SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					R20

III B.Tech. I Semester MODEL QUESTION PAPER

R PROGRAMMING

(Open Elective Common to CE, ECE, EEE, & ME)

Time: 3 Hrs.				Max. Marks: 70 M	

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1	a)	"R operates in two modes". Interpret with an example	1	3	7
	b)	Explain various mechanisms to subset numeric and character vectors in R?	1	2	7
		OR			
2	a)	Create an array and a matrix and demonstrate their indexing mechanisms.	1	2	7
	b)	Define a List and create a list to show heterogeneous data type storage ability.	1	2	7
		UNIT-II			
3	a)	What is recursion? Write a simple R code to print GCD of two numbers using recursion.	2	3	7
	b)	Develop R code using 'for' to print elements of a sequence, vector, array and matrix.	2	3	7
		OR			
4	a)	List the arithmetic and Boolean operators in R along with their possible result.	2	2	7
	b)	Interpret the passing of default value for arguments in R.	2	3	7
		UNIT-III			
5	a)	Examine the use of functions for statistical distribution.	3	3	7
	b)	How do you apply order and sort functions on vectors and data frames?	3	2	7
		OR			
6	a)	Explain about any four linear algebra functions with example.	3	2	7
	b)	Summarize the setoperations over two vectors.	3	2	7
		UNIT-IV			
7	a)	Generate 20 random numbers and plot using scatter plot with title and labels using R.	3	3	7
	b)	Write an R code to generate Barplot of temperature from air quality dataset.	3	3	7
		OR			

8	a)	Compare various plot functions available in R with an emphasis on data distribution.	3	3	7
	b)	Write the syntax to write plot to a file in various file formats.	3	2	7
		UNIT-V			
9	a)	Discuss on Probability distribution i.e., Normal Distribution Binomial Distribution and Poisson Distribution	4	2	7
	b)	Explain about Random Forest in detail.	4	2	7
		OR			
10	a)	Compare correlation and covariance measures of dataset features.	4	3	7
	b)	Differentiate between simple linear and multiple linear regressions.	4	3	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

					Course Code: B20ADOE02

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	**R20**	
III B.Tech. I Semester MODEL QUESTION PAPER		
FOUNDATION OF DATA SCIENCE		
(Open Elective Common to CE, ECE, EEE, & ME)		

Time: 3 Hrs.	**Max. Marks: 70 M**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.	**a).**	Explain Linear algebra with Numpy ?	**1**	**2**	**7**
	b).	Build in detail about Data Science process with necessary examples.	**1**	**2**	**7**
		OR			
2.	**a).**	Explain Required steps of data science .	**1**	**2**	**7**
	b).	Explain Arrays and vectorized computation using Numpy with example	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	How many types of files in data science? Explain each with examples	**2**	**2**	**7**
	b).	Explain Correlation and covariance with examples .	**2**	**2**	**7**
		OR			
4.	**a).**	Explain Data loading, Storage using pandas .	**2**	**2**	**7**
	b).	Make a pandas Data Frame with two-dimensional list using python .	**2**	**3**	**7**
		UNIT-III			
5.	**a).**	Is regular expressions important for data science? What are the applications of regular expression?	**3**	**2**	**7**
	b).	Explain about Data Wrangling and uses of data wrangling .	**3**	**2**	**7**
		OR			
6.	**a).**	What is data Cleaning and preparation? Explain different types of data cleaning techniques with examples .	**3**	**2**	**7**
	b).	Apply a methods join, Combine and reshape - Hierarchical indexing using student sample data .	**3**	**3**	**7**
		UNIT-IV			
7.	**a).**	Define Data Visualization what are the benefits of data visualization .	**4**	**2**	**7**
	b).	Explain Data aggregation and Group operations Group By mechanics .	**4**	**2**	**7**
		OR			
8.	**a).**	Apply Different types of plots with examples.	**4**	**3**	**7**
	b).	How can we visualize more than three dimensions of data in a single	**4**	**3**	**7**

		chart?			
		UNIT-V			
9.	**a).**	What is resampling and describe the methods of Down sampling, up sampling with examples	5	3	7
	b).	Describe the various tools used to represent the time data types	5	3	7
		OR			
10.	**a).**	Describe various applications of time series data and list out the basics of time series data	5	3	7
	b).	Explain the various methods for Moving window functions	5	3	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A, B splits or as a single Question for 14 marks

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R20

III B.Tech. I Semester MODEL QUESTION PAPER

REMOTE SENSING AND GIS

(Open Elective Common to AIDS, CSE, CSBS, ECE, EEE, IT & ME)

TIME: 3Hrs.	Max. Marks: 70M

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.	(a).	Explain the interaction of electromagnetic radiation with atmosphere. Highlight those aspects that find application in earth observation.	1	2	7
	(b).	What are the characteristics of Active and Passive Remote Sensing sensors? Relate them to their preferred applications.	2	2	7
		OR			
2.	(a).	Describe energy interaction with earth surface features. Indicate how this knowledge helps in design of sensors for data acquisition.	1	2	7
	(b).	Discuss at least two remote sensing platforms. Explain their relevance to various applications with examples from the Indian and International Space Sector.	2	2	7
		UNIT-II			
3.	(a).	Compare visual interpretation of analog satellite imagery and digital image analysis. State the advantages and limitations of both the approaches.	3	2	7
	(b).	Briefly describe the various stages of Digital Image Processing leading up to a classified image output.	3	2	7
		OR			
4.	(a).	What are image interpretation keys? Discuss their significance in standardizing the image interpretation exercise.	3	2	7
	(b).	Distinguish between Supervised and Unsupervised classification. State the criteria based on which, one or the other approach is adopted in Image Processing.	3	2	7
		UNIT-III			
5.	(a).	Illustrate the workflow of creating a digital Geographic Information System (GIS) Explain the key components.	4	2	7
	(b).	What are map projections? What changes do you notice when you switch the projection of a World Map from Mercator to Peter's projection?	4	2	7
		OR			

6.	(a).	Discuss in detail various application areas of Computer and Web-based Geographic Information Systems.	4	2	7
	(b).	Differentiate between the Raster and Vector model of representing spatial data in computer models. State the applications of each model clearly.	4	2	7
		UNIT-IV			
7.	(a).	What is Overlay Analysis in GIS? Explain its applications and elaborate with one example.	4	2	7
	(b).	Define DEM and DTM. Draw out the differences in their conception and application.	4	2	7
		OR			
8.	(a).	What is Network Analysis in GIS? Explain its applications and elaborate with one example.	4	2	7
	(b).	Explain how 3 D Modelling tools in GIS can help in scenario planning for a dam breach scenario.	4	2	7
		UNIT-V			
9.	(a).	What is Land use / Land cover map? Explain its significance in any type of Geospatial Analysis.	5	2	7
	(b).	How can GIS help in Environmental Impact Assessment? Elaborate your answer.	5	2	7
		OR			
10.	(a).	State any twp 3D Modelling applications using GIS and explain each one briefly.	5	2	7
	(b).	Elaborate on a few urban applications of GIS.	5	2	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A, B splits or as a single Question for 14 marks

			Course Code: B20CEOE02	
	SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			R20
	III B.Tech. I Semester MODEL QUESTION PAPER			
	DISASTER MANAGEMENT			
	(Open Elective Common to AIDS, CSE, CSBS, ECE, EEE, IT & ME)			
TIME: 3Hrs			Max.Marks:70M	
	Answer ONE Question from EACH UNIT			
	All questions carry equal marks			
	Assume suitable data if necessary			

