				Course Code: B23ADOE01	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		JAVA PROGRAMMING			
		Offered by AIDS			
		(Offered to CE, ECE, EEE &ME)			
Time: 3 Hrs.				**Max. Marks: 70 M**	
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
				10 x 2 = 20 Marks	
			CO	**KL**	**M**
1.	**a).**	What is the purpose of the main method in a Java program?	**1**	**1**	**2**
	b).	Explain the difference between ++i and i++ in Java.	**1**	**2**	**2**
	c).	What is the significance of the this keyword in Java?	**2**	**2**	**2**
	d).	Explain method overloading with an example.	**2**	**3**	**2**
	e).	How do you declare a two-dimensional array in Java? Provide a code example.	**3**	**3**	**2**
	f).	What is the purpose of the super keyword in Java inheritance?	**3**	**2**	**2**
	g).	What is the role of the finally block in exception handling?	**4**	**2**	**2**
	h).	How do you import a class from a package in Java? Provide a code example.	**4**	**3**	**2**
	i).	What is the difference between String and StringBuffer in Java?	**5**	**2**	**2**
	j).	Explain the purpose of the synchronized keyword in Java multithreading.	**5**	**2**	**2**
				5 x 10 = 50 Marks	
		UNIT-1			
2.	**a).**	Describe any 5 features of Java programming language.	**1**	**2**	**5**
	b).	Write a simple Java program to display "Hello, World!" and explain each line of code.	**1**	**3**	**5**
		OR			
3.	**a).**	List and explain the different data types available in Java.	**1**	**1**	**5**
	b).	What is type casting in Java? Write a program to demonstrate implicit and explicit type casting.	**1**	**3**	**5**
		UNIT-2			
4.	**a).**	Explain the concept of constructors in Java. How do they differ from regular methods?	**2**	**2**	**5**
	b).	Write a Java program to create a class with overloaded constructors. Show how each constructor is called.	**2**	**3**	**5**
		OR			

5.	**a).**	Define method overriding. How is it different from the method overloading?	**2**	**2**	**5**
	b).	Provide an example to demonstrate method overriding in Java.	**2**	**3**	**5**
		UNIT-3			
6.	**a).**	Describe the process of declaring and initializing a one-dimensional array in Java.	**3**	**3**	**5**
	b).	Write a Java program to find the maximum element in an array of integers.	**3**	**3**	**5**
		OR			
7.	**a).**	Explain the concept of inheritance in Java. What are the different types of inheritance supported by Java?	**3**	**2**	**5**
	b).	Write a Java program to demonstrate multilevel inheritance.	**3**	**3**	**5**
		UNIT-4			
8.	**a).**	What are packages in Java? Why are they used?	**4**	**2**	**5**
	b).	Create a package named com.example and a class named Hello within this package. Write a program to display "Hello, Package!".	**4**	**3**	**5**
		OR			
9.	**a).**	Describe the try-catch-finally mechanism in Java exception handling.	**4**	**2**	**5**
	b).	Write a Java program that demonstrates handling multiple exceptions using multiple catch blocks.	**4**	**3**	**5**
		UNIT-5			
10.	**a).**	Explain the differences between String, String Builder, and String Buffer.	**5**	**2**	**5**
	b).	Write a Java program to reverse a string using String Builder.	**5**	**3**	**5**
		OR			
11.	**a).**	What is JDBC? Describe its architecture.	**5**	**2**	**5**
	b).	Write a Java program to establish a connection to a MySQL database and execute a simple query to retrieve data from a table.	**5**	**3**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23ADOE02
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		COMPUTER ORGANIZATION AND ARCHITECTURE			
		Offered by AIDS			
		(Offered to CE, ECE, EEE &ME)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Convert the function to another canonical form. F(x,y,z)=π(0,3,6,7)	**1**	**3**	**2**
	b).	What is RTL?	**1**	**1**	**2**
	c).	List out computer registers	**2**	**1**	**2**
	d).	Explain Subtraction of Signed Numbers with example	**2**	**2**	**2**
	e).	Represent F=(A+B)*(C+D) in two-address instruction format	**3**	**3**	**2**
	f).	Explain CAR	**3**	**1**	**2**
	g).	Define memory read and write operation	**4**	**1**	**2**
	h).	What is hit ratio?	**4**	**1**	**2**
	i).	What is the need of Interface	**5**	**1**	**2**
	j).	Isolated I/0 vs memory mapped I/O	**5**	**2**	**2**
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Simplify F(A,B,C,D)=∑(1,2,3,6,7,10,12,13)	**1**	**3**	**5**
	b).	Design Arithmetic and Logic shift unit	**1**	**2**	**5**
		OR			
3.	**a).**	Design and explain about JK Flip flop	**1**	**3**	**5**
	b).	Explain about Bus and Memory Transfer	**1**	**2**	**5**
		UNIT-2			**5**
4.	**a).**	Design Binary Adder and Subtractor and explain	**2**	**3**	**5**
	b).	Describe Instruction cycle in computer system	**2**	**2**	**5**
		OR			
5.	**a).**	Explain about Computer instructions	**2**	**2**	**5**
	b).	Describe Signed-operand Multiplication with example	**2**	**2**	**5**
		UNIT-3			
6.	**a).**	Explain about General register organization with seven registers	**3**	**2**	**5**

	b).	Discuss about functionality of of Micro programmed Control unit?	**3**	**2**	**5**
		OR			
7.	**a).**	Describe the Addressing Modes	**3**	**2**	**5**
	b).	Hardwired control Vs Micro programmed control	**3**	**2**	**5**
		UNIT-4			
8.	**a).**	Explain Associative Memory	**4**	**2**	**5**
	b).	Explain Memory Mapping Techniques of Cache Memory	**4**	**2**	**5**
		OR			
9.	**a).**	Illustrate Virtual Memory	**4**	**2**	**5**
	b).	(a). A. How many 128 × 8 RAM chips are needed to provide a memory capacity of 2048 bytes? B. How many lines of the address bus must be used to access 2048 byte of memory? How many of these lines will be common to all chips? C. How many lines must be decoded for chip select? Specify the size of the decoders?	**4**	**3**	**5**
		UNIT-5			
10.	**a).**	Explain about Asynchronous Communication interface with neat diagram	**5**	**2**	**5**
	b).	Explain about priority interrupts and interrupts cycle	**5**	**2**	**5**
		OR			
11.	**a).**	Demonstrate Direct Memory Access	**5**	**2**	**5**
	b).	Explain daisy chain priority interrupt	**5**	**2**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

Course Code:B23AMOE01

SAGI RAMA KRISHNAMRAJU ENGINEERING COLLEGE (A) **R23**

III B.Tech. I Semester MODEL QUESTION PAPER

OPERATING SYSTEMS

(Offered by AIML)

(Offered to CE, ECE, EEE &ME)

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

Answer Question No.1compulsorily

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

Assume suitable data if necessary

10x 2 = 20 Marks

			CO	KL	M
1.	**a).**	List the services of Operating system?	**1**	**1**	**2**
	b).	Differentiate fork() and vfork()	**1**	**2**	**2**
	c).	Explain process states.	**2**	**1**	**2**
	d).	Explain waiting time and turnaround time	**2**	**2**	**2**
	e).	List the two basic operations of a Semaphore?	**3**	**1**	**2**
	f).	Explain race condition with an example.	**3**	**1**	**2**
	g).	Explain page table.	**4**	**1**	**2**
	h).	Differentiate Internal and external fragmentation.	**4**	**2**	**2**
	i).	List different File Attributes	**5**	**1**	**2**
	j).	List the different types of directory in OS	**5**	**1**	**2**

5x 10 = 50 Marks

		UNIT-1			
2.	**a).**	Explain Operating System Structures?	**1**	**2**	**5**
	b).	List different types of system calls.	**1**	**2**	**5**
		OR			
3.	**a)**	Explain the different functions and services provided by an operating system.	**1**	**2**	**10**
		UNIT-2			
4.	**a).**	Differentiae Process and Thread.	**2**	**2**	**5**
	b).	Explain in detail Inter Process Communication?	**2**	**2**	**5**
		OR			
5.		Evaluate preemptive and non-preemptive SJF CPU Scheduling algorithm for given Problem.	**2**	**3**	**10**

