		Course Code: B20IT3101			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			
		III B.Tech. I Semester MODEL QUESTION PAPER			
		AUTOMATA THEORY AND COMPILER DESIGN			
		Information Technology			
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)**	a) Obtain the Regular Expression represented by the following Regular Set: {0, 1, 00, 01, 000, 001, 0000, 0001, ...}.	**1**	**3**	**7**
	b)	Design a DFA that accepts the language over = {a, b} of all strings that contain the sub-string either aa or bb.	**1**	**3**	**7**
		OR			
2	**a)**	Construct a NFA with Є equivalent to the regular expression: 10 + (0 + 11)0*1	**1**	**3**	**7**
	b)	Explain the procedure for converting NFA with Є to DFA	**1**	**2**	**7**
		UNIT-II			
3	**a)**	If G is a grammar then S→ SbS / a, Show that G is ambiguous	**2**	**3**	**7**
	b)	Design CFG for the language $\{0^n1^n / n>=1\}$	**2**	**3**	**7**
		OR			
4	**a)**	Construct an LL(1) parsing Table for the following grammar. [5+5] E → E+T/T T → T*F/F F → (E)/id	**2**	**2**	**7**
	b)	Construct LALR parsing table for the grammar given below S→CC C →cC|d	**2**	**3**	**7**
		UNIT-III			
5	**a)**	Explain in detail Chomsky hierarchy of languages	**2**	**2**	**7**
	b)	Explain in detail type conversion with suitable examples.	**2**	**2**	**7**
		OR			
6	**a)**	What role does semantic analysis play in compiler design	**2**	**2**	**7**
	b)	Differentiate L-attributed and S-attributed grammars with suitable examples	**2**	**2**	**7**

		UNIT-IV			
7	**a)**	State and explain different code optimization techniques.	**4**	**3**	**7**
	b)	What is DAG? Why DAG is used in the process of compiler construction? Construct the DAG for the following statement Z = X – Y + X * Y * U – V/W + X + V	**4**	**3**	**7**
		OR			
8		Construct the DAG for the following basic block and apply common sub-expression and dead code elimination on it. Assume that a and b are live e as c and e are non live on exit from the block. a = b + c b = b –d c = c + d e = b + c	**4**	**3**	**14**
		UNIT-V			
9	**a)**	What is peephole? What peephole optimizations can be performed on code	**3**	**2**	**7**
	b)	Explain the different storage allocation strategies	**3**	**2**	**7**
		OR			
10	**a)**	Explain in detail about data flow analysis of flow graphs	**3**	**2**	**7**
	b)	Explain in detail about overloading of functions and operations.	**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

Course Code: B20IT3102

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A) **R20**

III B.Tech. I Semester MODEL QUESTION PAPER

DATA MINING TECHNIQUES

Information Technology

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

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

All questions carry equal marks

Assume suitable data if necessary

<table>
<tr><th></th><th></th><th></th><th>CO</th><th>KL</th><th>M</th></tr>
<tr><td></td><td></td><td>UNIT-I</td><td></td><td></td><td></td></tr>
<tr><td>1.</td><td>a).</td><td>Differentiate between operational database systems and data warehouses.</td><td>1</td><td>2</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain with an example, the three schemas for multi dimensional data models.</td><td>1</td><td>3</td><td>7</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>2.</td><td>a).</td><td>Explain OLAP operations with an example.</td><td>1</td><td>3</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain the design process of a data warehouse.</td><td>1</td><td>2</td><td>7</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-II</td><td></td><td></td><td></td></tr>
<tr><td>3.</td><td>a).</td><td>Compute the median and standard deviation for the following values of percentage of fat of different persons: 9.5, 26.5, 7.8, 17.8, 31.4, 25.9, 27.4, 27.2, 31.6, and 42.5.</td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain $\chi 2$ test for correlation of numerical data with and apply on the following example.
<table>
<tr><td>Education/Political Affiliation</td><td>Republican</td><td>Democrat</td></tr>
<tr><td>HS</td><td>17</td><td>42</td></tr>
<tr><td>BA</td><td>28</td><td>35</td></tr>
<tr><td>MA</td><td>32</td><td>32</td></tr>
</table></td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>4.</td><td>a).</td><td>Normalize the following group of data: 200,300,400,600 and 1000 using a) min-max normalization by setting min=0 and max=1, b) z score normalization, and c) normalization by decimal scaling.</td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain with an example, proximity measures for binary attributes.</td><td>2</td><td>3</td><td>7</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-III</td><td></td><td></td><td></td></tr>
<tr><td>5.</td><td>a).</td><td>Consider the following transactions. Consider min_sup=60% and min_conf=80%. Find all frequent itemsets using Apriori algorithm.
<table>
<tr><td>TID</td><td>Items_Bought</td></tr>
</table></td><td>3</td><td>3</td><td>9</td></tr>
</table>