			CO	KL	M
		UNIT-I			
1.	a)	What are *Natural* Disasters? Is there a relationship between development and occurrence of natural disasters? Support your answer with data.	1	2	7
	b)	What are urban floods? Should they be considered natural disaster or man-made disaster? Support your answer with reasons.	1	2	7
		(OR)			
2.	a)	What are *Man-made* Disasters? How is the work of scientists and engineers related to their occurrence? Suggest measures to reduce their occurrence.	1	2	7
	b)	Are urban and rural population susceptible to the same types of natural and man-made disasters? Support your answer with reasons. Are rural population at lower risk compared to urban population from a disaster point-of-view?	1	2	7
		UNIT-II			
3.	a)	Relate the Impacts of disasters on the loss of human lives and livestock with examples. How are the physical and environmental conditions affected by a disaster?	2	2	7
	b)	Summa rise the interventions needed in a community in the aftermath of a disaster. What support do the disaster survivors need to rebuild their communities?	2	2	7
		(OR)			
4.	a)	Explain global climate change. Establish any relationship between global climate change and the occurrence of natural disasters.	2	2	7
	b)	Why are GHG (Green House Gas) reductions the focus of climate change mitigation? Which of the GHGs are the greatest contributors to climate change from the top 5 GHG emitting countries in the world?	2	2	7

		UNIT-III			
5.	**a)**	Discuss the various stages of the disaster management cycle. Explain the structural and non-structural measures necessary for effective mitigation of disaster impacts.	3	2	7
	b)	Associate the basic strategies and practices of disaster risk reduction with the disaster management cycle.	3	2	7
		OR			
6.	**a)**	Describe a risk management framework. How do you assess the vulnerability of a community to incidence of disasters?	3	2	7
	b)	Paraphrase the global policies and best practices in the domain of disaster risk reduction and management.	3	2	7
		UNIT-IV			
7.	**a)**	Differentiate between government preparedness and community preparedness. Why is it important to have community preparedness for facing disasters?	4	2	7
	b)	Describe the role of education in community preparedness to face disasters. What are the essentials of school disaster education?	4	2	7
		OR			
8.	**a)**	What is the difference between disaster mitigation and adaptation? How does social capital enhance the community response to disasters?	4	2	7
	b)	Illustrate how resilience can be designed in a community towards facing disasters. How do you go about building community capacity for action?	4	2	7
		UNIT-V			
9.a)	**b)**	Illustrate how technology is helping forecast natural disasters and supporting disaster management.	5	2	7
		Explain the role of multimedia technology in disaster risk management and training.	5	2	7
		OR			
10.	**a)**	How does Geospatial Information help in predicting extreme weather events and associated disasters?	5	2	7
	b)	Illustrate how indigenous and traditional knowledge of environment and ecology can help reduce the incidence of disasters.	5	2	7

CO-COURSE OUTCOME   **KL-KNOWLEDGE LEVEL**   **M-MARKS**

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

				Course Code: B20CBOE01
SAGI RAMAKRISHNAM RAJU ENGINEERING COLLEGE (A)				**R20**
III B.Tech. I Semester MODEL QUESTION PAPER				
PYTHON PROGRAMMING				
(Open Elective Common to CE)				

Time: 3 Hrs.				**Max. Marks:70**

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1	**a)**	Explain about input validation loops and nested loops with examples	1	2	7
	b)	Write a Python program to calculate the amount payable if money has been lent on simple interest. Principal or money lent = P, Rate of interest = R% per annum and Time = T years. Then Simple Interest (SI) = (P x R x T)/ 100. Amount payable = Principal + SI. P, R and T are given as input to the program.	1	4	7
		OR			
2	**a)**	Explain about explicit conversion with examples.	1	2	7
	b)	Explain about precedence of all operators in Python.	1	2	7
		UNIT-II			
3	**a)**	Define Python string padding functions? Explain with examples	2	2	7
	b)	Illustrate if, if-else, if-elif-else Statements with examples.	2	3	7
		OR			
4	**a)**	Explain about data encryption in Python.	2	2	7
	b)	Explain about special data types in Python (List, tuple, set, dictionary)	2	2	7
		UNIT-III			
5	**a)**	Write a Python program to create three dictionaries, then create one dictionary that will contain the other three dictionaries.	3	3	7
	b)	Describe Python list/Array methods? Explain.	3	2	7
		OR			
6	**a)**	Discuss about importing module from a package.	3	2	7
	b)	Explain about anonymous or Lambda function with merits and demerits	3	2	7
		UNIT-IV			
7	**a)**	Explain about structuring classes with inheritance and polymorphism.	4	2	7
	b)	Illustrate manipulating file pointer using seek with suitable example.	4	3	7
		OR			

8	a)	Demonstrate the case study of an ATM using classes.	4	3	7
	b)	Explain about reading numbers from a file using Python program.	4	2	7
		UNIT-V			
9	a)	Describe syntax errors and exceptions in python briefly?	5	2	7
	b)	Illustrate Entry fields for the input and output of text with example.	5	3	7
		OR			
10	a)	Describe user Defined exception with example.	5	2	7
	b)	Define Scrolling list boxes with example.	5	2	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A, B splits or as a single Question for 14 marks

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R20

III B.Tech. I Semester MODEL QUESTION PAPER

DATABASE MANAGEMENT SYSTEMS

(Open Elective Common to CIVIL, ECE, EEE & ME)

Time: 3 Hrs.				Max. Marks: 70 M		
Answer **ONE Question** from **EACH UNIT**						
All questions carry equal marks						
Assume suitable data if necessary						
				CO	**KL**	**M**
		UNIT-I				
1.	**a).**	Explain the problems associated with conventional file processing system.		1	2	8
	b).	Explain different levels of abstraction offered by DBMS with an example.		1	2	6
		OR				
2.	**a).**	Draw a neat diagram of the structure of DBMS and explain the functions of various components of DBMS.		1	2	8
	b).	Explain about Centralized and Client-Server architectures of DBMS.		1	2	6
		UNIT-II				
3.	**a).**	A University has several departments. Each department has several instructors and one among them is the HOD. Each instructor teaches multiple courses. Each department offers several courses. A student can enrol for several courses offered by different departments. Considering above description, develop a complete E-R diagram for the University database.		2	3	7
	b).	Explain briefly about any four Integrity Constraints with suitable examples.		2	2	7
		OR				
4.	**a).**	There are different libraries in a University. Each library maintains different books that are issued for loan. A book is uniquely identified in conjunction with its library. A student can subscribe to any one library, but, can take books from any library. Considering above description, develop a complete E-R diagram for the University database.		2	3	7
	b).	Consider an E-R diagram of a binary relationship of your choice with key and participation constraints. Translate the E-R diagram into a collection of suitable relations.		2	3	7
		UNIT-III				
5.	**a).**	Consider the following schema. Students (***Std_ID***: String, S_Name: String, Dept: String, GPA: Real) Courses (***C_ID***: String, C_Name: String, Credits: Integer, Offered_by_Dept: String) Enrolled (***Std_ID***: String, ***C_ID***:String, Grade: Character). Answer the following queries in SQL.		3	3	8

