temperature as a function of time 't' in lumped heat capacity system.	K2	CO2	7M
		ii) A long fin of 10mm diameter made of steel (thermal conductivity, k=43W/m K) is attached to a plate at 200°C and extends to surroundings at 30°C with a convective heat transfer coefficient of 20W/m K. Find the heat flow rate through the fin.	K3	CO2	7M
		Unit-III			
3	a	i) Explain hydrodynamic and thermal boundary layers with neat sketch. Also give relevant expressions.	K1	CO3	7M
		ii) A vertical plate measuring 180mm × 180mm and at 50°C is exposed to atmosphere at 10°C. Compare the free convection heat transfer from this plate with that which would result due to forced convection over the plate at a velocity equal to twice the maximum velocity which would occur in free convection boundary layer.	K3	CO3	7M
		OR			
	b	I)Derive an equation for free convection by applying dimensional analysis. $Nu = C(Pr^n.Re^m)$	K2	CO3	7M
		ii) A vertical pipe 80mm diameter and 2m height is maintained at a constant temperature of 120°C. The pipe is surrounded by still atmospheric air at 30°C . Find heat loss by natural convection.	K3	CO2	7M

		Unit-IV			
4	a	i) What do you understand by the term forced convection? Explain its mechanism in detail.	K4	CO3	7M
		ii) A plate 20cm height and 1m wide is placed in air at 20^0C. If the surface of the plate is maintained at 100^0C calculate the boundary layer thickness and local heat transfer coefficient at 10cm from the leading edge. Also calculate the average heat transfer coefficient over the entire length of the plate.	K3	CO3	7M
		OR			
	b	i) Derive an expression for LMTD in a parallel flow double pipe heat exchanger.	K4	CO3	7M
		ii) A counter flow heat exchanger is employed to cool 0.55 kg/s (C_p= 2.45kJ/kg^{0}C) of oil from 115^0C to 40^0C by the use of water. The inlet and outlet temperatures of cooling water are 15^0C and 75^0C, respectively. The overall heat transfer coefficient is expected to be 1450W/m^{2}K. Using the NTU method, calculate the following: (i) The mass flow rate of water, (ii) the effectiveness of the heat exchanger and (iii) the surface area required.	K3	CO3	7M
		Unit-V			
5	a	i) Discuss the regimes of Pool boiling curve in detail.	K2	CO4	7M
		ii) Saturated steam at a temperature of 65^0C condenses on a vertical surface at 55^0C. Determine the thickness of the condensate film at locations 0.2 m and 1.0 m from the top. Also calculate condensate flow rate at these locations.	K3	CO4	7M
		OR			
	b	i) Derive an expression for the shape factor in case of a radiation exchange between two surfaces.	K2	CO5	7M
		ii) Two large parallel planes with emissivities of 0.3 and 0.5 are maintained at temperatures of 527^0 C and 127^0C respectively. A radiation shield having emissivities of 0.05 on both sides is placed between them. Calculate (i) Heat transfer rate between them without shield. (ii) Heat transfer rate between them with shield.	K3	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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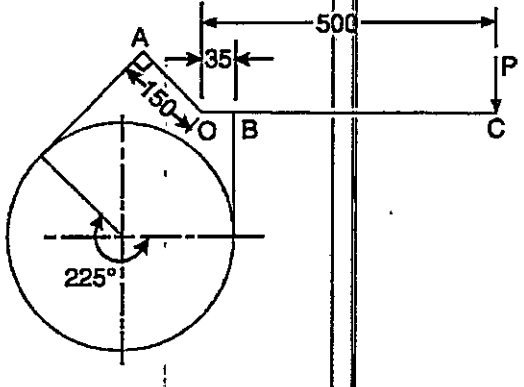
NARASARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20ME3203 **DYNAMICS OF MACHINERY**

Time: 3 hours (ME) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Derive the expression for angle of heel of a two-wheeler while taking a turn.	3	1	5M
		ii) The turbine rotor of a ship has a mass of 20 tones and a radius of gyration 0.75. Its speed is 2000 rpm. The ship pitches 6° above and below the horizontal position. One complete oscillation takes 18 seconds and the motion is simple harmonic. Determine (i) the maximum couple tending to shear the holding down bolt of the turbine (ii) The maximum angular acceleration of the ship during pitching. The direction in which the bow will tend to turn while, if the rotation of the rotor is clockwise when looking from rear.	3	1	9M
		OR			
	b	Each wheel of a four wheeled rear engine automobile has a moment of inertia of 2.4 kg-m^2 and an effective diameter of 660 mm. The rotating parts of the engine have moment of inertia of 1.2 kg-m^2. The gear ratio of engine to back axle is 3 : 1. The engine axis is parallel to rear axle and the crank shaft rotates in the same sense as the road wheel. The mass of the vehicle is 2200 kg and the centre of mass is 550 mm above the road level. The track width of the vehicle is 1.5m. Find the limiting speed of the vehicle around a curve with 80 m radius so that all the four wheels maintain contact with the road surface.	3	1	
		Unit-II			
2	a	i) Analyze the working of single plate clutch with neat diagram	2	2	7M
		ii) Explain about the working of a cone clutch with neat diagram	3	2	7M
		OR			
	b	i) Derive the expression for the ratio of tension on tight side to slack side in case of band and block brakes.	3	2	5M
		ii)  A differential band brake, as shown in Fig. has an angle of contact of 225°. The band has a compressed woven lining and bears against a cast iron drum of 350 mm diameter. The brake is to sustain a torque of 350 N-m and the coefficient of friction between the band and the drum is 0.3. Find : **1.** The necessary force (P) for the clockwise and anticlockwise rotation of the drum; and **2.** The value of 'OA' for the brake to be self locking, when the drum rotates clockwise.	3	2	9M

