

**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)**L.B. Reddy Nagar :: Mylavaram-521 230 :: NTR Dist. :: A.P
Approved by AICTE, New Delhi. Affiliated to JNTUK, Kakinada**B.Tech. (VI Semester) (R23) Semester End Examinations (Regular) April 2026****TIME TABLE****R23****Time : 10.00 AM to 01.00 PM****A.Y. : 2025-26**

Branch	30-04-2026 (Thursday)	02-05-2026 (Saturday)	05-05-2026 (Tuesday)	07-05-2026 (Thursday)	09-05-2026 (Saturday)	12-05-2026 (Tuesday)	14-05-2026 (Thursday)
AI & DS	23AM05-Natural Language Processing	23AD09-Big Data Analytics	23AM06-Deep Learning	--	23CS06-Operating Systems (PE-II)	23AD08-No SQL Databases (PE-III)	23ME83-Applied Operations Research (OE-II)
ASE	23AMM2 - Foundations of Machine Learning (Minor) 23ADM3 - Predictive Machine Learning Algorithms (Minor)	23AE14-Aircraft Structures and Vibrations	23AE15-Air Breathing Propulsion	23AE16-Flight Dynamics	23AE17-Computational Fluid Dynamics and Heat Transfer (PE-II)	23AE23-Instrumentation Measurements and Experiments in Fluids (PE-III)	23EC82-Principles of communications (OE-II)
CE	23CSM5 - Software Engineering Fundamentals (Minor)	23CE15-Design and Drawing of Steel Structures	23CE16-Highway Engineering	23CE17-Environmental Engineering	23CE19-Low-Cost and Eco-Friendly Building Techniques (PE-II)	23CE22-Green Buildings (PE-III)	23CS84-IoT based smart Systems (OE-II)
CSE	--	23CS11-Cloud Computing	23CS13-Cryptography & Network Security	23AM01-Machine Learning (PE-II)	23CS15-Compiler Design	23IT07-Software Project Management (PE-III)	23CE81-Disaster Management (OE-II)
CSE (AI&ML)	23AM05-Natural Language Processing	--	23AM06-Deep Learning	23AD05-Data Visualization	23IT08-DevOps (PE-II)	23IT07-Software Project Management (PE-III)	23CE81-Disaster Management (OE-II)
ECE	23ADM3 - Predictive Machine Learning Algorithms (Minor) 23CSM5 - Software Engineering Fundamentals (Minor) 23ECH3 - CMOS Mixed Signal Design (Honors)	23EC15-VLSI Design	23EC16-Microprocessors & Microcontrollers	23EC17-Digital Signal Processing	23EC19-Satellite Communication (PE-II)	23EC24-Embedded Systems (PE-III)	23IT82-Introduction to Programming in Java (OE-II)
EEE	23AMM2 - Foundations of Machine Learning (Minor) 23CSM5 - Software Engineering Fundamentals (Minor) 23PEH2 - Advanced Power Converters (Honors)	23EE15-Electrical Measurements and Instrumentation	23EE16-Basics of Microprocessors and Microcontrollers	23EE17-Power System Analysis	23EE18-Switchgear and Protection (PE-II)	23EE22-Electric Drives (PE-III)	23CS81-Introduction to Java Programming (OE-II)
IT	23AM05-Natural Language Processing (PE-III)	23CS11-Cloud Computing	23CS13-Cryptography & Network Security	23AM01-Machine Learning	23IT06-Software Testing Methodologies (PE-II) 23IT08-DevOps (PE-II) 23IT10-Generative AI (PE-II)	23IT07-Software Project Management (PE-III)	23CE81-Disaster Management (OE-II)
ME	23ADM3 - Predictive Machine Learning Algorithms (Minor) 23CSM5 - Software Engineering Fundamentals (Minor)	23ME17-Heat Transfer	23ME18-Artificial Intelligence and Machine Learning	23ME19-Finite Element Methods	23ME21-Advanced Manufacturing Processes (PE-II) 23ME22-Renewable Energy Technologies (PE-II)	23ME27-Refrigeration and Air Conditioning (PE-III)	23EE83-Utilization of Electrical Energy (OE-II)

Note(s): Any omissions or clashes in the time table may please be informed to the Controller of Examinations immediately.


Date: 11 APR 2026

CONTROLLER OF EXAMINATIONS


PRINCIPAL

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (VI Semester) Regular Examinations

23AM05-NATURAL LANGUAGE PROCESSING

(AI&DS,CSE(AI&ML) and IT)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define NLP and mention any two major challenges in natural language processing.	2 M	CO1	L1
(b)	Differentiate between grammar-based language models and statistical language models.	2 M	CO1	L1
(c)	Define tokenization and state one issue faced while tokenizing English text.	2 M	CO2	L2
(d)	What is minimum edit distance? Mention one application in spelling correction.	2 M	CO2	L2
(e)	Define smoothing in n-gram language models.	2 M	CO3	L1
(f)	What is Part-of-Speech tagging? Give any two POS tags.	2 M	CO3	L1
(g)	Define context-free grammar and write one production rule for English.	2 M	CO4	L1
(h)	What is syntactic ambiguity? Give one example sentence.	2 M	CO4	L1
(i)	Define word sense disambiguation and mention one supervised approach.	2 M	CO5	L1
(j)	What is anaphora resolution? Name any one algorithm used for it.	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the origins of NLP and discuss the major challenges involved in processing natural language.	5 M	CO1	L3
(b)	Describe grammar-based and statistical language models with suitable examples.	5 M	CO1	L2
(OR)				
3(a)	Explain the role of regular expressions in text processing with two suitable examples.	5 M	CO2	L3
(b)	Describe the working of finite-state automata and their use in NLP applications.	5 M	CO2	L2
4.	Explain English morphology, distinguishing inflectional and derivational morphology with examples.	10 M	CO2	L2
(OR)				
5(a)	Explain lexical transducers and rule-based transducers used in morphology processing.	5 M	CO2	L3
(b)	Discuss the process of tokenization and the issues involved in detecting and correcting spelling errors.	5 M	CO2	L3
6(a)	Explain dependency grammar and compare it with phrase-structure grammar.	5 M	CO3	L2
(b)	Discuss dynamic programming parsing and shallow parsing in NLP.	5 M	CO3	L3
(OR)				
7(a)	Explain probabilistic CFG, probabilistic CYK, and lexicalized PCFGs.	5 M	CO3	L2
(b)	Describe feature structures and explain unification with an example.	5 M	CO3	L3
8(a)	Apply the First-Order Logic (FOL) to the following English sentences: (i) "All cats are mammals." (ii) "Some dogs chase cats." (iii) "Every person who owns a cat is happy."	5 M	CO4	L3
(b)	Explain thematic roles (semantic roles). Name five thematic roles and give a sentence illustrating each role.	5 M	CO4	L2
(OR)				
9.	Explain the four main requirements for a meaning representation language in natural language processing. Provide a brief justification for each.	5M	CO4	L2
(b)	Explain how a dictionary-based method performs WSD.	5M	CO4	L2
10(a)	Compare and contrast the Hobbs algorithm and the Centering algorithm for anaphora resolution. In which scenarios would one be preferred over the other?	5 M	CO5	L2
(b)	Explain the Porter Stemmer algorithm in brief with an example.	5 M	CO5	L3
(OR)				
11(a)	Discuss about sentence level discourse segmentation with an example	5 M	CO5	L2
(b)	Explain the predicate-argument structure annotation in PropBank, including the role of numbered arguments (Arg0, Arg1, etc.).	5 M	CO5	L3

30 APR 2026

H.T.No

R23

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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B.Tech. (VI Semester) Regular Examinations

23ADM3-PREDICTIVE MACHINE LEARNING ALGORITHMS

(ASE,ECE & ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	List the different types of Machine Learning.	2 M	CO1	L1
(b)	Label the grade of student marks. How you give the grades in which data types.	2 M	CO1	L1
(c)	Define Model Representation.	2 M	CO2	L1
(d)	Describe what you know about a feature.	2 M	CO2	L2
(e)	Define a regression.	2 M	CO3	L1
(f)	Recite the formula for Multiple Linear Regression.	2 M	CO3	L1
(g)	Paraphrase how the Random Forest uses multiple trees. Give your answer.	2 M	CO4	L1
(h)	Define what you know about hyperplane.	2 M	CO4	L1
(i)	Explain how AdaBoost handles weak learners.	2 M	CO5	L2
(j)	Outline the architecture of a Stacking model.	2 M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Differentiate between supervised and unsupervised learning.	5 M	CO1	L2
(b)	Infer the issues in machine learning.	5 M	CO1	L2
(OR)				
3.	Difference between nominal, ordinal, interval, and ratio data types, with example.	10 M	CO1	L2
4(a)	Classify how you evaluate a perform of a model.	5 M	CO2	L2
(b)	Tabulate the differences between Feature Construction and Extraction.	5 M	CO2	L2
(OR)				
5(a)	Describe the Basics of Feature Engineering, with an example.	5 M	CO2	L2
(b)	Model a task where Feature Extraction is better than Selection.	5 M	CO2	L3
6(a)	List and Describe the Main Problems in Regression Analysis.	5 M	CO3	L2
(b)	Demonstrate how to solve a Regularized Logistic Regression.	5 M	CO3	L3
(OR)				
7.	Differentiate simple linear regression and multiple linear regression.	10 M	CO3	L2
8(a)	Discuss the examples of supervised learning.	5 M	CO4	L2
(b)	Explain any one of the common classification algorithms.	5 M	CO4	L2
(OR)				
9(a)	Discuss the working mechanism of Support Vector Machines.	5 M	CO4	L2
(b)	Demonstrate how Random Forest improves on Decision Trees.	5 M	CO4	L3
10(a)	Paraphrase the process of Gradient Boosting Machines.	5 M	CO5	L2
(b)	Categorize ensemble methods by their bias-variance impact.	5 M	CO5	L2
(OR)				
11.	Contrast Q-Learning with traditional Supervised Learning.	10 M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23CSM5-SOFTWARE ENGINEERING FUNDAMENTALS

(CE,ECE,EEE&ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Why do we require software engineering?	2 M	CO1	L2
(b)	Define legacy software.	2 M	CO1	L1
(c)	Show the Software engineering layers.	2 M	CO2	L1
(d)	Summarize the steps involved in component-based development model.	2 M	CO2	L2
(e)	Recall the basic guidelines for conducting a collaborative requirements gathering meeting.	2 M	CO3	L1
(f)	State the purpose of architectural design.	2 M	CO3	L2
(g)	Label the advantages of class diagram in UML.	2 M	CO4	L2
(h)	Mention the role of state machine in UML.	2 M	CO4	L1
(i)	What is a Component in UML?	2 M	CO5	L1
(j)	Differentiate error and bug.	2 M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Elaborate the evolving role of software and changing nature of software.	5 M	CO1	L2
(b)	Define software engineering and infer the importance of software engineering.	5 M	CO1	L2
(OR)				
3(a)	Name and discuss the reality of various software myths in detail.	5 M	CO1	L2
(b)	Summarize and assess various characteristics of the software.	5 M	CO1	L2
4.	Provide a brief history of the unified process and analyze different phases of the unified process.	10 M	CO2	L3
(OR)				
5(a)	Demonstrate various activities performed in the Waterfall model.	5 M	CO2	L3
(b)	Label and explain the components of a software process framework.	5 M	CO2	L2
6(a)	Examine the methodology for accomplishment of requirements analysis.	5 M	CO3	L3
(b)	Present the overview of the software design process and its stages.	5 M	CO3	L3
(OR)				
7(a)	Elucidate the content of the software requirements specification document.	5 M	CO3	L2
(b)	Analyze the key design concepts used in software engineering.	5 M	CO3	L3
8(a)	Inspect the basic building blocks of UML, including relationships and diagrams.	5 M	CO4	L3
(b)	Demonstrate the utilization of interaction diagrams in UML.	5 M	CO4	L3
(OR)				
9(a)	Illustrate the purpose and components of a Class Diagram in UML	5 M	CO4	L3
(b)	Diagnose the usage of the state chart diagrams with suitable example.	5 M	CO4	L3
10(a)	Describe deployment diagrams and their significance in system architecture.	5 M	CO5	L2
(b)	Represent the fundamentals of software testing and its objectives.	5 M	CO5	L2
(OR)				
11(a)	How components are mapped onto deployment diagrams in UML? Discuss.	5 M	CO5	L2
(b)	Differentiate the features of black-box testing and white box testing.	5 M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23PEH2-ADVANCED POWER CONVERTERS

(EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the role of the diode in a Buck converter?	2 M	CO1	L1
(b)	What is the main advantage of a Cuk converter?	2 M	CO1	L1
(c)	How does a flyback converter differ from a forward converter?	2 M	CO2	L2
(d)	What is the purpose of a transformer in an isolated power supply?	2 M	CO2	L1
(e)	How does soft switching reduce switching losses?	2 M	CO3	L1
(f)	What is Zero Current Switching (ZCS)?	2 M	CO3	L1
(g)	What are the advantages of state-space modeling?	2 M	CO4	L1
(h)	What are typical state variables in DC-DC converters?	2 M	CO4	L1
(i)	What are the disadvantages of low power factor?	2 M	CO4	L1
(j)	What is passive power factor correction?	2 M	CO4	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Analyze the continuous mode operation of a Cuk converter and determine suitable design parameters for practical implementation.	5 M	CO1	L3
(b)	The boost converter has an input voltage of 18V. The average output voltage of 28V and the average load current 0.8A. The switching frequency is 25kHz. If $L = 175\mu\text{H}$ and $C = 250\mu\text{F}$. Determine (i) Duty cycle (ii) the ripple current of inductor (iii) peak-current of inductor.	5 M	CO1	L3
(OR)				
3(a)	Analyze the discontinuous conduction mode operation of a buck converter and summarize how appropriate design parameters are selected for practicality.	5 M	CO2	L3
(b)	Mention applications of non-isolated switch mode power converters.	5 M	CO2	L2
4(a)	Discuss the advantages and applications of fly-back converter.	5M	CO2	L2
(b)	Construct the power circuit of a forward converter and apply steady-state principles to determine its output voltage and key operating waveforms under given operating conditions.	5M	CO2	L2
(OR)				
5(a)	Explain what you know about isolated and non-isolated converters to select the suitable one for real-life applications and give reasons for your choice.	5M	CO2	L2
(b)	Draw the power circuit of a full bridge converter and analyze its steady-state performance using suitable equations.	5M	CO2	L2
6(a)	Classify Resonant Converters.	5M	CO3	L3
(b)	Analyze the operation of an M-type Zero Current Switching (ZCS) Boost Converter with appropriate circuit diagrams and waveforms.	5M	CO3	L3
(OR)				
7(a)	Discuss the concept of Zero Voltage Switching.	5M	CO3	L2
(b)	Analyze the operation of an L-type Zero Voltage Switching (ZVS) Buck Converter with appropriate circuit diagrams and waveforms.	5M	CO3	L3
8.	Analyze a forward DC-DC converter and derive the state and output equations for it's ON and OFF switching intervals using state-space modeling.	10M	CO3	L3
(OR)				
9.	Evaluate the dynamic performance of a buck converter by deriving the state equation and output equations during ON and OFF intervals.	10M	CO3	L3
10.	Classify the different types of active power factor corrector (PFC) topologies and explain them briefly.	10M	CO4	L2
(OR)				
11(a)	Illustrate the concept of Energy Balance in power factor corrector circuits.	5M	CO4	L2
(b)	Explain in detail passive power factor corrector.	5M	CO4	L2

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B.Tech. (VI Semester) Regular Examinations

23AMM2-FOUNDATIONS OF MACHINE LEARNING

(ASE & EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	List any two applications of machine learning.	2 M	CO1	L1
(b)	Name the basic data types in machine learning.	2 M	CO1	L1
(c)	What is meant by model training in Machine Learning?	2 M	CO2	L1
(d)	Recall what you know about a feature.	2 M	CO2	L1
(e)	Identify the assumptions of regression.	2 M	CO3	L1
(f)	Restate the concept of regularization.	2 M	CO3	L1
(g)	Classify the types of supervised learning.	2 M	CO4	L1
(h)	Solve a simple class prediction task.	2 M	CO4	L1
(i)	Define Ensemble Learning.	2 M	CO5	L1
(j)	Recall the goal of Boosting.	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the types of machine learning.	5 M	CO1	L2
(b)	Discuss the different Machine Learning activities.	5 M	CO1	L2
(OR)				
3(a)	Explain the various methods used for Data Remediation.	5 M	CO1	L2
(b)	Analyze the trade-offs between different data pre-processing steps.	5 M	CO1	L4
(OR)				
4.	Summarize the process of training and selecting a model.	10 M	CO2	L2
(OR)				
5(a)	Discuss how to evaluate a performance of a model, in detail.	5 M	CO2	L2
(b)	Explain the significance of Singular Value Decomposition.	5 M	CO2	L2
(OR)				
6(a)	Demonstrate the simple linear regression.	5 M	CO3	L3
(b)	Select the appropriate degree for a Polynomial model.	5 M	CO3	L4
(OR)				
7.	Differentiate regularized linear regression and regularized logistic regression.	10 M	CO3	L2
(OR)				
8(a)	Illustrate the classification learning steps.	5 M	CO4	L3
(b)	Describe the k – nearest neighbor classification with an example.	5 M	CO4	L2
(OR)				
9.	Solve a classification problem using the Random Forest approach.	10 M	CO4	L3
(OR)				
10(a)	List and Describe Bagging, Boosting, and Stacking.	5 M	CO5	L2
(b)	Discuss the features and advantages of XGBoost.	5 M	CO5	L2
(OR)				
11(a)	Summarize the process of Gradient Boosting Machines.	5 M	CO5	L2
(b)	Explain the role of the Reward signal in Q-Learning.	5 M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23ECH3-CMOS MIXED SIGNAL DESIGN

(ECE)

Passes 30/4/26

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is a switched capacitor (SC) circuit?	2M	CO4	L2
(b)	Write the main drawback of switch sharing.	2M	CO4	L2
(c)	List the main blocks of a basic PLL.	2M	CO2	L1
(d)	Identify the advantage of a charge pump PLL.	2M	CO2	L2
(e)	List out the DC specifications of data converters.	2M	CO1	L1
(f)	What do you mean by a D/A converter?	2M	CO1	L2
(g)	What is meant by Flash ADC?	2M	CO1	L2
(h)	What is a Time-Interleaved ADC?	2M	CO1	L2
(i)	Define the noise shaping.	2M	CO3	L2
(j)	What is a higher-order modulator?	2M	CO3	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Describe in detail the principle of operation of switched capacitor circuits.	5M	CO4	L2
(b)	Illustrate the role of op-amp non-idealities in limiting SC filter performance.	5M	CO4	L2
(OR)				
3(a)	Outline various non-ideal effects in SC circuits.	5M	CO4	L2
(b)	Differentiate between "Parasitic Sensitive" and "Parasitic Insensitive" integrators.	5M	CO4	L2
4(a)	With a neat block diagram, explain the working of a basic PLL and derive the expression for output frequency.	5M	CO2	L3
(b)	Illustrate the non-ideal characteristics of Phase-Frequency Detectors (PFDs).	5M	CO2	L2
(OR)				
5(a)	Interpret the operation of a Phase-Frequency Detector (PFD) using logic circuits.	5M	CO2	L2
(b)	Summarize the applications of PLLs in communication systems, such as frequency synthesis.	5M	CO2	L2
6(a)	Summarize the DC and dynamic specifications of data converters.	5M	CO1	L2
(b)	Outline the current-mode D/A converter.	5M	CO1	L2
(OR)				
7(a)	What is resistor-string D/A converter? Explain with diagram.	5M	CO1	L2
(b)	Describe the hybrid D/A converter.	5M	CO1	L2
8(a)	Illustrate the successive approximation A/D converter.	5M	CO1	L2
(b)	Demonstrate the folding A/D converter.	5M	CO1	L2
(OR)				
9(a)	Outline the conversion process of two-step A/D converter.	5M	CO1	L2
(b)	What is pipelined A/D converter? Explain.	5M	CO1	L2
10(a)	Draw the oversampling A/D converter and explain.	5M	CO3	L2
(b)	Find SNR (dB) of Delta Sigma modulator (3-bit) with second order noise shaping, if oversampling rate is increased by 4 times.	5M	CO3	L3
(OR)				
11(a)	Model the second-order noise shaping.	5M	CO3	L2
(b)	Summarize the different types of oversampling ADCs.	5M	CO3	L2

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B.Tech. (VI Semester) Regular Examinations

23AD09-BIG DATA ANALYTICS

(AI&DS)

Answered
21/5/26

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Generics in Java. Why are they used in the Collection Framework?	2 M	CO1	L1
(b)	State the primary difference between a Set and a Map in Java.	2 M	CO1	L1
(c)	What is the primary purpose of the Google File System (GFS)?	2 M	CO2	L1
(d)	What is the function of the Job Tracker in the classic Hadoop MapReduce framework?	2 M	CO2	L1
(e)	Describe the role of a Record Reader in the MapReduce pipeline.	2 M	CO3	L1
(f)	Name the three main phases of a Reducer: Shuffle, Sort, and Reduce.	2 M	CO3	L1
(g)	Define Stream Computing. How does it differ from traditional batch processing?	2 M	CO4	L1
(h)	What is the role of the Spark Driver program?	2 M	CO4	L1
(i)	Define Apache Pig. Why is it often described as a platform for "data flow" rather than a database?	2 M	CO5	L1
(j)	List any four complex data types supported by Apache Hive.	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Demonstrate the process of Serialization and Deserialization of an object with a code snippet.	5 M	CO1	L3
(b)	Implement a simple Queue using a Linked List in Java, showing the enqueue and dequeue logic.	5 M	CO1	L2
(OR)				
3(a)	Mention the two primary operations of a Queue and their time complexity in a Linked List implementation.	5 M	CO1	L3
(b)	Analyze how a HashMap handles collisions. Explain the transition from a linked list to a tree structure (Red-Black Tree) in modern Java versions.	5 M	CO1	L2
4(a)	Differentiate Hadoop Distributed File System (HDFS) with the Google File System (GFS). Identify two key architectural similarities.	5 M	CO2	L2
(b)	Outline the process of formatting the NameNode. Why is this a critical first step before starting Hadoop services?	5 M	CO2	L2
(OR)				
5(a)	Explain the HDFS Write Pipeline. How does the system ensure that all replicas are successfully written before acknowledging the client?	5 M	CO2	L2
(b)	Discuss the differences between Local Mode and Fully Distributed Mode in Hadoop. Under what circumstances would a developer use each.	5 M	CO2	L2
6(a)	Contrast InputSplit and HDFS Block. How does the Record Reader bridge the gap between a raw block of data and a logical record?	5 M	CO3	L2
(b)	Examine the data flow of a MapReduce job. Trace a single record from the TextInputFormat to the final TextOutputFormat.	5 M	CO3	L3
(OR)				
7(a)	Show the implementation of a Reducer that calculates the maximum temperature for a specific year from a list of values.	5 M	CO3	L1
(b)	Explain the process of setting up a Hadoop project dependencies using a pom.xml (Maven) or through build path configuration.	5 M	CO3	L2
8(a)	Demonstrate the process of Filtering a Stream using a Hash-based approach. Provide a small example scenario.	5 M	CO4	L3
(b)	Contrast Resilient Distributed Datasets (RDD) with Hadoop MapReduce. Why is Spark generally faster?	5 M	CO4	L2
(OR)				
9(a)	Analyze the impact of Data Skew in a Spark RDD operation. How does it affect the performance of worker nodes?	5 M	CO4	L4
(b)	Describe the architecture of Spark Streaming. How are "DStreams" (Discretized Streams) related to RDDs?	5 M	CO4	L2
10(a)	Illustrate the Pig Latin Application Flow from the generation of an operator DAG to the execution of MapReduce jobs.	5 M	CO5	L3
(b)	Contrast Apache Pig and Apache Hive. In which scenarios would a developer choose Pig over Hive?	5 M	CO5	L2
(OR)				
11(a)	Explain the process of using UDFs (User Defined Functions) in Pig. Why are they necessary for complex data processing?	5 M	CO5	L2
(b)	Explain the steps to configure and connect a Java application to Hive using the JDBC Client.	5 M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