		i) For each course offered by CSE department, find the total number of enrolments. ii) Find the sum of credits of all courses enrolled by student "S01". iii) Find the courses that have at least 10 enrolments. iv) Applying outer join, find the count of enrolments for each course offered.			
	b).	Explain with a suitable example, the way nested and correlated queries are evaluated.	3	3	6
		OR			
6.	**a).**	Consider the following schema. Students (***Std_ID***: String, S_Name: String, Dept: String, GPA: Real) Courses (***C_ID***: String, C_Name: String, Credits: Integer, Offered_by_Dept: String) Enrolled (***Std_ID***: String, ***C_ID***:String, Grade: Character). Answer the following queries in SQL. i) Write a correlated query to find IDs and names of students who are enrolled for course "C01". ii) Create a view named "GoodGrades" which contain Std_ID, S_Name and C_ ID of enrolments for which the grade is "A". iii) Display Students table in the descending order of names of students. iv) Find the IDs and names of students who enrolled for both the courses "C02" and "C03".	3	3	8
	b).	Explain with suitable examples, natural inner join and all variants of natural outer joins.	3	3	6
		UNIT-IV			
7.	**a).**	Consider the schema R(A,B,C,D,E,G) and the list of functional dependencies F={A→BC, EC→D,D→A, G→E }. Determine all candidate keys of R. Find the best normal form that R satisfies.	4	3	8
	b).	Explain with an example, multi-valued dependency and fourth normal form.	4	3	6
		OR			
8.	**a).**	Find the best normal form satisfied by the relation R(A,B,C,D,E) with set of FDs F= {BC->D, AC->BE, B->E} Decompose R into the next higher normal form.	4	3	8
	b).	What do you mean by lossless join decomposition and dependency preserving decomposition? Write down the tests for the same.	4	3	6
		UNIT-V			
9.	**a).**	Explain briefly ACID properties of a transaction.	5	2	6
	b).	Explain recovery related structures maintained during normal execution and explain the three phases of ARIES recovery algorithm.	5	2	8
		OR			
10.	**a).**	Explain search and insert operations on a B+ tree index structure.	5	2	7

b).	Explain with an example, hash based indexing.	5	2	7

CO-COURSE OUTCOME   **KL-KNOWLEDGE LEVEL**   **M-MARKS**

NOTE: Questions can be given as A, B splits or as a single Question for 14 marks

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R 20

III B.Tech. I Semester MODEL QUESTION PAPER

DATA STRUCTURES

(Open Elective Common to CE, ECE, EEE & ME)

Time: 3 Hrs.	Max. Marks:70

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

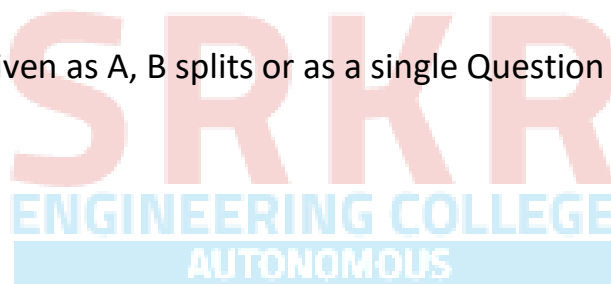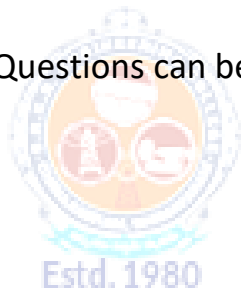|			CO	KL	M
		UNIT-I			
1	a).	Explain representation of array as an ADT along with their advantages and disadvantages	1	3	7
	b).	Arrange the following list of elements in ascending order using Merge Sort A, L, G, O, R, I, T, H, M, S Clearly show the sorting process at each step.	1	2	7
		OR			
2	a).	Write ADT operations for array implementation of polynomial addition.	1	2	7
	b).	Sort the elements using Quick Sort: 52, 38, 81, 22, 48, 13, 69, 93, 14, 45, 58, 79, 72.	1	3	7
		UNIT-II			
3	a).	Define stack ADT. Explain basic operations of a stack ADT.	2	3	7
	b).	Convert the given infix Expression ((A+B)*C-(D-E)^(F+G)) into its Equivalent Prefix and Postfix Notations.	2	3	7
		OR			
4	a).	Explain the procedure to evaluate postfix expression 6 2 3 + - 3 8 2 / + * 2 4 3 +	2	3	7
	b).	Discuss about implementation of queues using linked list	2	3	7
		UNIT-III			
5	a).	Compare singly and circular linked list while performing insertion and deletion operations	3	4	7
	b).	Explain polynomial multiplication using linked list with an example	3	3	7
		OR			
6	a).	List various operations of linked list and explain how to insert a node anywhere in the list.	3	2	7
	b).	Explain various operations performed on doubly Linked Lists	3	3	7
		UNIT-IV			
7	a).	Sketch the binary search tree resulting after inserting the following integer keys 49, 27, 12, 11, 33, 77, 26, 56, 23, 6.	4	3	7

		i) Check whether the tree is almost complete or not? ii) Determine the height of the tree iii) Write post order and preorder traversals			
	b).	Create max heap for the following elements 33, 14, 65, 02, 76, 69, 59, 85, 47, 99, 98.	**4**	**3**	**7**
		OR			
8	**a).**	A binary tree has seven nodes. The Preorder and Post order traversal of the tree are given below. Can you draw the tree? Justify. Preorder: GFDABEC Post order ABDCEFG	**4**	**3**	**7**
	b).	Write in-order, pre-order and post-order traversal of a binary tree.	**4**	**2**	**7**
		UNIT-V			
9	**a).**	What is minimum cost spanning tree? Discuss with an example	**5**	**2**	**7**
	b).	Explain Dijkstras Algorithm with an example	**5**	**3**	**7**
		OR			
10	**a).**	Discuss Kruskal "s algorithm advantages and disadvantages.	**5**	**3**	**7**
	b).	Discuss the Representation of Graphs.	**5**	**2**	**7**

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A, B splits or as a single Question for 14 marks

					Course Code: B20CSOE02

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R 20**

III B. Tech. I Semester MODEL QUESTION PAPER

JAVA PROGRAMMING

(Open Elective Common to CE, ECE, EEE & ME)

Time: 3 Hrs.	Max. Marks:70

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1	**a).**	Explain about the Features of Java.	**1**	**2**	**7**
	b).	Explain about Method Overloading with an example	**1**	**2**	**7**
		OR			
2	**a).**	Explain various types of Constructors with suitable examples.	**1**	**2**	**8**
	b).	Explain with an example about this keyword.	**1**	**2**	**6**
		UNIT-II			
3	**a).**	Explain the differences between Arrays and Vectors	**2**	**2**	**7**
	b).	Write a Java Program to implement methods of Vector class.	**2**	**3**	**7**
		OR			
4	**a).**	Explain the differences between String class and StringBuffer class.	**2**	**2**	**6**
	b).	Write a Java Program to implement various methods of String class.	**2**	**2**	**8**
		UNIT-III			
5	**a).**	Explain different types of inheritances in Java.	**3**	**2**	**8**
	b).	Explain with example about Method Overriding	**3**	**3**	**6**
		OR			
6	**a).**	Differentiate Abstract class and Interface.	**3**	**4**	**6**
	b).	Discuss about procedure for creating packages with an example	**3**	**3**	**8**
		UNIT-IV			
7	**a).**	Explain about the mechanism of Exception handling in Java.	**4**	**2**	**7**
	b).	Write a Java Program to create Custom Exception.	**4**	**2**	**7**
		OR			
8	**a).**	Explain about the life cycle of thread	**4**	**2**	**7**
	b).	Explain about the various methods of creating Thread.	**4**	**2**	**7**
		UNIT-V			
9	**a).**	Discuss about Byte Oriented IO and Character Oriented IO.	**5**	**2**	**7**
	b).	Write a Java program to copy contents of one file to another file using Line Oriented IO.	**5**	**2**	**7**
		OR			