		Unit-III			
3	a	i) State the different types of governors. Explain about any one of them.	2	3	9M
		ii) The following particulars refer to a Wilson-Hartnell governor: Mass of each ball = 2 kg ; minimum radius = 125 mm ; maximum radius = 175 mm ; minimum speed = 240 rpm ; maximum speed = 250 rpm ; length of the ball arm of each bell crank lever = 150 mm; length of the sleeve arm of each bell crank lever = 100 mm ; combined stiffness of the two ball springs = 0.2 kN/m. Find the equivalent stiffness of the auxiliary spring referred to the sleeve.	3	3	5M
		OR			
	b	i) Derive the equation for the energy stored in fly wheels.	3	3	5M
		ii) The torque exerted on the crank shaft of a two stroke engine is given by the equation $T=(14{,}500+2{,}300\sin 2\theta-1{,}900\cos 2\theta)$N-m where θ is the angle moved by the crank from I.D.C. If the resisting torque is constant find: i) The power of the engine, when the speed is 150rpm. ii) The moment of inertia of the flywheel if the speed variation is not to exceed ±0.5% of the mean speed. iii) The angular acceleration of the flywheel when the crank has turned through 30° from the I.D.C.	3	3	9M
		Unit-IV			
4	a	i) Discuss how a single revolving mass is balanced by two masses revolving in different planes.	2	4	5M
		ii) A, B, C and D are four masses carried by a rotating shaft at radii 100mm,125mm,200mm and 150mm respectively. The planes in which the masses revolve are spaced 600mm apart and the masses of B,C and D are 10kg,5kg and 4kgrespectively.Find the required mass A and relative angular setting of the four masses so that the shaft be in complete balance.	3	4	9M
		OR			
	b	i) Differentiate Static Balancing from Dynamic Balancing.	3	4	4M
		ii) A shaft caries four rotating masses A, B, C and D which are completely balanced. The masses B, C and Dare 50kg, 80kg and 70kg respectively. The masses C and D make angles of 90° and 195° respectively with mass B in the same sense. The masses A,B,C and D are concentrated at radius 75mm,100mm,50mm and 90mmrespectively.The plane of rotation of masses B and C are 250mm apart. Determine (i) the magnitude of mass A and its angular position (ii) the position of planes A and D.	3	4	10M
		Unit-V			
5	a	A four-cylinder vertical engine has cranks 300mm long. The plane of rotation of the first, third and fourth cranks are 750mm,1050mm and 1650mm respectively from that of the second crank and their reciprocating masses are 10kg,400kg and 250kg respectively. Find the mass of the reciprocating parts for the second cylinder and relative angular position of the cranks in order that the engine may be in complete balance.	3	5	14M
		OR			
	b	Derive the following expression of effects of partial balancing in two cylinder locomotive engine (i) Variation of attractive force (ii) Swaying couple (iii) Hammer blow	3	5	14M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20ME3207 **ROBOTICS AND APPLICATIONS**

Time: 3 hours (ME) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain the various parts of a robot with neat sketch	KL1	CO1	7M
		ii) Classify the robots according to the coordinates of motion. with a sketch and example, explain the features of each type	KL2	CO1	7M
		OR			
	b	i) Find a homogeneous transformation matrix T that represents a rotation of 60^0 angle about the OX axis, followed by a translation 10 units along the current OV axis, followed by a translation of 15 units along the current OW axis, followed by a rotation of 30^0 angle about the current OW axis.	KL3	CO1	14M
2		Unit-II			
	a	i) Discuss various electrical actuators used in robots	KL1	CO2	7M
		ii) Explain salient features of pneumatic actuators	KL2	CO2	7M
		OR			
	b	i) Explain the principle of the following sensors and also mention how they are used in robots. (i) Piezo elecric sensor (ii) Inductive proximity sensor	KL2	CO2	7M
		ii) Describe the classification of sensors and the factors to be considered for its selection	KL1	CO2	7M
3		Unit-III			
	a	i) . Derive forward kinematics equations of manipulator for a particular position	KL3	CO3	7M
		ii) Discuss various difficulties associated with the inverse kinematic solution and explain 'geometric approach' used in inverse kinematic problem	KL2	CO3	7M
		OR			
	b	i) Obtain direct kinematics using D-H convention for SCARA manipulator.	KL3	CO3	14M
4		Unit-IV			
	a	i) Define and explain a geometric Jacobian.	KL1	CO4	7M
		ii) What are Lagrange–Euler formulations? What are its applications?	KL2	CO4	7M
		OR			
	b	i) What are the steps involved in Newton-Euler formulations in deriving dynamic equations of manipulators.	KL2	CO4	7M
		ii) Apply Lagrangean formulation to derive the dynamic equations of motion for RP type planar manipulator.	KL3	CO4	7M
5		Unit-V			
	a	i) What are the features of robot in machine loading and unloading applications?	KL1	CO5	7M
		ii) Describe the Spray coating operation with robot system.	KL2	CO5	7M
		OR			
	b	i) Explain the applications of robots in continuous arc welding and spray painting.	KL2	CO5	7M
		ii) Differentiate between path planning and trajectory planning.	KL2	CO5	7M

NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20EC3201

MICRO WAVE AND OPTICAL COMMUNICATIONS

Time: 3 hours (ECE) Max. Marks: 70

Note: Answer All **FIVE** Questions All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) A TE_{10} wave at 10 GHz propagates in a rectangular waveguide of internal dimensions 2.5cm×1.25 cm filled with Teflon having ε_r=2.1. Determine (i) phase constant, (ii) guide wavelength, (iii) phase velocity, (iv) The wave impedance.	K2	CO1	7M
		ii) Derive different field expressions for TM mode existing in Circular Waveguide?	K3	CO1	7M
		OR			
	b	i) Derive different field expressions for TE mode existing in Rectangular Waveguide?	K3	CO1	7M
		ii) A silver plated (σ=6.17×10^7 Sm^{-1}) WR 90 rectangular waveguide (a=2.286 cm, b=1.016 cm) filled with PTFE Teflon (ε_r=2.1, μ_r=1, tanδ=1.5×10^{-4}) has to propagate the TE_{10} wave at 10 GHz. Determine the attenuation due to conduction and dielectric losses for the wave propagating down the dielectric-loaded waveguide.	K2	CO1	7M
2		Unit-II			
	a	i) Discuss the principle of operation of an Isolator with the help of a neat sketch.	K2	CO2	7M
		ii)(a) What is the application of an E-plane Tee? (b) Find the S-Matrix for an E-plane Tee.	K3	CO2	2+5 M
		OR			
	b	i) Discuss the principle of the reflex klystron as a microwave oscillator.	K2	CO2	7M
		ii) (a) What is the application of a Magic Tee? (b) Find the S-Matrix for a Magic Tee.	K3	CO2	2+5 M
3		Unit-III			
	a	i) Write down the working principle of Gunn diode using the valley model theory.	K2	CO3	7M
		ii) Explain how the high value of VSWR can be measured by twice the minimum method.	K2	CO3	7M
		OR			
	b	i) Write down the working principle of the IMPATT diode as an oscillator.	K2	CO3	7M
		ii) Explain with a block diagram how the frequency of an unknown microwave signal can be measured.	K2	CO3	7M
4		Unit-IV			
	a	i) (a) What do you mean by numerical aperture and the acceptance angle of a fiber? (b) Derive expressions for them.	K1	CO4	2+5 M
		ii) Describe the structures of different optical fibers with ray paths. What is the approximate diameter of an optical fiber in each case?	K3	CO4	7M
		OR			
	b	i) What do you mean by V-number? Give the expression for the same.	K3	CO4	7M
		ii) Single-mode step-index fiber has a core diameter and numerical aperture as of 3 μm and 0.1 respectively. Calculate the value of the V-number when the wavelength of the propagating wave is 0.8 μm.	K3	CO4	7M