<table>
<tr><td></td><td></td><td><table><tr><td>T100</td><td>{I1,I2,I3,I4,I5,I6}</td></tr><tr><td>T200</td><td>{I8,I3,I4,I5,I6}</td></tr><tr><td>T300</td><td>{I1,I7,I4,I5}</td></tr><tr><td>T400</td><td>{I1,I7,I8,I4,I6}</td></tr><tr><td>T500</td><td>{I8,I2,I2,I4,I5,I6}</td></tr></table></td><td></td><td></td><td></td></tr>
<tr><td></td><td>b).</td><td>Explain with an example, closed frequent and maximal frequent itemsets.</td><td>3</td><td>3</td><td>5</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>6.</td><td>a).</td><td>What is a misleading association rule? Explain with an example, the use of the measure Lift to avoid misleading strong association rules.</td><td>3</td><td>3</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain with an example, the mining of multilevel association rules with uniform and reduced supports.</td><td>3</td><td>3</td><td>7</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-IV</td><td></td><td></td><td></td></tr>
<tr><td>7.</td><td>a).</td><td>Explain Decision Tree Induction Classifier.</td><td>4</td><td>3</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain the working of Naïve Bayesian classifier.</td><td>4</td><td>2</td><td>7</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>8.</td><td>a).</td><td>Explain the classifier performance evaluation measures accuracy and error rate and calculate the values for the following data.<table><tr><th>Classes</th><th>Yes</th><th>No</th><th>Total</th></tr><tr><td>Yes</td><td>97</td><td>203</td><td>300</td></tr><tr><td>No</td><td>135</td><td>9565</td><td>9700</td></tr><tr><td>Total</td><td>232</td><td>9768</td><td>10000</td></tr></table></td><td>4</td><td>3</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain briefly, various methods to improve classification accuracy.</td><td>4</td><td>2</td><td>7</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td>UNIT-V</td><td></td><td></td><td></td></tr>
<tr><td>9.</td><td>a).</td><td>Explain the process of clustering using DBSCAN algorithm.</td><td>5</td><td>2</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain how the quality of clustering do is measured using extrinsic methods.</td><td>5</td><td>2</td><td>7</td></tr>
<tr><td></td><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>10.</td><td>a).</td><td>Explain the general principle of hierarchical clustering. Explain briefly about dendrogram representation.</td><td>5</td><td>2</td><td>7</td></tr>
<tr><td></td><td>b).</td><td>Explain briefly statistical and proximity-based methods to detect outliers.</td><td>5</td><td>2</td><td>7</td></tr>
</table>

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: B20IT3103			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		III B.Tech. I Semester MODEL QUESTION PAPER			
		OPERATING SYSTEMS			
		Information Technology			
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 services provided by the operating system for efficient system operation.	**1**	**2**	**7**
	b).	What is a System call? Explain in detail the system call sequence to copy the contents of one file to another file.	**1**	**2**	**7**
		OR			
2.	**a).**	Operating system is resource manager"-Justify this statement with suitable functionality of OS.	**1**	**4**	**7**
	b).	Explain the purpose of system calls and discuss the system calls related to process control and communication in brief.	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	List the advantages of inter-process communication? How communication takes place in a shared-memory environment? Explain.	**2**	**4**	**7**
	b).	Assume the following workload in a system: Process Arrival Time Burst Time P1 5 5 P2 4 6 P3 3 7 P4 1 9 P5 2 2 P6 6 3 Draw a Gantt chart illustrating the execution of these jobs using Round robin scheduling algorithm and also Calculate the average waiting time and average turnaround time.	**2**	**3**	**7**
		OR			
4.	**a).**	Does preemptive scheduling give same performance as non-preemptive scheduling algorithm? Compare their performance by assuming at least 5 processes arrived at different time intervals.	**2**	**4**	**7**
	b).	Write in detail about the thread libraries.	**2**	**2**	**7**
		UNIT-III			
5.	**a).**	Given free memory partitions of 100 K, 500 K, 200 K, 300 K, and 600 K (in order), how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212 K, 417 K, 112 K, and 426 K (in order)?	**3**	**3**	**7**
	b).	Define Virtual Memory. Explain the process of converting virtual addresses to physical addresses with a neat diagram.	**3**	**2**	**7**
		OR			

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6.	**a).**	Explain various types of memory Allocation techniques with advantages and disadvantages with example	**3**	**2**	**7**
	b).	Consider the following page reference string 1,2,3,4,5,2,6,7,3,2,4,1,7,1,4,3,2,3,4,7,1. Compare the number of page faults with frame sizes 3,4 and 5 with any replacement algorithm.	**3**	**3**	**7**
		UNIT-IV			
7.	**a).**	How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.	**4**	**2**	**7**
	b).	Explain the bankers algorithm with a suitable example.	**4**	**2**	**7**
		OR			
8.	**a).**	Discuss the different file allocation methods with suitable example.	**4**	**2**	**7**
	b).	Describe any two disk scheduling algorithms with suitable illustrations.	**4**	**2**	**7**
		UNIT-V			
9.	**a).**	Describe the access matrix model used for protection purpose.	**5**	**2**	**7**
	b).	Explain the terms 'WORMS' and 'VIRUSES' with reference to system threats.	**5**	**2**	**7**
		OR			
10.	**a).**	Write a short note on Revocation of access rights.	**5**	**3**	**7**
	b).	Briefly explain the various kinds of program threats and system threats.	**5**	**2**	**7**