10	a).	Discuss the types of JDBC Drivers.	5	2	8
	b).	Write a JDBC program to retrieve data from the database.	5	2	6

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A, B splits or as a single Question for 14 marks

			Course Code: B20CSOE03		
	SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			R 20	
	III B.Tech. I Semester MODEL QUESTION PAPER				
	WEB TECHNOLOGIES				
	(Open Elective Common to CE, ECE, EEE & ME)				
Time: 3 Hrs.				Max. Marks:70	
	Answer ONE Question from EACH UNIT				
	All questions carry equal marks				
	Assume suitable data if necessary				
			CO	KL	M
		UNIT-I			
1	a).	Explain the concept of frameset and frames in building Web Pages	1	2	7
	b).	Explain various form elements with an example	1	2	7
		OR			
2	a).	Explain different types of lists in HTML with an example	1	2	7
	b).	Write an HTML script to manage personal details of a student like name, class, qualifications, photo, address etc., using tables and other suitable tags.	1	2	7
		UNIT-II			
3	a).	Explain various types of Style sheets with example	2	2	7
	b).	Write a java script to print Armstrong Numbers between 1 to 500.	2	2	7
		OR			
4	a).	Explain different java script objects.	2	2	6
	b).	Explain various types of selectors in CSS with suitable examples	2	2	8
		UNIT-III			
5	a).	Explain about Ajax Mechanism with an Example	3	2	7
	b).	Explain the differences between DOM & SAX	3	2	7
		OR			
6	a).	Explain about XML schema with an example	3	2	6
	b).	Explain about integration of Ajax and PHP with an example	3	2	8
		UNIT-IV			
7	a).	Explain about the types of Arrays in PHP with an example.	4	2	7
	b).	Explain any 5 String Operations in PHP with Suitable Examples	4	2	7
		OR			
8	a).	Explain various types of control statements in PHP	4	2	7
	b).	Write a PHP Script to find the Fibonacci sequence upto a given number	4	2	7
		UNIT-V			
9	a).	Explain how a Session is created and Destroyed in PHP	5	2	7

	b).	Develop a PHP program to fetch data from the MYSQL database	5	3	7
		OR			
10	**a).**	Develop a PHP Program to Insert data into a MYSQL database	5	3	7
	b).	Explain about Cookies in PHP with an example.	5	2	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

			Course Code: B20ECOE01		
	SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R 20**	
	III B.Tech. I Semester MODEL QUESTION PAPER				
	BASIC ELECTRONICS				
	(Open Elective Common to CE & CSE)				
Time: 3 Hrs.				Max. Marks:70	
	Answer **ONE Question** from **EACH UNIT**				
	All questions carry equal marks				
	Assume suitable data if necessary				
			CO	KL	M
	UNIT-I				
1	**a).**	Describe intrinsic and extrinsic semiconductors?	1	2	7
	b).	Derive expressions form obility in semiconductors?	1	1	7
		OR			
2	**a).**	What is Hall-effect? What are its applications?	1	1	7
	b).	Explain Phenomenon of Drift and Diffusion in semiconductors?	1	2	7
		UNIT-II			
3	**a).**	What are various types of passive components? How 3 band and4 Band resistors are decoded?	2	1	7
	b).	Explain inductance and mutual inductance of an inductor?	2	2	7
		OR			
4	**a).**	With a neat sketch explain basic operation of CRO?	2	2	7
	b).	What are KVL and KCL? Explain each with an example?	2	2	7
		UNIT-III			
5	**a).**	Explain basic operation and V-I characteristics of semiconductor diode?	3	2	7
	b).	What is Zener diode? Explain its operation in reverse bias condition Along with its applications?	3	2	7
		OR			
6	**a).**	Draw and explain the operation of a full wave rectifier?	3	2	7
	b).	Explain construction and operation of photo-diode?	3	2	7
		UNIT-IV			
7	**a).**	Plot the input and output characteristics of transistor in CB configuration?	4	1	7
	b).	List and Explain the fabrication steps of Monolithic ICs?	4	2	7
		OR			
8	**a).**	Explain CC configuration of transistor?	4	2	7
	b).	What is an IC? Write a short notes on Classification of ICs?	4	1	7
		UNIT-V			
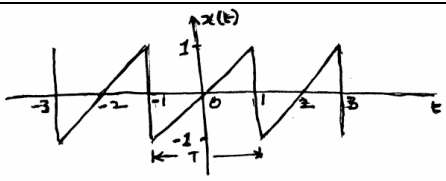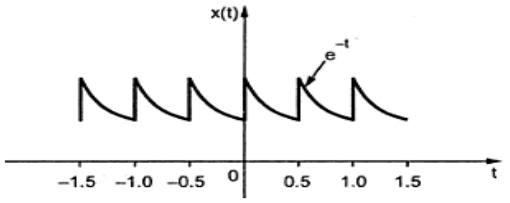
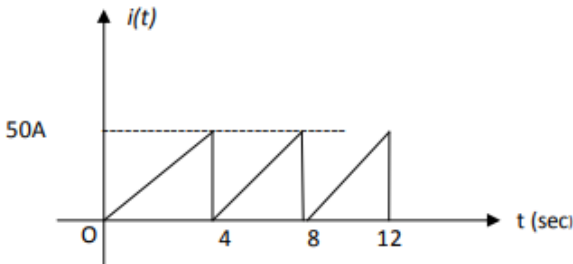| 9	a).	Convert the Decimal number 867.9 into Binary, Octal, and Hexadecimal?	5	3	7
	b).	Explain operation and truth table of a)NAND b)NOR c)XOR gates.	5	2	7
		OR			
10	a).	Explain operation and State Transition table of J-K flip-flop?	5	2	7
	b).	Convert following Decimal numbers to Binary a)1101b)1110.1111c)217.67	5	3	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

	Course Code: B20ECOE02
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R20

III B.Tech. I Semester MODEL QUESTION PAPER

SIGNALS AND SYSTEMS

(Open Elective Common to AIDS, CE, CSE, CSBS, IT & ME)