Process	P1	P2	P3	P4
Process Time	8	4	9	5
Arrival Time	0	1	2	3

		UNIT-3			
6.	**a).**	Explain about Deadlock Detection?	**3**	**2**	**5**
	b).	Explain how semaphores are used while solving reader and writers problem.	**3**	**2**	**5**
		OR			
7.		Explain Banker's Algorithm with an Example?	**3**	**2**	**10**
		UNIT-4			
8.	**a).**	What is virtual memory? Discuss the benefits of virtual memory Technique.	**4**	**2**	**5**
	b)	Differentiate Paging and segmentation	**4**	**3**	**5**
		OR			
9.	**a).**	Consider the following reference string 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. Assume there are three frames. Apply LRU replacement algorithm to the above reference string and find out how many page faults are produced.	**4**	**3**	**5**
	b).	Explain the following disk scheduling algorithm with proper Example a)FCFS b)LOOK c)C-SCAN.	**4**	**2**	**5**
		UNIT-5			
10.	**a).**	Explain file allocation methods in detail.	**5**	**2**	**5**
	b).	Explain the need and Goals of protection.	**5**	**2**	**5**
		OR			
11.	**a)**	Explain the implementation of access matrix.	**5**	**2**	**5**
	b)	Describe file allocation methods	**5**	**2**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

		Course Code: B23AMOE02			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		COMPUTER ORGANIZATION AND ARCHITECTURE			
		(Offered by AIML)			
		(Offered to CE, ECE, EEE &ME)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Convert the decimal number 25.625 to binary.	**1**	**3**	**2**
	b).	Implement a half adder using logic gates.	**1**	**3**	**2**
	c).	Describe different types of computer instructions.	**2**	**2**	**2**
	d).	Illustrate the function of the program counter.	**2**	**2**	**2**
	e).	Describe the addressing mode.	**3**	**2**	**2**
	f).	Explain the concept of data transfer instructions.	**3**	**2**	**2**
	g).	Explain the need for cache memory.	**4**	**2**	**2**
	h).	Explain the set-associative mapping.	**4**	**2**	**2**
	i).	Describe any three peripheral devices.	**5**	**2**	**2**
	j).	Explain the various modes of transfer used in I/O operations.	**5**	**2**	**2**
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Design a 4-bit binary adder circuit using full adders. Explain its working with a suitable example.	**1**	**3**	**5**
	b).	Convert the decimal number 156.6875 into its binary, octal, and hexadecimal equivalents. Show all steps clearly.	**1**	**3**	**5**
		OR			
3.	**a).**	Simplify the Boolean expression Y = (A + B)(A + B') using Boolean algebra and implement the simplified circuit using basic logic gates.	**1**	**3**	**5**
	b).	Design a 16:1 multiplexer using two 8:1 multiplexers and one 2:1 multiplexer.	**1**	**3**	**5**
		UNIT-2			
4.	**a).**	Describe the components and functions of Instruction Codes in computer architecture.	**2**	**2**	**5**
	b).	Explain the different types of Computer Registers used in instruction processing.	**2**	**2**	**5**
		OR			

5.	**a).**	Describe the Instruction Cycle in detail, highlighting its phases and operations.	**2**	**2**	**5**
	b).	Explain the concept of Timing and Control in the context of computer architecture.	**2**	**2**	**5**
		UNIT-3			
6.	**a).**	Describe the Stack Organization and its operations in a CPU.	**3**	**2**	**5**
	b).	Explain various Instruction formats used in CPU architecture with examples.	**3**	**2**	**5**
		OR			
7.	**a).**	Describe the General register organization.	**3**	**2**	**5**
	b).	Explain the role and function of Control Memory in Micro programmed Control.	**3**	**2**	**5**
		UNIT-4			
8.	**a).**	Describe the working of virtual memory with a block diagram.	**4**	**2**	**5**
	b).	Explain the types and characteristics of auxiliary memory.	**4**	**2**	**5**
		OR			
9.	**a).**	Describe the principles of operation and advantages of using Memory Hierarchy in computer systems.	**4**	**2**	**5**
	b).	Explain the concept of Associative Memory and its applications in computer architecture.	**4**	**2**	**5**
		UNIT-5			
10.	**a).**	Describe the I/O interface in computer systems, highlighting its components and functions.	**5**	**2**	**5**
	b).	Explain about the priority interrupt.	**5**	**2**	**5**
		OR			
11.	**a).**	Describe the working principle of DMA controller.	**5**	**2**	**5**
	b).	Explain about handshaking technique in asynchronous data transfer.	**5**	**2**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

				Course Code: B23AMOE03	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		ARTIFICIAL INTELLIGENCE TOOLS & TECHNIQUES			
		(Offered by AIML)			
		(Offered to CE, ECE, EEE &ME)			
Time: 3 Hrs.				**Max. Marks: 70 M**	
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
				10 x 2 = 20 Marks	
			CO	**KL**	**M**
1.	**a).**	Name and describe three different domains of AI	**1**	**2**	**2**
	b).	Explain about features of environment?	**1**	**2**	**2**
	c).	Explain differences between BFS and DFS.	**2**	**2**	**2**
	d).	What is heuristic search?	**2**	**1**	**2**
	e).	What is predicate logic?	**3**	**1**	**2**
	f).	Define conceptual dependency.	**3**	**1**	**2**
	g).	Define Well Formed Formula.	**4**	**1**	**2**
	h).	What are the differences between forward and backward chaining?	**4**	**1**	**2**
	i).	Define an expert system.	**5**	**1**	**2**
	j).	What is fuzzy logic?	**5**	**1**	**2**
				5 x 10 = 50 Marks	
		UNIT-1			
2.	**a).**	Explain about different problem characteristics of AI.	**1**	**2**	**5**
	b).	Use state space representation to solve the 8 Puzzle Problem. Describe each step.	**1**	**3**	**5**
		OR			
3.	**a).**	Use state space representation to solve the Water Jug Problem. Describe each step.	**1**	**3**	**5**
	b).	Explain the structure of agent and types of agents with suitable examples.	**1**	**2**	**5**
		UNIT-2			
4.	**a).**	Apply simple hill climbing to solve 8-puzzle problem.	**2**	**3**	**5**
	b).	Explain AO* algorithm with a suitable example.	**2**	**2**	**5**
		OR			
5.	**a).**	Apply A* algorithm to solve 8-puzzle problem.	**2**	**3**	**5**
	b).	Explain means ends analysis with suitable example.	**2**	**2**	**5**

		UNIT-3			
6.	**a).**	Represent the following facts in Conceptual Dependency: a. John gave the AI book to marry. b. John punched marry	**3**	**3**	**5**
	b).	Explain Semantic Nets with baseball domain as an example	**3**	**2**	**5**
		OR			
7.	**a).**	Represent the following facts using Partitioned Semantic Nets: (CO3, K3) a. The dog bite the mail carrier b. Every batter hit every bowler	**3**	**3**	**5**
	b).	Explain script with suitable example.	**3**	**2**	**5**
		UNIT-4			
8.	**a).**	Apply the Resolution algorithm to Prove that: ● John likes peanuts. From the following facts: a. John likes all kind of food. b. Apple and vegetable are food. c. Anything anyone eats and not killed is food. d. Anil eats peanuts and still alive. e. Harry eats everything that Anil eats.	**4**	**3**	**5**
	b).	Apply WFF to clause form algorithm for the following facts: a. Steeve likes easy courses b. Science courses are hard c. All courses in AIML department are easy d. AI is a AIML course	**4**	**3**	**5**
		OR			
9.	**a).**	Apply unification algorithm to the following: a. Like (john, x) Hate (john, x) b. Like (Marcus, Caesar, john) and Like (x, y) c. Like (john, kate) and Like (x, kate)	**4**	**3**	**5**
	b).	Explain conversion of Well Wormed Formula to Clause from algorithm with an example.	**4**	**2**	**5**
		UNIT-5			
10.	**a).**	Explain the architecture of Expert system with a neat diagram.	**5**	**2**	**5**
	b).	Explain the difference between crisp sets and fuzzy sets with suitable examples.	**5**	**2**	**5**
		OR			
11.	**a).**	Explain advantages and disadvantages of expert systems.	**5**	**2**	**5**
	b).	What is a membership function? Describe its role in fuzzy set theory.	**5**	**2**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