		Unit-V			
5	a	i) Derive the condition of lasing in terms of gain and loss coefficients per unit length and the reflectivity of mirrors placed at the end facets of the LASER crystal.	K3	CO5	7M
		ii) Explain the detection process in a p-i-n photodiode. Compare the device with the p-i-n avalanche photodiode.	K1	CO5	7M
		OR			
	b	i) Write a note on the semiconductor Injection laser or explain the working principle of the LASER diode.	K3	CO5	7M
		ii) Explain the detection process in a p-n photodiode. Compare the device with the p-i-n photodiode.	K1	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M: Marks

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NAKASARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20EC3202 **VLSI DESIGN**

Time: 3 hours (ECE) Max. Marks: 70

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain the nMOS enhancement mode fabrication process for different conditions of V_{ds}.	K2	1	7M
		ii) Derive an expression for transconductance of an n-channel enhancement MOSFET operating in active region.	K3	1	7M
		OR			
	b	i) Explain in detail the p-well process for CMOS fabrication indicating the masks used.	K2	1	7M
		ii) Compare the relative merits of three different forms of pull-up for an inverter circuit. What is the best choice for realization in nMOS and CMOS technology?	K4	1	7M
2		Unit-II			
	a	Analyze the sheet resistance concept applied to MOS transistor and inverter.	K3	2	7M
		Why scaling is required? Write the scaling factors for different types of device parameters.	K2	2	7M
		OR			
	b	Evaluate the scaling factors impact on the device parameters: Gate Area (Ag), Gate Capacitance (Cg), Parasitic Capacitance (Cx) and Gate Capacitance Per Unit Area (Co).	K3	2	7M
		What is meant by sheet resistance R_s? Explain the concept of Rs applied to MOS transistors.	K2	2	7M
3		Unit-III			
	a	i) What are the λ-based design rules? Give them for each layer.	K2	3	7M
		ii) Draw a stick diagram and layout for two input CMOS NAND gate indicating all the regions and layers.	K3	3	7M
		OR			
	b	i) Explain 2 μm Double Metal, Double Poly CMOS / BiCMOS Rules.	K2	3	7M
		ii) Draw a stick diagram for CMOS logic $Y=(A+B+C)^{'}$.	K3	3	7M
4		Unit-IV			
	a	i) What are the issues occurred in Dynamic Design of static CMOS design.	K2	4	7M
		ii) Explain about the Cascading Dynamic Gates in detail.	K2	4	7M
		OR			
	b	i) Discuss the Dynamic Logic-Basic Principles of static CMOS design.	K3	4	7M
		ii) Explain the Speed and Power Dissipation of Dynamic Logic in CMOS process.	K2	4	7M
5		Unit-V			
	a	i) Discuss the procedure for implementation of Basic FPGA architecture.	K3	5	7M
		ii) Explain various forms of FPGA Technologies.	K2	5	7M
		OR			
	b	i) Explain the following related to advanced technologies of Giga-scale dilemma and High–k.	K2	5	7M
		ii) Discuss in detail about Metal Gate Technology.	K2	5	7M

NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20EC3203 **MICROPROCESSOR AND MICRO CONTROLLERS**

Time: 3 hours (ECE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i)Sketch the architecture of 8086 microprocessor and explain.	K3	CO1	7M
		ii)Explain the Flag register of 8086 microprocessor in detail.	K4	CO1	7M
		OR			
	b	i)Explain all the addressing modes of 8086 processor	K4	CO1	7M
		ii)Implement an assembly language program to multiply two numbers.	K3	CO1	7M
		Unit-II			
2	a	Sketch the pin diagram of 8086 and explain each signal in detail.	K3	CO2	14M
		OR			
	b	i)Distinguish between maskable interrupt and non-maskable interrupts and write about interrupt vector table.	K4	CO2	7M
		ii)Determine the salient features of Pentium processor.	K3	CO2	7M
		Unit-III			
3	a	i)Explain Dynamic RAM interfacing with 8086 in detail.	K4	CO3	7M
		ii)Explain interfacing of Analog to digital converter with 8086.	K4	CO3	7M
		OR			
	b	i)Analyze the block diagram of 8255 and explain.	K4	CO3	7M
		ii)Demonstrate Programmable Communication Interface 8251 and explain in detail.	K2	CO3	7M
		Unit-IV			
4	a	Sketch the architecture of 8051 microcontroller and explain in detail.	K3	CO4	14M
		OR			
	b	i)Demonstrate the memory organization of 8051 microcontroller.	K2	CO4	7M
		ii)Analyze special function registers of 8051 in detail.	K4	CO4	7M
		Unit-V			
5	a	i)Explain LED interfacing with 8051 Microcontroller briefly.	K4	CO5	7M
		ii) Explain DAC interfacing with 8051 briefly.	K4	C05	7M
		OR			
	b	Analyze the interfacing of Seven segment display with 8051 in detail.	K4	CO5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NAJRA SARAOPETA
NEC ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20EC3207 **DIGITAL IMAGE PROCESSING**