Time: 3 Hrs.	Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.	a).	**Define** signal power and signal energy. **Check** whether $x(n) = -0.5 ^n(n)$ is a power signal or energy signal.	1	3	7
	b).	**Test** whether the following signals are periodic or not. If periodic **Determine** the fundamental period. (i) $x(t) = 3\cos 10\pi t + \sin 20\pi t$ (ii) $x[n] = \cos(\frac{8\pi}{31})$ n	1	3	7
		OR			
2.	a).	**Determine** are the basic transformations for the following signal? Given x(t) = u(t)-u(t-3), plot x(t) and x(2t).	1	3	7
	b).	**Explain** the system properties Linearity, Time-Invariance, Stability and Causality by giving examples.	1	3	7
		UNIT-II			
3.	a).	**Determine** the Convolution between the two Signals $x(t) = e^{-3t}u(t)$ and $h(t) = tu(t)$	2	3	7
	b).	An LTI system is described by the difference equation: $y[n] + 2y[n-1] = x[n]$. **Find** the output y[n] when input x[n] = u[n]. Assume initial rest.	2	3	7
		OR			
4.	a).	**Draw** the block diagram representation of an LTI system in direct form-I realization for the system described by the difference equation y(n) -14 y(n-1) -18 y(n-2) = x(n) + 3x(n-1) + 2x(n-2)	2	3	7
	b).	**Explain** about the singularity functions and **prove that** $x(t) * \delta(t - t_0) = x(t - t_0)$	2	3	7
		UNIT-III			
5.	a).	Determine the trigonometric Fourier series for the given signal shown below.	3	4	7
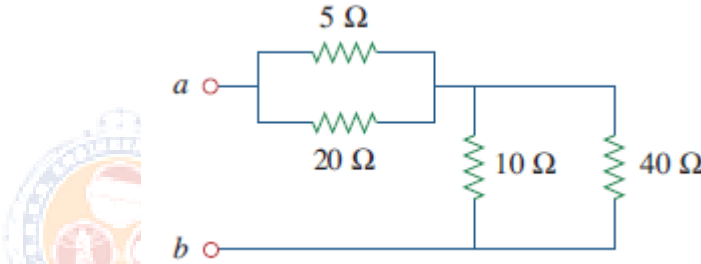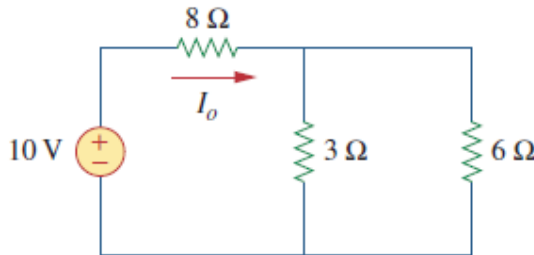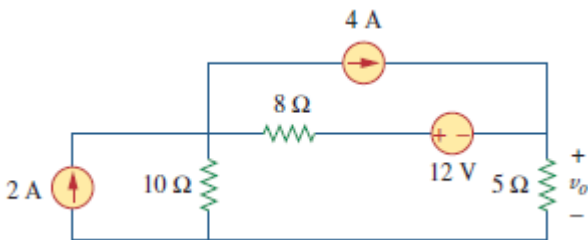
	b).	**Obtain** the exponential Fourier series for x[n]=Sin 0.1Πn	3	4	7
		OR			
6.	a).	**Obtain** the Exponential Fourier series for the periodic signal x(t) = e^{-t} shown below. 	3	4	7
	b).	**Determine** the best approximation of signal x(t) = t in terms of y(t)=Sin t over an interval (–Π ≤ t ≤ Π).	3	4	7
		UNIT-IV			
7.	a).	**Determine** the Fourier Transform of x(t)=e$^{-2|t|}$	4	3	7
	b).	**Derive** the convolution property of the Continuous time Fourier transform.	4	4	7
		OR			
8.	a).	**Determine** the inverse DTFT of $X(e^{j\omega}) = \dfrac{1}{(1-ae^{-j\omega})^2}$ $|a| < 1$	4	3	7
	b).	**Obtain** the step response of the system described by the following difference equation using DTFT. $y[n] - ay[n-1] = x[n]$ $|a| < 1$	4	4	7
		UNIT-V			
9.	a).	**Determine** the Z-transform of x[n]=n a^n u[n]	5	3	7
	b).	**State** and **Explain** about the Sampling theorem. What is "Aliasing" and **how** it can be avoided?	5	4	7
		OR			
10.	a).	**Obtain** the inverse Z-transform $X(z) = \dfrac{z}{2Z^2 - 3Z + 1}$ $ROC : |Z| < \dfrac{1}{2}$	5	3	7
	b).	A signal x(t) = cos5πt + 0.5cos10πt is instantaneously sampled. **Determine** the maximum interval of sampling from which the signal can be recovered.	5	4	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE : Questions can be given as A,B splits or as a single Question for 15 marks

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R20

III B.Tech. I Semester MODEL QUESTION PAPER

ELEMENTS OF ELECTRICAL ENGINEERING

(Open Elective Common to CE & CSE)

Time: 3 Hrs.	Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.	a).	State and explain Kirchhoff's laws with an example.	1	3	7
	b).	Calculate the equivalent resistance at terminals a-b for the circuits in Figure 1. Figure 1	1	3	7
		OR			
2.	a).	Calculate I_0 in the circuit in Figure 2. Figure 2	1	3	7
	b).	Use superposition to find V_0 in the circuit of Figure 3. Figure 3	1	3	7

		UNIT-II			
3.	a).	Calculate the rms value and average for the saw-tooth waveform shown in figure 4. Figure 4	2	3	7
	b).	A coil having a resistance of 50 ohms and an inductance of 0.02 H is connected in parallel with a capacitor of 25 µF, across a 200 V, 50 Hz supply. Find the current in the coil and the capacitor. Also find the total current taken from the supply, the overall power factor and total power consumed. Draw the phasor diagram.	2	4	7
		OR			
4.	a).	Derive the expression for Average and RMS values of a sinusoidal waveform.	2	3	7
	b).	A Capacitor of 79.6µF is connected in series with a resistance of 30Ω across a 100V, 50Hz supply. Determine (i) impedance (ii) current (iii) phase angle and (iv) Phasor diagram.	2	3	7
		UNIT-III			
5.	a).	Explain the principle of operation of DC generator.	3	3	7
	b).	Derive the torque equation od DC motor.	3	3	7
		OR			
6.	a).	Explain laws of Illumination in detail.	3	3	7
	b).	Explain the construction and working of Fluorescent Lamp.	3	3	7
		UNIT-IV			
7.	a).	Explain the operation of Single phase full wave diode bridge rectifier with C-filter.	4	3	7
	b).	Explain the operation of Uninterrupted Power Supply (UPS).	4	3	7
		OR			
8.	a).	Explain the working of Li-ion battery.	4	3	7
	b).	Define DOD, C-rate, Capacity, SOC and Energy density of a Battery.	4	3	7
		UNIT-V			
9.	a).	Explain the construction details and operation of ELCB (Earth leakage Circuit Breaker).	5	3	7
	b).	Discuss about electrical safety measures.	5	3	7

		OR			
10.	**a).**	Explain about working principle of MCB (Miniature circuit Breaker).	5	3	7
	b).	Define earthing. Explain the construction details and procedure of pipe earthing with a neat sketch.	5	3	7

CO-COURSE OUTCOME   **KL-KNOWLEDGE LEVEL**   **M-MARKS**

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R20

III B.Tech. I Semester MODEL QUESTION PAPER

MATLAB PROGRAMING FOR ENGINEERING APPLICATIONS

(Open Elective Common to AIDS, CE, CSE, CSBS, IT & ME)

Time: 3 Hrs.	Max. Marks: 70 M

Answer ONE Question from EACH UNIT

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.	**a).**	**Explain** the vectors, matrices, and its conversions procedures with an example using MATLAB.	1	3	7
	b).	**Explain** the different data types in MATLAB? How are they represented in MATLAB programming?	1	3	7
		OR			
2.	**a).**	**Explain** the line plots, subplots, bar plots, surface plots with suitable examples.	1	3	7
	b).	Consider three matrices given as follows: $$MatA = \begin{bmatrix} 4 & 7 & 1 \\ 7 & 2 & 3 \\ 5 & 5 & 9 \end{bmatrix}; MatB = \begin{bmatrix} 6 & 0 & 4 \\ 9 & 8 & 1 \\ 7 & 5 & 2 \end{bmatrix}; MatC = \begin{bmatrix} 2 & 5 & 3 \\ 0 & 17 & 9 \\ 8 & 0 & 1 \end{bmatrix}$$ Write a MATLAB program to **find** the following: (a) MatA + MatB, (b) MatB – MatC, (c) MatA *MatC, (d) Determinant of MatC.	1	3	7
		UNIT-II			
3.	**a).**	**Explain** the different types of conditional statements with an example.	2	4	7
	b).	For the arrays x and y given below, **use** the MATLAB program to obtain all the elements in x that are greater than the corresponding elements in y. x = [−3, 0, 0, 2, 6, 8], y = [−5, −2, 0, 3, 4, 10]	2	3	7
		OR			
4.	**a).**	**Explain** the different loop control statements with suitable example.	2	3	7
	b).	**Write** a program using FOR loop to evaluate the equation $y(x) = x^2-3x+2$ for all values of x between -1 and 3, with increment of 0.1.	2	4	7
		UNIT-III			
5.	**a).**	**Explain** the terms Mean, Standard Deviation, Median and Mode with MATLAB syntax.	3	3	7
	b).	**Illustrate** the difference between the rand ( ), randn ( ), and randi ( ) functions? and explain with examples.	3	4	7
		OR			