				Course Code: B23CEOE01	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		REMOTE SENSING & GIS			
		(Offered by Civil Engineering)			
		(Offered to AIDS, AIML, CSIT, CSBS, CSD, CSE, CIC, ECE, EEE, IT & ME)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer ONE Question from EACH UNIT			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	List the bands commonly used in EM spectrum for remote sensing.	**1**	**3**	**2**
	b).	List any two characteristics of active remote sensing sensors.	**1**	**3**	**2**
	c).	Distinguish between raster and vector data models	**2**	**3**	**2**
	d).	Apply the use of map projections in preparing topographic maps.	**2**	**3**	**2**
	e).	How would you identify urban areas using image tone and texture?	**3**	**3**	**2**
	f).	How do you use contrast stretching in image enhancement?	**3**	**3**	**2**
	g).	How do DTM and DSM differ in representing ground features?	**4**	**4**	**2**
	h).	Identify the application of Digital Terrain Model (DTM).	**4**	**4**	**2**
	i).	Identify the application areas of RS & GIS.	**5**	**4**	**2**
	j).	Compare land use and land cover with examples.	**5**	**4**	**2**
					5 x 10 = 50 Marks
		UNIT - I	**CO**	**KL**	**M**
2.	a).	Explain the functional roles of basic components of remote sensing.	**1**	**3**	**5**
	b).	Describe the interaction of electromagnetic radiation with the objects.	**1**	**3**	**5**
		OR			
3.	a).	Explain different remote sensing sensors with examples.	**1**	**3**	**5**
	b).	Compare different platforms of remote sensing.	**1**	**3**	**5**
		UNIT - II			
4.	a).	Illustrate the components of GIS.	**2**	**3**	**5**
	b).	Compare raster and vector data models with suitable applied examples.	**2**	**3**	**5**
		OR			
5.	a).	Explain data input methods used in GIS.	**2**	**3**	**5**
	b).	Explain map projections in detail.	**2**	**3**	**5**
		UNIT - III			
6.	a).	Explain key elements of visual interpretation.	**3**	**3**	**5**
	b).	Demonstrate the steps involved in preprocessing a satellite image	**3**	**3**	**5**
		OR			

7.	a).	Apply any two image enhancement techniques on a raw image and explain the improvement.	**3**	**3**	**5**
	b).	Compare and apply supervised and unsupervised classification on a satellite image.	**3**	**3**	**5**
UNIT - IV					
8.	a).	Compare and contrast raster and vector overlay techniques with examples.	**4**	**4**	**5**
	b).	Analyze the applications of DEM, DSM, and DTM in terrain modeling.	**4**	**4**	**5**
OR					
9.	a).	Analyze the components of a GIS network and their role in transportation planning.	**4**	**4**	**5**
	b).	How does GIS-based optimum path analysis support shortest route determination?	**4**	**4**	**5**
UNIT - V					
10.	a).	Analyze how RS and GIS integration helps in delineating urban growth patterns.	**5**	**4**	**5**
	b).	Compare the use of remote sensing data in flood management before and after a major flood event.	**5**	**4**	**5**
OR					
11.	a).	Discuss how spatial analysis in GIS enhances watershed prioritization.	**5**	**4**	**5**
	b).	Examine the advantages of remote sensing over traditional methods in EIA studies.	**5**	**4**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

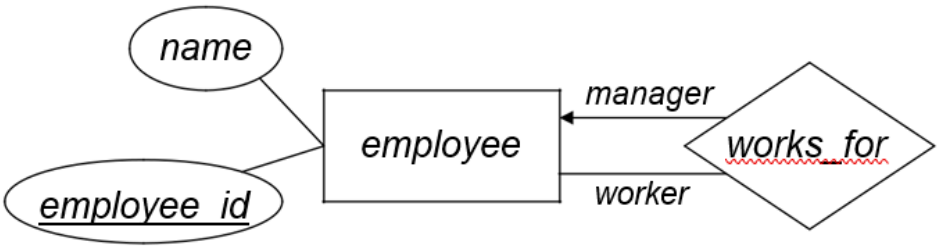
				Course Code: B23CEOE02	
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R23**
III B.Tech. I Semester MODEL QUESTION PAPER					
INTELLIGENT TRANSPORTATION SYSTEM					
(Offered by CE)					
(Offered to AIDS, AIML, CSIT, CSBS, CSD, CSE, CIC, ECE, EEE, IT & ME)					
Time: 3 Hrs.					**Max. Marks: 70 M**
Answer Question No.1 compulsorily					
Answer **ONE Question** from **EACH UNIT**					
Assume suitable data if necessary					
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define ITS.	**1**	**1**	**2**
	b).	Write are the objectives of ITS?	**1**	**1**	**2**
	c).	Explain about Traffic Management Centre.	**2**	**2**	**2**
	d).	Classify the sensors used to detect vehicle passing or presence.	**2**	**2**	**2**
	e).	Mention the merits of Commercial Vehicle Operations.	**3**	**2**	**2**
	f).	Define ramp metering.	**3**	**1**	**2**
	g).	Define ITS architecture.	**4**	**1**	**2**
	h).	What do you understand by ITS planning?	**4**	**2**	**2**
	i).	Define AHS.	**5**	**1**	**2**
	j).	Outline the need for a coordinated signal control.	**5**	**2**	**2**
					5 x 10 = 50 Marks
		UNIT-1	**1**	**2**	**5**
2.	**a).**	Explain the benefits of ITS in detail.	**1**	**2**	**5**
	b).	Describe the economic perspectives in implementation of ITS.			
		OR			
3.	**a).**	Explain the components of ITS.	**1**	**2**	**5**
	b).	List out examples of component areas in which public policy and private policy will hold good.	**1**	**1**	**5**
		UNIT-2			
4.	**a).**	Describe the importance of telecommunications in the ITS system.	**2**	**2**	**5**
	b).	Explain the concept of route navigation and guidance system.	**2**	**2**	**5**
		OR			
5.	**a).**	Explain various data collection techniques of ITS.	**2**	**2**	**5**
	b).	Describe the use of transponders for ITS.	**2**	**2**	**5**
		UNIT-3			

6.	**a).**	Describe the information intended to be provided by APTS?	**3**	**2**	**5**
	b).	Explain in detail about AVCS.	**3**	**2**	**5**
		OR			
7.	**a).**	List out ITS user needs and services.	**3**	**1**	**5**
	b).	Explain the application of electronic payment in ITS	**3**	**2**	**5**
		UNIT-4			
8.	**a).**	Demonstrate the logical and physical architectures of ITS.	**4**	**3**	**5**
	b).	Explain the concept of layered structure of ITS architecture.	**4**	**2**	**5**
		OR			
9.	**a).**	Explain in detail ITS and Safety.	**4**	**2**	**5**
	b).	Demonstrate ITS planning with typical statements of vision, goals and objectives.	**4**	**3**	**5**
		UNIT-5			
10.	**a).**	Describe ITS and sustainable mobility.	**5**	**2**	**5**
	b).	Explain travel demand management.	**5**	**2**	**5**
		OR			
11.	**a).**	Describe ITS programs in India with examples.	**5**	**2**	**5**
	b).	Explain the issues and challenges involved in the application of ITS in India.	**5**	**2**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

		Course Code: B23CBOE01			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		DATABASE MANAGEMENT SYSTEMS			
		(Offered by CSBS)			
		(Offered 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			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	List any four advantages of Database Systems.	**1**	**1**	**2**
	b).	Describe unary and binary relationships in E-R diagram.	**2**	**2**	**2**
	c).	Explain the use of primary key with an example.	**2**	**1**	**2**
	d).	What is the difference between count(col_name) and count(*) ?	**3**	**2**	**2**
	e).	Explain the use of "in" operator in SQL.	**3**	**1**	**2**
	f).	In what way, a view and a base table are different.	**2**	**2**	**2**
	g).	Explain the purpose of Normalization.	**4**	**2**	**2**
	h).	How dependency preservation is checked after decomposition?	**4**	**1**	**2**
	i).	Explain atomicity of a transaction with an example.	**5**	**1**	**2**
	j).	Draw state diagram of a Transaction	**5**	**1**	**2**
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Compare database system with file system.	**1**	**2**	**5**
	b).	Describe various mapping cardinalities in E-R diagrams with suitable examples.	**2**	**2**	**5**
		OR			
3.	**a).**	Explain the function of each component in DBMS architecture.	**1**	**2**	**5**
	b).	Model an E-R diagram for Library Information System by considering the activities in the system.	**2**	**3**	**5**
		UNIT-2			
4.	**a).**	Explain DDL and DML Commands with examples.	**2**	**2**	**5**
	b).	Make use of E-R model concepts to convert the following E-R diagram into a collection of relations.	**2**	**3**	**5**

