



Continuous Assessment Test (CAT) – II OCTOBER 2025

Programme	:	B.Tech CSE(BRS, BPS, BAI, BDS)	Semester	:	FALL 2025-26
Course Code & Course Title	:	BCSE355L - Cloud Architecture Design	Class Number	:	CH2025260101669 CH2025260101675 CH2025260101477 CH2025260101672 CH2025260101474 CH2025260102049 CH2025260102016 CH2025260102019 CH2025260102055 CH2025260102010 CH2025260101353
Faculty	:	Dr.LINDA JOSEPH Dr.SANKARI M Dr.MALINI A Dr.SUGUNA M Dr.RAJESH KUMAR Dr.POORNIMA S Dr.S VIGNESHWARI Dr.PRADEEP K Dr.TAMILARASI K Dr.SELLAM V Dr.KRITHIGA R	Slot	:	B2+TB2
Duration	:	1 hour 30 Minutes	Max. Mark	:	50

General Instructions:

- Write only your registration number on the question paper in the box provided and do not write other information
- Only non-programmable calculator without storage is permitted

Answer all questions

Q. No	Sub Sec.	Description	Marks	CO	BT Level
1		A multinational energy company operates a network of smart meters that report electricity usage at one-minute intervals. Each record includes a meter identifier, location, timestamp, voltage, current, and power factor. The system stores billions of these time-stamped records for real-time monitoring of recent consumption as well as historical analysis of monthly and yearly trends across different cities. The company wants to design a solution that efficiently handles the high write throughput of incoming data streams from all meters, supports fast queries for recent time ranges (e.g., the last hour per meter), enables cost-optimized long-term storage of aggregated consumption data, and provides a mechanism that reacts immediately to new records to trigger alerts and update dashboards without scanning the entire dataset. (i) Recommend the most suitable managed database service on AWS for this high-volume time-series data scenario and describe the	10	CO2	K3

		architectural concepts that make it suitable for this use case. [4 marks]. (ii) Indicate the design strategies you would use to automatically manage storage of older raw data while maintaining read efficiency and scalability across distributed servers. [3marks]. (iii) Elaborate on the event-driven approach you would implement to capture and process newly written records in near real time for downstream analytics and alerting, without resorting to costly data scans. [3 marks].			
2		A startup recently partnered with multiple event organizers. During a sudden viral campaign, traffic spiked 30× for two days. Some EC2 instances scaled automatically, but a few large instances never scaled down, leading to unexpected compute costs. One developer stored uploaded event videos in S3 Standard instead of S3 Infrequent Access and left versioning enabled, further increasing storage bills. Although CloudWatch alarms were configured, the DevOps team ignored notifications for several hours. The finance team now requires alerts before monthly costs exceed \$5,000, while the CTO insists on cost optimization without downtime and security checks (no public S3 buckets, correct IAM policies). (i) Identify the AWS tool that would allow the company to determine which services or teams were responsible for the cost spike during the viral campaign and explain the feature that would notify the finance team before the monthly cost exceeds \$5,000. [4 Marks]. (ii) Some marketing EC2 instances ran idle for weeks. Analyze which AWS service could automatically stop or terminate such idle resources and illustrate how it can be integrated with budget alerts to prevent unexpected costs. [3 Marks]. (iii) The CTO emphasized security best practices. Recommend two AWS tools or features that ensure no public S3 buckets exist and that IAM policies follow least-privilege principles and evaluate how these also contribute to cost optimization goals. [3 Marks].	10	CO3	K4
3		Alice and Bob work for a regional bank that manages sensitive customer financial data on AWS. They are developing a secure document storage system where customers can upload and access confidential financial documents. Alice handles encryption, while Bob manages access permissions. The bank requires that only authorized users can access encrypted documents, encryption keys are rotated regularly, and audit trails of key usage are maintained. Integration with third-party analytics tools adds complexity to access control and security monitoring. (i) Identify the main security requirements to protect sensitive data and explain why each is important. [4 Marks] (ii) Explain how a cloud-based key management service can help implement encryption, key rotation, and controlled access, and give one practical example. [3 Marks] (iii) Describe how Alice and Bob can monitor key usage, detect unauthorized access, and maintain audit logs to ensure compliance. [3 Marks]	10	CO3	K3

4	A multinational retail company migrated its ERP and customer portal to AWS. The operations team must monitor resources, track user activity, enforce compliance, and avoid cost spikes, while management requires proactive cost alerts, spend visibility by department, and automation to fix issues without manual effort. a) Design and justify a simple monitoring stack: use CloudWatch for key metrics, alarms, and dashboards; CloudTrail to record and analyze API/user activity; AWS Config to evaluate compliance rules and auto-remediate drift; and Systems Manager to apply automation for patching, enforcing desired state, and fixing misconfigurations. Explain how these services integrate to provide continuous monitoring, compliance, and audit readiness. [5 Marks] b) Explain and illustrate cost control: set AWS Budgets to monitor and alert on actual/forecasted spend; use Cost Explorer to analyze trends and detect anomalies; and enforce a tagging strategy to classify spend by department. Evaluate how combining Trusted Advisor checks with Systems Manager Automation can optimize costs, reduce waste, and enforce governance across accounts. [5 Marks]	10	CO4	K5
5	XYZ Retail runs an online ticketing system for events and movies. During flash sales, the tightly coupled services (reservation, payment, seat allocation, ticketing, notifications) cause slowdowns, double bookings, and missed alerts. Redesign the workflow using Amazon SNS, Amazon SQS, and Amazon SWF to make it scalable, fault-tolerant, and loosely coupled. (i) Explain how Amazon SQS decouples services like seat allocation, payment, and ticket generation, enabling reliable messaging and fault isolation. [2.5 marks] (ii) Describe how Amazon SWF can orchestrate the overall booking process, including handling retries, timeouts, and compensating actions on failure. [2.5 marks] (iii) Show how Amazon SNS sends real-time notifications to internal services and users (email/SMS/push) using fan-out and message filtering. [2.5 marks] (iv) With a diagram, present the integrated flow of SNS, SQS, and SWF for a booking request, and indicate how failures (e.g., payment decline, timeout) are contained. [2.5 marks]	10	CO4	K4

*****All the best *****