6.		Write a program to **Compute** the (a) P (4), (b) P' (4), for a given expression P(x) = -0.02x^3+0.1x^2-0.2x+1.66, which passes through the four points (1, 1.54), (2, 1.5), (3, 1.42), and (5, 0.66).	3	3	14
		UNIT-IV			
7.	**a).**	Write a program to **find** the rank of M and N, the Eigen values and eigenvector of M and N of a given matrices $(i)\ M = \begin{bmatrix} -4 & 5 \\ 8 & -11 \end{bmatrix}$ $(ii)\ N = \begin{bmatrix} 0.33 & 1 & 3.3 \\ 0.5 & 0.45 & -5.12 \\ 2 & -2 & 0 \end{bmatrix}$:	4	3	7
	b).	Write a program to **solve** the set of linear system equations using the Matrix inverse method. $2x_1 + 4x_2 - 6x_3 = -4$ $x_1 + 5x_2 + 3x_3 = 10$ $x_1 + 3x_2 + 2x_3 = 5$	4	3	7
		OR			
8.		Write a program to **solve** the first order ordinary differential equation as given below:dx/dt = x + t .With the initial conditions x (0) = 0.	4	3	14
		UNIT-V			
9.		Write a simple program to **solve** a nonlinear equations using gauss–seidel Iteration. Assume necessary data is required. $f(x) = x^3 - 6x^2 + 11x + 6 = 0$.	5	3	14
		OR			
10.	**a).**	**Explain** in detail about the Rungekutta-4 method for solving ordinary differential equation.	5	3	7
	b).	**Explain** in detail about the trapezoidal method for solving integral equation.	5	4	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

			Course Code: B20ITOE01		
		SAGI RAMAKRISHNAM RAJU ENGINEERING COLLEGE (A)	**R20**		
		III B.Tech. I Semester MODEL QUESTION PAPER			
		DATA STRUCTURES AND ALGORITHMS			
		(Open Elective Common to CE, ECE, EEE&ME)			
Time: 3 Hrs.			**Max. Marks:70**		
		Answer **ONE Question** from **EACH UNIT**			
		All questions carry equal marks			
		Assume suitable data if necessary			
			CO	**KL**	**M**
		UNIT-I			
1.	a).	Define data structure. Discuss different types of data structure their implementations applications.	1	2	7
	b).	Explain the recursive merge sort algorithm to sort the following elements: 12, 25, 5, 9, 1, 84, 63, 7, 15, 4, 3.	1	2	7
		OR			
2.	a).	Write Recursive Binary Search algorithm. Search element 12 in the given list using Recursive Binary Search algorithm 2, 5, 12, 15, 23, 28, 36, 39, 45	1	2	7
	b).	Rearrange following numbers using quick sort: 10, 6, 3, 7, 17, 26, 56, 32, 72	1	2	7
		UNIT-II			
3.	a).	Explain the procedure to evaluate postfix expression. Evaluate the following postfix expression 7 3 4 + - 2 4 5 / + * 6 / 7 +	2	2	7
	b).	Discuss the algorithms for push and pop operations on a stack	2	2	7
		OR			
4.	a).	Give the structure of Queue ADT. Explain the operations in it.	2	2	7
	b).	Convert the given infix expression A+B^C+(D*E/F)*G into its postfix expression, and evaluate the same using stack. Here A=3, B=5, C=2, D=7, E=4, F=1, G=8.	2	2	7
		UNIT-III			
5.	a).	Write an algorithm for representing the polynomial $6x^6 + 4x^3 - 2x + 10$ using linked lists.	2	3	7
	b).	Write an algorithm to insert new node at the beginning, at middle position and at the end of a singly linked list.	2	3	7
		OR			
6.	a).	Write an algorithm to push and pop an element from linked stack	2	3	7
	b).	Write an algorithm to delete an element anywhere from doubly linked	2	3	7

		list.			
		UNIT-IV			
7.	a).	Explain Heap sort algorithm. Create Heap for the following elements and then sort them. (13, 102, 405, 136, 15, 105, 390, 432, 28, 444)	3	3	7
	b).	Develop a binary search tree resulting after inserting the following integer keys 49, 27, 12, 11, 33, 77, 26, 56, 23, 6. (i) Check whether the tree is almost complete or not? (ii) Determine the height of the tree (iii) Write post order and pre-order traversals	3	3	7
		OR			
8.	a).	How to represent binary tree using arrays and linked list?	3	2	7
	b).	**Construc**t an AVL tree by inserting the following elements successively C O M P U T E R	3	3	7
		UNIT-V			
9.	a).	Explain Warshall's algorithm to find transitive closure of a graph with a suitable example.	3	2	7
	b).	What is minimum cost spanning Tree? Explain the process of finding the minimum spanning tree with suitable example.	3	2	7
		OR			
10.	a).	Explain Depth First Search algorithms in detail.	3	2	7
	b).	Explain Dijkstra's algorithm with suitable example.	3	2	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

			Code: B20ITOE02	
SAGI RAMAKRISHNAM RAJU ENGINEERING COLLEGE (A)				**R20**
III B.Tech. I Semester MODEL QUESTION PAPER				
JAVA PROGRAMMING				
(Open Elective Common to CE, ECE, EEE & ME)				

Time: 3 Hrs.			**Max. Marks:70**		

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.	**a).**	Illustrate the concept of JVM with a Diagram.	1	3	7
	b).	Illustrate the differences between C, C++ and Java with a neat diagram	1	3	7
		OR			
2.	**a).**	Illustrate the structure of a java program	1	3	7
	b).	Explain java buzz words in detail.	1	3	7
		UNIT-II			
3.	**a).**	Write a java program to perform constructor overloading with an example	2	2	7
	b).	Explain class Declaration syntax in java and modifiers	2	2	7
		OR			
4.	**a).**	Write a java program to perform method overloading.	2	2	7
	b).	Explain the keyword final how it is used in java	2	2	7
		UNIT-III			
5.	**a).**	Explain polymorphism and its types. Construct a java program which Illustrates the functionality of method overloading and method overriding.	3	3	7
	b).	Write how Multiple Inheritance is possible in java with an example program	3	3	7
		OR			
6.	**a).**	Demonstrate an array? Write a java program to read an array of **n** elements and print them.	3	3	7
	b).	Write a java program to find second largest number in an array.	3	3	7
		UNIT-IV			
7	**a).**	Interpret the concept of packages in java.	4	2	7
	b).	Construct a java program that shows the functionality of creating a public class in an already existing user defined package.	4	2	7
		OR			
8.	**a).**	Write a java program to create custom exception.	4	3	7
	b).	Illustrate 2 different ways of creating a thread in java with code	4	3	7

		UNIT-V			
9.	**a).**	Explain any 4 layout mangers in java with example code.	5	2	7
	b).	Write a java swing code to create a frame and add any five different components onto the frame.	5	3	7
		OR			
10.	**a).**	Write a java program to explain event handling.	5	2	7
	b).	Explain JDBC Architecture and procedure to establish JDBC Database Connections.	5	2	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R20