					
		OR			
5.	**a).**	Describe foreign key constraint and unique constraint with suitable examples.	**2**	**2**	**5**
	b).	Explain various steps in the evaluation of basic SQL query.	**2**	**2**	**5**
		UNIT-3			
6.	**a).**	What is the difference between a nested query and a correlated query?	**3**	**2**	**4**
	b).	Consider the following database: Students (S_ID, Dept, CGPA) Courses (C_ID, Offered_By_Dept, Credits) Enrolled (S_ID, C_ID, Grade). Apply SQL concepts to answer the following queries. i) Find the best CGPA in each department. ii) Find the IDs of students who enrolled for some course offered by other department. Display Student department and course offering department along with S_ID. iii) Find the IDs of students who got at least two "A" grades.	**3**	**3**	**6**
		OR			
7.	**a).**	Explain various types of joins in SQL	**3**	**2**	**5**
	b).	Explain the use of group by and having clauses with an example.	**3**	**2**	**5**
		UNIT-4			
8.	**a).**	Define lossless join decomposition. Suppose that we decompose the schema R(A,B,C,D,E) into R1(A,B,C) and R2(A,D,E). Determine whether this decomposition is a lossless decomposition under the following functional dependencies: F={A→BC,BD→E,B→D,E→A}	**4**	**3**	**5**
	b).	Determine that a relation in BCNF is also in 3NF and not vice-versa with a suitable example.	**4**	**3**	**5**
		OR			
9.	**a).**	Explain Fourth Normal form with an example	**4**	**2**	**5**
	b).	Let R (ABCDE) F={A→B, BC→D, D→E). Find all candidate keys of R and also determine the highest normal of R.	**4**	**3**	**5**
		UNIT-5			
10.	**a).**	Explain ARIES recovery algorithm.	**5**	**2**	**5**
	b).	Draw transaction state diagram and explain various states.	**5**	**2**	**5**
		OR			
11.	**a).**	Explain 2-Phase Locking Protocol.	**5**	**3**	**5**
	b).	Describe the properties of transaction	**5**	**2**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

				Course Code: B23CBOE02	
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R23**
III B.Tech. I Semester MODEL QUESTION PAPER					
PYTHON PROGRAMMING					
(Offered by CSBS)					
(Offered to CE)					
Time : 3hrs					**Max. Marks :70**
Answer Question No.1 compulsorily					
Answer **ONE Question** from **EACH UNIT**					
Assume suitable data if necessary					
					10 X 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Explain input command in python with suitable example.	**1**	**2**	**2**
	b).	Explain break, continue and pass statement with suitable example of each	**1**	**2**	**2**
	c).	Explain what is range() function and how it is used in lists?	**2**	**2**	**2**
	d).	What is meant by key-value pairs in a dictionary?	**2**	**1**	**2**
	e).	Write a few methods that are used in Python tuple.	**2**	**1**	**2**
	f).	What is module and package in Python?	**3**	**1**	**2**
	g).	What are the three types of import statement in Python?	**3**	**2**	**2**
	h).	Explain how the write method works on a file.	**4**	**1**	**2**
	i).	Write a simple program which illustrates Handling Exceptions?	**5**	**1**	**2**
	j).	What is the use of Tkinter in Python programming?	**5**	**1**	**2**
					5 X 10 = 50 Marks
		UNIT – I	**CO**	**KL**	**M**
1.	a).	Discuss about Identity and membership operator(s) with suitable Examples	**1**	**2**	**5**
	b).	Explain how to read input in python by considering any 3 data types	**1**	**2**	**5**
		OR			
2.	a).	Explain about precedence of all operators in Python.	**1**	**2**	**5**
	b).	Explain about input validation loops and nested loops with examples	**1**	**2**	**5**
		UNIT – II			
3.	a).	Explain the use of join () and split () string methods with examples. Describe why strings are immutable with an example.	**2**	**2**	**5**
	b).	Write a Python program to create three dictionaries, then create one dictionary that will contain the other three dictionaries.	**2**	**3**	**5**
		OR			
4.	a).	Differentiate the following manipulation operations of list i) append and insert ii)remove and pop	**2**	**2**	**5**

	b).	Define python tuples? With program explain the concept of Accessing Values in tuples, updating tuples and deleting tuple elements.	**2**	**3**	**5**
UNIT – III					
5.	a).	Discuss about importing module from a package.	**3**	**2**	**5**
	b).	Explain about anonymous or Lambda function with merits and demerits	**3**	**2**	**5**
OR					
6.	a).	Explain User Defined Functions in python?	**3**	**2**	**5**
	b).	Demonstrate the case study on gathering information from a file system?	**3**	**3**	**5**
UNIT – IV					
7.	a).	Explain about structuring classes with inheritance and polymorphism.	**4**	**2**	**5**
	b).	Illustrate manipulating file pointer using seek with suitable example.	**4**	**3**	**5**
OR					
8.	a).	Explain about reading numbers from a file using Python program.	**4**	**2**	**5**
	b).	Demonstrate the constructor method in python with suitable program	**4**	**3**	**5**
UNIT – V					
9.	a).	Describe user Defined exception with example.	**5**	**2**	**5**
	b).	Defining clean-up actions.	**5**	**2**	**5**
OR					
10.	a).	Illustrate Entry fields for the input and output of text with example.	**5**	**3**	**5**
	b).	Define Scrolling list boxes with example.	**5**	**2**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23CSOE01
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		COMPUTER ORGANIZATION AND ARCHITECTURE			
		(Offered by CSE)			
		(Offered to CE, ECE, EEE & ME)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Convert the decimal number 25.625 to binary.	1	3	2
	b).	Implement a half adder using logic gates.	1	3	2
	c).	Describe different types of computer instructions.	2	2	2
	d).	Illustrate the function of the program counter.	2	2	2
	e).	Describe the addressing mode.	3	2	2
	f).	Explain the concept of data transfer instructions.	3	2	2
	g).	Explain the need for cache memory.	4	2	2
	h).	Explain the set-associative mapping.	4	2	2
	i).	Describe any three peripheral devices.	5	2	2
	j).	Explain the various modes of transfer used in I/O operations.	5	2	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Design a 4-bit binary adder circuit using full adders. Explain its working with a suitable example.	1	3	5
	b).	Convert the decimal number 156.6875 into its binary, octal, and hexadecimal equivalents. Show all steps clearly.	1	3	5
		OR			
3.	**a).**	Simplify the Boolean expression Y = (A + B)(A + B') using Boolean algebra and implement the simplified circuit using basic logic gates.	1	3	5
	b).	Design a 16:1 multiplexer using two 8:1 multiplexers and one 2:1 multiplexer.	1	3	5
		UNIT-2			
4.	**a).**	Describe the components and functions of Instruction Codes in computer architecture.	2	2	5
	b).	Explain the different types of Computer Registers used in instruction processing.	2	2	5
		OR			

5.	**a).**	Describe the Instruction Cycle in detail, highlighting its phases and operations.	2	2	5
	b).	Explain the concept of Timing and Control in the context of computer architecture.	2	2	5
		UNIT-3			
6.	**a).**	Describe the Stack Organization and its operations in a CPU.	3	2	5
	b).	Explain various Instruction formats used in CPU architecture with examples.	3	2	5
		OR			
7.	**a).**	Describe the General register organization.	3	2	5
	b).	Explain the role and function of Control Memory in Micro programmed Control.	3	2	5
		UNIT-4			
8.	**a).**	Describe the working of virtual memory with a block diagram.	4	2	5
	b).	Explain the types and characteristics of auxiliary memory.	4	2	5
		OR			
9.	**a).**	Describe the principles of operation and advantages of using Memory Hierarchy in computer systems.	4	2	5
	b).	Explain the concept of Associative Memory and its applications in computer architecture.	4	2	5
		UNIT-5			
10.	**a).**	Describe the I/O interface in computer systems, highlighting its components and functions.	5	2	5
	b).	Explain about the priority interrupt.	5	2	5
		OR			
11.	**a).**	Describe the working principle of DMA controller.	5	2	5
	b).	Explain about handshaking technique in asynchronous data transfer.	5	2	5