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

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

		Course Code: B20IT3104			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			
		III B.Tech. I Semester MODEL QUESTION PAPER			
		ARTIFICIAL INTELLIGENCE			
		Information Technology			
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)	List out various applications of AI.	**1**	**2**	**7**
	b)	What are the advantages & disadvantages of AI?	**1**	**3**	**7**
		OR			
2	a)	Elaborate the implementation of Tic-Tac-Toe game with 3 approaches.	**1**	**3**	**7**
	b)	Categorize intelligent systems based on their working principle.	**1**	**3**	**7**
		UNIT-II			
3	a)	Write the productions involved in solving a Water-Jug Problem.	**2**	**3**	**7**
	b)	Elaborate the working of A* Algorithm with an example.	**2**	**3**	**7**
		OR			
4	a)	Explain the procedure to implement Hill Climbing.	**2**	**3**	**7**
	b)	Discuss the implementation of all the exhaustive searches with examples.	**2**	**3**	**7**
		UNIT-III			
5	a)	Trace the Resolution Algorithm by taking an example.	**3**	**3**	**7**
	b)	Discuss the procedure of converting WFF to the clause form.	**3**	**3**	**7**
		OR			
6	a)	Explain Propositional Calculus (PC).	**3**	**2**	**7**
	b)	Explain Propositional Logic (PL).	**3**	**2**	**7**
		UNIT-IV			
7	a)	Discuss the procedure to represent knowledge using Semantic Network.	**4**	**3**	**7**
	b)	How do you represent visiting a restaurant in the form of a Script? Explain	**4**	**3**	**7**
		OR			
8	a)	Write the significance of using CYC in capturing human commonsense database.	**4**	**3**	**7**

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	b)	Write about Conceptual Dependency theory. How it will be used for Knowledge Representation?	**4**	**3**	**7**
		UNIT-V			
9	a)	Differentiate Expert Systems versus Traditional Systems.	**5**	**3**	**7**
	b)	Write the significance of Bayes's theorem in AI	**5**	**3**	**7**
		OR			
10	a)	Explain Dempster-Shafer Theory	**5**	**3**	**7**
	b)	Explain the significance of various Fuzzy Set Operations.	**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

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			Course Code: B20IT3105		
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R20**
III B.Tech. I Semester MODEL QUESTION PAPER					
AGILE SOFTWARE PROCESS					
Information Technology					
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 is the working principle of Agile? What value is provided by Agile? Discuss.	**1**	**2**	**7**
	b).	Explain with the help of suitable example that how Agile helps to build quality product.	**1**	**2**	**7**
		OR			
2.	**a).**	Define Agile Software Development. Write any three principles of Agile Manifesto.	**1**	**2**	**7**
	b).	Differentiate between Agile software Development and Waterfall model.	**1**	**4**	**7**
		UNIT-II			
3.	**a).**	What is the role of Scrum events? Discuss Important Scrum Events.	**2**	**2**	**7**
	b).	Why Extreme Programming is called Extreme? Write down values of XP.	**2**	**2**	**7**
		OR			
4.	**a).**	Explain various roles in Agile process. How are these roles different from traditional roles?	**2**	**2**	**7**
	b).	What is meant by lean approach? How does it work?	**2**	**2**	**7**
		UNIT-III			
5.	**a).**	How measurement helps in monitoring the progress in Agile approach? Discuss.	**3**	**2**	**7**
	b).	What are various advanced Scrum applications? How are they applicable?	**3**	**2**	**7**
		OR			
6.	**a).**	What is meant by user stories? How are they used in Agile? Discuss with the help of suitable example.	**3**	**2**	**7**
	b).	Explain Agile architecture with the help of block diagram	**3**	**2**	**7**

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		UNIT-IV			
7.	**a).**	What is meant by Test-Driven Development? Explain with the help of a suitable project.	**4**	**2**	**7**
	b).	Explain various Agile tools available. Also discuss how they help in Agile process.	**4**	**2**	**7**
		OR			
8.	**a).**	Explain Pair Programming and its benefits?	**4**	**2**	**7**
	b).	What is meant by Behaviour -Driven Development? Explain with the help of a suitable project.	**4**	**2**	**7**
		UNIT-V			
9.	**a).**	How Agile testing is different from testing done waterfall model?	**4**	**2**	**7**
	b).	What Are the Principles of Agile Testing?	**4**	**2**	**7**
		OR			
10.	**a).**	List advantages of Agile testing.	**4**	**4**	**7**
	b).	Explain the testing strategy for Agile projects	**4**	**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