III B.Tech. I Semester MODEL QUESTION PAPER

OPERATIONS RESEARCH

(Open Elective Common to AIDS, CE, CSE, ECE, EEE & IT)

Time: 3 HrsMax.	Marks: 70 M

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.		Suppose an industry is manufacturing two types of products P1 and P2. The profits per Kg of the two products are Rs.30 and Rs.40 respectively. These two products require processing in three types of machines. The following table shows the available machine hours per day and the time required on each machine to produce one Kg of P1 and P2. Formulate the problem in the form of linear programming model and solve it by Graphical Method.	1	3	14

Profit/Kg	P1 Rs.30	P2 Rs.40	Total available Machine hours/day
Machine 1	3	2	600
Machine 2	3	5	800
Machine 3	5	6	1100

		OR			
2.		Find the solution of the following LPP: Maximize $z = 3x_1 + 2x_2 + 2x_3$ subject to $\quad x_1 + x_2 + 2x_3 \leq 38$ $\quad\quad\quad\quad 2x_1 + x_2 + x_3 \geq 24$ with $\quad\quad x_1 \geq 0, \ x_2 \geq 0, \ x_3 \geq 0$	1	3	14
		UNIT-II			
3.		Solve the following transportation problem.	2	3	14

Destination → / Origin ↓	D₁	D₂	D₃	D₄	Supply
O₁	5	3	6	2	19
O₂	4	7	9	1	37
O₃	3	4	7	5	34
Demand	16	18	31	25	90

		OR			
4.		Consider the problem of assigning five jobs to five persons. The assignment costs are given as follows. Determine the optimum assignment schedule.	2	3	14

```
                        Job

                1    2    3    4    5
            A    8    4    2    6    1
Person      B    0    9    5    5    4
            C    3    8    9    2    6
            D    4    3    1    0    3
            E    9    5    8    9    5
```

		UNIT-III			
5.		Find the sequence that minimizes the total time required in performing the following jobs on three machines in order ABC. Processing times (in hours) are given in the following table :	3	3	14

Job	:	1	2	3	4	5
Machine A	:	8	10	6	7	11
Machine B	:	5	6	2	3	4
Machine C	:	4	9	8	6	5

		OR			
6.		An auto parts supplier sells Hardy-brand batteries to car dealers and auto mechanics. The annual demand is approximately 1,200 batteries. The supplier pays $28 for each battery and estimates that the annual holding cost is 30 percent of the battery's value. It costs approximately $20 to place an order (managerial and clerical costs). The supplier currently orders 100 batteries Per month. a. Determine the ordering, holding and total inventory costs for the current order quantity. b. Determine the economic order quantity (EOQ). c. How many orders will be placed per year using the EOQ? d. Determine the ordering, holding, and total inventory costs for the EOQ? e. How has ordering cost changed? Holding cost? Total inventory cost?	3	3	14

		UNIT-IV			
7.		Solve the following 6x2 game graphically.	4	3	14

$$\begin{pmatrix} 1 & -3 \\ 3 & 5 \\ -1 & 6 \\ 4 & 1 \\ 2 & 2 \\ -5 & 0 \end{pmatrix}$$

		OR		

| 8. | A dental surgery has two operation rooms. The service times are assumed to be independent, exponentially distributed with mean15 minutes. Andrew arrives when both operation rooms are empty. Bob arrives 10 minutes later while Andrew is still under medical treatment. Another 20 minutes later Caroline arrives and both Andrew and Bob are still under treatment. No other patient arrives during this 30-minute interval.

    a. What is the probability that Andrew will be ready before Bob?
    b. What is the probability that Caroline will be ready before Andrew?
    c. What is the probability that Caroline will be ready before Bob? | 4 | 3 | 14 |

		UNIT-V		

| 9. | The following are the time estimates and the precedence relationships of the activities in a project network: | 5 | 3 | 14 |

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor activity	-	-	-	A	B	B	C	E	D	F,G	H,I
Timeestimate (weeks)	4	7	3	6	4	7	6	10	3	4	2

Draw the project network diagram. Determine the critical path, the project completion time, Total float, Free float and Independent float.

		OR		

| 10. | The time estimates (in weeks) and other characteristics of a project are given below. | 5 | 3 | 14 |

Activity	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
Optimistic time	3	2	6	4	8	3	3	2	8
Most likely time	6	5	12	5	11	7	9	4	16
Pessimistic time	9	8	18	6	14	11	15	6	18

Determine (i) Critical path (ii) Expected to complete the project and also prepare activity schedule.
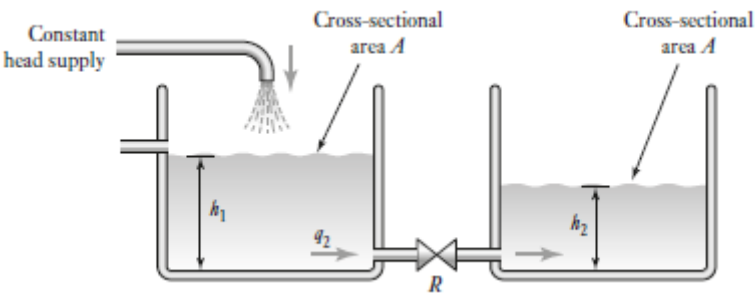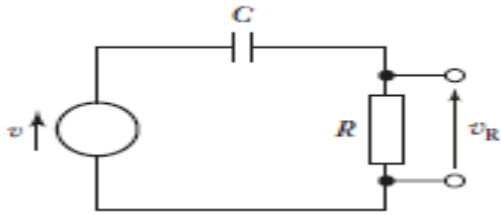
CO-COURSE OUTCOME   **KL-KNOWLEDGE LEVEL**   **M-MARKS**

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)	R20

III B.Tech. I Semester MODEL QUESTION PAPER

MECHATRONICS

(Open Elective Common to AIDS, CE, CSBS, CSE, ECE. EEE & IT)

Time: 3 Hrs.	Max. Marks: 70 M

Answer **ONE Question** from **EACH UNIT**

All questions carry equal marks

Assume suitable data if necessary

			CO	KL	M
		UNIT-I			
1.	a).	What do you understand by the term Mechatronics? With a neat diagram, show the basic elements of a Mechatronic system. Give examples of Mechatronic systems.	1	2	7
	b).	Write short notes on i) proximity sensor and ii) hall effect sensor	1	2	7
		OR			
2.	a).	Explain optical encoder and strain gauges.	1	2	7
	b).	Discuss integrating and differentiating amplifier.	1	2	7
		UNIT-II			
3.	a).	What is direction control valve? Explain the operation of single solenoid valve.	2	2	7
	b).	What do you understand by the term Actuation system? With a neat schematic diagram, describe the construction and working of a Hydraulic system.	2	2	7
		OR			
4.	a).	Explain digital to analog and analog to digital converters.	2	2	7
	b).	Draw ladder logic diagram of OR, NOR, and XOR logic.	2	2	7
		UNIT-III			
5.	a).	What is the use of a mechanical switch? How does an electrical relay operate? Draw the relay drive circuit and explain its operation.	3	3	7
	b).	Write the working principle of stepper motor.	3	3	7
		OR			
6.	a).	Derive the relationship between the height h_2 and time for the hydraulic system shown in Figure 1. Neglect inertance.	3	3	7