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

Course Code:B23CSOE02

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A) **R23**

III B.Tech. I Semester MODEL QUESTION PAPER

PRINCIPLES OF OPERATING SYSTEMS

(Offered by CSE)

(Offered to CE, ECE, EEE & ME)

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

Answer Question No.1compulsorily

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

Assume suitable data if necessary

10x 2 = 20 Marks

			CO	KL	M
1.	**a).**	List the services of Operating system?	1	1	2
	b).	Differentiate fork() and vfork()	1	2	2
	c).	Explain process states.	2	1	2
	d).	Explain waiting time and turnaround time	2	2	2
	e).	List the two basic operations of a Semaphore?	3	1	2
	f).	Explain race condition with an example.	3	1	2
	g).	Explain page table.	4	1	2
	h).	Differentiate Internal and external fragmentation.	4	2	2
	i).	List different File Attributes	5	1	2
	j).	List the different types of directory in OS	5	1	2

5x 10 = 50 Marks

		UNIT-1			
2.	**a).**	Explain Operating System Structures?	1	2	5
	b).	List different types of system calls.	1	2	5
		OR			
3.		Explain the different functions and services provided by an operating system.	1	2	10
		UNIT-2			
4.	**a).**	Differentiae Process and Thread.	2	2	5
	b).	Explain in detail Inter Process Communication?	2	2	5
		OR			
5.		Evaluate preemptive and non-preemptive SJF CPU Scheduling algorithm for given Problem.	2	3	10

Process	P1	P2	P3	P4
Process Time	8	4	9	5
Arrival Time	0	1	2	3

		UNIT-3			
6.	**a).**	Explain about Deadlock Detection?	3	2	5
	b).	Explain how semaphores are used while solving reader and writers problem.	3	2	5
		OR			
7.		Explain Banker's Algorithm with an Example?	3	2	10
		UNIT-4			
8.	**a).**	What is virtual memory? Discuss the benefits of virtual memory Technique.	4	2	5
	b)	Differentiate Paging and segmentation	4	3	5
		OR			
9.	**a).**	Consider the following reference string 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. Assume there are three frames. Apply LRU replacement algorithm to the above reference string and find out how many page faults are produced.	4	3	5
	b).	Explain the following disk scheduling algorithm with proper Example a) FCFS b) LOOK c) C-SCAN.	4	2	5
		UNIT-5			
10.	**a).**	Explain file allocation methods in detail.	5	2	5
	b).	Explain the need and Goals of protection.	5	2	5
		OR			
11.	**a).**	Explain the implementation of access matrix.	5	2	5
	b).	Write short notes on file allocation methods	5	2	5

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code:B23CIOE01
		SAGI RAMA KRISHNAMRAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		JAVA PROGRAMMING			
		(Offered by CIC)			
		(Offered to CE, ECE, EEE & ME)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	What is type casting in Java? Give an example.	**1**	**1**	**2**
	b).	What is the use of this keyword?	**1**	**1**	**2**
	c).	Explain the declaration, initialization, and accessing of array elements in Java.	**2**	**2**	**2**
	d).	Define an ArrayList in Java.	**2**	**1**	**2**
	e).	Define method overriding.	**3**	**1**	**2**
	f).	What is the difference between extends and implements?	**3**	**1**	**2**
	g).	Name any two standard exception classes in Java.	**4**	**1**	**2**
	h).	Define thread priority.	**4**	**1**	**2**
	i).	What is the difference between byte streams and character streams?	**5**	**1**	**2**
	j).	What is the use of the DriverManager class in JDBC?	**5**	**1**	**2**
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain Features of JAVA.	**1**	**2**	**5**
	b).	Write a program to accept an integer as command line argument and print the factorial of a number.	**1**	**3**	**5**
		OR			
3.	**a).**	Explain Method Overloading with an example.	**1**	**2**	**5**
	b).	Write a program that uses multiple constructors in a single class.	**1**	**3**	**5**
		UNIT-2			
4.	**a).**	Write a program to multiply two matrices.	**2**	**3**	**5**
	b).	Explain any five commonly used methods in the String class with examples.	**2**	**2**	**5**
		OR			
5.	**a).**	Write a Java program to input 5 numbers into an array and print their sum and average.	**2**	**3**	**5**

	b).	Explain StringBuffer class and its methods.	**2**	**2**	**5**
		UNIT-3			
6.	**a).**	Explain method overriding with suitable example.	**3**	**2**	**5**
	b).	Differentiate interfaces and abstract classes in Java.	**3**	**3**	**5**
		OR			
7.	**a).**	Explain how multiple inheritance is achieved using interfaces.	**3**	**2**	**5**
	b).	Explain the creation and use of user-defined packages in Java with an example.	**3**	**2**	**5**
		UNIT-4			
8.	**a).**	What are custom exceptions? Write a Java program to define and use a user-defined exception.	**4**	**3**	**5**
	b).	Explain Life Cycle of a Thread with a neat diagram.	**4**	**2**	**5**
		OR			
9.	**a).**	Explain Multiple Catch Statements with an example.	**4**	**2**	**5**
	b).	Explain inter-thread communication using wait(), notify(), and notifyAll() with an example.	**4**	**2**	**5**
		UNIT-5			
10.	**a).**	Write a Java program to read content from a file using FileReader and display it.	**5**	**3**	**5**
	b).	Explain the types of JDBC drivers and their advantages/disadvantages.	**5**	**2**	**5**
		OR			
11.	**a).**	Write a program to copy contents of one file to another file.	**5**	**3**	**5**
	b).	Write a Java program to insert and display records from an Oracle or MySQL database using JDBC.	**5**	**3**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23CIOE02
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		INTRODUCTION TO INTERNET OF THINGS			
		(Offered by CIC)			
		(Offered to CE, EEE & ME)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	List any four industry applications of IoT.	**1**	**1**	**2**
	b).	Define Industrial IoT with an example.	**1**	**1**	**2**
	c).	Identify the role of an IoT Gateway.	**2**	**2**	**2**
	d).	Describe the purpose of Edge Computing in IoT.	**2**	**2**	**2**
	e).	Write any two differences between sensors and transducers.	**3**	**1**	**2**
	f).	Explain sensor integration with microcontrollers.	**3**	**2**	**2**
	g).	State the purpose of MQTT protocol in IoT.	**4**	**1**	**2**
	h).	Contrast Modbus and CAN bus communication.	**4**	**2**	**2**
	i).	Define time-series data with one example.	**5**	**1**	**2**
	j).	What is the use of anomaly detection in IoT data?	**5**	**2**	**2**
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain the differences between Consumer IoT and Industrial IoT.	**1**	**2**	**5**
	b).	Describe the fundamental building blocks of IoT with neat examples.	**1**	**2**	**5**
		OR			
3.	**a).**	Illustrate IoT applications in Healthcare and Smart Homes.	**1**	**2**	**5**
	b).	Summarize how IoT is transforming agriculture and manufacturing sectors.	**1**	**2**	**5**
		UNIT-2			
4.	**a).**	Explain the IoT reference model and how it aligns with IIRA.	**2**	**2**	**5**
	b).	Analyze the function of data ingestion and stream processing in IoT.	**2**	**4**	**5**
		OR			
5.	**a).**	Describe the architecture of Edge Computing with its advantages.	**2**	**2**	**5**
	b).	Classify the components and role of IoT Gateways.	**2**	**4**	**5**
		UNIT-3			

