RV College of Engineering®

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Academic Year 2024-25 (ODD Semester)

USN | 1 | R | V | 2 | 1 | A | I | 0 | 5 | 7 |

Department of Artificial Intelligence and Machine Learning

Course Code: : AI254TA
Semester : VII
Max Marks : 10+50

Date : 26/12/2024
Time : 9:00-11:00
Duration : 120 mins

Stream Processing and Analytics
CIE I

Note: Answer all the Questions

SL. No		PART A Quiz 1 Questions	M	BT	CO
1		Classify the three types of real time systems	2	2	1
2		List any two needs for streaming data	2	1	1
3		Differentiate horizontal vs vertical scaling. Give example	2	1	1
4		How can we manage a broker crash in a stream processing environment?	2	2	2
5		List the three message delivery semantics?	2	2	2
		Part B CIE 1 Questions			
1	a	Consider the scenario of Vehicle Tracking System to monitor the real-time location, speed, and fuel level of vehicles in a fleet and trigger alerts for any anomalies. Draw the streaming data architecture for the given scenario and explain in detail?	10	1	1
2	a	With a neat diagram, elaborate the publisher-subscriber pattern	06	1	1
	b	Elaborate the need for Message queueing Tier with real time example?	04	2	1
3	a	Discuss the statement "Ingesting a stream of data and producing another stream". Draw appropriate diagram and give example	05	2	2
	b	Summarize the differences between sender-based vs receiver-based logging with a neat diagram?	05	2	2
4	a	A global financial services company processes billions of transactions daily to detect fraudulent activity. The company leverages a real-time fraud detection pipeline using streaming data. The company wants to implement different fault tolerant mechanisms to have secure transactions. What are the potential challenges that occur due to the failure in the stream processing? Discuss how the different stream processing tools handle failures in communication?	10	3	3
5	a	Consider the scenario given in 4a, discuss how apache kafka can handle data ingestion? Support the answer with a diagram.	06	3	3
	b	A global logistics company processes millions of shipment events daily, such as package scans, transit updates, and delivery confirmations. Few months later, the company wants to build a business model to track the missing shipments every quarter. Apply an appropriate durable message passing system to resolve the issue with a neat diagram.	04	3	3

***M*-Marks, BT-Blooms Taxonomy Levels, CO-Course Outcomes**

Marks Distribution	Particulars	CO1	CO2	CO3	CO4	CO5	L1	L2	L3	L4	L5	L6
	Max Marks Part A	6	4				4	6				
	Max Marks Part B	20	10	20			16	14	20			

Course Outcomes: After completing the course, the students will be able to:-

CO1	Describe the need and the application of real time and stream processing in real world applications.
CO2	Comprehend and apply the various operations like data ingestion, data communication, data analysis and storage for different streaming data applications.
CO3	Investigate and apply streaming concepts using modern tools to solve problems related to society and industry.
CO4	Demonstrate a prototype application for streaming data using Kafka as a team / individual.
CO5	Demonstrate solutions for societal and environmental concern problems using modern engineering tools through writing effective reports.