Time: 3 hours (ECE) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i) Write a short note on image sensing and acquisition.	2	1	10M
		ii) Using DCT prove the energy compaction property of the given image. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3	1	4M
		OR			
	b	i) Find KL transform of the image and verify. 4 −2 −1 3	3	1	7M
		ii) Explain connectivity and its types.	2	1	7M
		Unit-II			
2	a	i) Perform Histogram equalization for the given image. Draw the Histogram of the image before and after equalization. 1 6 2 4 3 1 2 2 4 2 3 5 2 3 1 2	3	2	7M
		ii) Explain how smoothing and sharpening operations are performed on an image using spatial filters.	2	2	7M
		OR			
	b	i) Explain how illumination and reflectance components of an image can be enhanced independently.	2	2	7M
		ii) Perform Geometric mean, harmonic mean and Alpha-trimmed mean filter (Assume d=2), for the given image for the marked (bold) pixel only) 30 10 20 10 250 25 20 25 30	4	2	7M
		Unit-III			
3	a	i) Explain global edge linking method used in line detection for the color image.	2	3	7M
		ii) Compare the performance of first and second order derivative in the detection of point, line and edge for the color image.	5	3	7M
		OR			
	b	i) Convert any RGB into CMY model and HIS model.	3	3	7M
		ii) Compute the degree of compression that can be achieved using Huffman coding for the given image. 1 1 1 2 2 1 1 1 3 2 2 2 2 3 3 0		3	7M

		Unit-IV			
4	a	i) Define orthonormality and explain the method of finding the coefficients with derivations	1	4	7M
		ii) Define wavelet packets. Explain the use of this in image compression.	1	4	7M
		OR			
	b	i) Constructs the discrete wavelet transform for multi resolution analysis.	3	4	7M
		ii) What is image de-noising? How the Haar wavelet is used to de-noising any signal with an example.	1	4	7M
		Unit-V			
5	a	i) Explain in detail how an image is segmented using region splitting and merging algorithm with an example.	2	5	7M
		ii) Write a short note on gray scale morphology.	3	5	7M
		OR			
	b	i) Explain watershed algorithm using dam construction.	2	5	7M
		ii) Explain Hit-or-miss transformation.	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CY3201 **INTRODUCTION TO CYBER SECURITY**

Time: 3 hours (CS) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Define cybercrime and discuss its origins. Explain the relationship between cybercrime and information security.	K2	1	7M
		ii) Analyze the various classifications of cybercrimes and discuss the legal perspectives associated with them.	K4	2	7M
		OR			
	b	i) Explain the concept of cyberstalking and discuss how cybercafés can be exploited for cybercrimes. Propose preventive measures to counter such crimes.	K2	4	7M
		ii) Evaluate the impact of cloud computing on cybercrime and how it serves as an attack vector for cybercriminals.	K4	3	7M
2		Unit-II			
	a	i) Explain the proliferation of mobile and wireless devices and discuss the emerging trends in mobility. How do these trends influence cybersecurity?	K2	1	7M
		ii) Analyze the security challenges posed by mobile devices, including authentication service security and registry settings. Provide examples of potential vulnerabilities.	K4	2	7M
		OR			
	b	i) Evaluate the organizational measures necessary for handling mobile device security. Discuss the importance of security policies and measures in the mobile computing era.	K2	4	7M
		ii) Critically analyze the types of attacks on mobile/cell phones and discuss how organizations can safeguard against such attacks.	K3	5	7M
3		Unit-III			
	a	i) Explain how proxy servers and anonymizers are used by cybercriminals to mask their identities. Discuss their implications for cybersecurity.	K2	1	7M
		ii) Analyze how phishing attacks are carried out and discuss effective countermeasures to protect individuals and organizations. Provide real-world examples.	K4	2	7M

		OR			
	b	i) Discuss the functioning of keyloggers and spyware, and explain how they are used to compromise systems. Suggest preventive techniques to mitigate these threats.	K3	5	7M
		ii) Explain how SQL injection and buffer overflow attacks work, and discuss how they can compromise database security. Provide preventive measures to secure databases.	K4	3	7M
4		Unit-IV			
	a	i) Explain the importance of cyber laws in India and discuss the key provisions of the Indian IT Act. How does it address cybercrime challenges?	K2	1	7M
		ii) Analyze the challenges faced by Indian law in combating cybercrimes. Discuss how addressing the weaknesses in the Information Technology Act can strengthen cybersecurity.	K4	2	7M
		OR			
	b	i) Analyze the challenges faced by Indian law in combating cybercrimes. Discuss how addressing the weaknesses in the Information Technology Act can strengthen cybersecurity.	K3	5	7M
		ii) Critically analyze the importance of continuing strategies in cybersecurity and discuss how organizations can maintain a proactive security approach.	K3	5	7M
5		Unit-V			
	a	i) Explain the historical background of cyber forensics and discuss the evolution of digital forensics science.	K2	1	7M
		ii) Discuss the role of network forensics in cybercrime investigations. How does the OSI 7-layer model relate to computer forensics?	K2	4	7M
		OR			
	b	i) Analyze the digital forensics life cycle and explain the significance of the chain of custody concept in maintaining the integrity of digital evidence.	K4	2	7M
		ii) Critically analyze the concept of antiforensics and discuss how it affects the integrity of digital investigations.	K4	2	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CY3202 MALWARE ANALYSIS & REVERSE ENGINEERING

Time: 3 hours (CY) Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) What is malware analysis and why is it important in cybersecurity?	L2	1	7M
		ii) How can malware indicators be utilized to enhance threat detection?	L3	1	7M
		OR			
	b	i) What are the major differences between behavioral analysis and code analysis in malware analysis?	L2	1	7M
		ii) How can malware indicators be utilized to enhance threat detection?	L3	1	7M
2		Unit-II			
	a	i) What is the purpose of using the Microsoft Offline API for registry discoveries in forensic investigations?	L2	2	7M
		ii) How can TSK (The Sleuth Kit) be used for network and host discovery in malware forensics?	L3	2	7M
		OR			
	b	i) How can malware artifacts be identified through registry analysis?	L2	2	7M
		ii) Describe how PEID can help in identifying packers and its relevance in malware analysis.	L3	2	7M
3		Unit-III			
	a	Describe how Python scripts and Py commands can assist in debugging.	L2	3	7M
		ii) How can program execution be controlled during the debugging process?	L3	3	7M
		OR			
	b	i) How does debugging on a Parallels guest differ from debugging on a VMware guest?	L2	3	7M
		ii) Describe the challenges faced when debugging a VMware Workstation guest.	L3	3	7M
4		Unit-IV			
	a	i) How does Volatility assist in analyzing memory dumps?	L2	4	7M
		ii) Describe the process of investigating processes in memory dumps.	L3	4	7M
		OR			
	b	i) What is the role of Malfind and YARA in identifying injected code?	L2	4	7M
		ii) How can artifacts in process memory be identified during memory forensics?	L3	4	7M
5		Unit-V			
	a	i) How can WHOIS lookups be used to research domains associated with malware?	L2	5	7M
		ii) Explain the process of DNS hostname resolution and its relevance in malware analysis.	L3	5	7M
		OR			
	b	i) Describe the importance of checking DNS records in the context of malware investigations.	L2	5	7M
		ii) What are the steps involved in creating static maps for domain and IP data analysis?	L3	5	7M

NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20AI3204 **DEEP LEARNING**

Time: 3 hours CSE (AI) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Compare and contrast Over fitting and Under fitting	KL2	CO1	7M
		ii) Explain about Stochastic Gradient Descent	KL4	CO1	7M
		OR			
	b	i) Exemplifying about Bias and Variance	KL2	CO1	7M
		ii) Summarizing Supervised Learning Algorithms	KL2	CO1	7M
2		Unit-II			
	a	i) Illustrating Gradient-Based Learning in Deep Feed forward Networks	KL4	CO2	7M
		ii) Explain about Hidden Units of Deep Feed forward Networks	KL4	CO2	7M
		OR			
	b	i) Determine parameter Norm Penalties	KL3	CO2	7M
		ii) Summarizing Regularization for Deep Learning	KL2	CO2	7M
3		Unit-III			
	a	i) Justify How Learning Differs from Pure Optimization.	KL3	CO3	7M
		ii) Explain Challenges in Neural Network Optimization	KL4	CO3	7M
		OR			
	b	i) Illustrate Approximate Second-Order Methods	KL4	CO3	7M
		ii) Explain Optimization Strategies and Meta-Algorithms	KL4	CO3	7M
4		Unit-IV			
	a	i) Explain about the Convolution Operation, Motivation, Pooling	KL4	CO4	7M
		ii) Summarize The Neuroscientific Basis for Convolutional Networks.	KL2	CO4	7M
		OR			
	b	i) Examining Convolution and Pooling as an Infinitely Strong Prior	KL3	CO4	7M
		ii)Explain any one Efficient Convolution Algorithms	KL4	CO4	7M
5		Unit-V			
	a	i) Explain about Recurrent Neural Networks	KL4	CO5	7M
		ii) Illustrate Bidirectional RNNs	KL4	CO5	7M
		OR			
	b	i) Illustrate Deep Recurrent Networks	KL4	CO5	7M
		ii) Explain about Optimization for Long-Term Dependencies	KL4	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20AM3203 DEEP LEARNING TECHNIQUES

Time: 3 hours CSE(AIML) Max. Marks: 70

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No			Questions	KL	CO	M
1			Unit-I			
	a	i)	Explain the key components of probabilistic models and how they are used in machine learning.	1	1	7M
		ii)	Describe the structure of a decision tree and discuss how it can be used for classification and regression tasks.	2	1	7M
			OR			
	b	i)	Differentiate between overfitting and underfitting in machine learning	2	1	7M
		ii)	Apply the concept of gradient boosting machines to a real world scenario.	3	1	7M
2			Unit-II			
	a	i)	Explain the concept of biological and machine vision.	2	2	7M
		ii)	Analyze the role of activation functions in the training of deep neural networks.	4	2	7M
			OR			
	b	i)	Describe the process of training deep networks.	2	2	7M
		ii)	Apply a feedforward neural network to classify images from a dataset.	3	2	7M
3			Unit-III			
	a	i)	What are Keras, TensorFlow, Theano and CNTK? Explain their basic functionalities.	1	3	7M
		ii)	Implement a neural network using Keras to predict whether a movie review is positive or negative.	3	3	7M
			OR			
	b	i)	Differentiate between a feedforward neural network and a recurrent neural network.	1	3	7M
		ii)	How would you set up a deep learning workstation for training a neural network using TensorFlow	3	3	7M
4			Unit-IV			
	a	i)	Explain the concept of representation learning in neural networks.	2	4	7M
		ii)	Explain how to implement multichannel convolution for color images.	3	4	7M
			OR			
	b	i)	Discuss how you would set up and train an RNN in PyTorch for predicting future values based on time-series data.	3	4	7M
		ii)	Analyze the impact of using a CNN compared to an RNN for image classification.	4	4	7M
5			Unit-V			
	a	i)	Explain how GANs generates realistic images.	3	5	7M
		ii)	Outline the architecture and training process of a Deep Belief Network for classifying images.	3	5	7M
			OR			
	b	i)	Compare deep reinforcement learning with traditional reinforcement learning for real-time tasks.	4	5	7M
		ii)	Analyze how auto encoders can be used for both reducing data dimensions and removing noise.	4	5	7M

NEC NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20DS3201 **DATA ANALYTICS & VISUALIZATION**

Time: 3 hours (DS) Max. Marks: 70

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain the importance of data in modern applications.	2	1	7M
		ii) Describe the fundamental concepts of the Pandas library.	2	1	7M
		OR			
	b	i) Describe the different measures of dispersion in data analysis.	1	1	7M
		ii) Describe the various ways to visually represent data.	1	1	7M
2		Unit-II			
	a	i) Compare and contrast Logistic Regression and Linear Regression in terms of application and methodology.	2	2	7M
		ii) Explain the key assumptions of ANOVA and discuss their impact on statistical analysis.	2	2	7M
		OR			
	b	i) Analyze the advantages and limitations of using ANOVA for hypothesis testing.	4	2	7M
		ii) Evaluate the importance of interaction effects in Two-Way ANOVA	5	2	7M
3		Unit-III			
	a	i) Describe the four levels of validation in data analysis and their role in ensuring data accuracy.	2	3	7M
		ii) Explain the purpose and interpretation of scatter plots and regression curves in data analysis	2	3	7M
		OR			
	b	i) Explain the concepts of Dimensions and Measures in data visualization with suitable examples	2	3	7M
		ii) Compare bar charts and pie charts for categorical data visualization, highlighting their advantages and limitations.	2	3	7M
4		Unit-IV			
	a	i) Analyze the differences between K-means and hierarchical clustering methods.	4	4	7M
		ii) Evaluate the role of visualizing cluster analysis in understanding data patterns.	5	4	7M
		OR			
	b	i) List and explain scalar and point visualization techniques with suitable examples	1	4	7M
		ii) Explain how different data visualization tools aid in decision-making and data interpretation	2	4	7M
5		Unit-V			
	a	i) Explain the key features of Power BI	2	5	7M
		ii) Describe the role of DAX logical functions in data analysis and reporting.	2	5	7M
		OR			
	b	i) Discuss the use of Mathematical and Trigonometric functions in Power BI data modeling.	2	5	7M
		ii) Compare different statistical functions in Power BI and their impact on data-driven decision-making.	2	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20DS3202 **PRINCIPLES OF MACHINE LEARNING**