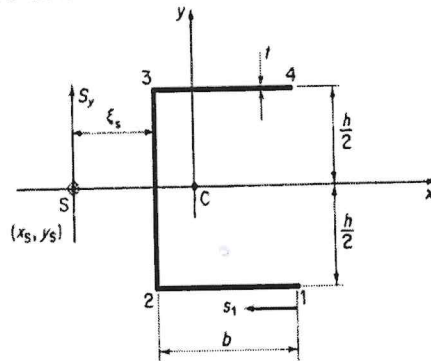
23AE14-AIRCRAFT STRUCTURES AND VIBRATIONS
(ASE)

Time : 3 hours

Max. Marks : 70

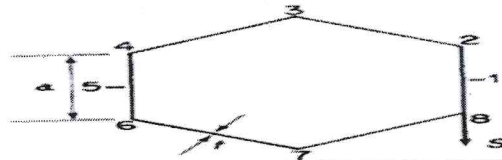
Q.No	Compulsory Question	Marks	CO	BL
1(a)	Recall shear center for channel section.	2 M	CO1	L1
(b)	Define the term shear center.	2 M	CO1	L1
(c)	State assumptions of thin plate theory.	2 M	CO2	L1
(d)	Summarize the term buckling of plates.	2 M	CO2	L2
(e)	Define elastic axis.	2 M	CO3	L1
(f)	Recall semi tension field beam.	2 M	CO3	L1
(g)	Define natural frequency.	2 M	CO4	L1
(h)	Recall the term damping.	2 M	CO4	L1
(i)	Define forced vibration.	2 M	CO5	L1
(j)	Define transmissibility in vibration.	2 M	CO5	L1

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Compare the shear flow in symmetric and asymmetric open sections.	5 M	CO1	L2
(b)	Calculate the shear flow of section 1-2, the thin-walled channel section shown in Figure. The thickness "t" of the walls is constant.	5 M	CO1	L3



(OR)

3.	Figure shows the regular hexagonal cross section of a thin-walled beam of sides a and constant wall thickness t. The beam is subjected to a transverse shear force S, its line of action being along a side of the hexagon, as shown. Plot the shear flow distribution around the section, with values in terms of S and a.	10 M	CO1	L3
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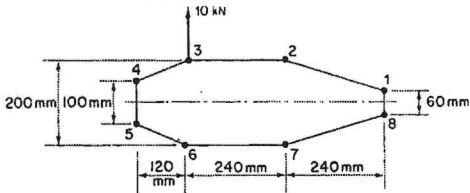
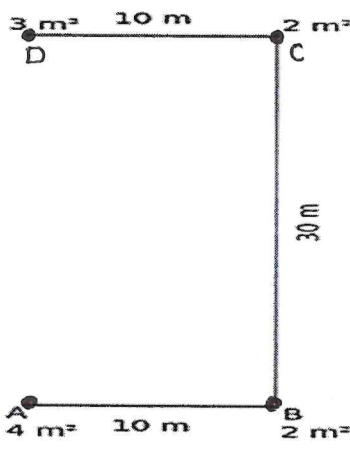


4.	Derive the governing equation for buckling of a rectangular plate under compression.	10 M	CO2	L3
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(OR)

5(a)	Compare the buckling behavior of stiffened and unstiffened panels with examples.	5 M	CO2	L2
(b)	Differentiate between shear buckling and local buckling.	5 M	CO2	L2

23AE14-AIRCRAFT STRUCTURES AND VIBRATIONS

6.	The thin-walled single cell beam shown in Figure below has been idealized into a combination of direct stress carrying booms and shear stress only carrying walls. If the section supports a vertical shear load of 10 kN acting in a vertical plane through booms 3 and 6, calculate the distribution of shear flow around the section. Boom areas: $B_1 = B_8 = 200 \text{ mm}^2$, $B_2 = B_7 = 250 \text{ mm}^2$, $B_3 = B_6 = 400 \text{ mm}^2$, $B_4 = B_5 = 100 \text{ mm}^2$. The centroid of the direct stress carrying area lies on the horizontal axis of symmetry so that $I_{xy} = 0$. Also, $t_D = 0$ and only a vertical shear load is applied. 	10 M	CO3	L3
(OR)				
7.	Calculate the shear flow and shear center for the given section shown in figure. The boom areas at each corner $A=4\text{m}^2$, $B=2\text{m}^2$, $C=2\text{m}^2$, $D=3\text{m}^2$. 	10 M	CO3	L3
8(a)	Derive expression for natural frequency using Energy method.	5 M	CO4	L3
(b)	Two springs of stiffness 1000 N/m and 2000 N/m are connected in series and attached to a 5 kg mass. Find the natural frequency.	5 M	CO4	L3
(OR)				
9.	A damper offers a resistance of 0.08 N at a constant velocity of 0.05 m/s. The damper is attached to a spring of stiffness $k=12\text{N/m}$. The mass of the system is 0.15 kg. Determine: (i) Damping coefficient (ii) Damping ratio (iii) Natural frequency of the system (iv) Damped natural frequency.	10 M	CO4	L3
10.	Explain with sketch the working principle of vibrometer.	10 M	CO5	L2
(OR)				
11(a)	A damper offers a resistance of 0.08 N at a constant velocity of 0.05 m/s. The damper is attached to a spring of stiffness 12N/m and mass 0.2 kg. Determine the Damping coefficient, Damping ratio and Damped natural frequency.	5 M	CO5	L3
(b)	Derive equation of motion for SDOF system under harmonic force.	5 M	CO5	L3

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23CE15-DESIGN AND DRAWING OF STEEL STRUCTURES

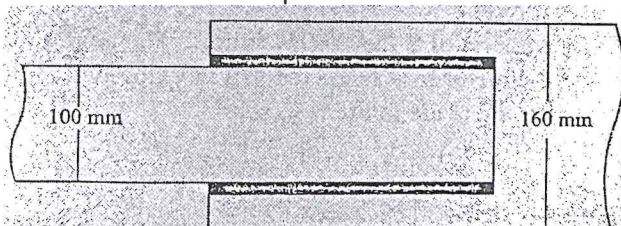
(CE)

Time : 3 hours

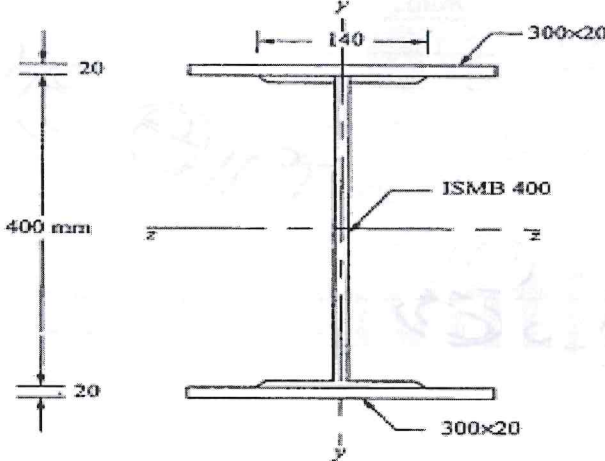
Max. Marks : 70

Note: IS 800, IS 875(Part-3), steel tables are permitted in the examination hall.

R23
21/5/25

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define pitch of bolts.	2 M	CO1	L1
(b)	What is throat thickness of weld?	2 M	CO1	L1
(c)	Define section modulus.	2 M	CO2	L1
(d)	What is web crippling?	2 M	CO2	L1
(e)	Define rupture strength.	2 M	CO3	L1
(f)	What is Euler's buckling load?	2 M	CO3	L1
(g)	What is battened column?	2 M	CO4	L1
(h)	Define column splice.	2 M	CO4	L1
(i)	What is flange in plate girder?	2 M	CO5	L1
(j)	What are stiffeners?	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2.	Identify the strength of joint for 18mm thick plate is joined to a 16mm plate by 200mm long butt weld if (i) A double V butt weld is used (ii) A single V butt weld is used. Assume that Fe410 grade plates and shop welds are used.	10 M	CO1	L3
(OR)				
3.	Examine a suitable longitudinal fillet weld to connect the plates as shown in fig to transmit a pull equal to the full strength of small plate. Given: Plates are 12mm thick; grade of plates Fe410 and welding to be made in workshop. 	10 M	CO1	L3
4.	Inspect a simply supported beam has been restrained having a effective span 1.5 m carrying a factored load of 300kN at mid span and check for shear and deflection only	10 M	CO2	L3
(OR)				
5(a)	Explain the design steps involved in the laterally supported beam design.	5M	CO2	L2
(b)	Outline the classification of cross sections of various types of beams.	5M	CO2	L2
6.	Examine a single angle section for a tension member of a roof truss to carry a factored tensile force of 225 KN. The member is subjected to the possible reversal of stress due to the action of wind. The length of the member is 3m. Use 20 mm shop bolts of grade 4.6 for the connection.	10M	CO3	L3
(OR)				
7(a)	Illustrate the different modes of failure of tension members.	5M	CO3	L2

23CE15-DESIGN AND DRAWING OF STEEL STRUCTURES

(b)	Summarize the effective length of compression members for idealized boundary conditions.	5M	CO3	L2
8.	Inspect the design axial load capacity of the column ISHB 300@577N/m if the length of the column is 3m and its both ends pinned.	10M	CO4	L3
(OR)				
9.	Examine the load carrying capacity of the column section shown in fig. if its actual length is 4.5m. Its one end may be assumed fixed and other end hinged. The grade of steel is Fe415.	10M	CO4	L3
				
10.	Analyze a welded plate girder of span 24 m to carry a super imposed load of 30 kN/m. Use Fe-415 grade steel. Draw to scale the cross section details.	10M	CO5	L3
(OR)				
11.	Discover a welded simply supported plate girder for a span of 28m. The girder is loaded with a uniformly distributed load of the intensity 40kN/m due to dead and live loads. Consider the steel grade as Fe415. Draw cross section of plate girder and end portions of the plate girder.	10M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23CS11-CLOUD COMPUTING

(CSE & IT)

Time : 3 hours

Max. Marks: 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define cloud computing.	2 M	CO1	L1
(b)	List cloud deployment models.	2 M	CO1	L1
(c)	What is distributed computing?	2 M	CO2	L1
(d)	Define RPC.	2 M	CO2	L1
(e)	What is virtualization?	2 M	CO3	L1
(f)	What is Kubernetes?	2 M	CO3	L1
(g)	What is cloud security?	2 M	CO4	L1
(h)	Define scalability.	2 M	CO4	L1
(i)	What is serverless computing?	2 M	CO5	L1
(j)	Define IoT.	2 M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain cloud computing reference model.	5 M	CO1	L2
(b)	Discuss benefits of cloud computing.	5 M	CO1	L2
(OR)				
3(a)	Illustrate the concept of utility computing and its role in cloud services.	5 M	CO1	L2
(b)	Analyze how cloud computing differs from traditional IT infrastructure.	5 M	CO1	L4
4(a)	Describe interprocess communication methods	5 M	CO2	L2
(b)	Explain Web services in distributed computing.	5 M	CO2	L2
(OR)				
5(a)	Explain the role of ubiquitous Internet in enabling cloud computing.	5M	CO2	L2
(b)	Analyze the differences between parallel and distributed computing.	5M	CO2	L4
6(a)	Explain types of virtualization techniques.	5M	CO3	L2
(b)	Compare virtualization and containers.	5M	CO3	L4
(OR)				
7(a)	Describe the role of Kubernetes in managing containerized applications.	5M	CO3	L2
(b)	Analyze the impact of virtualization on cloud scalability and resource utilization.	5M	CO3	L4
8(a)	Analyze cloud security architecture.	5 M	CO4	L4
(b)	Discuss cloud challenges.	5 M	CO4	L3
(OR)				
9.	Analyze the challenges of interoperability and standardization in cloud computing and explain the economic aspects of cloud computing with examples.	10 M	CO4	L4
10(a)	Explain serverless architecture.	5M	CO5	L2
(b)	Discuss IoT and cloud integration.	5M	CO5	L2
(OR)				
11(a)	Discuss the architecture and workflow of Function-as-a-Service (FaaS).	5M	CO5	L2
(b)	Analyze the role of cloud computing in enabling IoT applications.	5M	CO5	L4

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23EC15-VLSI DESIGN

(ECE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the significance of MOS transistor Threshold Voltage in CMOS circuits?	2 M	CO1	L1
(b)	Explain the concept of Sheet Resistance and its application in MOS transistors.	2 M	CO1	L1
(c)	List the differences between CMOS and BiCMOS technologies.	2 M	CO2	L1
(d)	Define the term "Latch-up" in CMOS circuits. How does it affect the performance of CMOS devices?	2 M	CO2	L1
(e)	Calculate the delay unit for an inverter based on the given resistance and capacitance values.	2 M	CO3	L1
(f)	Explain the working principle of a D flip-flop.	2 M	CO3	L1
(g)	What is the function of a flip-flop in sequential circuits?	2 M	CO4	L1
(h)	What is the significance of FPGA in VLSI design? Explain its role in speeding up logic design.	2 M	CO4	L1
(i)	Identify the issues related to scaling in MOS circuits.	2 M	CO1	L1
(j)	What are the major challenges in implementing FinFET and TFET technologies?	2 M	CO1	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Identify the steps involved in CMOS twin-tub process of with suitable sketches.	5 M	CO1	L2
(b)	Draw the stick diagram for a CMOS NAND and NOR gates.	5 M	CO1	L2
(OR)				
3.	Examine pull-up to pull-down ratio of an NMOS inverter driven by another NMOS inverter.	10 M	CO1	L3
(OR)				
4(a)	What is the impact of scaling on Gate Area and Gate capacitance?	5M	CO2	L1
(b)	List any five parameters of MOS transistors which can be scalable .	5M	CO2	L1
(OR)				
5(a)	Explain about Time Delay Unit and Propagation Delays.	5M	CO2	L2
(b)	Define standard unit of capacitance? Summarize capacitance of different MOS circuits.	5M	CO2	L2
(OR)				
6(a)	Model single stage amplifier with resistive load and interpret its operation.	5M	CO3	L2
(b)	Identify regions of operation of MOSFET using VI characteristics.	5M	CO3	L1
(OR)				
7.	Illustrate the Small-signal equivalent circuit of Source Degeneration in Common-Source Stage.	10M	CO3	L3
(OR)				
8(a)	Define Pass-Transistor Logic and implement AND gate.	5M	CO4	L2
(b)	Explain Complementary CMOS with Two-input NAND Gate.	5M	CO4	L2
(OR)				
9.	Draw and explain D flip-flop and JK flip flop in Dynamic CMOS Design.	10M	CO4	L2
(OR)				
10.	Illustrate the architecture of FPGA.	10M	CO1	L3
(OR)				
11(a)	Define Giga-scale dilemma and Write notes on short channel effects.	5M	CO1	L2
(b)	Explain the operation of High-k dielectrics and give applications.	5M	CO1	L2

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B.Tech. (VI Semester) Regular Examinations

23EE15-ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	List out the advantages and disadvantages of Moving-Iron instruments.	2 M	CO1	L1
(b)	What are the uses of instrument Transformers?	2 M	CO1	L1
(c)	Write the advantages and disadvantages of Power Factor meters.	2 M	CO2	L1
(d)	Write the applications of AC Potentiometers.	2 M	CO2	L1
(e)	What are the methods of measuring earth resistance?	2 M	CO3	L1
(f)	List out the advantages and disadvantages of Anderson's bridge.	2 M	CO3	L1
(g)	List out the advantages and disadvantages of LVDTs.	2 M	CO4	L1
(h)	List out the applications of Thermistors.	2 M	CO4	L1
(i)	Differentiate digital frequency meter, digital energy meter, digital tachometer.	2 M	CO5	L1
(j)	What is the purpose of Lissajous pattern measurement?	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Derive the torque equations of a moving iron instrument and further comment up on the nature of scale.	5 M	CO1	L3
(b)	Design a multi-range ammeter with the ranges of 1A, 5A, 25A and 125A employing individual shunts in each case & D Arsonval movement with an internal resistance of 730 Ω and full scale current of 5 mA is available.	5 M	CO1	L3
(OR)				
3(a)	Compare the advantages of MI and MC instruments.	5 M	CO1	L2
(b)	A single turn 1000/5A, 50 Hz current transformer has a non-inductive burden of 1 ohm. The magnetizing current is 100 A. Calculate the current ratio error and Phase Angle error. Assume the iron loss in the core is 1.6W. Neglect leakage reactance.	5 M	CO1	L3
(OR)				
4.	Derive the expression for deflecting and controlling torques of single phase dynamometer type power factor meter.	10 M	CO2	L3
(OR)				
5(a)	Demonstrate the term standardization and explain the procedure of standardization for a DC potentiometer with a neat sketch.	5 M	CO2	L2
(b)	Explain the working of Polar type ac potentiometer with a neat sketch.	5 M	CO2	L2
(OR)				
6(a)	What are the various methods to measure medium resistance? Illustrate the operation of Wheatstone bridge for measuring medium resistance with a neat sketch.	5 M	CO3	L2
(b)	What are the various methods to measure high resistance? Explain loss of charge method to measure high resistance.	5 M	CO3	L2
(OR)				
7(a)	Describe the working of Hay's bridge for measurement of inductance. Derive the equations for balance condition.	5 M	CO3	L3
(b)	Describe working of low voltage Schering bridge. Derive the equation of capacitance and dissipation factor.	5 M	CO3	L3
(OR)				
8(a)	Explain the concept of a transducer and analyze its classification based on different criteria.	5 M	CO4	L2
(b)	Illustrate the working of Thermocouple with applications.	5 M	CO4	L2
(OR)				
9.	Illustrate in detail operation of Piezo electric transducer with a neat sketch and its necessary derivation.	10 M	CO4	L2
(OR)				
10(a)	List out various methods for conversion of analog to digital(A/D). Briefly explain any one method with neat a sketch.	5 M	CO5	L2
(b)	Illustrate the operation of digital frequency meter.	5 M	CO5	L2
(OR)				
11.	Explain in detail about measurement of radio frequency coils using Q-meter in laboratory test.	10 M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23ME17-HEAT TRANSFER

(ME)

Time : 3 hours

Max. Marks : 70

1302/001
215/16

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the difference between thermodynamics and heat transfer?	2 M	CO1	L1
(b)	Define overall heat transfer coefficient.	2 M	CO1	L1
(c)	What is thermal capacity and thermal diffusivity of a material?	2 M	CO2	L1
(d)	What is Lumped Heat analysis in one dimensional heat conduction?	2 M	CO2	L1
(e)	What is a turbulent flow?	2 M	CO3	L1
(f)	Define Nusselt number and Prandtl number.	2 M	CO3	L1
(g)	Enumerate the applications of boiling heat transfer.	2 M	CO4	L1
(h)	What is the difference between black body and white body?	2 M	CO4	L1
(i)	Define 'heat exchanger effectiveness'.	2 M	CO5	L1
(j)	What do you mean by 'fouling' in heat exchangers?	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the three modes of Heat Transfer with examples.	5 M	CO1	L2
(b)	A hot plate 1m × 1.5 m is maintained at 300°C. Air at 20°C blows over the plate. If the convective heat transfer coefficient is 20W/m ² °C, calculate the rate of heat transfer.	5 M	CO1	L3
(OR)				
3(a)	Interpret the variation of thermal conductivity in solids, liquids and gases.	5 M	CO1	L2
(b)	Calculate the rate of heat loss for a red brick wall of 5 m length, height 4 m and thickness 0.25 m. The temperature of the inner surface is 110 °C and that of the outer surface is 40 °C. The thermal conductivity of red brick K = 0.7 W/m K. Calculate the temperature at an interior point of the wall 20 cm distant from the inner surface.	5 M	CO1	L3
4.	A steel rod (k = 30 W/m °C), 15 mm in diameter and 80 mm long, with an insulated end, is to be used as a spine. It is exposed to surroundings with a temperature of 40°C and a heat transfer coefficient of 60 W/m ² °C. The temperature at the base of fin is 95°C. Determine: (i) The fin efficiency; (ii) The temperature at the edge of the spine; (iii) The heat dissipation.	10 M	CO2	L3
(OR)				
5(a)	Discuss the importance of Heisler chart in unsteady state heat transfer.	5 M	CO2	L2
(b)	An aluminum sphere weighing 5 kg and initially a temperature of 350°C is suddenly immersed in a fluid at 50°C. The heat transfer coefficient is 60 W/m ² °C. Estimate the time required to cool the sphere to 100°C. Take for aluminum ρ = 2700 kg/m ³ , c=900 J/kg K and k = 200 W/m K.	5 M	CO2	L3
6(a)	Explain Natural convection process with neat sketch and laws of convection.	5 M	CO3	L2

(b)	A hot plate 1.1 m wide, 300 mm high and at 120°C is exposed to the ambient still air at 20°C. Calculate: (i) Maximum velocity boundary layer thickness and local heat transfer coefficient at 150mm from the leading edge of the plate, (ii) Total mass flow through the boundary, (iii) Heat loss from the plate and (iv) Rise in temperature of the air passing through the boundary.	5 M	CO3	L3
(OR)				
7(a)	Describe the formation of boundary layer over a flat horizontal plate.	5 M	CO3	L2
(b)	Water at 20°C enters a 2 cm diameter tube with a velocity of 1.5m/s. The tube is maintained at 100°C. Determine the length required to heat the water to a temperature of 60°C.	5 M	CO3	L3
8(a)	Boiling is the convective heat transfer process that involves a phase change from liquid to vapour state. Justify?	5 M	CO4	L2
(b)	A wire of 1.2 mm diameter and 200 mm length is submerged horizontally in water at 7 bar. The wire carries a current of 135 A with an applied voltage of 2.18 V. If the surface of the wire is maintained at 200°C, calculate: (i) The heat flux, and (ii) The boiling heat transfer coefficient.	5 M	CO4	L3
(OR)				
9(a)	Illustrate the laws of radiation heat transfer.	5 M	CO4	L2
(b)	Two large parallel plates exchange thermal radiation in Plate 1 temperature: $T_1 = 800\text{ K}$, and Plate 2 temperature: $T_2 = 500\text{ K}$ having emissivity of Plate 1: $\varepsilon_1 = 0.7$ and emissivity of Plate 2: $\varepsilon_2 = 0.5$. Find the net radiation heat transfer per unit area between the plates.	5 M	CO4	L3
10(a)	How are Heat exchangers are classified? Explain.	5 M	CO5	L2
(b)	The flow rates of hot and cold water streams running through a parallel flow heat exchanger are 0.2 kg/s and 0.5 kg/s respectively. The inlet temperatures on the hot and cold sides are 75°C and 20°C respectively. The exit temperature of hot water is 45°C. If the individual heat transfer coefficients on both sides are 650 W/m ² °C, calculate the area of the heat exchanger.	5 M	CO5	L3
(OR)				
11(a)	Define effectiveness of the heat exchanger. In what circumstances effectiveness – NTU method is preferred over LMTD method?	5 M	CO5	L2
(b)	A parallel flow heat exchanger has hot and cold-water streams running through it. The flow rates are 10 kg/min and 25 kg/min, respectively. Inlet temperatures are 75°C on the hot side and 25°C on the cold side. The exit temperature on the hot side should not exceed 50°C. Assume $h_i = h_o = 600\text{ W/m}^2\cdot\text{K}$. Calculate the area of the heat exchanger using the ε -NTU approach.	5 M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23AM06-DEEP LEARNING