6.	**a).**	Apply how sensors are integrated with microcontrollers for data acquisition.	**3**	**3**	**5**
	b).	Analyze the use of Industrial Control Systems with one real-time example.	**3**	**4**	**5**
		OR			
7.	**a).**	Explain a basic data acquisition system with a suitable block diagram.	**3**	**2**	**5**
	b).	Justify the role of transducers in an industrial IoT setup.	**3**	**4**	**5**
		UNIT-4			
8.	**a).**	Apply MQTT to demonstrate cloud communication in IoT.	**4**	**3**	**5**
	b).	Compare and contrast WebSockets and REST APIs.	**4**	**4**	**5**
		OR			
9.	**a).**	Use OSI layers to map IoT protocol stacks with examples.	**4**	**3**	**5**
	b).	Evaluate the performance differences between JSON and Protocol Buffers in IoT.	**4**	**5**	**5**
		UNIT-5			
10.	**a).**	Apply the characteristics and uses of time-series data in an IoT use case.	**5**	**3**	**5**
	b).	Evaluate techniques to handle missing or noisy data in IoT systems.	**5**	**5**	**5**
		OR			
11.	**a).**	Apply summarization and sketching techniques for processing time-series data.	**5**	**3**	**5**
	b).	Analyze a real-time example of anomaly detection in IoT data.	**5**	**4**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23ECOE01
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		ELECTRONIC DEVICES AND CIRCUITS			
		(Offered by ECE)			
		(Offered to AIDS, AIML, CE, CSIT, CSBS, CSD, CSE, CIC, IT & ME)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Give one example each of an n-type and a p-type semiconductor.	**1**	**2**	**2**
	b).	What is meant by donor and acceptor impurities?	**2**	**1**	**2**
	c).	What is an open-circuited PN junction?	**2**	**2**	**2**
	d).	What is reverse saturation current?	**3**	**1**	**2**
	e).	Define ripple factor.	**3**	**2**	**2**
	f).	What is the advantage of a bridge rectifier over a center-tapped full wave rectifier?	**4**	**1**	**2**
	g).	When does a transistor act as a switch?	**4**	**1**	**2**
	h).	What is meant by biasing a transistor?	**5**	**1**	**2**
	i).	Differentiate between depletion mode and enhancement mode FETs.	**5**	**2**	**2**
	j).	What are the types of MOSFETs?	**5**	**2**	**2**
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Explain Phenomenon of Drift and Diffusion in semiconductors?	**1**	**2**	**5**
	b).	Describe intrinsic and extrinsic semiconductors?	**1**	**3**	**5**
		OR			
3.		Explain Hall-effect? What are its applications?	**1**	**4**	**10**
		UNIT-2			
4.	**a).**	Explain basic operation and V-I characteristics of semiconductor diode?	**2**	**3**	**10**
		OR			
5.	**a).**	What is Zener diode? Explain its operation in reverse bias condition Along with its applications?	**2**	**3**	**5**
	b).	Explain construction and operation of photo-diode?	**2**	**2**	**5**
		UNIT-3			
6.	**a).**	Draw and explain the operation of a full wave rectifier?	**3**	**4**	**5**

	b).	Mention the advantages and applications of rectifier circuits.	**3**	**4**	**5**
		OR			
7.		Derive the expression for efficiency and ripple factor for a half wave rectifier with capacitive filter.	**3**	**3**	**5**
		UNIT-4			
8.	**a).**	Explain CC configuration of transistor?	**4**	**3**	**5**
	b).	Explain different modes of operation of a BJT.	**4**	**3**	**5**
		OR			
9.		Plot the input and output characteristics of transistor in CE configuration?	**4**	**3**	**10**
		UNIT-5			
10.		Explain construction and operation of a MOSFET.	**5**	**3**	**10**
		OR			
11.		List out the comparisons between BJT, FET and MOSFET.	**5**	**3**	**10**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23EEOE01
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		RENEWABLE ENERGY SOURCES			
		(Offered by EEE)			
		(Offered to AIDS, AIML, CE, CSIT, CSBS, CSD, CSE, CIC, ECE & IT)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Write the limitations of conventional energy resources.	1	K1	2
	b).	Compare the characteristics of conventional and non-conventional energy resources.	1	K2	2
	c).	Describe the working principle of flat plate solar collectors.	2	K2	2
	d).	Explain the significance of solar geometry in solar energy conversion.	2	K2	2
	e).	Explain the basic principle of wind energy conversion.	3	K2	2
	f).	Explain how lift and drag forces affect wind turbine blades.	3	K2	2
	g).	Explain the working principle of Ocean Thermal Energy Conversion (OTEC).	4	K2	2
	h).	Describe the basic types of tidal power plants.	4	K1	2
	i).	What is geothermal energy?	5	K1	2
	j).	Describe the basic principle of fuel cells.	5	K2	2
					5 x 10 = 50 Marks
		UNIT-1	**CO**	**KL**	**M**
2.	**a).**	What are the Effects of Conventional Energy methods?	1	3	5
	b).	Classify renewable energy sources? Explain in brief the need of these energy sources.	1	3	5
		OR			
3.	**a).**	What are the Environmental aspects of conventional power plants.	1	3	5
	b).	What is meant by Renewable energy sources? Explain in brief this energy source scenario in Indian context.	1	3	5
		UNIT-2			
4.	**a).**	Explain the principle of conversion of solar energy into heat.	2	3	5
	b).	Explain the I-V Characteristics of solar cell.	2	3	5
		OR			
5.	**a).**	Explain in detail about the beam and Diffuse Solar radiation	2	3	5

	b).	What is the principle of solar photo voltaic power generation? What are the main elements of a PV system?	2	3	5
		UNIT-3			
6.	**a).**	Describe with a neat sketch the working of a wind energy system with main Components.	3	3	5
	b).	What are the different types of wind energy systems?	3	3	5
		OR			
7.	**a).**	What are the Safety and Environmental Aspects of wind energy?	3	3	5
	b).	Describe the main applications of wind energy, giving neat sketches.	3	3	5
		UNIT-4			
8.	**a).**	List the advantages and disadvantages of tidal power.	4	3	5
	b).	Explain the following terms: i) Tidal movement ii) tidal current iii) Spring tide and iv) Neap tide.	4	3	5
		OR			
9.	**a).**	Write a short note on wave energy conversion machines. What are the advantages and limitations of wave energy conversion?	4	3	5
	b).	Identify the environmental impacts of geothermal energy.	4	3	5
		UNIT-5			
10.	**a).**	Making use of diagram explain the vapour dominated and Liquid dominated systems.	5	3	5
	b).	Define a geothermal source. What are the classifications of geothermal source	5	3	5
		OR			
11.	**a).**	What is a fuel cell? Describe the principle of working of a fuel cell with reference to H2–O2 cell.	5	3	5
	b).	Describe the classification of fuel cell. With a neat sketch explain the working of fuel cell	5	3	5

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23OE
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		PRINCIPLES OF CONTROL SYSTEMS			
		(Offered by EEE)			
		(Offered to AIDS, AIML, CE, CSIT, CSBS, CSD, CSE, CIC, ECE & IT)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define open-loop and closed-loop control systems.	1	2	2
	b).	What is the significance of feedback in control systems?	1	2	2
	c).	List the standard test input signals used in time domain analysis.	2	1	2
	d).	What are the three types of steady state error constants?	2	2	2
	e).	What is the necessary condition for stability in Routh-Hurwitz criterion?	3	1	2
	f).	What is the effect of gain on the root locus of a system?	3	3	2
	g).	Define frequency response of a system.	4	1	2
	h).	Define phase margin and gain margin.	4	2	2
	i).	Write the general form of a state-space representation.	5	1	2
	j).	Define controllability.	5	2	2
					5 x 10 = 50 Marks
		UNIT-1			
2.	**a).**	Draw and explain the signal flow graph for a given system and find the transfer function using Mason's gain formula.	1	3	5
	b).	Derive the transfer function of an RLC series electrical circuit.	1	3	5
		OR			
3.	**a).**	Discuss the advantages and disadvantages of closed-loop systems over open-loop systems.	1	3	10
		UNIT-2			
4.	**a).**	Derive the time domain specifications of a second-order underdamped system with a unit step input.	2	3	5
	b).	Describe and compare PI, PD, and PID controllers with their functions and basic equations.	2	4	5
		OR			
5.	**a).**	Differentiate between first-order and second-order systems based on their time response characteristics.	2	2	5
	b).	Define and explain the terms: i.Rise time ii. Maximum overshoot iii Settling time	2	1	5