Time: 3 hours (DS) Max. Marks: 70

Note: Answer All FIVE Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i)Explain the concept of a well-posed learning problem. How does it help in designing effective learning systems?	4	1	7M
		ii) Describe the Find-S algorithm. How does it work, and in what scenario is it most useful in concept learning?	2	1	7M
		OR			
	b	i)What is inductive bias in machine learning? Discuss its importance in concept learning and how it influences the learning process.	2	1	7M
		ii)Explain the Candidate Elimination algorithm. How does it systematically eliminate hypotheses to converge to the correct concept?	4	1	7M
2		Unit-II			
	a	i)Describe the basic decision tree learning algorithm. What are the steps involved in building a decision tree from a set of training data?	2	2	7M
		ii)Explain Appropriate problems for decision tree learning.	4	2	7M
		OR			
	b	i) Discuss about the Issues in decision tree learning.	2	2	7M
		ii)Explain Inductive bias in decision tree learning	4	2	7M
3		Unit-III			
	a	i)Illustrate Estimating hypothesis accuracy	2	3	7M
		ii) Explain Basics of sampling theorem with example	4	3	7M
		OR			
	b	i) Describe General approach for deriving confidence intervals	4	3	7M
		ii) Discuss the difference in error of two hypothesis	2	3	7M
4		Unit-IV			
	a	i)Discuss Models of learnability	2	4	7M
		ii) Explain the probably approximately correct (PAC) learning	4	4	7M
		OR			
	b	i) Illustrate Sample complexity for infinite hypothesis spaces	2	4	7M
		ii)Discuss Vapnik-Chervonenkis dimension.	4	4	7M
5		Unit-V			
	a	i)Determining Naive Bayes learning algorithm	3	5	7M
		ii) Differences between Generative vs. discriminative training	2	5	7M
		OR			
	b	i)Illustrate Logistic regression	4	5	7M
		Ii) Explain with example k-nearest neighbor learning	4	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20DS3205 **ETL PRINCIPLES**

Time: 3 hours (DS) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Explain the role of staging areas in ETL. When should staging be used, and when can it be avoided?	2	1	7M
		ii) Describe the differences between relational tables and dimensional data models in ETL systems.	2	1	7M
		OR			
	b	i) What are fact tables and dimension tables? How do they contribute to data warehousing?	2	1	7M
		ii) Discuss the purpose and significance of surrogate key mapping tables in ETL.	2	1	7M
2		Unit-II			
	a	i) Explain the key components of a Logical Data Map and their importance in data extraction.	2	2	7M
		ii) Discuss the challenges of extracting data from heterogeneous sources such as XML files, web logs, and ERP systems.	2	2	7M
		OR			
	b	i) What is the role of business rules in ETL extraction? Explain their significance with examples.	2	2	7M
		ii) Describe the data discovery phase and content analysis in the ETL extraction process.	2	2	7M
3		Unit-III			
	a	i) Analyze the role of conformed dimensions in ensuring data consistency across multiple data sources.	4	3	7M
		ii) Explain how column nullity, column numeric ranges, and column length restrictions impact data quality in ETL.	4	3	7M
		OR			
	b	i) Given a dataset with missing and inconsistent values, determine the best approach for data cleaning and justify your choice.	4	3	7M
		ii) Compare explicit valid values and explicit invalid values in data cleaning. Why is each important for maintaining data integrity?	4	3	7M
4		Unit-IV			
	a	i) Apply the concept of incremental loading to a business scenario and explain its benefits over full data loading.	3	4	7M
		ii) Demonstrate how managing partitions and indexes improves ETL performance in fact table delivery.	3	4	7M
		OR			
	b	i) Explain the differences between transaction grain, periodic snapshot, and accumulating snapshot fact tables with real-world examples.	3	4	7M
		ii) Illustrate how factless fact tables can be used to capture event occurrences in an ETL system.	3	4	7M

5		Unit-V			
	a	i) Apply ETL performance tuning appraoches to improve efficiency in large-scale data warehousing.	3	5	4M
		ii) Demonstrate how scheduling and monitoring ETL processes help in minimizing load failures.	3	5	10M
		OR			
	b	i) Explain how measuring ETL-specific performance indicators can help optimize system performance.	3	5	7M
		ii) Illustrate the importance of ETL system security and describe best practices to protect data integrity.	3	5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NAKARAKOPETA
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III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CY3203 **ETHICAL HACKING**