(AI&DS and CSE(AI&ML))

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are the components in an artificial neuron?	2 M	CO1	L2
(b)	State how threshold works in McCulloch Pitts Neuron.	2 M	CO1	L2
(c)	What is overfitting?	2 M	CO2	L2
(d)	List the types of autoencoders.	2 M	CO2	L2
(e)	Name any two second order methods for optimization.	2 M	CO3	L2
(f)	What is generalization?	2 M	CO3	L1
(g)	Write the difference between conventional RNN and Bi-directional RNN.	2 M	CO4	L2
(h)	Write any two applications where LSTM is suitable to solve.	2 M	CO4	L3
(i)	Define latent variable.	2 M	CO5	L1
(j)	Expand the term MCMC.	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	How McCulloch-Pitts unit can be used to implement AND logic?	5 M	CO1	L3
(b)	Differentiate machine learning and deep learning w.r.t feature extraction.	5 M	CO1	L2
(OR)				
3(a)	State and explain the Perceptron Convergence Theorem.	5 M	CO1	L3
(b)	Describe the functionalities of a deep learning framework for classification problem.	5 M	CO1	L2
(OR)				
4(a)	Explain mathematical model of Multi Layer Perceptron (MLP).	5 M	CO2	L3
(b)	Discuss any two activation functions with the mathematical expressions.	5 M	CO2	L2
(OR)				
5(a)	Elaborate the training process of a deep learning model with an appropriate diagram.	5 M	CO2	L2
(b)	Define quadratic and cross-entropy cost functions. What is the significance of the cost function in training process?	5 M	CO2	L3
(OR)				
6(a)	Write the functionality of Adagrad optimizer. Discuss the appropriate applications in which Adagrad optimizer is suitable.	5M	CO3	L3
(b)	Write the key features of RMSProp optimizer.	5M	CO3	L2
(OR)				
7(a)	Calculate hessian matrix for the following function: $f(x, y) = x^2 + 3xy + y^2$.	5M	CO3	L3
(b)	Why saddle point problem is important in optimization?	5M	CO3	L3
(OR)				
8(a)	What is RNN? Explain the functionalities of each component of a RNN with a suitable diagram.	5 M	CO4	L2
(b)	Write any two issues of standard RNN.	5 M	CO4	L3
(OR)				
9(a)	Summarize the functionality of each gate in LSTM with a neat diagram.	5 M	CO4	L2
(b)	Define LENET5 architecture with appropriate values of feature map, kernel size and activation function.	5 M	CO4	L3
(OR)				
10(a)	Describe the Transformer architecture.	5M	CO5	L3
(b)	List any 5 applications of deep learning in NLP.	5M	CO5	L3
(OR)				
11(a)	Discuss how autoencoders can be used to solve the problems of feature engineering.	5M	CO5	L3
(b)	Draw the architecture of autoencoder and write the functionality of each component.	5M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

**23AE15-AIR BREATHING PROPULSION
(ASE)**

Time : 3 hours

Max. Marks : 70

23/5/26

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define bypass ratio in turbofan engines.	2M	CO1	L1
(b)	List the main components of a turbojet engine.	2M	CO1	L1
(c)	Define area ratio in inlet design.	2M	CO2	L1
(d)	What is a supersonic inlet?	2M	CO2	L1
(e)	Define pressure rise in a compressor.	2M	CO3	L1
(f)	What is a velocity diagram in compressors?	2M	CO3	L1
(g)	What is flame stabilization?	2M	CO4	L1
(h)	What is the role of fuel injection in combustion chambers?	2M	CO4	L1
(i)	What factors affect turbine performance?	2M	CO5	L1
(j)	What are the methods of blade cooling?	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the basic working principle of a gas turbine engine. Using a neat sketch describe the major components of a gas turbine engine and their functions.	5M	CO1	L2
(b)	Explain how a turboprop engine generates thrust and why it is more efficient at lower speeds.	5M	CO1	L2
(OR)				
3(a)	Describe the working principle of a ramjet engine with a neat sketch and T-S diagram and its operational limitations.	5M	CO1	L2
(b)	Explain the working principle of a SCRAMJET engine with a neat sketch and mention as to how a scramjet differ from a ramjet in terms of airflow and flight speed capability?	5M	CO1	L2
(OR)				
4(a)	Differentiate between internal and external flows in subsonic inlets. Provide examples and explain their practical applications.	5M	CO2	L2
(b)	List the different design considerations for the subsonic inlets used in aircrafts.	5M	CO2	L2
(OR)				
5(a)	Describe the challenges involved in designing supersonic inlets and how they differ from subsonic inlet designs.	5M	CO2	L2
(b)	Describe the three modes of operations of a Supersonic diffuser with an external cone/spike.	5M	CO2	L2
(OR)				
6(a)	Explain the concept of surge in centrifugal compressors, and differentiate it from stall. Discuss the operational consequences of surge.	5M	CO3	L2
(b)	A centrifugal compressor runs at a speed of 12,500 revolutions per minute. It takes air at 25°C and compresses it from 1 bar to 4.5 bars. Impeller diameter is 85 centimeter, slip factor is 0.94. Find isentropic efficiency of the compressor.	5M	CO3	L3
(OR)				
7(a)	Define degree of reaction in axial flow compressors and derive an expression for it using velocity diagrams.	5M	CO3	L3

23AE15-AIR BREATHING PROPULSION

(b)	An axial flow compressor stage has the following data: Air inlet stagnation temperature: 295K Blade angle at outlet measured from the axial direction: 32° Flow coefficient: 0.56 Relative inlet Mach number: 0.78 Degree of reaction: 0.5 Find the stagnation temperature rise in the first stage of the compressor.	5M	CO3	L3
8(a)	Classify the different types of combustion chambers used in gas turbine engines and compare their advantages and disadvantages.	5M	CO4	L2
(b)	Describe the combustion process in a Gas turbine engine with a neat sketch.	5M	CO4	L2
(OR)				
9(a)	Describe the working of flame holders and explain the different types commonly used in gas turbine combustion chambers.	5M	CO4	L2
(b)	Write the balanced equation of the combustion of Kerosene ($C_{16}H_{34}$) with oxygen and determine its stoichiometric Fuel-to-oxidizer ratio. If the same Kerosene is to be burned with air, what will be its stoichiometric f. Compare them and mention your observations.	5M	CO4	L3
10(a)	Explain the working principle of a radial flow turbine with neat sketch and the appropriate velocity triangles.	5M	CO5	L2
(b)	Discuss the parameters involved in estimating the performance of a single turbine stage.	5M	CO5	L2
(OR)				
11.	Combustion gases enter the first stage of a gas turbine at a stagnation temperature and pressure of 1200 K and 4.0 bar. The rotor blade tip diameter is 0.75m, the blade height is 0.12 m and the shaft speed is 10,500 rpm. At the mean radius, the stage operates with a reaction of 50%, a flow coefficient of 0.7 and a stage loading coefficient of 2.5. Determine (i) the relative and absolute flow angles for the stage; (ii) the velocity at nozzle exit; (iii) the static temperature and pressure at nozzle exit assuming a nozzle efficiency of 0.96 and the mass flow.	10M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23CE16-HIGHWAY ENGINEERING

(CE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are the primary necessities for Highway Planning?	2 M	CO1	L1
(b)	List the different types of Engineering Surveys required for highway projects.	2 M	CO1	L1
(c)	List the different types of Gradients used in vertical alignment design.	2 M	CO2	L1
(d)	List the Highway cross section elements.	2 M	CO2	L1
(e)	What is the Passenger Car Unit (PCU) and why is it used in traffic studies?	2 M	CO1	L1
(f)	Differentiate between Condition Diagrams and Collision Diagrams in accident.	2 M	CO1	L1
(g)	Define the Modulus of Subgrade Reaction.	2 M	CO3	L1
(h)	List three desirable properties of stone aggregates used in road construction.	2 M	CO3	L1
(i)	Explain the necessity of providing Joints in Rigid Pavements.	2 M	CO4	L1
(j)	List the factors affecting bituminous mix design.	2 M	CO4	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the various Engineering surveys for highway location.	5 M	CO1	L2
(b)	What are the significant recommendations of Jaykar Committee Report?	5 M	CO1	L2
(OR)				
3(a)	Describe the various Road Network Patterns with the help of sketches and explain their suitability.	5 M	CO1	L2
(b)	Discuss the principles of ideal highway alignment.	5 M	CO1	L2
4.	A two-lane highway has a design speed of 60 kmph and is provided with a horizontal curve of radius 300 m. Design the rate of super elevation for mixed traffic conditions. Also, calculate the difference in height between the outer and inner edges of the pavement, if the carriageway width is 7.0 m.	10 M	CO2	L3
(OR)				
5(a)	Explain the concept of super elevation and extra widening on horizontal curves.	5 M	CO2	L2
(b)	Design the super-elevation for a highway curve of radius 250 m with a design speed of 75 km/h. Assume no lateral friction.	5 M	CO2	L2
6(a)	Explain the concept of Level of Service (LOS) and discuss the factors affecting the capacity of highways.	5 M	CO1	L2
(b)	A traffic stream has a flow of 1200 vehicles/hour and an average speed of 60 kmph. Calculate the traffic density and interpret the result.	5 M	CO1	L3
(OR)				
7(a)	Define traffic volume, speed, and density. List their units and basic relationships.	5 M	CO1	L2
(b)	Explain how the traffic signal times decided based on Webster's Method.	5 M	CO1	L2
8(a)	Explain California Bearing Ratio (CBR) and discuss its significance in pavement design.	5 M	CO3	L2
(b)	List the desirable properties of road aggregates and name the standard tests conducted on them.	5 M	CO3	L2
(OR)				
9.	Explain the Marshall Method of mix design and determine key parameters (stability and flow) for a given set of bituminous mix data.	10 M	CO3	L3
10(a)	Define pavement and list the types of pavements. State the basic differences between flexible and rigid pavements.	5M	CO4	L1
(b)	Explain the procedure for the design of flexible pavement as per IRC guidelines using the following data: Initial traffic count = 900 commercial vehicles per day, construction period = 2 years, annual traffic growth rate = 6%, sub-grade CBR = 6%, category of road = State Highway (two-lane), design life = 12 years.	5M	CO4	L3
(OR)				
11(a)	List the functions and requirements of different components of a pavement structure.	5M	CO4	L1
(b)	Explain wheel load stresses, temperature stresses, and frictional stresses in rigid pavements.	5M	CO4	L2

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B.Tech. (VI Semester) Regular Examinations

23CS13-CRYPTOGRAPHY & NETWORK SECURITY

(CSE & IT)

Time : 3 hours

Max. Marks : 70

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Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is a cryptographic mechanism?	2 M	CO1	L1
(b)	What is the purpose of the greatest common divisor (GCD) in cryptography?	2 M	CO1	L1
(c)	What are algebraic structures in cryptography?	2 M	CO2	L1
(d)	State any two differences between block and stream ciphers.	2 M	CO2	L1
(e)	Define asymmetric key cryptography.	2 M	CO3	L1
(f)	What is meant by modular exponentiation?	2 M	CO3	L1
(g)	What are the basic steps in a digital signature process?	2 M	CO4	L1
(h)	Define symmetric key distribution.	2 M	CO4	L1
(i)	State any two differences between SSL and TLS.	2 M	CO5	L1
(j)	What is an Intrusion Detection System (IDS)?	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the security goals of cryptography with suitable examples.	5 M	CO1	L2
(b)	Apply the Euclidean Algorithm to find GCD of any two numbers.	5 M	CO1	L3
(OR)				
3(a)	Differentiate between cryptographic services and mechanisms.	5 M	CO1	L2
(b)	Demonstrate how steganography hides information with an example.	5 M	CO1	L3
(OR)				
4(a)	Illustrate the working of a Feistel cipher structure with an example.	5 M	CO2	L3
(b)	Describe the Advanced Encryption Standard (AES) algorithm and its transformations in detail with the help of a neat diagram.	5 M	CO2	L2
(OR)				
5(a)	Justify the need for Triple DES over single DES with the help of suitable example.	5 M	CO2	L3
(b)	Analyze the role of substitution and permutation in Advanced Encryption Standard algorithm.	5 M	CO2	L4
(OR)				
6(a)	Differentiate between symmetric and asymmetric cryptography.	5 M	CO3	L2
(b)	Demonstrate the Elgamal encryption and decryption process with the help of suitable example.	5 M	CO3	L3
(OR)				
7(a)	Explain the Chinese Remainder Theorem (CRT) with the help of an example.	5 M	CO3	L3
(b)	Explain the fundamentals of Elliptic Curve Cryptography (ECC) in detail.	5 M	CO3	L2
(OR)				
8(a)	Explain the concepts of message integrity and message authentication.	5 M	CO4	L2
(b)	Demonstrate the Kerberos authentication process step-by-step.	5 M	CO4	L3
(OR)				
9(a)	Illustrate how message authentication is achieved using hash functions.	5 M	CO4	L3
(b)	Discuss various digital signature services and applications in detail.	5 M	CO4	L2
(OR)				
10(a)	Explain PGP and its services in secure communication in detail.	5 M	CO5	L2
(b)	Describe the TLS protocol and its improvements over SSL.	5 M	CO5	L3
(OR)				
11(a)	Describe the S/MIME protocol and its features.	5 M	CO5	L2
(b)	Analyze the role of firewalls in preventing attacks.	5 M	CO5	L4

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B.Tech. (VI Semester) Regular Examinations

23EC16-MICROPROCESSORS & MICROCONTROLLERS
(ECE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Mention the Maximum Mode Signals of 8086 microprocessor.	2 M	CO1	L1
(b)	How to calculate the physical address of the code segment and mention registers used to calculate?	2 M	CO1	L2
(c)	Define addressing mode and mention the addressing modes for control transfer instructions.	2 M	CO2	L1
(d)	Differentiate NMI and INTR of 8086 microprocessor.	2 M	CO2	L2
(e)	Mention the purpose of Modem Control Signals of 8251 USART.	2 M	CO3	L1
(f)	Draw the ICW1 format of 8259 Programmable Interrupt Controller.	2 M	CO3	L1
(g)	What is the difference between MOV and MOVX?	2 M	CO2	L2
(h)	Write about indexed addressing mode of 8051 along with suitable example.	2 M	CO2	L2
(i)	Write about program status register in ARM processor.	2 M	CO1	L2
(j)	How instruction pipeline is implemented in ARM Architectures?	2 M	CO1	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2.	Explain the minimum mode operation with circuit diagram and timing waveforms.	10 M	CO3	L2
(OR)				
3(a)	Discuss about the 8086 Microprocessor General Purpose Registers and their special functions.	5 M	CO1	L2
(b)	Draw and explain the Flag Register and mention the status of each status flag for (82H) + (85H).	5 M	CO1	L2
4.	Write an Assembly Language Program to find the number of even, odd, positive and negative numbers in the given string. Consider the following data Count EQU 06H Numbers DB 45H, -6AH, -2FH, 09H, 1B, 23H	10 M	CO2	L3
(OR)				
5.	Explain the following instructions with examples (i) DAA (ii) OUT (iii) PUSH (iv) XCHG (v) CALL.	10 M	CO2	L2
6(a)	Draw the architecture of Intel 8251 and explain the function of each block.	5 M	CO1	L2
(b)	Explain synchronous mode of operation of 8251 with diagrams.	5 M	CO1	L2
(OR)				
7.	Draw the memory map, interfacing diagram and chip select logic for the following problem statement. Interface two 32K x 8 EPROMs and two 16K x 8 RAM chips with 8086 microprocessor.	10 M	CO4	L3
8(a)	Explain the memory organization of 8051 microcontroller with neat diagram.	5 M	CO1	L2
(b)	Write short notes on IO ports of 8051 microcontrollers.	5 M	CO1	L2
(OR)				
9.	Draw the interfacing diagram of the 2x16 LCD with 8051 microcontroller. Explain in detail.	10 M	CO4	L2
10.	Explain the ARM instruction set features and classification.	10 M	CO2	L2
(OR)				
11(a)	Explain branch instructions and program flow control in ARM.	5 M	CO2	L2
(b)	Explain the barrel shifter and its role in ARM instruction execution.	5 M	CO1	L2

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23EE16-BASICS OF MICROPROCESSORS AND MICROCONTROLLERS
(EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Distinguish the 8085 and 8086 processors.	2M	CO1	L1
(b)	In which years, 8086 processors are accelerating their revolution?	2M	CO1	L2
(c)	Notify the rotate instructions of 8086.	2M	CO2	L1
(d)	Present the importance of $\overline{DEN}$ signal in 8086 bus.	2M	CO2	L1
(e)	Name the all Ports used in 8255 devices.	2M	CO3	L1
(f)	Outline about the 8255 control word.	2M	CO3	L1
(g)	Write the about TMOD of 8051.	2M	CO4	L1
(h)	Mention the address and data bit size of 8051 controller.	2M	CO4	L1
(i)	Write about the WREG function of PIC18X.	2M	CO5	L1
(j)	Notify the EEPROM purpose in PIC18X controller.	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Aarchitecture of 8086 design required different components – Interpret and justify your answer according requirements.	5M	CO1	L3
(b)	The Base register, Counter register in 8086 have 16-bits. Is the same register can use for 8-bit operation? Give the details in your justification.	5M	CO1	L3
(OR)				
3(a)	Why the memory segmentation design is used in 8086? Determine the physical address of location, for CS=1000H and IP=3008H.	5M	CO1	L3
(b)	Analyze the instruction stream byte queue ISBQ in 8086 processor.	5M	CO1	L3
(OR)				
4(a)	Evaluate the 8086 timing diagram for memory read operation in Minimum Mode.	5M	CO2	L3
(b)	Through an examples, encapsulate the 8086 arithmetic instructions set.	5M	CO2	L3
(OR)				
5(a)	How the Immediate addressing mode, Register addressing mode are used in 8086?	5M	CO2	L3
(b)	Perform the addition and subtraction of two numbers using 8086 ALP code.	5M	CO2	L3
(OR)				
6(a)	Develop a 8255 PPI architecture with help of Port C upper and Port C lower registers.	5M	CO3	L3
(b)	Deduce the Mode-1 operation of 8255 PPI for input peripheral IO operation.	5M	CO3	L3
(OR)				
7(a)	Handshake signal is required for Mode-2 operation of 8255. Justify your answer with possible design.	5M	CO3	L3
(b)	Develop the pin diagram of 8255 PPI using dedicated ports.	5M	CO3	L3
(OR)				
8(a)	From a starting address, design BAA of 8051 RAM.	5M	CO4	L3
(b)	Using ALP programing code, write a program for multiplication of two numbers.	5M	CO4	L3
(OR)				
9(a)	Analyze the logic instruction set of 8051 microcontroller.	5M	CO4	L3
(b)	Timers and Counters are used in PIC18X MCU operation - Interpret your answer with required circuit design.	5M	CO4	L3
(OR)				
10.	Develop the design procedure of PIC18X program memory. Address location is assigned from "000000 H" in design - Justify your answer.	10M	CO5	L3
(OR)				
11(a)	Describe the data transfer instructions of PIC18 MCU.	5M	CO5	L2
(b)	Express the data conversion operation of PIC18 MC computer.	5M	CO5	L3

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23ME18-ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

(ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL				
1(a)	Define an agent and its environment.	2M	CO1	L1				
(b)	List the applications of Artificial Intelligence.	2M	CO1	L1				
(c)	Define unsupervised learning?	2M	CO2	L1				
(d)	What is meant by regression problem.	2M	CO2	L1				
(e)	State concept learning.	2M	CO3	L1				
(f)	What is meant by instance-based learning?	2M	CO3	L1				
(g)	Draw the sketch of a perceptron model.	2M	CO4	L1				
(h)	Write any two applications of convolutional neural network (CNN)	2M	CO4	L1				
(i)	State the meaning of bagging concept.	2M	CO5	L1				
(j)	List the model evaluation methods.	2M	CO5	L1				
Q.No	All questions carry equal marks	Marks	CO	BL				
2(a)	Discuss the need and importance of Artificial Intelligence.	5M	CO1	L2				
(b)	Describe simple reflex agent with a neat sketch.	5M	CO1	L2				
(OR)								
3(a)	Outline the concept of rationality.	5M	CO1	L2				
(b)	Differentiate propositional logic and first order logic.	5M	CO1	L2				
4(a)	Define Machine Learning and explain its need and applications in the real world.	5M	CO2	L2				
(b)	Calculate (i) Accuracy (ii) precision and (iii) Recall and (iv)F1-score of a classification algorithm by using the following confusion matrix. <table><tr><td>5</td><td>1</td></tr><tr><td>1</td><td>2</td></tr></table>	5	1	1	2	5M	CO2	L3
5	1							
1	2							
(OR)								
5(a)	Interpret various performance metrics in a regression algorithm.	5M	CO2	L3				
(b)	Demonstrate the working of support vector machine with an example.	5M	CO2	L3				
6(a)	Explicate any two types of clustering methods used in Unsupervised Learning.	5M	CO3	L2				
(b)	Show how the principal component analysis (PCA) can be used to reduce features in a dataset and improve model performance.	5M	CO3	L3				
(OR)								
7.	Given the data points: A (2,3), B (3,2), C (3,3), D (7,7), E (8,9), F (9,10) Apply K-means clustering to cluster the data Points with K = 2	10M	CO3	L3				
8(a)	Construct a Convolutional Neural Network (CNN) architecture and explain its working.	5M	CO4	L3				
(b)	Demonstrate crossover and mutation working with examples.	5M	CO4	L3				
(OR)								
9(a)	What is a perceptron? Explain its working.	5M	CO4	L2				
(b)	Summarize about the convergence criteria in Genetic Algorithm.	5M	CO4	L2				
10(a)	Discuss any one Deep Generative model with a neat sketch.	5M	CO5	L2				
(b)	Demonstrate how model selection is performed in machine learning.	5M	CO5	L3				
(OR)								
11.	Construct a Random Forest model and explain its working procedure.	10M	CO5	L3				