		UNIT-3			
6.	**a).**	State and explain the Routh-Hurwitz stability criterion. Apply it to check the stability of: $s^4+3s^3+5s^2+6s+4=0$	3	3	5
	b).	Explain the concept of system stability with respect to pole locations in the s-plane.	3	2	5
		OR			
7.	**a).**	A unity feedback system has the open-loop transfer function: $\frac{K}{s(s+2)(s+4)}$ Construct the root locus and comment on the stability for different values of K.	3	3	10
		UNIT-4			
8.	**a).**	Explain the construction of Bode plots for a simple transfer function like: G(s)= $\frac{1}{s(1+0.1s)}$ .Sketch magnitude and phase plots.	4	4	10
		OR			
9.	**a).**	Draw the polar plot for the transfer function G(s)= $\frac{1}{s(s+1)}$ and explain the shape.	4	4	10
		UNIT-5			
10.	**a).**	Convert the given transfer function into state-space form: $\frac{y(s)}{u(s)}=\frac{2}{(s^2+3s+2)}$	5	3	5
	b).	Convert the state-space model into transfer function: $\dot{x}=\begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}x+\begin{bmatrix}0\\ 2\end{bmatrix}u; y=\begin{bmatrix}1 & 0\end{bmatrix}x$	5	3	5
		OR			
11.	**a).**	Test controllability and observability for a system with: $\dot{x}=\begin{bmatrix}0 & 1\\ -4 & -3\end{bmatrix}x+\begin{bmatrix}0\\ 1\end{bmatrix}u; y=\begin{bmatrix}1 & 0\end{bmatrix}x$	5	3	5
	b).	Derive the solution of the state equation: $\dot{x}=Ax(t)+Bu(t); y=\begin{bmatrix}1 & 0\end{bmatrix}x$ using the state transition matrix $\phi(t)$.	5	3	5

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

				Course Code: B23ITOE01	
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R23**
III B.Tech. I Semester MODEL QUESTION PAPER					
OBJECT-ORIENTED PROGRAMMING THROUGH JAVA					
Offered by IT					
(Offered to CE, ECE, EEE & ME)					
Time: 3 Hrs.					**Max. Marks: 70 M**
Answer Question No.1 compulsorily					
Answer **ONE Question** from **EACH UNIT**					
Assume suitable data if necessary					
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	What is the purpose of the main method in a Java program?	**1**	**1**	**2**
	b).	Explain the difference between ++i and i++ in Java.	**1**	**2**	**2**
	c).	What is the significance of this keyword in Java?	**2**	**2**	**2**
	d).	Explain method overloading with an example.	**2**	**3**	**2**
	e).	How do you declare a two-dimensional array in Java? Provide a code example.	**3**	**3**	**2**
	f).	What is the purpose of the super keyword in Java inheritance?	**3**	**2**	**2**
	g).	What is the role of the finally block in exception handling?	**4**	**2**	**2**
	h).	How do you import a class from a package in Java? Provide a code example.	**4**	**3**	**2**
	i).	What is the difference between String and StringBuffer in Java?	**5**	**2**	**2**
	j).	Explain the purpose of the synchronized keyword in Java multithreading.	**5**	**2**	**2**
					5 x 10 = 50 Marks
		UNIT-1	**CO**	**KL**	**M**
2.	**a).**	Describe any 5 features of Java programming language.	**1**	**2**	**5**
	b).	Write a simple Java program to display "Hello, World!" and explain each line of code.	**1**	**3**	**5**
		OR			
3.	**a).**	List and explain the different data types available in Java.	**1**	**1**	**5**
	b).	What is type casting in Java? Write a program to demonstrate implicit and explicit type casting.	**1**	**3**	**5**
		UNIT-2			
4.	**a).**	Explain the concept of constructors in Java. How do they differ from regular methods?	**2**	**2**	**5**
	b).	Write a Java program to create a class with overloaded constructors. Show how each constructor is called.	**2**	**3**	**5**

		OR			
5.	**a).**	Define method overriding. How is it different from method overloading?	**2**	**2**	**5**
	b).	Provide an example to demonstrate method overriding in Java.	**2**	**3**	**5**
		UNIT-3			
6.	**a).**	Describe the process of declaring and initializing a one-dimensional array in Java.	**3**	**3**	**5**
	b).	Write a Java program to find the maximum element in an array of integers.	**3**	**3**	**5**
		OR			
7.	**a).**	Explain the concept of inheritance in Java. What are the different types of inheritance supported by Java?	**3**	**2**	**5**
	b).	Write a Java program to demonstrate multilevel inheritance.	**3**	**3**	**5**
		UNIT-4			
8.	**a).**	What are packages in Java? Why are they used?	**4**	**2**	**5**
	b).	Create a package named com.example and a class named Hello within this package. Write a program to display "Hello, Package!".	**4**	**3**	**5**
		OR			
9.	**a).**	Describe the try-catch-finally mechanism in Java exception handling.	**4**	**2**	**5**
	b).	Write a Java program that demonstrates handling multiple exceptions using multiple catch blocks.	**4**	**3**	**5**
		UNIT-5			
10.	**a).**	Explain the differences between String, StringBuilder, and StringBuffer.	**5**	**2**	**5**
	b).	Write a Java program to reverse a string using StringBuilder.	**5**	**3**	**5**
		OR			
11.	**a).**	What is JDBC? Describe its architecture.	**5**	**2**	**5**
	b).	Write a Java program to establish a connection to a MySQL database and execute a simple query to retrieve data from a table.	**5**	**3**	**5**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23MEOE01
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		APPLIED OPERATIONS RESEARCH			
		(Offered by ME)			
		(Offered to AIDS, CE, CSIT, CSBS, CSD, CSE, CIC, EEE & ECE)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	a.	What are the applications of OR?	**1**	**3**	**2**
	b.	Define basic feasible solution w.r.to LPP.	**1**	**3**	**2**
	c.	What is meant by unbalanced transportation problem?	**2**	**3**	**2**
	d.	What is a travelling salesman problem?	**2**	**3**	**2**
	e.	What is meant by no passing rule in job sequencing problems?	**3**	**3**	**2**
	f.	What is meant by Total Elapsed time?	**3**	**3**	**2**
	g.	Differentiate CPM and PERT.	**4**	**3**	**2**
	h.	Define the three time estimates of an activity in PERT.	**4**	**3**	**2**
	i.	What is meant by a two person – zero sum game?	**5**	**3**	**2**
	j.	What is meant by bellman's principle of optimality?	**5**	**3**	**2**
					5 x 10 = 50Marks
		UNIT-1			
2.		Vitamin A and B are found in two different foods F1 & F2. One unit of food F1contains 2 units of vitamin A and 3 units of vitamin B. One unit of food F2 contains 4 units of vitamin A and 2 units of vitamin B. One unit of food F1& F2 costs Rs 50 and 25 respectively. The minimum daily requirement for a person of vitamin A and B is 40 and 50 units respectively. Assuming that any things in excess of daily minimum requirement of vitamin A and B is not harmful, find out the optimum mixture of food F1 and F2 at the minimum cost which meets the daily minimum requirement of vitamin A and B. Formulate this as an LPP and solve it by graphical method.	**1**	**3**	**10**
		OR			
3.		Solve the following LPP by Big -M method. Maximize $Z = -4X_1 - 3X_2$ Sub to $3X_1 + X_2 = 3$, $3X_1 + 4X_2 \geq 4$, $X_1 + X_2 \leq 6$ & $X_1, X_2 \geq 0$	**1**	**3**	**10**
		UNIT-2			

Q.No.	Question			
4.	Find the optimum transportation schedule for the T.P of 3 plants and 3 projects. The unit transportation cost and requirements are given below. (see table below)	2	3	10

P L A N T		PROJECTS			Capacity
		A	B	C	
	W	4	8	8	56
	X	16	24	16	82
	Y	8	16	24	77
Req.		72	102	41	

OR

5.	Find the optimal assignment of salesmen to sales areas for the following cost matrix: (see table below)	2	3	10

		Sales Area			
		A_1	A_2	A_3	A_4
Salesman	S_1	11	17	8	16
	S_2	9	7	12	10
	S_3	13	16	15	12
	S_4	14	10	12	11

UNIT-3

6.	Six jobs are to go over two machines M_1 and M_2 in the order M_1M_2. The order of completion of the jobs has no significance. From the data given below, find the sequence that minimizes the total time elapsed and also that minimum time. (see table below)	3	3	10