Time: 3 hours (CY) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
		Unit-I			
1	a	i)Explain Hacking technology and its types in detail	K2	CO1	7M
		ii) Explain How do penetration testers help in strengthening cybersecurity?	K2	CO1	7M
		OR			
	b	i) Discuss the impact of emerging technologies on cybersecurity challenges.	K3	CO1	7M
		ii)Define backdoors, and how do hackers use them to gain unauthorized access?	K2	CO1	7M
		Unit-II			
2	a	i) If a hacker gathers employee social media data to launch a phishing attack, what preventive measures could have stopped this attack?	K3	CO2	7M
		ii) Analyze types of sensitive information can attackers retrieve through dumpster diving?	K3	CO3	7M
		OR			
	b	i) Define sniffer, and how is it used in network security? Explain about the different types of sniffing attacks? How can organizations protect their networks against packet sniffers?	K3	CO3	7M
		ii) A competitor is using publicly available job postings to learn about new technologies your company is adopting. How can you balance transparency in hiring while protecting business intelligence?	K3	CO2	7M
		Unit-III			
3	a	i) Suppose a website allows users to upload files. How can attackers exploit this feature, and how should developers secure it?	K2	CO3	7M
		ii) Illustrate how can a web application firewall (WAF) help mitigate SQL injection attacks?	K2	CO3	7M
		OR			
	b	i) Define a buffer overflow attack, and why is it dangerous? Explain how do attackers exploit buffer overflows to execute arbitrary code?	K2	CO1	7M
		ii) Describe the primary security risks associated with Linux systems?	K2	CO3	7M
		Unit-IV			
4	a	i)Differentiate between IDS and IPS in network security?	K2	CO4	7M
		ii)Explain briefly the role of blacklisting and whitelisting in web filtering?	K2	CO4	7M
		OR			
	b	i) Describe briefly about the role of mobile security apps play in protecting devices from hacking?	K2	CO4	7M
		ii) Explain about the most common Bluetooth security vulnerabilities? Explain how do attackers use BlueBorne to exploit Bluetooth-enabled devices?	K2	CO4	7M
		Unit-V			
5	a	i) Illustrate the Computer Fraud and Abuse Act (CFAA) in detail	K3	CO5	7M
		ii)Explain about the potential ethical concerns when working as a freelance ethical hacker?	K2	CO5	7M
		OR			
	b	i) Explain the importance of using hacking tools responsibly and within the law?	K2	CO5	14M

NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20CY3205 **BLOCK CHAIN TECHNOLOGIES**

Time: 3 hours (CY) Max. Marks: 70

Note: Answer All **FIVE** Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Summarize the origin and evolution of Blockchain technology.	2	1	7M
		ii) Evaluate a real-world Blockchain application and discuss its impact on business operations.	4	3	7M
		OR			
	b	i) Explain the shortcomings of current transaction systems that led to the emergence of Bitcoin.	2	1	7M
		ii) Analyze how Blockchain revolutionizes the traditional business network.	4	2	7M
2		Unit-II			
	a	i) Interpret the role of smart contracts in automating transactions in a Blockchain network.	4	3	7M
		ii) Apply the concept of consensus mechanisms to ensure trust and security in Blockchain	3	5	7M
		OR			
	b	i) Explain why Blockchain is called a "Blockchain" and how it maintains data integrity.	2	1	7M
		ii) Summarize the key characteristics that make Blockchain suitable for business applications.	2	1	7M
3		Unit-III			
	a	i) Evaluate how Blockchain technology enables friction-free business networks.	4	3	7M
		ii) Summarize how Blockchain transforms ecosystems by increasing visibility.	2	4	7M
		OR			
	b	i) Interpret how Blockchain can ease interaction frictions in financial transactions.	4	3	7M
		ii) Apply Blockchain principles to improve supply chain transparency and reduce fraud.	3	5	7M
4		Unit-IV			
	a	i) Demonstrate how Blockchain can streamline healthcare payments and preauthorization processes.	3	5	7M
		ii) Summarize how Blockchain is applied in financial services and trade finance.	2	1	7M
		OR			
	b	i) Apply Blockchain-based solutions to improve transparency in the insurance sector.	3	5	7M
		ii) Interpret the benefits of using Blockchain for electronic medical records in healthcare.	4	3	7M
5		Unit-V			
	a	i) Apply knowledge of Blockchain scalability issues to propose potential solutions.	3	5	7M
		ii) Discuss case studies of failed cryptocurrencies and analyze the factors leading to their downfall.	4	2	7M
		OR			
	b	i) Analyze the role of Hyperledger Fabric in enterprise Blockchain development.	4	2	7M
		ii) Summarize the vision and objectives of Hyperledger as a Linux Foundation project.	2	4	7M

NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20AM3204 **SOFT COMPUTING**

Time: 3 hours CSE(AIML) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i)Explain uncertainty and evidence with suitable examples.	K2	CO1	7M
		ii) Explain the importance of Bayesian networks with example	K4	CO1	7M
		OR			
	b	i)Explain random sets and mass assignments with examples.	K2	CO1	7M
		ii)Illustrate about fuzzy measures, and aggregation operators.	K2	CO1	7M
2		Unit-II			
	a	i)Demonstrate Bayesian network learning algorithms with a suitable example.	K3	CO2	7M
		ii)Explain decision tree induction and rule induction algorithms.	K3	CO2	7M
		OR			
	b	i)Compare supervised and unsupervised learning with examples.	K3	CO2	7M
		ii)Illustrate about evolutionary algorithms? Explain their working.	K2	CO2	7M
3		Unit-III			
	a	i)Illustrate about Adaptive Networks.	K2	CO3	7M
		ii)Explain about fuzzy control in Neural Networks.	K2	CO3	7M
		OR			
	b	i)Demonstrate about Fuzzy set theory.	K2	CO3	7M
		ii)Explain about Reinforcement Learning with an example.	K2	CO3	7M
4		Unit-IV			
	a	i)Analyze the concept of neuro-fuzzy systems with an example.	K3	CO4	7M
		ii)Explain about the role of Genetic Algorithm in Neural networks.	K2	CO4	7M
		OR			
	b	i)Analyze the importance of back-propagation networks in Neural networks.	K3	CO4	7M
		ii)Explain about Genetic Algorithm based weight determination applications.	K2	CO4	7M
5		Unit-V			
	a	i)Illustrate about Fitness functions in Neural networks.	K2	CO5	7M
		ii)Illustrate about GA in fuzzy logic controller design.	K2	CO5	7M
		OR			
	b	i)Illustrate about Fuzzy Genetic Algorithms.	K2	CO5	7M
		ii)Analyze the role of Neural networks with examples from the Medical Domain.	K3	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC NARASARAOPETA ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20AI3206 **NATURAL LANGUAGE PROCESSING**

Time: 3 hours CSE (AI) Max. Marks: 70

Note: Answer All **FIVE** Questions.