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B.Tech. (VI Semester) Regular Examinations

23AE16-FLIGHT DYNAMICS

(ASE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is meant by drag due to lift?	2 M	CO1	L1
(b)	What is the condition for minimum power required for steady level flight?	2 M	CO1	L1
(c)	Define Range of an aircraft.	2 M	CO2	L2
(d)	Define Load factor of an aircraft.	2 M	CO2	L2
(e)	What is meant by statically neutral system?	2 M	CO3	L2
(f)	Represent the various axes of an airplane with a suitable diagram.	2 M	CO3	L2
(g)	Define Dihedral angle of a wing.	2 M	CO3	L1
(h)	Define sideslip.	2 M	CO3	L1
(i)	What is the nature of roots for exponentially decaying response of a dynamic system?	2 M	CO4	L1
(j)	Mention the types of equations suitable for lateral and directional dynamics of the airplane.	2 M	CO4	L2
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	An aeroplane has a wing loading of 2400N/m^2 , and its drag equation is $C_D = 0.016 + 0.055C_L^2$, calculate its maximum lift/drag ratio and lift/drag ratio at a speed of 100m/s .	5 M	CO1	L3
(b)	Derive the expression for minimum thrust required in a steady level flight.	5 M	CO1	L3
(OR)				
3(a)	Derive the relation between velocity corresponding to the minimum power required for steady level flight.	5 M	CO1	L3
(b)	Prove that flight velocity for minimum power required is 0.76 times the flight velocity for minimum thrust required in the case of steady level flight.	5 M	CO1	L3
4.	Derive the expression for endurance equation for jet aircraft.	10 M	CO2	L3
(OR)				
5(a)	An aircraft with a mass 5000 kg takes off from sea level with a forward speed of 50 m/s and starts to climb with a climb angle of 15° . Calculate the rate of climb and excess thrust available at the start of climb.	5M	CO2	L3
(b)	Derive the expression for maximum possible load factor.	5M	CO2	L3
6(a)	For a given wing-body combination, the aerodynamic center lies 0.05 chord length ahead of the center of gravity. The moment coefficient about the aerodynamic center is -0.016 . If the lift coefficient is 0.45 , calculate the moment coefficient about the center of gravity	5M	CO3	L3
(b)	Derive the expression for elevator angle to trim the airplane.	5M	CO3	L3
(OR)				
7.	Derive the Equations of Longitudinal Static Stability.	10M	CO3	L3
8(a)	Illustrate the criterion for lateral static stability.	5 M	CO3	L2
(b)	Describe qualitatively the effect of wing dihedral, wing sweep and vertical tail on rolling moment created on airplane when it starts to sideslip.	5 M	CO3	L2
(OR)				
9(a)	Illustrate mathematically the effect of wing sweep contributes towards the directional static stability of an airplane.	5 M	CO3	L3
(b)	Derive the expression for coefficient of yawing moment produced by the vertical tail of an airplane.	5M	CO3	L3
10.	The longitudinal motion of an airplane is described by the following characteristics equation $\lambda^4 + 5.05\lambda^3 + 13.15\lambda^2 + 0.6735\lambda + 0.593 = 0$. Determine the roots of this equation.	10M	CO4	L3
(OR)				
11(a)	An airplane in level flight encounters a vertical gust, which excites the phugoid mode. The phugoid motion completes 10 cycles in 50 s and its amplitude reduces to half of its maximum value in 25 s. Find out the relevant complex roots of this airplane which represent phugoid mode of motion.	5M	CO4	L3
(b)	Describe the Dutch roll mode of motion of an aircraft with suitable diagrams.	5M	CO4	L2

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B.Tech. (VI Semester) Regular Examinations

**23CE17-ENVIRONMENTAL ENGINEERING
(CE)**

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question						Marks	CO	BL
1(a)	What is meant by conveyance of water?						2 M	CO1	L1
(b)	Explain any two factors affecting water demand.						2 M	CO1	L1
(c)	List two drinking water quality parameters as per WHO.						2 M	CO2	L1
(d)	What is the purpose of valves in pipelines?						2 M	CO2	L1
(e)	Define breakpoint chlorination.						2 M	CO3	L1
(f)	What is stokes law?						2 M	CO3	L1
(g)	What is scum in sedimentation tanks?						2 M	CO4	L1
(h)	Define (i) sewage (ii) sullage						2 M	CO4	L1
(i)	What is soak pit?						2 M	CO5	L1
(j)	State the principles of operation of septic tank.						2M	CO4	L1
Q.No	All questions carry equal marks						Marks	CO	BL
2(a)	Explain the variations in water demand (hourly, daily, seasonal) and their significance.						5 M	CO1	L2
(b)	Discuss the advantages and disadvantages of gravity conduits for water conveyance.						5 M	CO1	L2
(OR)									
3.	The population of 5 decades from 1930 to 1970 are given below in table. Find out the population after one, two and three decades beyond the last known decade, by using arithmetic increase method.						10 M	CO1	L3
	Year	1930	1940	1950	1960	1970			
	Population	25,000	28,000	34,000	42,000	47,000			
4(a)	Define hardness in water and distinguish between temporary and permanent hardness.						5 M	CO2	L2
(b)	Explain about dead end and grid network systems with neat sketch.						5 M	CO2	L2
(OR)									
5(a)	Discuss the sources, determination and impacts of (i) Turbidity (ii) Colour.						5 M	CO2	L2
(b)	Discuss the water quality criteria for rural, municipal, industrial, and agricultural uses.						5 M	CO2	L2
6(a)	Determine the surface area, volume, detention time, and weir loading of a plain circular sedimentation tank handling 10 MLD with a SOR of 25 m/d. Assume water depth = 3m.						5 M	CO3	L3
(b)	Describe the mechanism of flocculation with neat sketch.						5 M	CO3	L2
(OR)									
7(a)	Explain about the sedimentation with coagulation process and write about the factors affecting it with neat sketch.						5M	CO3	L2
(b)	Differentiate slow sand filter and rapid sand filter.						5M	CO3	L2
8(a)	Explain the characteristics and composition of sewage.						5M	CO4	L2
(b)	Describe working principles and design of screens and grit chamber.						5M	CO4	L2
(OR)									
9 (a)	Illustrate the working, function and construction of an oil trap.						5 M	CO4	L2
(b)	The ultimate BOD of wastewater sample is estimated as 300 mg/L. Assuming $K_d = 0.23 \text{ d}^{-1}$ (base e) at 20C, determine the BOD value after 3 days at 25C.						5 M	CO5	L3
10(a)	Describe the mechanism of biological growth.						5 M	CO4	L2
(b)	Define sludge. Explain the terms primary and secondary sludge. Differentiate their properties.						5 M	CO4	L2
(OR)									
11(a)	A 100 kg/d dry sludge contains 95% moisture content with 70% volatile solids. Assuming sp. gravity of fixed and volatile solids as 2.5 and 1, calculate volume of the sludge. Calculate its wet weight.						5 M	CO5	L3
(b)	Explain the construction and working of complete mix process using neat sketch.						5 M	CO4	L2

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B.Tech. (VI Semester) Regular Examinations

23AM01-MACHINE LEARNING

(CSE & IT)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL															
1(a)	Define Machine Learning.	2 M	CO1	L1															
(b)	What is the encoded output after applying label encoding on the attribute? {Low, Medium, High, Medium}.	2 M	CO1	L2															
(c)	What is classification?	2 M	CO2	L2															
(d)	Define similarity function.	2 M	CO2	L2															
(e)	What is information gain?	2 M	CO3	L2															
(f)	State Bayes theorem.	2 M	CO3	L2															
(g)	Define linear discriminant.	2 M	CO4	L2															
(h)	List features of Support Vector Machine.	2 M	CO4	L2															
(i)	Define clustering.	2 M	CO5	L1															
(j)	What is hierarchical clustering?	2 M	CO5	L2															
Q.No	All questions carry equal marks	Marks	CO	BL															
2(a)	Explain model selection and model prediction stages in ML.	5 M	CO1	L2															
(b)	Describe the types of data (nominal, ordinal, numerical) with examples. Explain techniques used for Data Pre-processing and handling missing values.	5 M	CO1	L2															
(OR)																			
3(a)	Differentiate between Supervised, unsupervised and reinforcement learning.	5 M	CO1	L2															
(b)	Explain Search and Learning in Machine Learning.	5 M	CO1	L2															
(OR)																			
4(a)	Explain radius distance nearest neighbor algorithm.	5 M	CO2	L2															
(b)	Find the distances between two points A = (2, 3) and B = (6, 7) using Euclidean distance, Manhattan distance and Minkowski distance(r=3).	5 M	CO2	L3															
(OR)																			
5(a)	Explain about non-metric similarity functions.	5 M	CO2	L2															
(b)	What are the performance measures of regression? Explain with an example.	5 M	CO2	L2															
(OR)																			
6(a)	Apply Naïve Bayes Classification on the following dataset and classify the sample X={Sunny, Cool} <table border="1"><tr><td>Weather</td><td>Temp</td><td>Play</td></tr><tr><td>Sunny</td><td>Hot</td><td>No</td></tr><tr><td>Sunny</td><td>Cool</td><td>Yes</td></tr><tr><td>Rainy</td><td>Cool</td><td>Yes</td></tr><tr><td>Sunny</td><td>Hot</td><td>No</td></tr></table>	Weather	Temp	Play	Sunny	Hot	No	Sunny	Cool	Yes	Rainy	Cool	Yes	Sunny	Hot	No	5 M	CO3	L3
Weather	Temp	Play																	
Sunny	Hot	No																	
Sunny	Cool	Yes																	
Rainy	Cool	Yes																	
Sunny	Hot	No																	
(b)	Explain impurity measures in decision trees.	5 M	CO3	L2															
(OR)																			
7(a)	Describe the Class Conditional Independence assumption in the Naive Bayes Classifier(NBC). Explain Multi-Class Classification using NBC with an example.	5 M	CO3	L2															
(b)	Explain the steps to construct a decision tree using Gini index.	5 M	CO3	L2															
(OR)																			
8(a)	Explain perceptron classifier with diagram.	5 M	CO4	L2															
(b)	Explain the steps involved in Back propagation algorithm.	5 M	CO4	L2															
(OR)																			
9.	Construct the projection vector for the following data using Linear Discriminant Analysis Class 1 (C ₁): (2, 3), (3, 3), (2, 2) Class 2 (C ₂): (6, 5), (7, 6), (8, 5)	10 M	CO4	L3															
(OR)																			
10(a)	Apply K-means Clustering with k=2 on the following data points and perform one full iteration to find new centroids. (1,1),(2,2),(3,3),(8,8),(9,9),(10,10).	5 M	CO5	L3															
(b)	Explain advantages and limitations of clustering.	5 M	CO5	L2															
(OR)																			
11(a)	Describe Expectation Maximization based clustering.	5 M	CO5	L2															
(b)	Explain partition based clustering techniques.	5 M	CO5	L2															

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B.Tech. (VI Semester) Regular Examinations

23AD05-DATA VISUALIZATION
(CSE(AI&ML))

Time : 3 hours

Max. Marks : 70

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7/5/26

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is pattern recognition in visual perception?	2M	CO1	L1
(b)	State any two advantages of visualization.	2M	CO1	L1
(c)	How would you map numerical data using visual encoding?	2M	CO2	L2
(d)	How can you represent time-series data visually?	2M	CO2	L2
(e)	Suggest a suitable visualization technique for document clustering results.	2M	CO3	L1
(f)	Apply an interaction technique to explore large datasets effectively.	2M	CO3	L3
(g)	List the advantages of Tree hierarchical representation.	2M	CO4	L2
(h)	What is similarity measurement in clustering?	2M	CO4	L1
(i)	What is vector field visualization?	2M	CO5	L1
(j)	What is a scatterplot matrix?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss the usage of data visualization into day-to-day life in real time.	5M	CO1	L2
(b)	Discuss the importance of visual representation in real-world applications with examples.	5M	CO1	L2
(OR)				
3(a)	Describe different data representation techniques in visualization.	5M	CO1	L2
(b)	Discuss the problem of information overload and how visualization helps to reduce it.	5M	CO1	L2
4(a)	Illustrate how to build an interactive leaflet can be used for geographic visualization using ggplot.	10M	CO2	L3
(OR)				
5(a)	Compare graphs, charts, and maps with suitable use cases.	5M	CO2	L2
(b)	Apply effective visualization methods to represent supermarket data including product categories, sales, and profit for business decision-making.	5M	CO2	L3
6(a)	Given the following text dataset, apply suitable visualization techniques to analyse patterns.	5M	CO3	L3
	Sample Text			
	S1 "Data visualization helps in understanding complex data easily."			
	S2 "Visualization techniques include charts, graphs, and maps."			
	S3 "Data analysis and visualization are important in decision making."			
	S4 "Graphs and charts are widely used in data visualization."			
(b)	Apply suitable visualization techniques to represent misleading data correctly.	5M	CO3	L3
(OR)				
7.	Discuss various interactive operators used in data visualization.	10M	CO3	L2
8(a)	How can scatterplot matrices be utilized to understand correlations and grouping in multidimensional data?	5M	CO4	L2
(b)	Discuss the scenario where complex hierarchical data needs to be presented to non-technical users, how would metaphorical visualization help.	5M	CO4	L2
(OR)				
9(a)	Discuss non-space filling methods with examples.	5M	CO4	L2
(b)	Illustrate how graph representation using matrices can address issues in graph visualization with a suitable example.	5M	CO4	L2
10(a)	Discuss different map projection techniques available in ArcGIS.	5M	CO5	L2
(b)	Describe the steps involved in the marching cubes technique used for surface extraction.	5M	CO5	L2
(OR)				
11(a)	Describe advancements in perceptual techniques for analysing complex data.	5M	CO5	L2
(b)	Demonstrate the role of adjacency matrix and adjacency list in graph visualization with example.	5M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23EC17-DIGITAL SIGNAL PROCESSING

(ECE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	List out different classes of discrete systems.	2 M	CO1	L1
(b)	Define correlation of signals.	2 M	CO1	L1
(c)	List the applications of FFT.	2 M	CO2	L2
(d)	Differentiate DIT and DIF FFT.	2 M	CO2	L2
(e)	What is parallel realization?	2 M	CO3	L1
(f)	List the applications of IIR Filter	2 M	CO3	L2
(g)	Name any two window functions and write their mathematical equations.	2 M	CO3	L1
(h)	What is linear phase FIR filter?	2 M	CO3	L2
(i)	What is multiple access memory?	2 M	CO4	L1
(j)	List any two on-chip peripherals in DSP processors.	2 M	CO4	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	State and prove any three properties of DTFT.	5 M	CO2	L3
(b)	Consider a rectangular pulse defined as $x(n) = \begin{cases} A, & n \leq N \\ 0, & \text{otherwise} \end{cases}$ Solve DTFT of the given $x[n]$ and draw its spectrum	5 M	CO2	L3
(OR)				
3(a)	Summarize the structure of a DSP system with its key components.	5 M	CO1	L2
(b)	Compute and plot the convolution of the discrete sequences sequence $x[n] = \{1, 1, 1, 1\}, h[n] = \{2, 2, 2, 2\}$	5 M	CO1	L3
4.	Solve 8-point DFT of the sequence $x(n) = \{2, 2, 2, 2, 1, 1, 1, 1\}$ using radix-2 DIT-FFT algorithm.	10 M	CO2	L3
(OR)				
5(a)	Solve the circular convolution of the two sequences $x[n] = \{1, 2, 3, 2, 1\}$ $h[n] = \{1, 2, 3\}$ using Concentric circles method and matrix Multiplication method.	5 M	CO2	L3
(b)	Compare Direct DFT and FFT Complexity in computation.	5 M	CO2	L4
6(a)	Build the direct form and cascade form realization of an FIR filter with system function described by $H[z] = (1 - \frac{1}{4}z^{-1} + \frac{3}{8}z^{-2})(1 - \frac{1}{8}z^{-1} - \frac{1}{2}z^{-2})$	5 M	CO3	L3
(b)	Illustrate Direct Form-I and Direct Form-II structures with an example.	5 M	CO3	L4
(OR)				
7(a)	Obtain the Direct Form-II and Parallel Form structures of the system $y[n] = -0.1y[n-1] + 0.2y[n-2] + 3x[n] + 3.6x[n-1] + 0.6x[n-2]$	5 M	CO3	L3
(b)	Apply Bilinear Transformation and Impulse Invariant Transformation to $H(s)$ with $T=1\text{sec}$ and find $H(z)$. $H(s) = \frac{1}{(s+1)(s+2)}$	5 M	CO3	L3
8(a)	Make use of Fourier series method to design an ideal Low Pass Filter with a frequency response $H_d(e^{j\omega}) = \begin{cases} 1 & \text{for } -\frac{\pi}{3} \leq \omega \leq \frac{\pi}{3} \\ 0 & \text{otherwise} \end{cases}$ Find the values of $h[n]$ for $N=9$ and plot the Magnitude response.	5 M	CO3	L4
(b)	Distinguish between IIR and FIR filters.	5 M	CO3	L2
(OR)				
9	Simplify for the realizable transfer function $H[z]$ from the given ideal Band Stop Filter with a frequency response using Hanning Window for $N=9$ $H_d(e^{j\omega}) = \begin{cases} 1 & \text{for } \omega \leq \frac{\pi}{3} \text{ and } \omega \geq \frac{2\pi}{3} \\ 0 & \text{other wise} \end{cases}$	10 M	CO3	L4
10.	List out the on-chip peripherals in programmable DSP's and explain any two of them in detail.	10 M	CO4	L2
(OR)				
11.	Illustrate the Architecture of TMS320C5X Processor.	10 M	CO4	L2

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B.Tech. (VI Semester) Regular Examinations

23EE17-POWER SYSTEM ANALYSIS

(EEE)

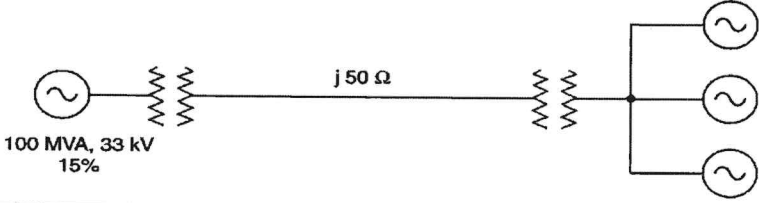
Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	State the importance of the per unit system in power system analysis.	2M	CO1	L2
(b)	What is the need for selecting base quantities in the per unit system?	2M	CO1	L2
(c)	Define a slack bus in load flow studies.	2M	CO2	L1
(d)	What is meant by a flat start in load flow analysis?	2M	CO2	L1
(e)	State the importance of short-circuit calculations in power systems.	2M	CO3	L2
(f)	Define subtransient reactance of a synchronous machine.	2M	CO3	L1
(g)	Define symmetrical components.	2M	CO4	L1
(h)	State the properties of negative sequence components.	2M	CO4	L2
(i)	Define synchronous stability of a power system.	2M	CO5	L1
(j)	State the swing equation of a synchronous machine.	2M	CO5	L1

Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	From fundamentals, derive per unit impedance expression for a new base.	5M	CO1	L2
(b)	Discuss the advantages of the per unit method over the absolute method of analysis.	5M	CO1	L2

(OR)

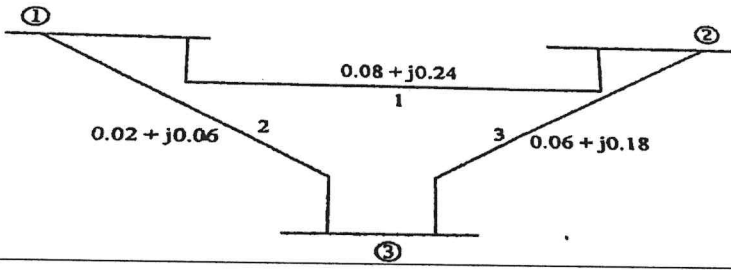
3.	A 100 MVA, 33 kV 3-phase generator has a sub-transient reactance of 15%. The generator is connected to the motors through a transmission line and transformers as shown in Fig. below. The motors have rated inputs of 30 MVA, 20 MVA and 50 MVA at 30 kV with 20% sub-transient reactance. The 3-phase transformers are rated at 110 MVA, 32 kV, $\Delta/110$ kV, Y with leakage reactance 8%. The line has a reactance of 50 ohms. Selecting the generator rating as the base quantities in the generator circuit, evaluate the corresponding p.u. values and draw the reactance diagram. 	10M	CO1	L4
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4(a)	Classify various types of buses in a power system for load flow studies. Justify the classification.	5M	CO2	L2
(b)	Explain clearly with a flow chart the computational procedure for load flow solution using Newton-Raphson method when the system contains P-Q buses.	5M	CO2	L2

(OR)

5(a)	Derive Newton-Raphson load flow equations in rectangular coordinates.	5M	CO2	L2
(b)	Compare the performance of Gauss-Seidal method and Newton-Raphson method for load flow solution using nodal admittance approach.	5M	CO2	L2

23EE17-POWER SYSTEM ANALYSIS

6(a)	(i) What do you understand by a short-circuit? (ii) Discuss the possible causes of short-circuit in the power system.	5M	CO3	L2
(b)	Derive the necessary expression for building up of three phase bus impedance matrix when the added element is between an old bus and a new bus.	5M	CO3	L2
(OR)				
7.	Formulate the Z_{bus} matrix for the network shown in Figure below using Z_{bus} building algorithm. All impedances are in p.u. 	10M	CO3	L4
8(a)	Categorize the various types of unsymmetrical faults and state the order of frequency of occurrence of shunt faults.	5M	CO4	L2
(b)	Explain positive, negative, and zero sequence networks with suitable diagrams.	5M	CO4	L2
(OR)				
9.	A 3-phase, 11 kV, 10 MVA alternator has sequence reactances of $X_0 = 0.05$ p.u., $X_1 = 0.15$ p.u. and $X_2 = 0.15$ p.u. If the generator is on no load, find the ratio of fault currents for L-G fault to a 3-phase fault.	10M	CO4	L4
10(a)	Derive Swing equation and discuss its application in the study of power system stability.	5M	CO5	L2
(b)	(i) Derive 'equal area criterion' for a synchronous machine. (ii) Discuss its application in the study of power system stability.	5M	CO5	L2
(OR)				
11(a)	Distinguish between transient and steady-state stabilities.	5M	CO5	L2
(b)	A 4-pole, 50 Hz, 22 kV turbo-alternator has a rating of 100 MVA p.f. 0.8 lag. The moment of inertia of rotor is 8000 kg-m ² . Determine M and H.	5M	CO5	L4