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			Course Code: B20IT3106		
SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R20**
III B.Tech. I Semester MODEL QUESTION PAPER					
DISTRIBUTED SYSTEMS					
Information Technology					
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).**	Describe the difference between message passing systems and shared memory systems.	**1**	**2**	**7**
	b).	Describe the framework for a system of logical clocks and also physical clock synchronization?	**1**	**2**	**7**
		OR			
2.	**a).**	Explain the models of process communications.	**1**	**2**	**7**
	b).	Describe Synchronous versus asynchronous executions.	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	Define message ordering? Explain Asynchronous execution with synchronous communication?	**2**	**2**	**7**
	b).	Illustrate the Snapshot algorithm for FIFO Channels.	**2**	**2**	**7**
		OR			
4.	**a).**	What is Group communication? Explain casual order and total order.	**2**	**2**	**7**
	b).	Briefly explain the external data representation and marshaling.	**2**	**2**	**7**
		UNIT-III			
5.	**a).**	Explain the Preliminaries and Lamport's algorithm.	**3**	**2**	**7**
	b).	Explain how distributed deadlocks can be detected?	**3**	**2**	**7**
		OR			
6.	**a).**	Discuss about different models of deadlocks and Knapp's classification	**3**	**2**	**7**
	b).	Discuss about Ricart Agrawala algorithm	**3**	**2**	**7**
		UNIT-IV			
7.	**a).**	Discuss about check point based recovery and Log based recovery.	**4**	**2**	**7**
	b).	Describe about Asynchronous check pointing and recovery.	**4**	**2**	**7**
		OR			

8.	**a).**	Illustrate how failure free systems can be achieved.	**4**	**2**	**7**
	b).	Discuss hoe Agreement in synchronous systems with failures.	**4**	**2**	**7**
		UNIT-V			
9.	**a).**	Illustrate the process of Data indexing and overlays.	**4**	**2**	**7**
	b).	Explain content addressable networks.	**4**	**2**	**7**
		OR			
10.	**a).**	Explain Memory consistency models in distributed Systems?	**4**	**2**	**7**
	b).	What is meant by Shared memory Mutual Exclusion? How it is important in distributed systems?	**4**	**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

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		Course Code: B20IT3107			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			
		III B.Tech. I Semester MODEL QUESTION PAPER			
		ADVANCED UNIX PROGRAMMING			
		Information Technology			
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).**	With a neat sketch explain the architecture of Unix Operating Systems	**1**	**2**	**6**
	b).	Explain the following commands with examples i) echo ii) ls iii) cat iv) who	**1**	**2**	**8**
		OR			
2.	**a).**	Differentiate External and Internal commands in UNIX with suitable examples.	**1**	**3**	**6**
	b).	Explain the following commands with examples i) date ii) tty iii) man iv) pwd	**1**	**3**	**8**
		UNIT – II			
3.	**a).**	Write about Read command and Positional parameters for giving input to the shell script.	**2**	**3**	**8**
	b).	Explain the following file permission commands with examples i) chmod ii) fchmod	**2**	**3**	**6**
		OR			
4.	**a).**	Write a shell script to calculate gross salary of employee with DA as 60% and HRA as 15%, and read basic salary though keyboard.	**2**	**3**	**7**
	b).	Illustrate different Unix commands to manipulate File Ownerships.	**2**	**2**	**7**
		UNIT – III			
5.	**a).**	List and explain Unix commands to create, change and Remove Directories using suitable example.	**3**	**3**	**7**
	b).	Illustrate the functional difference between pause and sleep functions in Unix	**3**	**2**	**7**
		OR			
6.	**a).**	Explain the following commands for scanning Directories i)opendir ii)readdir iii) closedir	**3**	**2**	**6**
	b).	Differentiate fork() and vfork() process system calls in UNIX	**3**	**3**	**8**

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		UNIT – IV			
7.	**a).**	With an example, Explain in detail about the process of writing Messages on to a Queue.	**4**	**2**	**7**
	b).	Write about file locking versus Record Locking.	**4**	**2**	**7**
		OR			
8.	**a).**	Explain, in detail about the client - server communication using FIFOS	**4**	**3**	**7**
	b).	What are the named pipes? Explain in detail.	**4**	**2**	**7**
		UNIT – V			
9.	**a).**	What is shared memory? What is the importance of it? Explain in detail about the process of "Allocating a shared memory segment".	**5**	**3**	**7**
	b).	Explain the steps involved in writing TCP Echo Program in UNIX environment.	**5**	**3**	**7**
		OR			
10.	**a).**	Illustrate Semaphore structure in Unix Kernel	**5**	**2**	**7**
	b).	Explain the steps involved in writing TCP Echo Program in UNIX environment.	**5**	**3**	**7**

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

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

			Course Code: B20IT3108		
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		MODEL QUESTION PAPER			
		III B.Tech. I Semester MODEL QUESTION PAPER			
		COMPUTER GRAPHICS			
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 computer graphics. And explain its applications.	**1**	**2**	**7**
	b).	Illustrate CRT with neat diagram.	**1**	**3**	**7**
		OR			
2.	**a).**	Illustrate shadow-mask display method with neat diagram.	**1**	**3**	**7**
	b).	What are the differences between raster and random scan systems?	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	Rasterize line segment between the end points (0,0) and (-8,-4) using DDA line drawing algorithm.	**1**	**4**	**7**
	b).	Draw a line between X, Y using bresenham's line drawing algorithm, where X= (3, 3) and Y= (10, 5).	**1**	**4**	**7**
		OR			
4.	**a).**	Draw a circle with radius r = 7 and center (20, 30).	**1**	**4**	**7**
	b).	Draw an ellipse by using mid-point ellipse algorithm with r_x= 3, r_y= 5	**1**	**4**	**7**
		UNIT-III			
5.	**a).**	Illustrate basic 2D transformations with examples.	**2**	**3**	**7**
	b).	A triangle having vertices A(0,0), B(1, 1), C(5, 2) and rotation angle= 45^O. And perform rotation i) about coordinate origin ii) about a point (-1, -1).	**2**	**4**	**7**
		OR			
6.	**a).**	Illustrate reflection about a line y=mx + c.	**2**	**3**	**7**
	b).	Reflect the triangle with vertices A(2,4), B(4,6), C(2,6) about a line Y=(1/2)X +2.	**2**	**4**	**7**
		UNIT-IV			
7.	**a).**	Derive the transformation matrix for parallel projection (xy-plane)	**2**	**3**	**7**
	b).	Derive the transformation matrix for perspective projection.	**2**	**3**	**7**
		OR			