Figure 1

			CO	KL	M
	b).	Derive the relationship between the output, the potential difference across the resistor R of vR, and the input v for the circuit shown in Figure 2 which has a resistor in series with a capacitor. Figure 2	3	3	7
		UNIT-IV			
7.	a).	A first-order system has a time constant of 4 s and a steady-state transfer function of 6. What is the form of the differential equation for this system?	4	3	7
	b).	What is the overall transfer function for a closed-loop system having a forward-path transfer function of 5/ (s+3) and a negative feedback-path transfer function of 10?	4	3	7
		OR			
8.	a).	Explain the closed loop control system using a block diagram.	4	3	7
	b).	Explain PD and PID control.	4	3	7
		UNIT-V			
9.	a).	Describe basic elements of microprocessor based control system.	5	3	7
	b).	Lists out differences between microprocessor and microcontroller.	5	3	7
		OR			
10.	a).	Define PLC. Sketch and explain the basic functions of PLC.	5	3	7
	b).	What is an industrial robot? With the help of a block diagram describe different components of a robotic system.	5	3	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

			Course Code: B20MEOE03			
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)						R20
III B.Tech. I Semester MODEL QUESTION PAPER						
ESSENTIALS OF MECHANICAL ENGINEERING						
(Open Elective Common to AIDS, CE, CSBS, CSE, ECE. EEE & IT)						
Time: 3 Hrs.					Max. Marks: 70 M	
Answer ONE Question from EACH UNIT						
All questions carry equal marks						
Assume suitable data if necessary						
				CO	KL	M
		UNIT-I				
1.	a).	Discuss the limitations of first law of thermodynamics. State the various statements of second law of thermodynamics.		1	3	7
	b).	Explain the working of Otto cycle and show the expression for its thermal efficiency.		1	3	7
		OR				
2.	a).	Define entropy and Explain Entropy-a property of a system.		1	3	7
	b).	Derive an expression for the air standard thermal efficiency of a diesel cycle with help of P-V and T-S diagram.		1	3	7
		UNIT-II				
3.	a).	Explain briefly the constructional features of the various parts of a car body.		2	3	7
	b).	Sketch an automobile Layout and Explain?		2	3	7
		OR				
4.	a).	What are the components of an automobile? Explain some of them?		2	3	7
	b).	Briefly explain electronic ignition system?		2	3	7
		UNIT-III				
5.	a).	Explain about primary and secondary manufacturing processes with examples.		3	3	7
	b).	Explain about a pattern and discuss about pattern allowances.		3	3	7
		OR				
6.	a).	Discuss about job and batch production with examples.		3	3	7
	b).	Explain the properties of green sand used for preparation of sand mould for casting		3	3	7
		UNIT-IV				
7.	a).	Mention the differences between the hot and cold working process.		4	3	7
	b).	Explain about hot extrusion process with a neat sketch.		4	3	7
		OR				

8.	a).	Explain about the concept of spring back and discuss about any two materials used in sheet metal forming.	4	3	7
	b).	Explain about the sheet metal shearing operations with a neat sketch.	4	3	7
		UNIT-V			
9.	a).	Explain about the specifications of a lathe machine with neat sketch.	5	3	7
	b).	Explain about the parts and functioning of radial arm drilling machine with a neat sketch.	5	3	7
		OR			
10.	a).	Illustrate the up milling and down milling process with a neat sketch.	5	3	7
	b).	Explain about the working of vertical grinding machine.	5	3	7

CO-COURSE OUTCOME   KL-KNOWLEDGE LEVEL   M-MARKS

NOTE: Questions can be given as A,B splits or as a single Question for 14 marks

				Code: B20BSOE01

SAGI RAMAKRISHNAM RAJU ENGINEERING COLLEGE (A)		**R20**
III B.Tech. I Semester MODEL QUESTION PAPER		
MATHEMATICS FOR MACHINE LEARNING		
(Open Elective Common to AIDS, CE, CSE, CSBS, ECE, EEE, IT & ME)		

Time: 3 Hrs.	**Max. Marks:70**
Answer **ONE Question** from **EACH UNIT**	
All questions carry equal marks	
Assume suitable data if necessary	

			CO	KL	M
		UNIT-I			
1.	a).	Find the value of k such that the system of equations $2x + 3y - 2z = 0, 3x - y + 3z = 0, 7x + ky - z = 0$, has non-trivial solutions	1	3	7
	b).	Are the vectors (1, 3, 4, 2), (3, -5, 2, 2) and (2, -1, 3, 2) linear dependent? If so express one of these as a linear combination of others.	1	3	7
		OR			
2.	a).	Establish that the set S = {(1,2,1), (2, 1, 0), (1, -1, 2)} forms a basis for $V_3(F)$	1	3	7
	b).	Verify the mapping $\phi : L^1[a,b] \rightarrow \mathbb{R}$ defined by $\phi(f) = \int_a^b f(x)dx$ is Linear mapping, where $L^1[a,b]$ denotes the set of integrable functions on [a, b].	1	3	7
		UNIT-II			
3.		Apply Gram-Schmidt orthogonalization to the following sequence of vectors in $R^3 = \begin{bmatrix} 1 \\ 2 \\ 0 \end{bmatrix}; \begin{bmatrix} 8 \\ 1 \\ -6 \end{bmatrix}; \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$ and determine orthogonal basis and orthonormal basis	2	3	14
		OR			
4.		Determine the QR decomposition of A, where A = $\begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ -1 & 0 & 1 \end{bmatrix}$	2	3	14
		UNIT-III			
5.		Solve Equations 25x+15y-5z=35,15x+18y+0z=33, -5x+0y+11z=6 using Cholesky decomposition method	3	3	14
		OR			

6.		Determine the singular values of A: $A = \begin{bmatrix} 0 & 1 & 1 \\ \sqrt{2} & 2 & 0 \\ 0 & 1 & 1 \end{bmatrix}$ and Determine the SVD decomposition of A.	4	3	14
		UNIT-IV			
7.	a).	Differentiate f with respect to t and g with respect to X, where f(t) = sin(log(t^Tt)) ; t $\in$ R^D g(X) = tr(A × B) ; A $\in$ $R^{D \times E}$; X $\in$ $R^{E \times F}$; B $\in$ $R^{F \times D}$; where tr denotes the trace.	5	3	7
	b).	Compute the derivative $f^1(x)$ of the logistic sigmoid $f(x) = \dfrac{1}{1+e^{-x}}$	5	3	7
		OR			
8.	a).	If g(z; v) := log p(x; z) – log q(z; v) & z := t(ε; v) for differentiable functions p; q; t. By using the chain rule, compute the gradient $\dfrac{d}{dv} g(z;v)$	5	3	7
	b).	If f(x) = x^Ty ; x, y $\in$ R^n , then obtain the dimension of $\dfrac{\partial f}{\partial x}$ and Compute the Jacobians.	5	3	7
		UNIT-V			
9.		Consider a mixture of two Gaussian distributions $0.4\, \aleph \left(\begin{bmatrix} 10 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \right) + 0.6\, \aleph \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 8.4 & 2.0 \\ 2.0 & 1.7 \end{bmatrix} \right)$ a. Compute the marginal distributions for each dimension. b. Compute the mean, mode and median for each marginal distribution. c. Compute the mean and mode for the two-dimensional distribution.	6	3	14
		OR			
10.		Consider the following convex optimization problem $\min\limits_{w \in \mathbb{R}^D} \dfrac{1}{2} w^T w$ subject to $w^T w \geq 1$. Derive the Lagrangian dual by introducing the Lagrange multiplier λ.	6	3	14

CO-COURSE OUTCOME   **KL-KNOWLEDGE LEVEL**   **M-MARKS**

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