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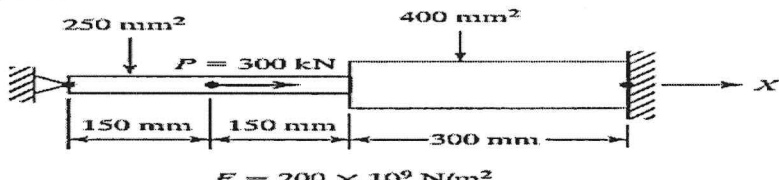
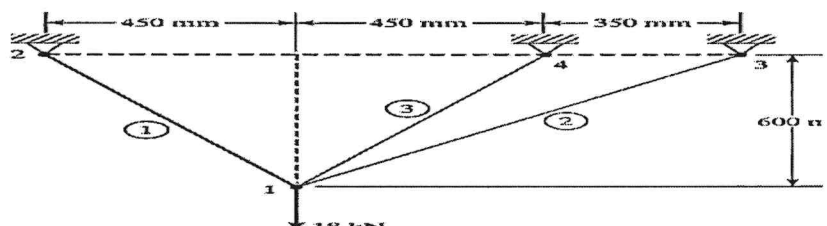
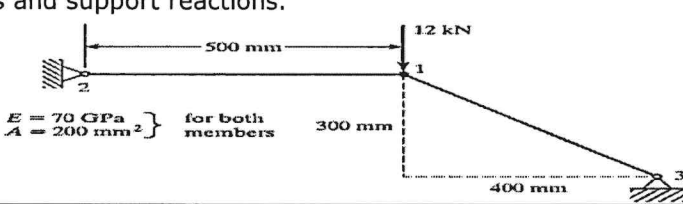
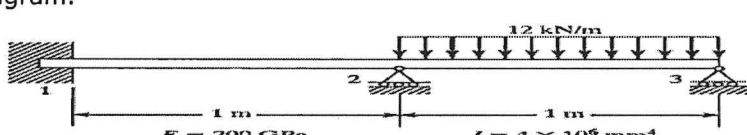
B.Tech. (VI Semester) Regular Examinations

23ME19-FINITE ELEMENT METHODS

(ME)

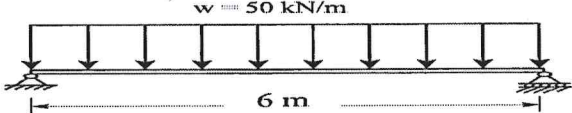
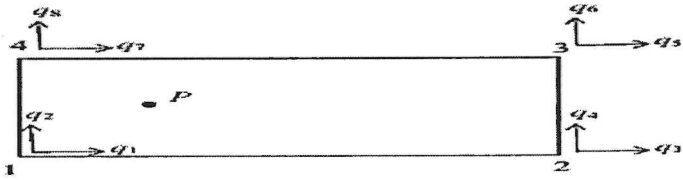
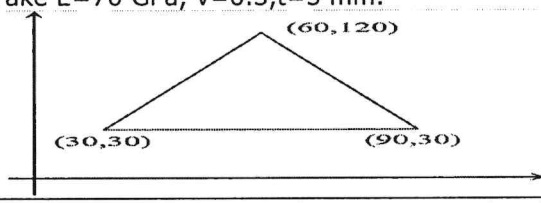
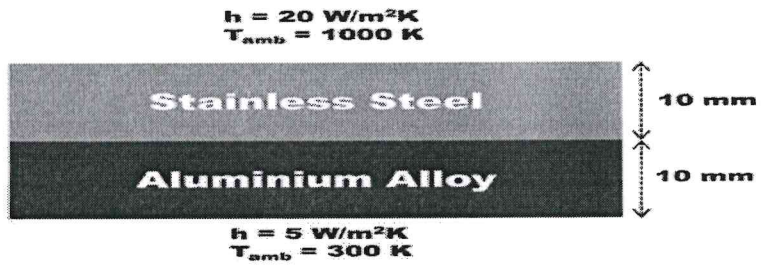
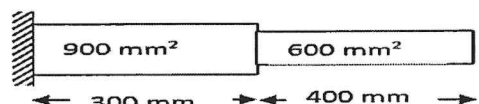
Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	List the properties of stiffness matrix	2M	CO1	L2
(b)	Compare Rayleigh Ritz and Galerkin's methods.	2M	CO1	L2
(c)	Write the expression for transformation vector for displacement in a truss element.	2M	CO2	L2
(d)	Draw a truss element with degrees of freedom.	2M	CO2	L2
(e)	What are essential and natural boundary conditions for a beam element?	2M	CO3	L2
(f)	State the conditions to convert a 3D analysis to 2D analysis in Finite element formulation.	2M	CO3	L2
(g)	Compare CST and LST element.	2M	CO4	L2
(h)	Draw a quadrilateral element and mentions its degrees of freedom.	2M	CO4	L2
(i)	What are different types of boundary conditions in heat transfer formulation?	2M	CO5	L2
(j)	What is the significance of Eigen values and Eigen vectors?	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2.	Consider the bar in Fig loaded as shown. Determine the nodal displacements, element stresses, and support reactions. Solve this problem adopting the elimination method for handling BCs.  $E = 200 \times 10^9 \text{ N/m}^2$	10 M	CO1	L3
(OR)				
3(a)	Explain the basic steps of FEM elaborately with a neat flow chart.	5M	CO1	L2
(b)	Derive the expression for Element stiffness matrix and load vector for Bar element.	5M	CO1	L3
4.	For the three-bar steel truss shown in Fig, determine the nodal displacements and the stress in element 2 and 3 and support reactions at node 2. (E=200GPa, Area of members is 500 mm²). 	10M	CO2	L3
(OR)				
5.	For the two-bar truss shown in Fig, determine the nodal displacements and the element stress and support reactions.  $E = 70 \text{ GPa}$ $A = 200 \text{ mm}^2$ for both members	10M	CO2	L3
6.	For the beam and loading shown in Fig, determine (i) the slopes at nodes 2 and 3, (ii) the vertical deflection at the midpoint of the distributed load, and (iii) the bending moment diagram.  $E = 200 \text{ GPa}$ $I = 4 \times 10^6 \text{ mm}^4$	10M	CO3	L3

(OR)

23ME19-FINITE ELEMENT METHODS

7(a)	Calculate the midspan deflection for the beam subjected to the uniformly distributed load $w=50 \text{ kN/m}$ as shown in figure. Given $L= 6\text{m}$, $E=70 \text{ GPa}$, $I=1 \text{ m}^4$.	5M	CO3	L3																		
																						
(b)	Derive the expression for element stiffness matrix of the beam.	5M	CO3	L3																		
8(a)	Determine the Jacobian matrix and area of the triangular element whose coordinates of the corner nodes are given by (1.5, 2), (7, 3.5) and (4, 7). Find the shape functions at the point (3.85, 4.8).	5M	CO4	L3																		
(b)	A four-node quadrilateral element is as shown in fig.  Determine the x- and y-displacements at point P. Determine the strains ϵ_x, ϵ_y, and γ_{xy} at point P. Coordinates of points and corner displacements are as given <table><tr><td>Point</td><td>(x, y) coordinates</td><td>(x, y) displacements</td></tr><tr><td>Node 1</td><td>(1, 1)</td><td>(0, 0)</td></tr><tr><td>Node 2</td><td>(5, 1)</td><td>(0.2, 0)</td></tr><tr><td>Node 3</td><td>(5, 3)</td><td>(0.15, 0.1)</td></tr><tr><td>Node 4</td><td>(1, 3)</td><td>(0, 0.05)</td></tr><tr><td>P</td><td>(2, 2)</td><td>To be determined</td></tr></table>	Point	(x, y) coordinates	(x, y) displacements	Node 1	(1, 1)	(0, 0)	Node 2	(5, 1)	(0.2, 0)	Node 3	(5, 3)	(0.15, 0.1)	Node 4	(1, 3)	(0, 0.05)	P	(2, 2)	To be determined	5M	CO4	L3
Point	(x, y) coordinates	(x, y) displacements																				
Node 1	(1, 1)	(0, 0)																				
Node 2	(5, 1)	(0.2, 0)																				
Node 3	(5, 3)	(0.15, 0.1)																				
Node 4	(1, 3)	(0, 0.05)																				
P	(2, 2)	To be determined																				
(OR)																						
9(a)	Evaluate the stiffness matrix for the elements as shown in figure. Assume plane stress conditions. Take $E=70 \text{ GPa}$, $\nu=0.3$, $t=5 \text{ mm}$. 	5M	CO4	L3																		
(b)	Derive the strain displacement matrix for axisymmetric element and draw a axisymmetric element with degrees of freedom.	5M	CO4	L3																		
10.	A composite slab made of 10 mm aluminum alloy AA2014 and 10 mm Stainless SS304L is exposed to thermal environments as shown in Fig. Determine the steady state temperature distribution within the slab. Consider conductivity of AA2014 as $130 \text{ W/m}\cdot\text{K}$ and SS304L as $15 \text{ W/m}\cdot\text{K}$. 	10M	CO5	L3																		
(OR)																						
11.	Consider the axial vibrations of a steel bar shown ($E= 70 \text{ GPa}$, and mass density as 7840 kg/mm^3 . (i) Develop global stiffness and mass matrices (ii) Determine the natural frequencies. 	10M	CO5	L3																		

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (VI Semester) Regular Examinations

23CS06-OPERATING SYSTEMS

(AI&DS)

Time : 3 hours

Max. Marks: 70

Q.No	Compulsory Question	Marks	CO	BL																								
1(a)	Define Operating System (OS) and its objectives.	2 M	CO1	L1																								
(b)	What is system call? Give example?	2 M	CO1	L1																								
(c)	What is the importance of IPC in OS?	2 M	CO2	L2																								
(d)	Define concurrency and mention any two challenges.	2 M	CO2	L2																								
(e)	What is critical section and its importance?	2 M	CO3	L1																								
(f)	Define deadlock and mention its consequences.	2 M	CO3	L1																								
(g)	Name the purpose of memory management.	2 M	CO4	L1																								
(h)	What is the need of virtual memory?	2 M	CO4	L1																								
(i)	Define the file system and list its types.	2 M	CO5	L1																								
(j)	What is file system internals?	2 M	CO5	L1																								
Q.No	All questions carry equal marks	Marks	CO	BL																								
2(a)	Explain various functions offered by Operating System (OS).	5 M	CO1	L2																								
(b)	Discuss core architectural approaches in OS design.	5 M	CO1	L3																								
(OR)																												
3(a)	Describe free and open-source OS features.	5 M	CO1	L2																								
(b)	Discuss key steps in building an OS.	5 M	CO1	L2																								
4(a)	Consider the following table of arrival time and burst time for three processes P1, P2 and P3. Note: Lower number represents higher priority. Computer average waiting time and average turn-around-time using Priority CPU scheduling algorithm.	5 M	CO2	L3																								
<table><tr><th>Process</th><th>Arrival Time</th><th>Burst Time</th><th>Priority</th></tr><tr><td>P1</td><td>0</td><td>4</td><td>2</td></tr><tr><td>P2</td><td>1</td><td>2</td><td>1</td></tr><tr><td>P3</td><td>2</td><td>6</td><td>3</td></tr></table>		Process	Arrival Time	Burst Time	Priority	P1	0	4	2	P2	1	2	1	P3	2	6	3											
Process	Arrival Time	Burst Time	Priority																									
P1	0	4	2																									
P2	1	2	1																									
P3	2	6	3																									
(b)	Outline multi-threading models in concurrency context.	5 M	CO2	L2																								
(OR)																												
5(a)	Discuss on message passing in IPC.	5 M	CO2	L2																								
(b)	Explain CPU scheduling criteria.	5 M	CO2	L3																								
6(a)	Explain features of semaphore and its types in detail.	5 M	CO3	L2																								
(b)	Summarize deadlock recovery strategies.	5 M	CO3	L2																								
(OR)																												
7(a)	Describe reader-writer problem in synchronization situation.	5 M	CO3	L2																								
(b)	Imagine a system with 3 resource types (A, B, C) and 5 processes (P0-P4). Total Resources: A=10, B=5, C=7, Snapshot at time T ₀ . Determine that the current state is safe or not. If yes give me the safe sequence of execution.	5 M	CO3	L3																								
<table><tr><th>Process</th><th>Allocation (A B C)</th><th>Max Need (A B C)</th><th>Available (A B C)</th></tr><tr><td>P0</td><td>0 1 0</td><td>7 5 3</td><td>3 3 2</td></tr><tr><td>P1</td><td>2 0 0</td><td>3 2 2</td><td></td></tr><tr><td>P2</td><td>3 0 2</td><td>9 0 2</td><td></td></tr><tr><td>P3</td><td>2 1 1</td><td>2 2 2</td><td></td></tr><tr><td>P4</td><td>0 0 2</td><td>4 3 3</td><td></td></tr></table>		Process	Allocation (A B C)	Max Need (A B C)	Available (A B C)	P0	0 1 0	7 5 3	3 3 2	P1	2 0 0	3 2 2		P2	3 0 2	9 0 2		P3	2 1 1	2 2 2		P4	0 0 2	4 3 3				
Process	Allocation (A B C)	Max Need (A B C)	Available (A B C)																									
P0	0 1 0	7 5 3	3 3 2																									
P1	2 0 0	3 2 2																										
P2	3 0 2	9 0 2																										
P3	2 1 1	2 2 2																										
P4	0 0 2	4 3 3																										
8(a)	What is paging? Illustrate and explain the role of page-table.	5 M	CO4	L2																								
(b)	Summarize mass-storage structure in the context of storage management.	5 M	CO4	L2																								
(OR)																												
9(a)	Find no of page faults for the reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3 with 3 frames using FIFO and LRU page replacement algorithms.	5 M	CO4	L3																								
(b)	Suppose the order of request is 82,170,43,140,24,16,190 and current position of Read/Write head is: 50. Find the total distance covered by the disk arm using FCFS and SSTF disk scheduling algorithms.	5 M	CO4	L2																								
10(a)	List and discuss various types of file access methods.	5 M	CO5	L2																								
(b)	Explain the role of file system mounting with an example.	5 M	CO5	L2																								
(OR)																												
11(a)	Explain various file allocation methods.	5 M	CO5	L2																								
(b)	Examine the principles of protection in OS.	5 M	CO5	L3																								

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B.Tech. (VI Semester) Regular/Supplementary Examinations

23AE17 COMPUTATIONAL FLUID DYNAMICS AND HEAT TRANSFER

(ASE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define a control volume.	2 M	CO1	L1
(b)	What is the substantial (material) derivative?	2 M	CO1	L2
(c)	How are second-order PDEs classified?	2 M	CO2	L2
(d)	What is the eigenvalue method used for in PDEs?	2 M	CO2	L1
(e)	What is the main advantage of MacCormack's method?	2 M	CO3	L2
(f)	What is space marching in CFD?	2 M	CO3	L2
(g)	Why is the Crank–Nicholson method preferred in Couette flows?	2 M	CO4	L2
(h)	Given: Plate velocity $U = 2 \text{ m/s}$, gap $h = 0.01 \text{ m}$, position $y = 0.005 \text{ m}$ find $u(y) = ?$	2 M	CO4	L2
(i)	Given: $T_1 = 100^\circ\text{C}$, $T_2 = 50^\circ\text{C}$, $L = 0.5 \text{ m}$, $x = 0.25 \text{ m}$ Find temperature at x by $T = T_1 + \frac{(T_2 - T_1)}{L}x$.	2 M	CO5	L2
(j)	Given: $k = \frac{200 \text{ W}}{\text{mK}}$, $\frac{dT}{dx} = -\frac{10 \text{ K}}{\text{m}}$ find Heat Flux by $q = -k \frac{dT}{dx}$	2 M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the role of Computational Fluid Dynamics (CFD) as a research and design tool.	5 M	CO1	L2
(b)	Derive the Continuity Equation (general form).	5 M	CO1	L3
(OR)				
3(a)	Derive the continuity equation for incompressible flow.	5 M	CO1	L3
(b)	State and explain the Momentum Equations (Navier–Stokes equation).	5 M	CO1	L3
4(a)	Classify quasi-linear partial differential equations.	5 M	CO2	L2
(b)	Illustrate hyperbolic equations with example.	5 M	CO2	L2
(OR)				
5(a)	Illustrate explicit and implicit methods.	5 M	CO2	L2
(b)	Describe stability and truncation error.	5 M	CO2	L2
6.	Derive formulations for Lax-Wendroff Technique.	10 M	CO3	L3
(OR)				
7.	Given: $C = 0.5$, Case 1: $\epsilon = 0.01$, Case 2: $\epsilon = 0.2$ Values: $u = [1, 3, 5, 3, 1]$ Determine effect of viscosity coefficient by $u_i^{n+1} = u_i^n - \frac{C}{2}(u_{i+1} - u_{i-1}) + \epsilon(u_{i+1} - 2u_i + u_{i-1})$.	10 M	CO3	L3
8.	Illustrate mathematically the Physical Problem And Its Exact Analytical Solution for Couette flow.	10 M	CO4	L3
(OR)				
9.	Given Data : Plate area $A = 1.2 \text{ m}^2$, Gap $h = 5 \text{ mm}$, Velocity $U = 18 \text{ m/s}$ Find the Power required to move the plate? $\tau = \mu \frac{U}{h}$ and $F = \tau A$ and the Power $P = FU$ And estimate the Reynolds number Density $\rho = 1.225 \text{ kg/m}^3$ $U = 20 \text{ m/s}$, $h = 6 \text{ mm}$.	10 M	CO4	L3
10(a)	Illustrate mathematically Crank–Nicholson method in Heat conduction.	5 M	CO5	L3
(b)	Enlist the Applications of 1D and 2D Steady Heat Conduction.	5 M	CO5	L2
(OR)				
11(a)	Illustrate mathematically 1D transient heat conduction equation.	5 M	CO5	L3
(b)	Enlist the Advantages & Limitations of Finite Difference Method (FDM).	5 M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

Bosof
9/5/26**23CE19-LOW-COST AND ECO-FRIENDLY BUILDING TECHNIQUES**

(CE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are traditional building materials?	2 M	CO1	L1
(b)	Define stabilized soil bricks.	2 M	CO1	L1
(c)	List any two eco-friendly building material	2 M	CO2	L1
(d)	What is agro-industrial waste?	2 M	CO2	L1
(e)	Define safe bearing capacity.	2 M	CO2	L1
(f)	What is precast concrete panel?	2 M	CO3	L1
(g)	State two advantages of prefabrication.	2 M	CO3	L1
(h)	Define floor area and carpet area	2 M	CO3	L1
(i)	Define disaster-prone area.	2 M	CO4	L1
(j)	What is fire retardant treatment?	2 M	CO4	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss causes of housing shortage in India.	5 M	CO1	L2
(b)	Explain advantages and limitations of traditional Building materials.	5 M	CO1	L2
(OR)				
3(a)	Explain wood-cement products and their uses.	5 M	CO1	L2
(b)	Differentiate between burnt and unburnt bricks.	5 M	CO1	L2
(OR)				
4.	Discuss advantages of sustainable materials in modern construction.	10 M	CO1	L2
(OR)				
5(a)	Compare eco-friendly materials with conventional construction materials.	5 M	CO1	L2
(b)	Discuss the suitability of earthen construction for modern buildings in India.	5 M	CO1	L2
(OR)				
6(a)	Explain types of foundations with examples.	5 M	CO2	L2
(b)	Describe cellular concrete blocks and their advantages.	5 M	CO2	L2
(OR)				
7.	Discuss catenary shell roofs and hollow clay block roofing systems.	10 M	CO2	L2
(OR)				
8(a)	Explain types of joints in precast concrete structures.	5 M	CO3	L2
(b)	Describe plinth area estimate method.	5 M	CO3	L2
(OR)				
9.	Explain prefabrication in detail with advantages and applications.	10 M	CO3	L2
(OR)				
10(a)	Describe characteristics of mud as a building material.	5 M	CO4	L2
(b)	Explain recommendations for future safe construction.	5 M	CO4	L2
(OR)				
11(a)	Discuss role of appropriate technology in improving rural housing.	5 M	CO4	L2
(b)	Summarize the challenges and solutions for safe housing in rural disaster-prone areas.	5 M	CO4	L2

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B.Tech. (VI Semester) Regular Examinations

23CS15-COMPILER DESIGN

(CSE)

Revised 9/5/26

Time : 3 hours

Max. Marks: 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Identify tokens for the input: int a = b + 10;.	2M	CO1	L2
(b)	Construct a regular expression to recognize identifiers and digits.	2M	CO1	L2
(c)	What is left recursion and left factoring?	2M	CO2	L2
(d)	What is dangling else ambiguity? Give example.	2M	CO2	L2
(e)	Explain dependency graph in SDD evaluation.	2M	CO3	L2
(f)	Explain the purpose of SDD in compiler design.	2M	CO3	L2
(g)	What is loop invariant code elimination?	2M	CO4	L1
(h)	What is live-variable analysis?	2M	CO4	L1
(i)	List different forms of object code.	2M	CO5	L1
(j)	Convert the given expression into target code $a = b + c * d$.	2M	CO5	L2
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2.	Explain the phases of compiler with example.	10M	CO1	L2
(OR)				
3(a)	Explain the language processing system with a neat diagram.	5M	CO1	L2
(b)	Explain bootstrapping in compilers and describe how a compiler is built using another compiler.	5M	CO1	L2
4.	Construct the CLR parsing table for the following grammar: $S \rightarrow LR \mid R$ $L \rightarrow *R \mid id$ $R \rightarrow L$	10M	CO2	L3
(OR)				
5(a)	Verify whether the following grammar is LL(1) or not? $E \rightarrow E + T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (F) \mid a \mid b$	7M	CO2	L3
(b)	Explain about error recovery in LR Parsing.	3M	CO2	L2
6(a)	Construct the syntax tree and postfix notation for the expression $(a + (b * c)) \uparrow d - e / (f + g)$.	5M	CO3	L3
(b)	What is type expression? How to construct them using various type constructors? Explain.	5M	CO3	L2
(OR)				
7(a)	What is syntax directed translation? Write the semantic rules for $D \rightarrow TL$, $T \rightarrow int \mid real$, $L \rightarrow L, id \mid id$	3M	CO3	L3
(b)	Write the quadruple, triple, indirect triple for the expression $-(a * b) + (c + d) - (a + b + c + d)$	7M	CO3	L3
8(a)	Describe how basic blocks are formed and optimized.	5M	CO4	L2
(b)	Explain different peephole optimization techniques with examples.	5M	CO4	L2
(OR)				
9.	Explain in detail the principle sources of optimization with examples.	10M	CO4	L2
10(a)	Explain the structure and components of an activation record.	5M	CO5	L2
(b)	Explain the major issues in the design of a code generator.	5M	CO5	L2
(OR)				
11(a)	Describe the importance of register allocation in code generation.	5M	CO5	L2
(b)	Explain in detail the run-time storage organization with a diagram.	5M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23IT08-DevOps
(CSE(AI&ML) and IT)