Job		1	2	3	4	5	6
Time in hours on the machines	M_1	4	8	3	6	7	5
	M_2	6	3	7	2	8	4

OR

7.	Find the optimum sequence that minimizes the total elapsed time required to complete the required tasks. Each job must be processed in the order ACB. Also find the total elapsed time and idle time of each machine. (see table below)	3	3	10

Machines	J1	J2	J3	J4	J5	J6	J7
A	12	6	5	11	5	7	6
B	7	8	9	4	7	8	3
C	3	4	1	5	2	3	4

UNIT-4

8.	The following are the time estimates and the precedence relationships of the activities in a project network: (see table below)	4	3	10

Activity	A	B	C	D	E	F	G	H	I	J	K
Predecessor activity	-	-	-	A	B	B	C	E	D	F,G	H,I

	Time estimate (weeks) | 4 | 7 | 3 | 6 | 4 | 7 | 6 | 10 | 3 | 4 | 2 Draw the project network diagram. Determine the critical path and the minimum project completion time.			
	OR			
9.	The time estimates (in weeks) and other characteristics of a PERT project are given below. 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 completion time of the project	**4**	**3**	**10**
	UNIT-5			
10.	Solve the game by using the principle of dominance. Player A | Player B: I | II | III | IV | V | VI 1 | 4 | 2 | 0 | 2 | 1 | 1 2 | 4 | 3 | 1 | 3 | 2 | 2 3 | 4 | 3 | 7 | -5 | 1 | 2 4 | 4 | 3 | 4 | -1 | 2 | 2 5 | 4 | 3 | 3 | -2 | 2 | 2	**5**	**3**	**10**
	OR			
11.	Use Dynamic Programming to solve the LPP Maximize $Z= X_1+ 9X_2$ Sub to $2X_1 + X_2 \leq 25$, $X_2 \leq 11$ & $X_1, X_2 \leq 0$	**5**	**3**	**10**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

					Course Code: B23MEOE02
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R23**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		SUSTAINABLE ENERGY TECHNOLOGIES			
		(Offered by ME)			
		(Offered to AIDS, CE, CSIT, CSBS, CSD, CSE, CIC, EEE & ECE)			
Time: 3 Hrs.					**Max. Marks: 70 M**
		Answer Question No.1 compulsorily			
		Answer **ONE Question** from **EACH UNIT**			
		Assume suitable data if necessary			
					10 x 2 = 20 Marks
			CO	**KL**	**M**
1.	**a).**	Define the term "solar constant." What is its approximate value?	**1**	**1**	**2**
	b).	Briefly describe the role of new and renewable sources in the current energy landscape.	**1**	**2**	**2**
	c).	What is the primary function of a battery in a solar PV system?	**2**	**1**	**2**
	d).	Name one routine maintenance task for a solar battery.	**2**	**1**	**2**
	e).	What is a flat plate collector?	**3**	**1**	**2**
	f).	What is the principle of a solar pond?	**3**	**1**	**2**
	g).	State any two advantages of horizontal axis windmills.	**4**	**1**	**2**
	h).	Differentiate between aerobic and anaerobic digestion.	**4**	**2**	**2**
	i).	What is the origin of geothermal energy?	**5**	**1**	**2**
	j).	Write two applications of fuel cells.	**5**	**1**	**2**
					5 x 10 = 50 Marks
		UNIT-1			
2.		Discuss the role and potential of solar energy as a new and renewable energy source. How does it contribute to sustainable development?	**1**	**2**	**10**
		OR			
3.		Explain the significance of understanding solar radiation on tilted surfaces for solar energy systems.	**1**	**2**	**10**
		UNIT-2			
4.		Explain the working principle of batteries in solar PV systems. How do they support energy storage and delivery during non-sunlight hours?	**2**	**2**	**10**
		OR			
5.		Describe the key causes of battery degradation in solar PV systems? How can these issues be prevented through proper design and maintenance?	**2**	**2**	**10**
		UNIT-3			

6.		Describe the classification of concentrating solar collectors. Give suitable diagrams and explain any two types in detail.	**3**	**2**	**10**
		OR			
7.		Describe different methods of solar energy storage. Compare sensible heat storage and latent heat storage with suitable examples.	**3**	**2**	**10**
		UNIT-4			
8.		Discuss the sources and potential of wind energy in India and the world. What are the major factors affecting wind power generation?	**4**	**2**	**10**
		OR			
9.		Explain the operation of an I.C. engine using biogas as fuel. Discuss modifications required.	**4**	**2**	**10**
		UNIT-5			
10.		Explain the working principle of Ocean Thermal Energy Conversion (OTEC). Compare open-cycle and closed-cycle OTEC systems with suitable diagrams.	**5**	**2**	**10**
		OR			
11.		Explain the construction, working, and characteristics of Proton Exchange Membrane Fuel Cell (PEMFC)	**5**	**2**	**10**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks

Course Code: B23BSOE01					
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R23**
III B.Tech. I Semester MODEL QUESTION PAPER					
MATHEMATICS FOR MACHINE LEARNING					
(Offered by M&H)					
(Offered to AIDS, AIML, CE, CSIT, CSBS, CSD, CSE, CIC, ECE, EEE, IT & MECH)					
Time: 3 Hrs.					**Max. Marks:70**
Answer Question No.1 compulsorily					
Answer **ONE Question** from **EACH UNIT**					
Assume suitable data if necessary					
10 x 2 = 20 Marks					
			CO	**KL**	**M**
1.	**a)**	Define Vector Space	**1**	**2**	**2**
	b)	Define Basis	**1**	**2**	**2**
	c)	Define Inner product	**2**	**2**	**2**
	d)	Write the importance of Gram-Schmidt Orthogonalization process	**2**	**2**	**2**
	e)	Define the Eigen values and Eigen vectors	**3**	**2**	**2**
	f)	Write the formula for Singular Value Decomposition	**3**	**2**	**2**
	g)	Compute the derivative for $f(x) = log(x^4)sin(x^3))$	**4**	**3**	**2**
	h)	Write the Taylor's series for a single variable at a point x_0	**4**	**2**	**2**
	i)	Define Sum rule and Product rule	**5**	**2**	**2**
	j)	Define Gaussian Distribution	**5**	**2**	**2**
5 x 10 = 50 Marks					
Q. No.		**UNIT-1**	**CO**	**KL**	**M**
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**	**5**
	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 combinations of others.	**1**	**3**	**5**
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**	**5**
	B	Verify the mapping $\phi: L^1[a,b] \to \square$ 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**	**5**
UNIT-2					
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	**2**	**3**	**10**

		orthonormal basis			
		OR			
4		Determine the QR decomposition of A, where A = $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 0 \\ -1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$	**2**	**3**	**10**
		UNIT-3			
5		Solve Equations 25x+15y-5z=35,15x+18y+0z=33,-5x+0y+11z=6 using Cholesky decomposition method	**3**	**3**	**10**
		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.	**3**	**3**	**10**
		UNIT-4			
7	A	Differentiate f with respect to t and g with respect to X, where f(t) = sin(log($t^T t$)) ; t ∈ R^D g(X) = tr(A × B) ; A ∈ $R^{D \times E}$; X ∈ $R^{E \times F}$;B ∈ $R^{F \times D}$; where tr denotes the trace.	**4**	**3**	**5**
	B	Compute the derivative $f^{l}(x)$ of the logistic sigmoid f(x) = $\frac{1}{1+e^{-x}}$	**4**	**3**	**5**
		OR			
8	A	If g(z; ν) := log p(x; z) – log q(z; ν) & z := t(ε; ν) for differentiable functions p; q; t. By using the chain rule, compute the gradient $\frac{d}{d\nu} g(z;\nu)$	**4**	**3**	**5**
	B	If f(x) = $x^T y$; x, y ∈ R^n , then obtain the dimension of $\frac{\partial f}{\partial x}$ and Compute the Jacobians.	**4**	**3**	**5**
		UNIT-5			
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.	**5**	**3**	**10**
		OR			
10		Consider the following convex optimization problem $\min_{w \in \square^D} \frac{1}{2} w^T w$ subject to $w^T w \geq 1$. Derive the Lagrangian dual by introducing the Lagrange multiplier λ.	**5**	**3**	**10**

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

NOTE : Questions can be given as A,B splits or as a single Question for 10 marks