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8.	**a).**	Interpret 3-dimensional fixed point scaling.	**2**	**3**	**7**
	b).	Interpret 3-dimensional reflection and shearing.	**2**	**3**	**7**
		UNIT-V			
9.	**a).**	Interpret window to viewport transformation.	**3**	**3**	**7**
	b).	Assume that a point "W" in the window ABCD is mapped as a point in the viewport MNOP. If A(2,4), B(8,4), C(8,10), D(2,10), M(12,14), N(16,14), O(16,18), P(12,18) and $W(X_W,Y_W)$= (5,7) then find $V(X_V,Y_V)$ using window to viewport transformation.	**3**	**4**	**7**
		OR			
10.	**a).**	Interpret properties of bezier curves.	**3**	**3**	**7**
	b).	Interpret quadric surfaces and super quadrics.	**3**	**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

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					Course Code: B20IT3201
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		MACHINE LEARNING			
		Information Technology			
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 about Types of Machine Learning Systems?	**1**	**2**	**8**
	b).	Illustrate the following: 1) Artificial Intelligence 2) Machine Learning 3)Deep learning	**1**	**3**	**6**
		OR			
2.	**a).**	Differentiate between Supervised and Unsupervised Learning?	**1**	**3**	**7**
	b).	Write about Sampling distribution of an estimator?	**1**	**3**	**7**
		UNIT-II			
3.	**a).**	Discuss about various steps to construct the decision tree model.	**2**	**3**	**7**
	b).	Elaborate Naive Bayes probabilistic model for categorical data with an example?	**2**	**3**	**7**
		OR			
4.	**a).**	Explain types of Regression?	**2**	**3**	**7**
	b).	Differentiate between the One-Versus-One and One-versus-Rest methods for multi class classification using binary classification?	**2**	**3**	**7**
		UNIT-III			
5.	**a).**	Write about Ensemble Learning. Justify bagging with Random Forest algorithm with an example?	**3**	**3**	**7**
	b).	Write about Voting Classifiers?	**3**	**3**	**7**
		OR			
6.	**a).**	Explain how Support Vector Machine can be used for classification of linearly separable data.?	**3**	**3**	**14**
		UNIT-IV			
7.	**a).**	Write about K-Means algorithm with an example?	**4**	**3**	**7**
	b).	Write about Clustering for Semi-Supervised Learning?	**4**	**3**	**7**
		OR			

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8.	**a).**	What is meant by Dimensionality reduction? Apply PCA to reduce the dimensionality reduction.	**4**	**3**	**7**
	b).	Explain the concept of learning hidden layer representations	**4**	**2**	**7**
		UNIT-V			
9.	**a).**	Write short notes on Implementation of MLP with Keras.	**5**	**3**	**14**
		OR			
10.	**a).**	Write short notes on Loading and Pre-processing Data with TensorFlow.	**5**	**3**	**14**

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

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		Course Code: B20IT3202			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			
		III B.Tech. II Semester MODEL QUESTION PAPER			
		DESIGN AND ANALYSIS OF ALGORITHMS			
		Information Technology			
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 algorithm. Explain asymptotic notations Big O, Omega, and Theta.	**1**	**3**	**7**
	b)	Write an algorithm for matrix multiplication and find its time complexity.	**1**	**3**	**7**
		OR			
2	**a)**	What is an articulation point? Explain the procedure to determine bi-connected components in the graph with example.	**1**	**2**	**7**
	b)	Write an algorithm for BFS. Explain with example.	**1**	**3**	**7**
		UNIT-II			
3	**a)**	Explain divide-and-conquer technique. Write a recursive algorithm for finding the maximum and minimum element from the list.	**2**	**3**	**7**
	b)	Illustrate the tracing of Quick Sort algorithm for the following set of numbers 25, 10, 72, 18, 40, 11, 64, 58, 32, 9	**2**	**3**	**7**
		OR			
4	**a)**	Find the optimal solution of the knapsack instance n = 7, M = 15, (p1, p2, …p7) = (10, 5, 15, 7, 6, 18, 3) and (w1, w2, ……w7) = (2, 3, 5, 7, 1, 4, 1).	**2**	**3**	**7**
	b)	What is job sequencing with deadlines problem? Let n=5, profit (10, 3, 33, 11, 40) and deadlines (3, 1, 1, 2, 2) respectively. Find the optimal solution using greedy method.	**2**	**3**	**7**
		UNIT-III			
5	**a)**	For the given cost matrix, obtain an optimal cost tour using dynamic programming 0 10 15 20 5 0 9 10 6 13 0 12 8 8 9 0	**3**	**3**	**7**