18/05/26

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define SDLC.	2 M	CO1	L1
(b)	What is Agile model?	2 M	CO1	L1
(c)	What is Git?	2 M	CO2	L1
(d)	Define branching in Git.	2 M	CO2	L1
(e)	What is Continuous Integration?	2 M	CO3	L1
(f)	What is Jenkins?	2 M	CO3	L1
(g)	Define Docker container.	2 M	CO4	L1
(h)	What is Dockerfile?	2 M	CO4	L1
(i)	What is Ansible?	2 M	CO5	L1
(j)	Define Kubernetes.	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Show how the Scrum framework is integrated into DevOps practices for delivery.	5 M	CO1	L3
(b)	Distinguish between the Agile model and the DevOps approach.	5 M	CO1	L2
(OR)				
3.	Demonstrate the DevOps lifecycle with a neat architectural diagram.	10 M	CO1	L3
(OR)				
4.	Demonstrate the GIT branching and merging strategy for a collaborative development environment.	10 M	CO2	L3
(OR)				
5(a)	Apply SonarQube to perform code quality analysis on a project.	5 M	CO2	L3
(b)	Explain the history and need for modern Source Code Management systems.	5 M	CO2	L2
(OR)				
6.	Explain the Jenkins Master-Slave architecture and how it handles distributed builds.	10 M	CO3	L3
(OR)				
7(a)	Explain CI process using Jenkins.	5 M	CO3	L2
(b)	List the benefits of using Jenkins for Continuous Integration.	5 M	CO3	L3
(OR)				
8(a)	Discuss the significance of Dockerfiles	5 M	CO4	L2
(b)	Use Selenium features to automate a basic functional test for a web application.	5 M	CO4	L3
(OR)				
9.	Explain the process of pulling an image from Docker Hub and running it as a container. Demonstrate with commands and explain each step involved.	10 M	CO4	L3
(OR)				
10(a)	Explain Ansible architecture and playbooks.	5 M	CO5	L2
(b)	Explain Jinja templating in Ansible.	5 M	CO5	L2
(OR)				
11.	Analyze how Kubernetes manages resources and namespaces to provide application isolation.	10 M	CO5	L4

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B.Tech. (VI Semester) Regular Examinations

23EC19-SATELLITE COMMUNICATION

(ECE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are frequency allocations in satellite communication?	2M	CO1	L1
(b)	State Kepler's third law of planetary motion.	2M	CO1	L1
(c)	Write main blocks in communication sub system.	2M	CO1	L1
(d)	State the function of TT&C subsystem.	2M	CO1	L1
(e)	Obtain the expression for overall carrier-to-noise ratio of the communication system.	2M	CO2	L1
(f)	Given LNA noise temperature = 45 K and Sky noise temperature due to 0.2 dB attenuation $\approx$ 13 K. Calculate system noise temperature.	2M	CO2	L1
(g)	Define terrestrial interface.	2M	CO3	L1
(h)	Write the antenna gain of the transmitting earth station.	2M	CO3	L1
(i)	Discuss few points about GLONASS.	2M	CO4	L1
(j)	State any two differences between LEO and GEO satellites.	2M	CO4	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Calculate the orbital time period and eccentricity for a satellite whose apogee height is 4100 km and perigee height is 1050 km. Assume radius of earth 6378.14 km.	5M	CO1	L3
(b)	Discuss different types of satellite orbits based on inclination, altitude, and orbital shape.	5M	CO1	L2
(OR)				
3(a)	Summarize the various effects causing orbital perturbations in satellites.	5M	CO1	L2
(b)	Describe the satellite launch vehicle selection parameters.	5M	CO1	L2
4(a)	Analyze the architecture and working of a satellite communication payload employing 24 transponders, highlighting the function of each major block.	5M	CO1	L2
(b)	Summarize the concept of satellite antennas.	5M	CO1	L2
(OR)				
5(a)	Discuss the concepts of 6/4 Ghz (single conversion) transponder (bent-pipe) in satellite with neat sketches.	5M	CO1	L2
(b)	Discuss the functions of Attitude and orbit control system.	5M	CO1	L2
6(a)	Using the expressions for Carrier to Noise Ratio (C/N) and received power (P_r), derive the expression for the G/T ratio of a receiving system.	5M	CO2	L3
(b)	A satellite in GEO orbit is at a distance of 39000 km from an earth station. The required flux density at the satellite to saturate one transponder at a frequency of 14.3 GHz is -90 dBW/m ² . The earth station has a transmitting antenna with a gain of 52 dB. Find the output power of the earth station transmitter.	5M	CO2	L3
(OR)				
7(a)	Derive the expression for the power received by an antenna in a satellite communication system.	5M	CO2	L3
(b)	Thermal noise in an earth station receiver result in a $(CNR)_{dn}$ ratio of 20.0 dB. A signal is received from a bent pipe transponder with $(CNR)_{up} = 20.0$ dB. (i) What is the value of overall $(CNR)_o$ at the earth station? (ii) If the transponder introduces inter-modulation products with a carrier to interference ratio $C/I = 24$ dB, what is the overall $(CNR)_o$ at the receiving earth station?	5M	CO2	L3
8(a)	Analyze a TDMA frame and burst structure for a satellite communication system, and evaluate its performance in handling multiple users.	5M	CO3	L2
(b)	Explain different types of earth station antennas and their characteristics.	5M	CO3	L2
(OR)				
9(a)	Explain the principle of CDMA technique using spread spectrum transmission and reception.	5M	CO3	L2
(b)	Analyze intermodulation in an FDMA satellite system, calculate the resulting inter-modulation frequencies and C/N ratio, and discuss techniques to reduce its effects.	5M	CO3	L2
10(a)	Discuss the different services provided by IRNSS and list the applications of IRNSS in various fields.	5M	CO4	L2
(b)	Explain the GPS principle with a neat diagram.	5M	CO4	L2
(OR)				
11(a)	Summarize various Global Navigation Satellite Systems (GNSS) such as GPS, GLONASS, Galileo, BeiDou, QZSS, and IRNSS.	5M	CO4	L2
(b)	Discuss the system consideration in satellite systems.	5M	CO4	L2

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B.Tech. (VI Semester) Regular Examinations

23EE18-SWITHEAR AND PROTECTION

(EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What are the main functions of a circuit breaker?	2M	CO1	L1
(b)	What are the advantages and disadvantages of vacuum circuit breaker?	2M	CO1	L1
(c)	What is directional relay?	2M	CO2	L1
(d)	Define breaking capacity of a circuit breaker.	2M	CO2	L1
(e)	What is Distance protection?	2M	CO3	L1
(f)	Define differential protection for transformers.	2M	CO3	L1
(g)	What are the advantage of using TSM?	2M	CO4	L1
(h)	A current transformer (CT) has a ratio of 100/5. The relay plug setting is 100%. If the fault current is 500 A, calculate the Plug Setting Multiplier (PSM).	2M	CO4	L1
(i)	Where are lightning arresters installed?	2M	CO5	L1
(j)	What is meant by solid grounding ?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Summarize the ratings and specifications of circuit breakers.	5 M	CO1	L2
(b)	Illustrate the construction and working of Oil circuit breaker.	5 M	CO1	L2
(OR)				
3(a)	What is meant by current chopping? Explain its causes, effects and methods to minimize current chopping in circuit breakers.	5 M	CO1	L2
(b)	Draw the time-current characteristics of instantaneous, definite minimum time (DMT) and inverse definite minimum time (IDMT) relays.	5 M	CO1	L2
4(a)	Illustrate the construction and working of an Electro magnetic relays with neat diagram.	5 M	CO2	L2
(b)	What is Reactance relay? Explain its operating principle, torque equation and operating characteristics for reactance relay.	5M	CO2	L3
(OR)				
5(a)	Demonstrate how differential relay distinguishes between internal and external faults.	5 M	CO2	L3
(b)	Compare directional relays with overcurrent relays.	5 M	CO2	L3
6(a)	Illustrate modified differential protection scheme for generators.	5M	CO3	L2
(b)	Discuss the rotor earth fault protection for generators.	5M	CO3	L2
(OR)				
7(a)	Discuss the need for bias in differential relays and explain the role of CTs in transformer protection.	5M	CO3	L2
(b)	Demonstrate the operation of Buchholz relay during incipient faults with neat diagram.	5M	CO3	L3
8(a)	Describe the three-zone distance protection scheme using impedance relays with a neat diagram.	5M	CO4	L2
(b)	Discuss time graded overcurrent protection scheme using definite time relays.	5M	CO4	L2
(OR)				
9(a)	Compare electromagnetic relays and static relays used in power system protection.	5M	CO4	L2
(b)	Summarize the concepts of Plug Setting Multiplier (PSM) and Time Multiplier Setting (TMS) in overcurrent protection with their significance.	5M	CO4	L3
10(a)	Illustrate the constructional features and working of valve type lightning arresters.	5 M	CO5	L2
(b)	Apply suitable protection methods to protect power stations and substations against direct strokes.	5 M	CO5	L3
(OR)				
11(a)	Illustrate the resonance grounding in power systems.	5 M	CO5	L2
(b)	Differentiate between grounded and ungrounded neutral systems in power systems.	5 M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23IT06-SOFTWARE TESTING METHODOLOGIES

(IT)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Differentiate between testing and debugging.	2 M	CO1	L4
(b)	List the consequences of bugs in a software system.	2 M	CO1	L2
(c)	What is path sensitizing in flow graph testing?	2 M	CO2	L2
(d)	Define a 'Transaction' in transaction flow testing.	2 M	CO2	L2
(e)	State the purpose of the 'Reduction Procedure' in path products.	2 M	CO3	L2
(f)	List any two applications of regular expressions in testing.	2 M	CO3	L2
(g)	Define 'State Testing' and its primary objective.	2 M	CO4	L1
(h)	Identify what makes a state graph "bad."	2 M	CO4	L1
(i)	Define the term 'Graph Matrix.'	2 M	CO5	L1
(j)	Name a tool used specifically for testing SOAP or REST APIs.	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Demonstrate the taxonomy of bugs and explain different testing models.	5 M	CO1	L3
(b)	Describe the basic model for testing and its importance in software quality.	5 M	CO1	L2
(OR)				
3(a)	Illustrate the application of path testing with a suitable flow graph example.	5 M	CO1	L3
(b)	Explain the concept of 'Achievable Paths' and why some paths remain unachievable.	5 M	CO1	L2
(OR)				
4.	Elaborate on the various strategies used in data flow testing and their applications.	10 M	CO2	L2
(OR)				
5(a)	Discuss transaction flow testing techniques and how they are used in system testing.	5 M	CO2	L2
(b)	Compare "Nice" and "Ugly" domains in the context of domain testing.	5 M	CO2	L3
(OR)				
6(a)	Demonstrate how flow anomalies are detected using regular expressions.	5 M	CO3	L3
(b)	Describe the relationship between path products and path expressions.	5 M	CO3	L2
(OR)				
7(a)	Explain the use of Karnaugh-Veitch (KV) charts in logic-based testing for simplifying specifications.	5 M	CO3	L2
(b)	Explain the procedure of constructing Decision Tables from software specifications and discuss their importance in logic-based testing.	5 M	CO3	L2
(OR)				
8(a)	Examine the structure of state graphs and their role in identifying testability issues.	5 M	CO4	L2
(b)	Explain the transition testing technique with a focus on system behavior.	5 M	CO4	L2
(OR)				
9.	Discuss the various testability tips recommended for designing software that is easier to test using state graphs.	10 M	CO4	L2
(OR)				
10(a)	Explain the application of graph matrices in calculating the relations between nodes.	5 M	CO5	L2
(b)	Provide a motivational overview of why graph matrices are preferred for automated tool building.	5 M	CO5	L3
(OR)				
11.	Discuss the features and application of any one modern testing tool (e.g., Katalon or SoapUI) in the current industry.	10 M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23IT10-GENERATIVE AI

(IT)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Generative Modeling and its primary goal.	2M	CO1	L1
(b)	List any two challenges of Generative Modeling.	2M	CO1	L1
(c)	Tell the role of the Attention mechanism in Transformers?	2M	CO2	L1
(d)	Define Retrieval Augmented Generation (RAG).	2M	CO2	L1
(e)	Identify the components of an Encoder-Decoder architecture.	2M	CO3	L1
(f)	Define CLIP in the context of image generation.	2M	CO3	L1
(g)	Define Cyclic GAN and its primary use case.	2M	CO4	L1
(h)	Recall Music Generating RNN?	2M	CO4	L1
(i)	Define the term "Fine-tuning" for generative models.	2M	CO5	L1
(j)	Name any two programming frameworks for LLMs.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Differentiate between Generative AI and Discriminative Modeling.	5M	CO1	L2
(b)	Explain the ethical aspects and Responsible AI principles.	5M	CO1	L2
(OR)				
3(a)	Describe the architecture and working principle of GANs.	5M	CO1	L2
(b)	Outline the importance of generative models in Machine Learning.	5M	CO1	L2
4(a)	Explain the Transformer Architecture including Encoder and Decoder.	5M	CO2	L2
(b)	Illustrate the mechanics of GPT models for text generation.	5M	CO2	L3
(OR)				
5(a)	Describe the process of Reinforcement Learning from Human Feedback (RLHF).	5M	CO2	L2
(b)	Explain Multimodal LLM and the issue of hallucination.	5M	CO2	L2
6(a)	Summarize the working principles of Stable Diffusion Models.	5M	CO3	L2
(b)	Explain the architecture of DALL-E 2 and DALL-E 3.	5M	CO3	L2
(OR)				
7(a)	Outline Visual Transformers (ViT) and their role in image generation.	5M	CO3	L2
(b)	Explain Mode Collapse and Stability issues in image models.	5M	CO3	L2
8(a)	Describe the use of Cyclic GAN for generating paintings.	5M	CO4	L2
(b)	Explain the working of MuseGAN for music production.	5M	CO4	L2
(OR)				
9(a)	Classify the principles of Neural Style Transfer with examples.	5M	CO4	L4
(b)	Describe the role of Autonomous Agents and Deep Q Algorithms.	5M	CO4	L2
10(a)	Explain the LangChain framework for programming LLMs.	5M	CO5	L2
(b)	Describe the deployment of generative models using Hugging Face.	5M	CO5	L2
(OR)				
11(a)	Explain Transfer Learning and the use of Pre-trained models.	5M	CO5	L2
(b)	Illustrate the open-source Llama model and its applications.	5M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23ME21-ADVANCED MANUFACTURING PROCESSES

(ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	State the applications of ECM.	2 M	CO1	L1
(b)	What is tool wear in EDM?	2 M	CO1	L1
(c)	What is Additive Manufacturing?	2 M	CO2	L1
(d)	State applications of LENS.	2 M	CO2	L1
(e)	What is electroforming?	2 M	CO3	L1
(f)	State applications of cladding.	2 M	CO3	L1
(g)	What is bottom-up approach?	2 M	CO4	L1
(h)	Define sputtering.	2 M	CO4	L1
(i)	What is oxidation?	2 M	CO5	L1
(j)	Define yield.	2 M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss the influence of abrasive size, velocity and stand-off distance in Abrasive Jet Machining (AJM).	5 M	CO1	L3
(b)	Explain advantages and applications of Electro Chemical Machining (ECM).	5 M	CO1	L2
(OR)				
3.	Explain Laser Beam Machining (LBM) process with its advantages and applications.	10 M	CO1	L2
(OR)				
4(a)	Explain Fused Deposition Modelling (FDM) process with diagram.	5 M	CO2	L2
(b)	Discuss applications of Additive Manufacturing (3D printing).	5 M	CO2	L2
(OR)				
5.	Explain Selective Laser Sintering (SLS) process with advantages.	10 M	CO2	L2
(OR)				
6(a)	Describe electroforming process with its applications.	5 M	CO3	L2
(b)	Explain surface cleaning methods used in surface preparation.	5 M	CO3	L2
(OR)				
7.	Explain diffusion coating process with its advantages and applications.	10 M	CO3	L2
(OR)				
8.	Explain sol-gel process used in nanomaterial synthesis with neat diagram.	10 M	CO4	L2
(OR)				
9(a)	Discuss the plasma arc discharge for nanomaterial processing.	5 M	CO4	L2
(b)	Explain pulsed laser deposition (PLD) technique.	5 M	CO4	L2
(OR)				
10(a)	Elaborate the crystal growth techniques used in semiconductor manufacturing.	5 M	CO5	L2
(b)	Explain the thermal oxidation process in semiconductor fabrication.	5 M	CO5	L2
(OR)				
11.	Describe the Printed Circuit Board (PCB) manufacturing process and yield with neat diagrams.	10 M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23ME22-RENEWABLE ENERGY TECHNOLOGIES

(ME)

Max. Marks : 70

Time : 3 hours

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Q.No	Compulsory Question	Marks	CO	BL
1(a)	Describe about the sun's declination and hour angle.	2 M	CO1	L1
(b)	What are the applications of solar energy?	2 M	CO1	L1
(c)	Define efficiency of PV module.	2 M	CO2	L1
(d)	What is depth of discharge?	2 M	CO2	L1
(e)	Give examples of sensible heat storage materials.	2 M	CO3	L1
(f)	State one advantage of stratified storage.	2 M	CO3	L1
(g)	What is cut-in wind speed?	2 M	CO4	L1
(h)	Define calorific value of biomass.	2 M	CO4	L1
(i)	State electrolyte used in AFC.	2 M	CO5	L1
(j)	Mention methods of hydrogen storage.	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss why it is necessary to develop non-conventional method of generating electrical energy.	5 M	CO1	L2
(b)	For New Delhi (28° 35' N, 77° 12' E), calculate the zenith angle of the sun at 2:30 P.M. on 20 February 2015. The standard IST latitude for India is 81° 44' E.	5 M	CO1	L3
(OR)				
3(a)	Summarize the reasons for variation in the amount of solar energy reaching earth surface.	5 M	CO1	L2
(b)	Distinguish between the working of Pyrheliometer and pyranometer.	5 M	CO1	L2
4.	Explain standalone and grid-connected solar PV systems with block diagrams.	10 M	CO2	L2
(OR)				
5(a)	Explain mismatch and temperature effects on PV module performance with suitable characteristics.	5 M	CO2	L2
(b)	Explain dielectric withstand and insulation resistance tests as per relevant standards.	5 M	CO2	L2
6(a)	Discuss latent heat storage systems and compare them with sensible heat storage.	5 M	CO3	L2
(b)	Explain construction, working and applications of solar distillation systems.	5 M	CO3	L2
(OR)				
7(a)	Discuss collector orientation, tilt angle and tracking mechanisms for maximizing solar energy collection.	5 M	CO3	L2
(b)	Explain the working principle, construction and applications of solar chimney.	5 M	CO3	L2
8(a)	Discuss importance of wind data in site selection.	5 M	CO4	L2
(b)	With the help of a diagram, discuss the power versus wind speed characteristics of a wind turbine.	5 M	CO4	L2
(OR)				
9(a)	Describe the process of pyrolysis in biomass conversion.	5 M	CO4	L2
(b)	Explain in detail the anaerobic digestion of biomass.	5 M	CO4	L2
10(a)	Discuss advantages, limitations and challenges of geothermal energy systems.	5 M	CO5	L2
(b)	Explain open cycle OTEC plant with diagram and working.	5 M	CO5	L2
(OR)				
11(a)	Explain construction, working and applications of PAFC.	5 M	CO5	L2
(b)	Discuss electrolysis method for hydrogen production with neat diagram.	5 M	CO5	L2

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LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING(AUTONOMOUS)

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B.Tech. (VI Semester) Regular Examinations

23AD08-No SQL DATABASES

(AI&DS)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define NoSQL. What does 'NoSQL' stand for?	2 M	CO1	L1
(b)	List the four types of NoSQL databases.	2 M	CO1	L1
(c)	What is Sharding in NoSQL databases?	2 M	CO2	L2
(d)	Define Master-Slave Replication.	2 M	CO2	L2
(e)	What is a Document-Oriented database?	2 M	CO3	L1
(f)	List any two suitable use cases of MongoDB.	2 M	CO3	L1
(g)	What is a Column-Family Data Store?	2 M	CO4	L1
(h)	Name two Column-Oriented NoSQL databases.	2 M	CO4	L1
(i)	What is a Key-Value Store? Give one example.	2 M	CO5	L1
(j)	What is a Graph Database? Name one Graph NoSQL database.	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss the key differences between relational databases and NoSQL databases.	5 M	CO1	L2
(b)	Describe the concept of Impedance Mismatch and how it led to the rise of NoSQL.	5 M	CO1	L2
(OR)				
3(a)	What are Application Databases and Integration Databases? Differentiate between them.	5 M	CO1	L2
(b)	Discuss the historical events and technological trends that contributed to the emergence of NoSQL.	5 M	CO1	L2
4.	Explain in detail the different NoSQL data models: Key-Value, Document, Column-Family, and Graph. Provide real-world examples for each.	10 M	CO2	L3
(OR)				
5(a)	Compare RDBMS with NoSQL stores with respect to scalability, structure, and query language.	5M	CO2	L3
(b)	Discuss the Key-Value and Document Data Models with suitable examples.	5M	CO2	L2
6(a)	Explain the key features of Document-Oriented databases with examples using MongoDB.	5M	CO3	L3
(b)	Describe how Consistency and Availability are handled in MongoDB.	5M	CO3	L2
(OR)				
7(a)	Illustrate the Query Features of MongoDB with examples using CRUD operations.	5M	CO3	L3
(b)	Describe how MongoDB is used in Content Management Systems and Blogging Platforms.	5M	CO3	L2
8(a)	Discuss the Architecture of Apache HBase.	5M	CO4	L2
(b)	Describe the Column-Family Data Store Features of Apache Cassandra.	5M	CO4	L2
(OR)				
9.	Explain the architecture of Apache HBase in detail, covering its components, data storage mechanism, consistency model, and suitable use cases.	10M	CO4	L3
10(a)	Illustrate the features of Key-Value databases using Riak as an example.	5M	CO5	L3
(b)	Describe the Query Features and Structure of Data in Key-Value stores.	5M	CO5	L2
(OR)				
11(a)	Explain Graph Database features using Neo4j including Consistency, Transactions, and Availability.	5M	CO5	L3
(b)	Discuss the suitable use cases for Key-Value databases: Session Information, User Profiles, and Shopping Cart Data.	5M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23AE23-INSTRUMENTATION MEASUREMENTS AND EXPERIMENTS IN FLUIDS
(ASE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Recall the performance terms used in measurement systems.	2 M	CO1	L1
(b)	Identify the two main categories of wind tunnel circuits.	2 M	CO1	L1
(c)	Describe the role of a smoke tunnel in flow visualization.	2 M	CO2	L2
(d)	State the condition under which a hydraulic jump occurs.	2 M	CO2	L1
(e)	Recall the operating range of velocities for which a hot-wire anemometer is most suitable.	2 M	CO3	L1
(f)	Explain the term "constant temperature mode" in hot-wire anemometry.	2 M	CO3	L2
(g)	State the working principle of a barometer.	2 M	CO3	L1
(h)	Explain the Seebeck effect.	2 M	CO3	L2
(i)	Define the term "data conversion" in the context of a data acquisition system.	2 M	CO5	L1
(j)	Describe the concept of internal estimate of error in uncertainty analysis.	2 M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Describe the need and objective of experimental study in fluid mechanics and explain how measurement systems influence the reliability of experimental data.	5 M	CO1	L2
(b)	Explain the constructional features of a low-speed wind tunnel, describe the function of each major component.	5 M	CO1	L2
(OR)				
3(a)	Describe yoke-type wind tunnel balance and analyze how it resolves the six aerodynamic force and moment components.	5 M	CO1	L2
(b)	Define the terms sensitivity, resolution, range, hysteresis and repeatability associated with an instrument.	5 M	CO1	L2
4.	Describe the construction and working of Hele-Shaw apparatus with a suitable schematic diagram.	10 M	CO2	L3
(OR)				
5(a)	Analyze the differences between qualitative and quantitative flow visualization methods.	5M	CO2	L2
(b)	Describe the working of a Mach-Zehnder interferometer.	5M	CO2	L2
6(a)	Explain the working principle of PIV (Particle Image Velocimetry).	5M	CO2	L2
(b)	Analyze the factors that affect the frequency response of a hot-wire anemometer system.	5M	CO2	L2
(OR)				
7(a)	Apply convective heat transfer principles and deduce the energy balance equation for a hot wire anemometer.	5M	CO3	L3
(b)	Compare constant current and constant temperature modes of working of a hot wire anemometer.	5M	CO3	L2
8(a)	Explain the working principle of a pyrometer for non-contact temperature measurement.	5M	CO3	L2
(b)	Describe the construction and working of a low-pressure measurement gauge.	5M	CO3	L2
(OR)				
9(a)	Explain the construction and operating principle of a Pitot-static tube, describe its geometric features.	5M	CO3	L2
(b)	illustrate the construction and working of a U-tube manometer with suitable sketch.	5M	CO3	L2
10(a)	Describe the principle of signal generation in a data acquisition system and what are the related components.	5M	CO4	L2
(b)	Analyze the consequences of under-sampling (aliasing) on the acquired data quality in data acquisition systems.	5M	CO4	L2
(OR)				
11(a)	Describe the general step-by-step procedure for estimating uncertainty, illustrating each step with reference to a pressure measurement experiment.	5M	CO4	L2
(b)	Analyze how uncertainties in stagnation pressure and static pressure propagate into the calculated Mach number, and identify which variable has a greater influence on Mach number uncertainty.	5M	CO4	L3