All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) Compare and contrast the foundational concepts of Natural Language Processing (NLP) with its practical applications across diverse domains	K2	CO1	7M
		ii) Explain the challenges associated with Natural Language Processing (NLP), focusing particularly on the concept of ambiguity within linguistic data.	K2	CO1	7M
		OR			
	b	Describe the key phases involved in Natural Language Processing (NLP) and provide examples to illustrate each phase.	K2	CO1	14M
2		Unit-II			
	a	Discuss the strengths and limitations of both N-gram and neural language models, and provide examples of scenarios where each approach might be more suitable.	K2	CO2	14M
		OR			
	b	Describe the architecture and functioning of Neural Language Models .	K2	CO2	14M
3		Unit-III			
	a	i) How POS tagging using HMMs works	K4	CO3	7M
		ii) How POS tagging using Neural Model.	K4	CO3	7M
		OR			
	b	i) Explain the concept of Parts-of-Speech (POS) tagging and its significance in Natural Language Processing (NLP).	K2	CO3	7M
		ii) Describe the process of POS tagging using Hidden Markov Models (HMMs)	K2	CO3	7M
4		Unit-IV			
	a	Compare and contrast top-down and bottom-up parsing strategies, highlighting their respective advantages and limitations in parsing syntactic structures.	K2	CO4	14M
		OR			
	b	Explain Probabilistic Context Free Grammar (PCFG) and Probabilistic CKY Parsing of PCFGs.	K2	CO4	14M
5		Unit-V			
	a	i) Explain the concept of vector semantics in Natural Language Processing (NLP).	K2	CO5	7M
		ii) Describe Semantics with dense vectors	K2	CO5	7M
		OR			
	b	Describe the concept of word embeddings learned from prediction methods in Natural Language Processing (NLP), with a focus on Skip-gram and Continuous Bag of Words (CBOW) models..	K2	CO5	14M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

NARASARAOPETA ENGINEERING COLLEGE
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III B.Tech II Semester Regular & Supple. Examinations, April-2025

Sub Code: R20IT3202 **AGILE METHODOLOGIES**

Time: 3 hours (IT) Max. Marks: 70

Note: Answer All **FIVE** Questions.
All Questions Carry Equal Marks (5 X 14 = 70M)

Q.No		Questions	KL	CO	M
1		Unit-I			
	a	i) What is the working principle of Agile? What value is provided by Agile? Discuss	L2	CO1	7M
		ii)Identify the technical differences among Agile manifesto and Agile principles.	L3	CO1	7M
		OR			
	b	i)What are the various various types of agile testing techniques? Explain Exploratory testing in detail	L2	CO1	7M
		ii)Explain the process used for Agile project managment	L2	CO1	7M
2		Unit-II			
	a	i) What is meant by lean approach? How does it work	L3	CO2	7M
		ii) What is Scrum? What is the need of Scrum. Explain	L5	CO2	7M
		OR			
	b	i) Why extreme programming is called extreme? Write down values of XP	L3	CO2	7M
		ii) Explain in detail about adaptive software development.	L2	CO2	7M
3		Unit-III			
	a	i) What way would you design the concept of Earl's school of KM? Explain in detail.	L3	CO3	7M
		ii) Describe in detail about role of story card and story card Maturity Model	L2	CO3	7M
		OR			
	b	i) What are the different stages of institutional knowledge evoluation cycle	L3	CO3	7M
		ii) What approach would you use for the agile knowledge sharing	L2	CO3	7M
4		Unit-IV			
	a	i) How to manage unstable requirements. Explain	L2	CO4	7M
		ii) How would you organize the agile prioritization techniques	L3	CO4	7M
		OR			
	b	i) Identify and narrate the different requirements elicitation	L3	CO4	7M
		ii) Analyze the agile requirements abstraction model	L4	CO4	7M
5		Unit-V			
	a	i) Discuss in detail about throughput and value added in FDD	L2	CO5	7M
		ii) Explain the computation of metrics in both financial and production	L2	CO5	7M
		OR			
	b	i) Explain in detail about test driven development	L2	CO5	7M
		ii) Explain agile appraoch in global software development	L3	CO5	7M

KL: Blooms Taxonomy Knowledge Level CO: Course Outcome M:Marks

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NEC ENGINEERING COLLEGE
(AUTONOMOUS)

III B.Tech II Semester Regular Examinations, April-2025

Sub Code: R20AM3205 **SOFTWARE PROJECT MANAGEMENT**

Time: 3 hours CSE(AIML) Max. Marks: 70

Note: Answer All FIVE Questions. All Questions Carry Equal Marks (5 X 14 = 70M)

No		Questions	KL	CO	M
		Unit-I			
1	a	i) Define the Waterfall model and explain its significance in conventional software management.	KL1	1	7M
		ii) Discuss how improving automation can help reduce costs and improve the software development process in the long run.	KL2	1	7M
		OR			
	b	i) How can improving software product size contribute to better software economics in a project?	KL3	1	7M
		ii) List and explain at least two ways to improve software processes that can lead to better economic outcomes.	KL2	1	7M
		Unit-II			
2	a	i) What are the main phases in the software development life cycle, and what occurs during each phase?	KL1	2	7M
		ii) Discuss how management artifacts and engineering artifacts contribute to the success of a software project.	KL3	2	7M
		OR			
	b	i) Evaluate the role of model-based software architectures from both a management perspective and a technical perspective.	KL4	2	7M
		ii) What are the key differences between management artifacts and programmatic artifacts?	KL1	2	7M
		Unit-III			
3	a	i) Explain the purpose of major milestones and minor milestones in a software development project.	KL2	3	7M
		ii) Analyze the significance of periodic status assessments in the software development lifecycle.	KL4	3	7M
		OR			
	b	i) Describe how cost and schedule estimating is performed during the iterative process planning phase of a project.	KL3	3	7M
		ii) What are the primary goals of software process checkpoints, and how do they help ensure project alignment?	KL1	3	7M
		Unit-IV			
4	a	i) What are the key components of process automation in software development?	KL1	4	7M
		ii) How would you apply process automation to improve the efficiency of the software development process?	KL3	4	7M
		OR			
	b	i) Explain the different types of project organizations and their responsibilities in managing software projects.	KL2	4	7M
		ii) List and explain which factors contribute to the successful automation of software development processes?	KL2	4	7M
		Unit-V			
5	a	i) What are the seven-core metrics in software project management, and explain why are they important?	KL2	5	7M
		ii) Define process instrumentation and explain its significance in controlling software project outcomes.	KL1	5	7M
		OR			
	b	ii) Compare the effectiveness of using generic processes vs tailored processes in software development.	KL4	5	14M