	b)	What is graph coloring? Write an algorithm for it and explain with an example.	**3**	**3**	**7**
		OR			
6	**a)**	Using dynamic programming, solve the following knapsack instance n=4, m=5, (W1, W2, W3, W4)=(2, 1, 3, 2), (P1, P2, P3, P4)=(12, 10, 20, 15).	**3**	**3**	**7**
	b)	Explain Multistage graphs with example. Write multistage graph algorithm to forward approach.	**3**	**3**	**7**
		UNIT-IV			
7	**a)**	What is backtracking? Apply backtracking to solve the instance of the sum of subset problem n=6, d=30, S={5, 10, 12, 13, 15, 18}	**4**	**3**	**7**
	b)	Explain backtracking concept. Illustrate N queens problem using backtracking to solve 4-Queens problem.	**4**	**3**	**7**
		OR			
8	**a)**	State travelling salesperson problem. Apply Branch and Bound algorithm to solve the TSP instantiated by the following cost matri ∞ 20 30 10 11 15 ∞ 16 4 2 3 5 ∞ 2 4 19 6 18 ∞ 3 16 4 7 16 ∞	**4**	**3**	**7**
	b)	Explain FIFO Branch and Bound	**4**	**2**	**7**
		UNIT-V			
9	**a)**	Explain the classes of NP-Hard and NP-complete.	**5**	**2**	**7**
	b)	State and prove Cook's theorem.	**5**	**2**	**7**
		OR			
10	**a)**	Apply the Rabin-Karp algorithm to search for the pattern AABA in the text A A B A A C A A D A A B A A B A	**5**	**3**	**7**
	b)	Apply the Knuth-Morris-Pratt matching to search for the pattern "ABABACA" in the text "BACBABABABACACA"	**5**	**3**	**7**

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

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		Course Code: B20IT3203			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			
		III B.Tech. II Semester MODEL QUESTION PAPER			
		COMPUTER NETWORKS			
		Information Technology			
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 -1			
1	**a)**	Explain different LAN topologies?	**1**	**2**	**7**
	b)	Explain TCP/IP Protocol suite.	**1**	**2**	**7**
		OR			
2	**a)**	Describe Guided Media in physical layer	**1**	**2**	**7**
	b)	Compare and contrast OSI and TCP/IP layered protocol architecture	**1**	**3**	**7**
		UNIT -II			
3	**a)**	Describe selective repeat protocol.	**2**	**2**	**7**
	b)	Explain simplex protocol for noisy channel.	**2**	**2**	**7**
		OR			
4	**a)**	Explain the following error detection techniques i) Checksum ii) CRC	**2**	**2**	**7**
	b)	Explain HDLC protocol transfer modes.	**2**	**2**	**7**
		UNIT -III			
5	**a)**	Explain how CSMA works and modified to detect collision.	**3**	**2**	**7**
	b)	Explain methods for Controlled Access on a network.	**3**	**2**	**7**
		OR			
6	**a)**	Explain 802.15 architecture and layers.	**3**	**2**	**7**
	b)	Define Multiple Access? Explain FDMA and CDMA.	**3**	**2**	**7**
		UNIT -IV			
7	**a)**	Explain about IPV6 header format with neat sketch.	**4**	**2**	**7**
	b)	With an example explain the distance vector routing algorithms used in computer network	**4**	**2**	**7**
		OR			
8	**a)**	Explain the operation of DHCP	**4**	**2**	**7**

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	b)	Explain different classes in class full addressing and write range of IP address for each class.	**4**	**2**	**7**
		UNIT -V			
9	**a)**	Explain TCP header with a neat diagram.	**5**	**2**	**7**
	b)	Explain congestion control in TCP.	**5**	**2**	**7**
		OR			
10	**a)**	Explain HTTP transaction.	**5**	**2**	**7**
	b)	Explain need for DNS? How DNS resolver performs resolution.	**5**	**2**	**7**

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

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		Course Code: B20IT3204			
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		MOBILE COMPUTING			
		Information Technology Engineering			
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 challenges in mobile communication.	**1**	**2**	**7**
	b).	Describe in detail about structure of a mobile computing application.	**1**	**2**	**7**
		OR			
2.	**a).**	Define mobile computing. Explain about different types of communication.	**1**	**2**	**7**
	b).	Discuss about mobile computing and wireless communication in contrast.	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	Discuss about the typical steps for handover and classify the types of handovers.	**2**	**2**	**7**
	b).	Describe in detail about the system architecture of GSM.	**2**	**2**	**7**
		OR			
4.	**a).**	Elucidate in detail about how GPRS networks replace circuit switch services on second generation GSM communication. Explain its servicesand operation briefly.	**2**	**2**	**7**
	b).	Explain with a diagram the steps involved in a mobile terminated call (a station calling a mobile station) in GSM.	**2**	**2**	**7**
		UNIT-III			
5.	**a).**	Explain about the Code Division Multiple Access in detail.	**3**	**2**	**7**
	b).	Analyze the hidden and exposed terminals in detail.	**3**	**3**	**7**
		OR			
6.	**a).**	Relate IEEE 802.11 in wireless communication.	**3**	**3**	**7**
	b).	Distinguish merits and demerits of SDMA, TDMA and FDMA.	**3**	**3**	**7**
		UNIT-IV			
7.	**a).**	Relate location management, registration, tunneling and encapsulation in mobile networks.	**4**	**3**	**7**