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B.Tech. (VI Semester) Regular Examinations

23CE22-GREEN BUILDINGS

(CE)

Time : 3 hours

Max. Marks: 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Explain Green Buildings concept.	2M	CO1	L2
(b)	List out the benefits of green buildings.	2M	CO1	L1
(c)	Mention the causes of global warming.	2M	CO2	L1
(d)	List out the sources of indoor air pollution.	2M	CO2	L1
(e)	Summarize the advantages of bamboo.	2M	CO3	L1
(f)	Explain the term "Ferro concrete".	2M	CO3	L1
(g)	Define building envelope. List out the types in buildings envelope.	2M	CO4	L1
(h)	Mention the common energy types used in commercial buildings.	2M	CO4	L1
(i)	List out the different green building rating systems.	2M	CO5	L1
(j)	Explain the LEED certification levels of green buildings.	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss about various Environmental Impacts on Green Buildings.	5M	CO1	L2
(b)	Explain in detail about Sustainable site selection in Green Buildings.	5M	CO1	L2
(OR)				
3(a)	Explain in detail about Planning of Buildings to maximize Natural ventilation.	5M	CO1	L2
(b)	Describe the basic concept of green building with suitable examples.	5M	CO1	L2
4(a)	Summarize the global efforts to reduce carbon emissions.	5M	CO2	L2
(b)	Illustrate the effect of ambient temperature and wind speed & direction on the design of green buildings.	5M	CO2	L2
(OR)				
5(a)	How the building orientation and architectural design optimize natural ventilation and daylighting?	5M	CO2	L2
(b)	Describe Fresh Air requirements and its Standards.	5M	CO2	L2
6(a)	Discuss the mechanical properties of timber.	5M	CO3	L2
(b)	List the different agro-waste produced. Mention their application in green buildings as a recyclable material.	5M	CO3	L2
(OR)				
7(a)	Discuss about types of wood products used in engineering applications along with their advantages.	5M	CO3	L2
(b)	Illustrate the various types of green roof alternatives.	5M	CO3	L2
8(a)	Summarize the necessity of conservation of water in buildings.	5M	CO4	L2
(b)	Explain the passive heating, cooling, and lighting techniques available in green buildings.	5M	CO4	L2
(OR)				
9(a)	Explain the water harvesting systems in green buildings.	5M	CO4	L2
(b)	Differentiate between Active and Passive Energy Systems with examples.	5M	CO4	L2
10.	Describe the different Methods of Solar Energy Harvesting. List out the Solar Energy Harvesting Devices.	10M	CO5	L2
(OR)				
11.	Discuss the Green Rating system for Integrated Habitat Assessment (GRIHA) of green buildings.	10M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23IT07-SOFTWARE PROJECT MANAGEMENT

(CSE,CSE(AI&ML) and IT)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define software process.	2M	CO1	L1
(b)	How to improve software economics?	2M	CO1	L1
(c)	What is inception phase?	2M	CO2	L1
(d)	List any two engineering artifacts.	2M	CO2	L1
(e)	What is model-based architecture?	2M	CO3	L1
(f)	Define Major and Minor milestones in software process.	2M	CO3	L1
(g)	What is process automation?	2M	CO4	L1
(h)	Explain any two software metrics.	2M	CO4	L2
(i)	What is Agile methodology?	2M	CO5	L1
(j)	Define DevOps.	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the waterfall model with its advantages and limitations.	5M	CO1	L2
(b)	Discuss the evolution of software economics.	5M	CO1	L2
(OR)				
3(a)	Discuss cost estimation techniques for a software project.	5M	CO1	L2
(b)	Differentiate conventional and modern software management practices.	5M	CO1	L2
4(a)	Illustrate all life cycle phases with examples.	5M	CO2	L3
(b)	Describe different artifact sets in software development.	5M	CO2	L3
(OR)				
5(a)	Apply lifecycle phases to a real-time application development.	5M	CO2	L3
(b)	Analyze the importance of programmatic artifacts.	5M	CO2	L4
6(a)	Apply model-based software architecture principles to design and manage a software project.	5M	CO3	L3
(b)	Illustrate iteration workflows with example.	5M	CO3	L3
(OR)				
7(a)	Demonstrate different types of Software Process Workflows.	5M	CO3	L3
(b)	Examine the Planning guidelines used in SPM.	5M	CO3	L3
8(a)	Describe the automation tools support for process workflows.	5M	CO4	L3
(b)	Interpret the need for metrics and examine the Management Indicators used for Project Control.	5M	CO4	L3
(OR)				
9(a)	Analyze quality indicators in software projects.	5M	CO4	L3
(b)	Illustrate the Pragmatic Software Metrics.	5M	CO4	L3
10(a)	Discuss Agile Methodology.	5M	CO5	L2
(b)	Explain the DevOps architecture.	5M	CO5	L2
(OR)				
11(a)	Summarise the DevOps Delivery Pipeline.	5M	CO5	L2
(b)	Explain the Scrum framework.	5M	CO5	L2

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (VI Semester) Regular Examinations

23EC24-EMBEDDED SYSTEMS

(ECE)

g n n

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define an embedded System.	2 M	CO1	L1
(b)	Define an ASIC.	2 M	CO1	L1
(c)	Define parallel communication.	2 M	CO2	L2
(d)	Define a counter.	2 M	CO2	L2
(e)	Define DMA.	2 M	CO3	L1
(f)	What is the use of a device drivers?	2 M	CO3	L1
(g)	Define real time operating system.	2 M	CO4	L1
(h)	Define a task.	2 M	CO4	L1
(i)	What is the need for a simulator?	2 M	CO5	L1
(j)	List different types of files used in embedded system development.	2 M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Discuss about classification of an embedded system.	5 M	CO1	L3
(b)	Write short notes on embedded firmware.	5 M	CO1	L2
	(OR)			
3(a)	Discuss about memories used in an embedded systems.	5 M	CO2	L3
(b)	Write short notes on hardware and software partitions.	5 M	CO2	L2
4.	Briefly explain the operation of watchdog timer.	10 M	CO3	L3
	(OR)			
5(a)	List different serial communication devices and explain briefly.	5M	CO3	L2
(b)	Write short notes on timers and counters.	5M	CO2	L2
6(a)	Discuss about different approaches used for firmware design.	5M	CO2	L2
(b)	Briefly explain the operation of DMA.	5M	CO3	L3
	(OR)			
7(a)	Discuss the steps to convert assembly language program in to machine language program.	5M	CO2	L2
(b)	Write the differences between compilers and cross compilers.	5M	CO3	L2
8(a)	Write short notes on task scheduling.	5M	CO3	L2
(b)	Discuss the need for synchronization in RTOS.	5M	CO3	L3
	(OR)			
9.	Briefly discuss about hardware software Co-design issues.	10M	CO4	L3
10(a)	Briefly discuss about BIST.	5M	CO4	L3
(b)	Discuss about translation tools in embedded systems.	5M	CO4	L3
	(OR)			
11.	Draw the embedded system design flow diagram by considering an example.	10M	CO4	L4

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B.Tech. (VI Semester) Regular Examinations

23EE22-ELECTRIC DRIVES

(EEE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	State essential parts of electrical drives.	2M	CO1	L1
(b)	List the merits and demerits of dynamic braking.	2M	CO1	L1
(c)	Explain the speed control techniques of dc motors.	2M	CO2	L1
(d)	What are the advantages of three phase drives over single-phase drives?	2M	CO2	L1
(e)	Explain about control techniques of choppers.	2M	CO3	L1
(f)	Draw the circuit diagram for the operation of Quadrant II choppers.	2M	CO3	L1
(g)	Why stator voltage control is suitable for speed control of induction motors in fan and pump drives?	2M	CO4	L2
(h)	Explain the principle of slip power recovery scheme.	2M	CO4	L1
(i)	Explain the principle of self-control of synchronous motor.	2M	CO5	L1
(j)	How is the output voltage of a VSI improved by PWM techniques?	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Draw the block diagram of Electric drive, What are the functions of a power modulator?	5M	CO1	L2
(b)	Differentiate between active and passive load torques. Give examples of each.	5M	CO1	L2
(OR)				
3(a)	Derive the mathematical condition to obtain the steady state stability of equilibrium point.	5M	CO1	L2
(b)	Draw and explain the closed loop speed control scheme widely used in electric drives.	5M	CO1	L2
4.	What are the advantages of electrical drives? The speed of a separately excited DC Motor is controlled by 3- ϕ full-converter. Input voltage 415V, $R_a=0.9\Omega$, $K_m=1.5V/rad/s$, $I_a=10A$. Find the motor developed torque.	10M	CO2	L3
(OR)				
5.	Draw and explain the speed-torque characteristics at different firing angles for a three phase fully converter feeding a d.c series motor. Draw the quadrant diagram also.	10M	CO2	L2
6(a)	Describe different braking methods employed for electrical motors by choppers.	5M	CO3	L2
(b)	A 220v, 24A, 1000rpm separately excited dc motor having an armature resistance of 2Ω is controlled by a chopper. The chopping frequency is 500Hz and the input voltage is 230V. Calculate the duty ratio for a motor torque of 1.2 times rated torque at 500rpm.	5M	CO3	L3
(OR)				
7(a)	Class-B chopper, operating in time-ratio control, is supplying the armature of the separately excited dc motor. Derive the motor speed-torque relation.	5M	CO3	L2
(b)	A 230 V, 960 rpm and 200A separately excited dc motor has an armature resistance of 0.02Ω . The motor is fed from a chopper, which is capable of providing both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction: (i) Calculate the time ratio of chopper for the motoring action at rated torque and 350 rpm. (ii) Determine the maximum possible speed, if maximum value of time ratio is 0.95 and maximum permissible motor current is twice the rated value.	5M	CO3	L3
8(a)	Discuss speed control of induction motor from stator side with speed-torque curves.	5M	CO4	L2
(b)	Illustrate the variable frequency control of induction motor by Current Source inverter.	5M	CO4	L2
(OR)				
9.	Discuss the concept of slip power recovery with the help of control of Static Kramers drive.	10M	CO4	L2
10(a)	Describe separate controlled mode and self-controlled mode of operation of a synchronous motor drive and compare them.	5M	CO5	L2
(b)	Draw the block diagram of a closed loop synchronous motor drive fed from VSI.	5M	CO5	L2
(OR)				
11(a)	Describe self-controlled and load-commutated inverter controlled synchronous motor drives in detail.	5M	CO5	L2
(b)	When a synchronous motor is operating in true synchronous mode, frequency must be varied insteps. Why?	5M	CO5	L2

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L.B.Reddy Nagar :: Mylavaram - 521 230 :: NTR Dist. :: A.P.

B.Tech. (VI Semester) Regular Examinations

23ME27-REFRIGERATION AND AIR CONDITIONING

(ME)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL																			
1(a)	Define COP and Ton of Refrigeration.	2 M	CO1	L1																			
(b)	What is dry ice Refrigeration?	2 M	CO1	L1																			
(c)	Write the equation for COP of VCR cycle.	2 M	CO2	L1																			
(d)	What is the difference between air cooled and water-cooled condenser?	2 M	CO1	L1																			
(e)	Name the working fluids used in VAR system.	2 M	CO3	L1																			
(f)	State the various non-conventional refrigeration systems.	2 M	CO1	L1																			
(g)	A room contains sensible heat load of 300kW and latent heat load of 100kW. Determine the Sensible Heat Factor (SHF)	2 M	CO4	L2																			
(h)	What are the Psychrometric processes used in summer and winter air conditioning systems?	2 M	CO4	L1																			
(i)	Define the terms (i) BPF (ii) GRSHF.	2 M	CO5	L1																			
(j)	What is cooling load estimation?	2 M	CO5	L1																			
Q.No	All questions carry equal marks	Marks	CO	BL																			
2(a)	What is meant by refrigeration? List out the various methods of refrigeration.	5 M	CO1	L1																			
(b)	A cold storage is to be maintained at -5°C while the surroundings are at 35°C . The heat leakage from the surroundings in to the cold storage is estimated to be 29kW. The actual C.O.P of the refrigeration plant is one third of an ideal plant working between the same temperatures. Find the power required to drive the plant.	5 M	CO2	L3																			
(OR)																							
3(a)	State the desirable properties of an ideal refrigerant.	5 M	CO3	L1																			
(b)	Derive an expression for the COP of Bell Coleman cycle with the P-V and T-S diagrams.	5 M	CO1	L2																			
4(a)	Explain the working of Vapour Compression Refrigeration cycle with P-h diagram.	5 M	CO1	L2																			
(b)	A vapour compression refrigerator works between the pressure limits of 60 bar and 25 bar. The working fluid is dry saturated at the end of the compression and there is no under cooling of the liquid before the expansion. Estimate: (i) COP of the cycle and (ii) Capacity of the refrigerator, if the fluid flow is at the rate of 5 kg/min.	5 M	CO2	L3																			
<table border="1"> <thead> <tr> <th rowspan="2">Pressure (bar)</th><th colspan="2">Enthalpy (kJ/kg)</th><th colspan="2">Entropy (kJ/kg.K)</th></tr> <tr> <th>Liquid</th><th>Vapour</th><th>Liquid</th><th>Vapour</th></tr> </thead> <tbody> <tr> <td>60</td><td>151.96</td><td>293.29</td><td>0.554</td><td>1.0332</td></tr> <tr> <td>25</td><td>56.32</td><td>322.58</td><td>0.226</td><td>1.2464</td></tr> </tbody> </table>					Pressure (bar)	Enthalpy (kJ/kg)		Entropy (kJ/kg.K)		Liquid	Vapour	Liquid	Vapour	60	151.96	293.29	0.554	1.0332	25	56.32	322.58	0.226	1.2464
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25	56.32	322.58	0.226	1.2464																			
(OR)																							
5(a)	Classify the condensers and explain the working of shell and tube condenser.	5 M	CO1	L2																			
(b)	Illustrate the working of single stage reciprocating compressor.	5 M	CO1	L2																			

23ME27-REFRIGERATION AND AIR CONDITIONING

6(a)	Demonstrate the working principle of actual vapor absorption refrigeration system with the help of neat sketch.	5 M	CO1	L2
(b)	In a vapour absorption refrigeration system, the refrigeration temperature is -15°C . The generator is operated by solar heat where the temperature reached is 100°C . The temperature of heat sink is 50°C . What is the maximum possible COP of the system?	5 M	CO2	L3
(OR)				
7(a)	Illustrate the working principle of Vortex tube refrigeration system.	5 M	CO1	L2
(b)	Explain the working principle of Adiabatic Demagnetization refrigeration system with a suitable sketch.	5 M	CO1	L2
8(a)	Sketch the psychrometric chart and explain the properties of atmospheric air and its representation on psychrometric chart.	5 M	CO4	L2
(b)	The pressure, temperature, relative humidity of air at a place is 1.013bar, 32°C and 65% respectively. Find: (i) Dew point temperature (ii) Specific enthalpy (iii) Specific volume (iv) Humidity Ratio.	5 M	CO4	L3
(OR)				
9 (a)	900 kg/hr of return air at 24°C DBT and 60% RH is mixed with 100 kg/hr of fresh air at 40°C DBT and 30% RH. Evaluate the final conditions of the mixture	5 M	CO4	L3
(b)	What is an effective temperature? Explain the comfort chart with suitable sketch.	5 M	CO4	L2
10(a)	Illustrate the working principle of winter air conditioning system.	5 M	CO5	L2
(b)	Distinguish between central air conditioning system and unitary air conditioning system.	5 M	CO5	L2
(OR)				
11(a)	Discuss different types of heat loads which have to be taken into account in order to estimate the cooling load.	5 M	CO5	L2
(b)	An air-conditioning system is to be designed for a small office during winter. The outdoor conditions are 10°C DBT and 8°C WBT, while the required indoor conditions are 20°C DBT and 60% RH. The office accommodates 50 people, with a fresh air supply of $0.3\text{m}^3/\text{min}$ per person. The desired conditions are achieved by first heating and then adiabatic humidification. Determine: (i) The heating capacity of the coil (in kW) and its surface temperature if the bypass factor is 0.32 (ii) The capacity of the humidifier.	5 M	CO5	L4

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L.B.Reddy Nagar :: Mylavaram – 521 230 :: NTR Dist. :: A.P.

B.Tech. (VI Semester) Regular Examinations

23ME83-APPLIED OPERATIONS RESEARCH
(AI&DS)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL																																										
1(a)	Define Operations Research.	2 M	CO1	L1																																										
(b)	List out the applications of operations research.	2 M	CO1	L1																																										
(c)	Differentiate between slack variables and surplus variables.	2 M	CO2	L2																																										
(d)	What is an unbalanced Transportation problem?	2 M	CO2	L1																																										
(e)	List the assumptions in sequencing problem.	2 M	CO3	L1																																										
(f)	What is meant by (M/M/1) : (∞ /FCFS) Queuing model ?	2 M	CO3	L1																																										
(g)	What is saddle point in Game theory?	2 M	CO4	L1																																										
(h)	Differentiate between PERT and CPM.	2 M	CO4	L2																																										
(i)	List the applications of dynamic programming.	2 M	CO5	L1																																										
(j)	Discuss the types of simulation models.	2 M	CO5	L2																																										
Q.No	All questions carry equal marks	Marks	CO	BL																																										
2.	Use Simplex method to solve the following Linear Programming problem Maximize, $Z = 4X_1 + 3X_2 + 6X_3$ Subject to $2x_1+3x_2+2x_3 \leq 440$, $4x_1+3x_3 \leq 470$, $2x_1+5x_2 \leq 430$ and $x_1, x_2, x_3 \geq 0$.	10 M	CO1	L3																																										
(OR)																																														
3(a)	Explain different Phases of Operations research.	5 M	CO1	L2																																										
(b)	A company produces 3 products p, q and r from 3 raw materials A, B and C. One unit of 'p' requires 2 units of 'A' and 3 units of 'B'. One unit of 'q' requires 2 units of 'B' and 5 units of 'C'. One unit of 'r' requires 3 units of 'A', 2 units of 'B' and 4 units of 'C'. A company having 8 units of 'A', 10 units of 'B' and 15 units of 'C'. Profits per unit of product p, q, r are Rs.3, Rs.4, Rs.5 respectively. Formulate the problem mathematically to maximize the product profit.	5 M	CO1	L3																																										
4.	A company has 4 workers (A, B, C, D) and 4 jobs (J1, J2, J3, J4). The cost (in ₹) of assigning each worker to each job is given below: <table border="1"><tr><td>Worker \ Job</td><td>J1</td><td>J2</td><td>J3</td><td>J4</td></tr><tr><td>A</td><td>9</td><td>2</td><td>7</td><td>8</td></tr><tr><td>B</td><td>6</td><td>4</td><td>3</td><td>7</td></tr><tr><td>C</td><td>5</td><td>8</td><td>1</td><td>8</td></tr><tr><td>D</td><td>7</td><td>6</td><td>9</td><td>4</td></tr></table> Determine the optimal assignment of workers to jobs to minimize the total cost using the Hungarian Method.	Worker \ Job	J1	J2	J3	J4	A	9	2	7	8	B	6	4	3	7	C	5	8	1	8	D	7	6	9	4	10 M	CO2	L3																	
Worker \ Job	J1	J2	J3	J4																																										
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C	5	8	1	8																																										
D	7	6	9	4																																										
(OR)																																														
5(a)	Find the initial basic feasible solution of the following transportation problem by North-West Corner rule. <table border="1"><tr><td>Source \ Destination</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>Supply</td></tr><tr><td>A</td><td>4</td><td>3</td><td>1</td><td>2</td><td>6</td><td>80</td></tr><tr><td>B</td><td>5</td><td>2</td><td>3</td><td>4</td><td>5</td><td>60</td></tr><tr><td>C</td><td>3</td><td>5</td><td>6</td><td>3</td><td>2</td><td>40</td></tr><tr><td>D</td><td>2</td><td>4</td><td>4</td><td>5</td><td>3</td><td>20</td></tr><tr><td>Demand</td><td>60</td><td>60</td><td>30</td><td>40</td><td>10</td><td></td></tr></table>	Source \ Destination	1	2	3	4	5	Supply	A	4	3	1	2	6	80	B	5	2	3	4	5	60	C	3	5	6	3	2	40	D	2	4	4	5	3	20	Demand	60	60	30	40	10		5 M	CO2	L3
Source \ Destination	1	2	3	4	5	Supply																																								
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Demand	60	60	30	40	10																																									
(b)	Five jobs J_1, J_2, J_3, J_4, J_5 are to be processed on three machines M_1, M_2, M_3 in the same order. The processing times (in hours) are given below: <table border="1"><tr><td>Job</td><td>M_1</td><td>M_2</td><td>M_3</td></tr><tr><td>J_1</td><td>3</td><td>8</td><td>5</td></tr><tr><td>J_2</td><td>6</td><td>4</td><td>7</td></tr><tr><td>J_3</td><td>5</td><td>7</td><td>6</td></tr><tr><td>J_4</td><td>2</td><td>3</td><td>4</td></tr><tr><td>J_5</td><td>7</td><td>6</td><td>5</td></tr></table> Find the optimal sequence of jobs to minimize total elapsed time.	Job	M_1	M_2	M_3	J_1	3	8	5	J_2	6	4	7	J_3	5	7	6	J_4	2	3	4	J_5	7	6	5	5 M	CO2	L3																		
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J_5	7	6	5																																											

23ME83-APPLIED OPERATIONS RESEARCH

6(a)	The cost of a machine is Rs. 5000 and its scrap value is Rs. 500. The maintenance costs over the years are as follows: <table><tr><td>Year</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Maintenance Cost (Rs.)</td><td>200</td><td>300</td><td>500</td><td>900</td></tr></table> Determine the optimal time to replace the machine.	Year	1	2	3	4	Maintenance Cost (Rs.)	200	300	500	900	5 M	CO3	L3																																								
Year	1	2	3	4																																																		
Maintenance Cost (Rs.)	200	300	500	900																																																		
6(b)	The purchase cost of a machine is Rs. 4000 and its scrap value is Rs. 500. The annual maintenance costs are given below: <table><tr><td>Year</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Maintenance Cost (Rs.)</td><td>300</td><td>400</td><td>600</td><td>900</td></tr></table> Assume the rate of interest is 10% per annum. Determine the optimal replacement period considering the time value of money.	Year	1	2	3	4	Maintenance Cost (Rs.)	300	400	600	900	5 M	CO3	L3																																								
Year	1	2	3	4																																																		
Maintenance Cost (Rs.)	300	400	600	900																																																		
(OR)																																																						
7(a)	Solve 3x3 game by the method of matrices. <table><tr><td colspan="2" rowspan="5"></td><td colspan="4">Player B</td></tr><tr><td></td><td>1</td><td>2</td><td>3</td></tr><tr><td>1</td><td>1</td><td>-1</td><td>-1</td></tr><tr><td>2</td><td>-1</td><td>-1</td><td>3</td></tr><tr><td>3</td><td>-1</td><td>2</td><td>-1</td></tr></table>			Player B					1	2	3	1	1	-1	-1	2	-1	-1	3	3	-1	2	-1	5 M	CO3	L3																												
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				2	-1	-1	3																																															
		3	-1	2	-1																																																	
7(b)	Reduce the following game by using the principle of dominance. <table><tr><td colspan="2" rowspan="6"></td><td colspan="6">Player B</td></tr><tr><td>I</td><td>II</td><td>III</td><td>IV</td><td>V</td><td>VI</td></tr><tr><td rowspan="5">Player A</td><td>I</td><td>4</td><td>2</td><td>0</td><td>2</td><td>1</td><td>1</td></tr><tr><td>II</td><td>4</td><td>3</td><td>1</td><td>3</td><td>2</td><td>2</td></tr><tr><td>III</td><td>4</td><td>3</td><td>7</td><td>-5</td><td>1</td><td>2</td></tr><tr><td>IV</td><td>4</td><td>3</td><td>4</td><td>-1</td><td>2</td><td>2</td></tr><tr><td>V</td><td>4</td><td>3</td><td>3</td><td>-2</td><td>2</td><td>2</td></tr></table>			Player B						I	II	III	IV	V	VI	Player A	I	4	2	0	2	1	1	II	4	3	1	3	2	2	III	4	3	7	-5	1	2	IV	4	3	4	-1	2	2	V	4	3	3	-2	2	2	5 M	CO3	L3
				Player B																																																		
				I	II	III	IV	V	VI																																													
				Player A	I	4	2	0	2	1	1																																											
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					III	4	3	7	-5	1	2																																											
		IV	4		3	4	-1	2	2																																													
V	4	3	3		-2	2	2																																															
8(a)	A situation where the mean arrival rate (λ) is one customer every 4 minutes and the mean service time (μ) is $2\frac{1}{2}$ minutes. Calculate the average number of customers in the system, the average queue length and the time taken by a customer in the system and the average time a customer waits before being served.	5 M	CO4	L3																																																		
8(b)	A TV repairman finds that the time spent on his jobs has an exponential distribution with mean 30 minutes. If he repairs sets in the order in which they come in, and if the arrival of sets is approximately poisson with an average rate of 10 per 8-hour day, what is repairman's expected idle time each day? How many jobs are ahead of the average set just brought in?	5 M	CO4	L3																																																		
(OR)																																																						
9.	A project has the following time schedule <table><tr><td>Activity</td><td>1-2</td><td>1-3</td><td>2-4</td><td>3-4</td><td>3-5</td><td>4-9</td><td>5-6</td><td>5-7</td><td>6-8</td><td>7-8</td><td>8-9</td><td>8-10</td><td>9-10</td></tr><tr><td>Time in weeks</td><td>4</td><td>1</td><td>1</td><td>1</td><td>6</td><td>5</td><td>4</td><td>8</td><td>1</td><td>2</td><td>1</td><td>8</td><td>7</td></tr></table> Compute the CPM network (i) T_E and T_L for each network (ii) Float for each activity (iii) Critical path for each duration.	Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-9	8-10	9-10	Time in weeks	4	1	1	1	6	5	4	8	1	2	1	8	7	10M	CO4	L3																						
Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-9	8-10	9-10																																									
Time in weeks	4	1	1	1	6	5	4	8	1	2	1	8	7																																									
10.	A company has 4 units of a resource to allocate between two projects (Project A and Project B). The profit (in ₹) obtained from each project depending on the number of units allocated is given below: Profit Table <table><tr><td>Units Allocated</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Project A</td><td>0</td><td>5</td><td>9</td><td>12</td><td>14</td></tr><tr><td>Project B</td><td>0</td><td>4</td><td>7</td><td>10</td><td>13</td></tr></table> Determine the optimal allocation of resources to maximize total profit using dynamic programming	Units Allocated	0	1	2	3	4	Project A	0	5	9	12	14	Project B	0	4	7	10	13	10M	CO5	L3																																
Units Allocated	0	1	2	3	4																																																	
Project A	0	5	9	12	14																																																	
Project B	0	4	7	10	13																																																	
(OR)																																																						
11(a)	Discuss advantages and limitations of simulation.	5M	CO5	L2																																																		
11(b)	Explain briefly the applications of simulation.	5M	CO5	L2																																																		

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B.Tech. (VI Semester) Regular Examinations

23EC82-PRINCIPLES OF COMMUNICATIONS
(ASE)

Max. Marks : 70

Time : 3 hours

Q.No	Compulsory Question	Marks	CO	BL
1(a)	State frequency shifting property of Fourier Transform.	2M	CO2	L2
(b)	Mention the need for modulation.	2M	CO1	L2
(c)	Sketch the spectrum of SSB-SC modulation.	2M	CO2	L2
(d)	Define coherent detection.	2M	CO1	L2
(e)	Define Modulation Index in FM.	2M	CO2	L2
(f)	Contrast between FM and PM.	2M	CO1	L2
(g)	Define non uniform quantizer.	2M	CO3	L2
(h)	What is Aliasing effect?	2M	CO3	L2
(i)	Define conditional probability.	2M	CO4	L2
(j)	Illustrate the meaning of thermal noise.	2M	CO4	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Derive the expression for amplitude modulated wave for single tone frequency.	5M	CO2	L3
(b)	Analyze the demodulation of an AM signal using envelope detector.	5M	CO1	L4
(OR)				
3(a)	Summarize the process of generation of AM wave using switching modulator.	5M	CO1	L3
(b)	An AM signal is represented as $s(t) = 2 \cos 2\pi 106t (1 + \cos 4000\pi t)$. Determine (i) Message & Carrier signal frequencies (ii) Band width (iii) Modulation index.	5M	CO2	L3
4.	Differentiate between double sideband full carrier, double sideband suppressed carrier and single sideband suppressed carrier modulation techniques.	10M	CO1	L2
(OR)				
5(a)	Illustrate the reason behind quadrature null effect in the demodulation of double side band suppressed carrier amplitude modulated signal.	5M	CO2	L3
(b)	Explain about demodulation of single sideband suppressed carrier amplitude modulated signal (SSBSC –AM) using coherent detector.	5M	CO1	L2
6(a)	Infer the process involved in the generation of narrow band frequency modulation (NBFM) with necessary block diagram.	5M	CO1	L3
(b)	A 107.6 MHZ carrier signal is frequency modulated by a 7KHZ sine wave. The resultant FM has a frequency deviation of 50KHZ. Determine (i) Carrier swing (ii) Highest and Lowest frequencies (iii) Modulation index.	5M	CO2	L3
(OR)				
7(a)	Contrast the working of FM demodulation using indirect method.	5M	CO1	L2
(b)	Describe the process of generation of wideband FM using Armstrong method.	5M	CO2	L3
8(a)	Demonstrate Signal Reconstruction from sampled signals.	5M	CO3	L2
(b)	Explain the three fundamental steps of Pulse Code Modulation (PCM) Sampling, Quantization, and Encoding used to digitize an analog signal.	5M	CO3	L2
(OR)				
9(a)	Explain the process of modulation and demodulation in Pulse Amplitude Modulation.	5M	CO3	L3
(b)	With a neat sketch explain the principle and operation of Differential Pulse Code Modulation.	5M	CO3	L3
10	Analyze the Gaussian random process and its role in modeling noise.	10M	CO4	L4
(OR)				
11(a)	Describe with necessary examples about the classification of Random variables.	5M	CO4	L2
(b)	Determine the constant value k if a random variable X has the density function is given $f_x(x) = \begin{cases} k \left(\frac{1}{1+x^2} \right), & -\infty < x < \infty \\ 0, & elsewhere \end{cases}$	5M	CO4	L3

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B.Tech. (VI Semester) Regular Examinations

23CS84-IOT BASED SMART SYSTEMS

(CE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Explain meaning of Internet of Things (IoT).	2M	CO1	L2
(b)	List any two characteristics of IoT.	2M	CO1	L1
(c)	Describe M2M communication.	2M	CO1	L2
(d)	Explain the use of IoT gateway.	2M	CO2	L2
(e)	What is HTTP protocol?	2M	CO3	L1
(f)	Define MQTT protocol.	2M	CO3	L1
(g)	What is data collection in IoT?	2M	CO4	L1
(h)	List different smart home applications.	2M	CO4	L1
(i)	Explain what is cloud computing.	2M	CO5	L2
(j)	What is a sensor?	2M	CO5	L1
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Describe and explain the key characteristics of IoT with suitable real-world examples.	5M	CO1	L2
(b)	Explain the applications of IoT in smart homes and healthcare systems.	5M	CO1	L2
(OR)				
3(a)	Explain the concept and role of embedded systems in IoT with examples.	5M	CO1	L2
(b)	Discuss the important design considerations for developing IoT systems.	5M	CO1	L2
4(a)	Explain about the layered architecture of IoT systems.	5M	CO2	L2
(b)	Describe the communication components involved in IoT and their functions.	5M	CO2	L2
(OR)				
5(a)	Compare short-range and long-range communication technologies in IoT.	5M	CO2	L2
(b)	Explain the role and functions of gateways in IoT communication.	5M	CO2	L2
6(a)	Illustrate how web-based communication is implemented in IoT systems using suitable examples.	5M	CO3	L2
(b)	Demonstrate different data transfer methods used in IoT communication.	5M	CO3	L2
(OR)				
7(a)	Describe various IoT communication protocols and their features.	5M	CO3	L2
(b)	Illustrate the process of device-to-web communication in IoT systems.	5M	CO3	L2
8(a)	Explain the methods of data collection and storage in IoT systems.	5M	CO4	L2
(b)	Apply IoT concepts to demonstrate smart agriculture systems with examples.	5M	CO4	L2
(OR)				
9(a)	Apply IoT concepts to design a smart waste management system with suitable explanation.	5M	CO4	L2
(b)	Explain the impact of IoT in reducing human intervention in smart systems.	5M	CO4	L2
10(a)	Describe various cloud platforms used in IoT and their features.	5M	CO5	L2
(b)	Explain IoT concepts to demonstrate smart monitoring systems with examples.	5M	CO5	L2
(OR)				
11(a)	Explain and differentiate between RFID and WSN in IoT.	5M	CO5	L2
(b)	Discuss how cloud integration supports smart temperature monitoring in IoT applications.	5M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23CE81-DISASTER MANAGEMENT

(CSE, CSE(AI&ML) and IT)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define Disaster Management (DM).	2M	CO1	L1
(b)	List the stages of the Disaster Management Cycle.	2M	CO1	L1
(c)	List any four common fire hazards.	2M	CO2	L1
(d)	How can groundwater contamination occur due to industries?	2M	CO2	L1
(e)	Define Building Codes in disaster management.	2M	CO3	L1
(f)	Mention two non-structural safety measures in buildings.	2M	CO3	L1
(g)	Summarize the list of Infrastructures that are used in daily life.	2M	CO4	L1
(h)	Mention the different categories in agricultural droughts.	2M	CO4	L1
(i)	What are the roles of the 'Warning and Information Dissemination Team' in a school?	2M	CO5	L1
(j)	How can Corporate Social Responsibility (CSR) funds be utilized to enhance community resilience in disaster-prone areas?	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the interdisciplinary nature of Disaster Management.	5M	CO1	L2
(b)	Explain droughts and their effects on agriculture and society.	5M	CO1	L2
(OR)				
3(a)	Explain the relationship between global warming and natural hazards.	5M	CO1	L2
(b)	Describe the characteristics of cyclones.	5M	CO1	L2
(OR)				
4(a)	Explain man-made disasters and their classification.	5M	CO2	L2
(b)	Explain bioterrorism and why it is considered highly dangerous.	5M	CO2	L2
(OR)				
5(a)	Explain emerging and re-emerging infectious diseases with examples.	5M	CO2	L2
(b)	Explain the causes of rail accidents and their management.	5M	CO2	L2
(OR)				
6(a)	Discuss the importance of building codes in disaster risk reduction with suitable examples.	5M	CO3	L2
(b)	Discuss structural and non-structural mitigation measures in building regulations.	5M	CO3	L2
(OR)				
7(a)	Explain the role of macro-economic policy in disaster recovery.	5M	CO3	L2
(b)	Discuss the impacts of climate change on natural hazards.	5M	CO3	L2
(OR)				
8(a)	Explain the functions of multimedia technology in disaster management.	5M	CO4	L2
(b)	Explain the advantages and disadvantages of indigenous knowledge.	5M	CO4	L2
(OR)				
9(a)	Explain in detail about GIS applications in disaster Risk reduction.	5M	CO4	L2
(b)	What are the different types of droughts? Suggest relief and rehabilitation measures for drought.	5M	CO4	L2
(OR)				
10(a)	Discuss the roles of the 'Warning and Information Dissemination Team' in a school.	5M	CO5	L2
(b)	How can Corporate Social Responsibility (CSR) funds be utilized to enhance community resilience in disaster-prone areas?	5M	CO5	L2
(OR)				
11(a)	Define Community-Based Disaster Management (CBDM) and explain its importance in disaster risk reduction.	5M	CO5	L2
(b)	Define Community Capacity Building and explain its three main types of activity.	5M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

23IT82-INTRODUCTION TO PROGRAMMING IN JAVA
(ECE)

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	What is the difference between method and constructor?	2M	CO1	L1
(b)	What is recursion?	2M	CO1	L1
(c)	What is method overriding?	2M	CO2	L2
(d)	What is dynamic binding?	2M	CO2	L1
(e)	What is the purpose of `import` statement?	2M	CO3	L1
(f)	What is unboxing a Wrapper Class in java?	2M	CO3	L1
(g)	What is the use of `catch` block?	2M	CO4	L1
(h)	What is race condition in java?	2M	CO4	L1
(i)	What is an event listener?	2M	CO5	L1
(j)	What is delegation event model?	2M	CO5	L1
(OR)				
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the role of the "this" keyword in Java.	5M	CO1	L2
(b)	Write a Java program to demonstrate recursion using factorial.	5M	CO1	L3
(OR)				
3(a)	Write a Java program to calculate the sum and average of elements in an array.	5M	CO1	L3
(b)	Explain the key features (buzzwords) of Java.	5M	CO1	L2
(OR)				
4(a)	Differentiate between abstract class and concrete class.	5M	CO2	L2
(b)	Write a Java program using an abstract class `Bank` with abstract method `getRateOfInterest()` and implement it in subclasses.	5M	CO2	L3
(OR)				
5(a)	Explain the role of `super` keyword in inheritance.	5M	CO2	L2
(b)	Explain dynamic binding and how it differs from static binding.	5M	CO2	L2
(OR)				
6(a)	Explain the concept of interfaces in Java and their importance.	5M	CO3	L2
(b)	Write a java program to convert a valid numerical strings into integer and float using wrapper class methods.	5M	CO3	L3
(OR)				
7(a)	Explain how access control works across packages in java.	5M	CO3	L2
(b)	Describe the role of classpath in package usage.	5M	CO3	L2
(OR)				
8(a)	Explain the concept of exception handling in Java and its benefits.	5M	CO4	L2
(b)	Write a Java program to create a thread using Runnable interface that prints even numbers.	5M	CO4	L3
(OR)				
9(a)	Differentiate between `throw` and `throws` keywords.	5M	CO4	L2
(b)	Write a Java program to read an array element using index and handle Array Index Out Of Bounds Exception.	5M	CO4	L3
(OR)				
10(a)	Explain about Mouse Event handling in java.	5M	CO5	L2
(b)	Write a Java program to accept user input using JTextField and display it.	5M	CO5	L3
(OR)				
11(a)	Explain the drawbacks of AWT in developing GUI java applications.	5M	CO5	L2
(b)	Write a Java program with a JCheckBox and display whether it is selected.	5M	CO5	L3

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B.Tech. (VI Semester) Regular Examinations

23CS81-INTRODUCTION TO JAVA PROGRAMMING

(EEE)

Time : 3 hours

Max. Marks : 70

Q. No	Compulsory Question	Marks	CO	BL
1(a)	What is Data Abstraction?	2M	CO1	L1
(b)	Differentiate While and do-while.	2M	CO1	L1
(c)	What is the purpose of 'super' and 'this' keyword?	2M	CO2	L1
(d)	What is Dynamic Binding?	2M	CO2	L1
(e)	How to create and Access a Package?	2M	CO3	L1
(f)	What is the role of an Interface?	2M	CO3	L1
(g)	What is the purpose of handling exceptions?	2M	CO4	L1
(h)	Which keywords are used in exception handling mechanism?	2M	CO4	L1
(i)	Differentiate Thread and Process.	2M	CO5	L1
(j)	What is inter-thread communication?	2M	CO5	L1
(OR)				
Q. No	All questions carry equal marks	Marks	CO	BL
2(a)	Explain the Features of Java.	5M	CO1	L2
(b)	Write a java program to demonstrate class and object.	5M	CO1	L3
(OR)				
3(a)	What is a multidimensional array? Explain with suitable example.	5M	CO1	L2
(b)	Write a java program to find the Factorial of the given number.	5M	CO1	L3
(OR)				
4(a)	Explain different types of inheritance with suitable diagrams and examples.	5M	CO2	L2
(b)	Difference between abstract class and interface.	5M	CO2	L2
(OR)				
5(a)	What is an abstract class? Write a program to demonstrate abstract methods.	5M	CO2	L3
(b)	Discuss Method overriding with an example program.	5M	CO2	L3
(OR)				
6(a)	Explain the syntax of an interface with an example.	5M	CO3	L2
(b)	Difference between extends and implements.	5M	CO3	L2
(OR)				
7(a)	Define package. Explain the steps involved in creating a user-defined package with an example.	5M	CO3	L3
(b)	Differentiate class and interface.	5M	CO3	L2
(OR)				
8(a)	What is an exception? How will you handle Exception.	5M	CO4	L2
(b)	How do you create your own Exception? Explain with a suitable program.	5M	CO4	L3
(OR)				
9(a)	What are runtime exceptions? Explain with examples.	5M	CO4	L2
(b)	Differentiate between error and exception.	5M	CO4	L3
(OR)				
10(a)	Explain the life cycle of thread with neat diagram.	5M	CO5	L2
(b)	Write a java program to demonstrate thread priorities.	5M	CO5	L3
(OR)				
11(a)	Explain different ways of creating a thread in Java.	5M	CO5	L2
(b)	What are the benefits of multithreading?	5M	CO5	L2

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B.Tech. (VI Semester) Regular Examinations

**23EE83-UTILIZATION OF ELECTRICAL ENERGY
(ME)**

g r a

Time : 3 hours

Max. Marks : 70

Q.No	Compulsory Question	Marks	CO	BL
1(a)	Define electric welding.	2M	CO1	L1
(b)	State any two applications of welding.	2M	CO1	L1
(c)	Define candle power.	2M	CO2	L1
(d)	State any two requirements of good lighting.	2M	CO2	L1
(e)	What is dynamic stability?	2M	CO3	L1
(f)	In Fourth quadrant how and electric drive works.	2M	CO3	L2
(g)	What is coasting period?	2M	CO4	L1
(h)	Define electric traction.	2M	CO4	L1
(i)	List methods of Power factor improvement methods.	2M	CO5	L2
(j)	Define kW, kVA, and kVAR.	2M	CO5	L2
Q.No	All questions carry equal marks	Marks	CO	BL
2(a)	Illustrate the working of spot and seam welding techniques.	5 M	CO1	L2
(b)	Describe the construction, working, and applications of an induction furnace.	5 M	CO1	L2
(OR)				
3.	Classify the different methods of Electric Resistance Welding and List their Applications.	10 M	CO1	L2
4(a)	Discuss the terms related to illumination. (i) Glare (ii) Luminous Flux (iii) Illumination (iv) Luminous Intensity.	5 M	CO2	L2
(b)	Describe the principle of operation of LED Lamp.	5 M	CO2	L2
(OR)				
5(a)	The illumination at a point on a working plane directly below the lamp is to be 80lumens/m ² . The lamp gives 150 CP uniformly below the horizontal plane. Determine: (i) The height at which lamp is suspended (ii) The illumination at a point on the working plane 3.8m away from the vertical axis of the lamp.	5 M	CO2	L3
(b)	Describe the construction and working of Mercury Vapour Lamp with a neat sketch.	5 M	CO2	L2
6(a)	Discuss the significance of load equalization in electrical drives.	5 M	CO3	L2
(b)	Compare AC Drives over DC Drives.	5 M	CO3	L2
(OR)				
7(a)	Define Electric Drive and Discuss the components of Electrical Drive system.	5 M	CO3	L2
(b)	Describe the Multi-quadrant operation of an electric drive with applications.	5 M	CO3	L2
8(a)	Illustrate the supply systems usually employed for track electrification.	5 M	CO4	L2
(b)	Enumerate various types of motors used in electric traction.	5 M	CO4	L2
(OR)				
9	A train has a schedule speed of 50 kmph between stops which are 1.5 km apart. It is running at a maximum speed of 60kmph with (i) Duration of stops as 30 sec (ii) Acceleration as 1.7kmphps (iii) Retardation as 3.3 kmphps. Draw the speed time curve for the run and represent the time durations of acceleration, free running and retardation.	10 M	CO4	L3
10(a)	Illustrate the power factor improvement by static capacitor method.	5 M	CO5	L2
(b)	Enumerate the following tariffs: (i) Block-Rate Tariff (ii) Two Part Tariff	5 M	CO5	L2
(OR)				
11(a)	Define power factor and discuss the advantages of power factor improvement.	5 M	CO5	L2
(b)	A consumer has a maximum demand of 200KW at 40% load factor. If the tariff is Rs.100 per kW of maximum demand plus 10 paise per kWh, find the overall cost per kWh.	5 M	CO5	L3