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	b).	Give an overview of classical enhancements to TCP for mobility.	**4**	**3**	**7**
		OR			
8.	**a).**	Explain the usage of selective retransmission in TCP in mobile networks.	**4**	**2**	**7**
	b).	Discuss in detail about conventional TCP/IP protocols.	**4**	**2**	**7**
		UNIT-V			
9.	**a).**	Discuss in detail about different caching techniques.	**5**	**2**	**7**
	b).	Explain about transactional models in detail.	**5**	**2**	**7**
		OR			
10.	**a).**	Explain in detail about communications asymmetry with proper example.	**5**	**2**	**7**
	b).	Discuss about data dissemination in mobile networks.	**5**	**2**	**7**

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

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			Course Code: B20IT3205		
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		MEAN STACK DEVELOPMENT			
		Information Technology			
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 about the HTML – Need, Case-insensitivity, Platform-independency.	**1**	**3**	**7**
	b).	Write a short note on HTML Elements - Attributes, Metadata Element, Sectioning Elements, Paragraph Element, Division and Span Elements, List Element, Link Element and Character Entities.	**1**	**2**	**7**
		OR			
2.	**a).**	Illustrate about Creating Form Elements, Input Elements - Attributes, Color and Date Pickers, Select and Datalist Elements, Editing Elements, Media, Iframe.	**2**	**3**	**7**
	b).	What are the best Practices for HTML Web Pages.	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	What is JavaScript? How JavaScript works with Identifiers, Primitive and Non Primitive Data Types, Operators and Types of Operators.	**2**	**2**	**7**
	b).	Elaborate how JavaScript works on types of Functions, Declaring and Invoking Function.	**2**	**3**	**7**
		OR			
4.	**a).**	How does the classes mechanism works in the field of JavaScript.	**2**	**3**	**7**
	b).	In what manner JavaScript programming is executing Network Requests using Fetch API, Creating and consuming Modules.	**2**	**3**	**7**
		UNIT-III			
5.	**a).**	Specify the usage of Node.js in detail.	**3**	**3**	**7**
	b).	In what way does the Middleware works.	**3**	**3**	**7**
		OR			
6.	**a).**	State a brief note on Express.js .	**3**	**2**	**7**
	b).	Pay a path for Connecting to MongoDB with Mongoose.	**3**	**2**	**7**
		UNIT-IV			

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7.	**a).**	Complement about JSON, MongoDB Structure and Architecture.	**4**	**3**	**7**
	b).	State the importance of Classes, Constructor, Access Modifiers, Properties and Methods in TypeScript.	**4**	**2**	**7**
		OR			
8.	**a).**	Figure out about " Module Vs Namespace".	**4**	**3**	**7**
	b).	List out the steps for Installing MongoDB on the local computer (Mac or Windows)	**4**	**3**	**7**
		UNIT-V			
9.	**a).**	Discuss about the Features of Angular and components and Modules involved inAngular.	**5**	**2**	**7**
	b).	Bulid the steps involved for Passing data from Container Component to Child Component, Passing data from Child Component to ContainerComponent	**5**	**3**	**7**
		OR			
10.	**a).**	Note down the explanation for the terms ngIf, ngFor, ngSwitch, ngStyle, ngClass.	**5**	**3**	**7**
	b).	In what way we are Communicating with different backend services using Angular HttpClient.	**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

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				Course Code: B20IT3206	
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			**R20**
		III B.Tech. II Semester MODEL QUESTION PAPER			
		DESIGN PATTERNS			
		Information Technology			
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 about the role of Design Patterns in Smalltalk MVC.	**1**	**2**	**7**
	b).	How Design Patterns Solve Design Problems.	**1**	**3**	**7**
		OR			
2.	**a).**	In what way we are Designing a Document Editor.	**1**	**3**	**7**
	b).	Explain about User Operations Spelling Checking and Hyphenation in design patterns.	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	Write a short note on Abstract Factory.	**2**	**2**	**7**
	b).	What does the words Builder, Factory Method mean .	**2**	**2**	**7**
		OR			
4.	**a).**	State the working prosess of Prototype, Singleton.	**2**	**2**	**7**
	b).	Illustrate about the term Discussion of Creational Patterns.	**2**	**3**	**7**
		UNIT-III			
5.	**a).**	Discuss in brief about Structural Pattern.	**3**	**2**	**7**
	b).	Give a note on the words Adapter, Bridge.	**3**	**2**	**7**
		OR			
6.	**a).**	Explain the terms açade, Flyweight, Proxy.	**3**	**3**	**7**
	b).	How Composite, Decorator work.	**3**	**3**	**7**
		UNIT-IV			**7**
7.	**a).**	Write a short note on Behavioral Patterns:	**4**	**3**	**7**
	b).	Explain about Interpreter, Iterator, Mediator.	**4**	**3**	
		OR			
8.	**a).**	Explain the terms Chain of Responsibility, Command.	**4**	**3**	**7**
	b).	Give a note on the words Memento, Observer.	**4**	**2**	**7**
		UNIT-V			
9.	**a).**	Explain about State, Strategy, Template Method, Visitor terms.	**5**	**2**	**7**
	b).	Illustrate the Brief History, the Pattern Community an Invitation, a Parting Thought.	**6**	**3**	**7**
		OR			
10.	**a).**	State the discussion of Behavioral Patterns.	**6**	**3**	**7**
	b).	What to Expect from Design Patterns.	**5**	**3**	**7**

SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)					**R20**
III B.Tech. II Semester MODEL QUESTION PAPER					
SCRIPTING LANGUAGE					
(Information Technology)					
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 is PERL debugger and what are several ways to call the debugger? Explain in detail?	**1**	**2**	**14**
		OR			
2.	**a).**	Briefly explain the regular expressions in Perl.	**1**	**2**	**7**
	b).	Write a short note on modules, objects in Perl.	**1**	**2**	**7**
		UNIT-II			
3.	**a).**	What are the security Issues in PERL.	**1**	**2**	**7**
	b).	Explain the features of PHP.	**2**	**1**	**7**
		OR			
4.	**a).**	How can you create functions in PHP.	**2**	**2**	**7**
	b).	Explain about arrays, list, hashes in PERL	**1**	**1**	**7**
		UNIT-III			
5.	**a).**	Write a PHP code for browser Redirection using GET & POST Methods.	**2**	**2**	**7**
	b).	Explain parameters in openssl_encrypt() and openssl_decrypt() in PHP C	**2**	**2**	**7**
		OR			
6.	**a).**	Describe PHP authentication and its methodologies.	**2**	**3**	**14**
		UNIT-IV			
7.	**a).**	Describe briefly about namespaces in TCL?	**3**	**3**	**7**
	b).	Explain about Recursion and Procedures in TCL with example?	**3**	**2**	**7**
		OR			
8.	**a).**	Write TCL code for Modifying Strings to lower, to upper, trim and format	**3**	**2**	**7**
	b).	What are the Patterns available in TCL	**3**	**2**	**7**
		UNIT-V			

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9.	**a).**	What is Exception Handling? How do you achieve it in Python?	**4**	**2**	**7**
	b).	Write the differences between list and set in Python?	**4**	**2**	**7**
		OR			
10.	**a).**	Describe classical web service architecture with neat sketch	**4**	**3**	**7**
	b).	Explain the built-in function and methods in python	**4**	**2**	**7**

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

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AUTONOMOUS

			Course Code: B20IT3208		
		SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (A)			
		III B.Tech. II Semester MODEL QUESTION PAPER			
		BIG DATA ANALYTICS			
		(Information Technology)			
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).**	List out different challenges in Conventional Systems while handling big data.	**1**	**2**	**7**
	b).	List the different analytical processing tools	**1**	**2**	**7**
		OR			
2.	**a).**	Explain about Nature of data in Big data.	**1**	**2**	**7**
	b).	What are the types of Big Data and Describe the characteristics of Big Data.	**1**	**2**	**7**
		UNIT -II			
3.	**a).**	Explain the Stream Model and Data Stream Management System Architecture.	**2**	**2**	**7**
	b).	Explain how to count 1's in a window using DGIM algorithm.	**2**	**3**	**7**
		OR			
4.	**a).**	What is Filtering Streams? Explain Bloom Filter with an example.	**2**	**3**	**7**
	b).	Write a short note on Finding most popular elements using decaying window.	**2**	**3**	**7**
		UNIT – III			
5.	**a).**	How Hadoop streaming is suited with text processing explain.	**3**	**2**	**7**
	b).	How do you analyze the data in hadoop.	**3**	**2**	**7**
		OR			
6.	**a).**	Define HDFS. Describe Namenode, Datanode and block. Explain HDFS operations in detail.	**3**	**2**	**7**
	b).	How Map Reduce job works with classic java stream.	**3**	**2**	**7**
		UNIT - IV			
7.	**a).**	Write in detail the concept of developing the Map Reduce Application	**4**	**2**	**7**
	b).	Explain how Map Reduce jobs run on YARN.	**4**	**2**	**7**
		OR			
8.	**a).**	Discuss the various types of Map Reduce & its formats.	**4**	**2**	**7**
	b).	Explain how to schedule job in hadoop	**4**	**2**	**7**

		UNIT – V			
9.	**a).**	Explain two execution types or modes in PIG	**5**	**2**	**7**
	b).	Explain the process of installing HIVE & features of HIVE	**5**	**2**	**7**
		OR			
10.	**a).**	What is Zookeeper explain its features with applications	**5**	**2**	**7**
	b).	Discuss the Visual Data Analysis Techniques in detail.	**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

Estd. 1980
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