AWS Solutions Architect Professional Level MCQ Questions

Section 1: Networking & Content Delivery

Q1. A company has a VPC with multiple subnets across 3 Availability Zones. They need to allow instances in private subnets to access the internet for software updates but prevent inbound internet access. What is the MOST cost-effective solution?

A) Deploy an Internet Gateway and update route tables
B) Deploy a NAT Gateway in each AZ
C) Deploy a single NAT Gateway in one AZ
D) Deploy NAT Instances in an Auto Scaling group

Q2. An application runs in multiple AWS regions. Users should be automatically routed to the nearest healthy region. Which Route 53 routing policy combination provides this capability?

A) Geolocation routing with health checks
B) Geoproximity routing with health checks
C) Latency-based routing with failover
D) Latency-based routing with health checks

Q3. A company wants to share a single AWS Direct Connect connection across multiple VPCs in different AWS accounts. What solution meets this requirement?

A) Use VPC Peering between all VPCs
B) Use Direct Connect Gateway with Virtual Private Gateways
C) Use AWS Transit Gateway with Direct Connect Gateway
D) Create separate Direct Connect connections for each VPC

Q4. An application requires a static IP address that can be moved between EC2 instances for failover. The IP must be reachable from the internet. What should be used?

A) Elastic Network Interface (ENI)
B) Elastic IP Address (EIP)
C) Application Load Balancer with fixed IP
D) Network Load Balancer

Q5. A company needs to inspect all traffic between VPCs for security threats. Which approach provides centralized inspection?

A) Deploy Security Groups in each VPC
B) Use AWS Network Firewall with Transit Gateway
C) Use VPC Flow Logs with CloudWatch
D) Deploy NACLs in each subnet

Section 2: Compute Services

Q6. A batch processing application runs for 4-6 hours daily at unpredictable times. The application is fault-tolerant and can handle interruptions. What is the MOST cost-effective compute option?

A) On-Demand EC2 instances
B) Reserved Instances
C) Spot Instances
D) Spot Fleet with On-Demand fallback

Q7. An application experiences sudden traffic spikes from 100 to 10,000 requests per second. The application must scale within 30 seconds. Which solution is BEST?

A) EC2 Auto Scaling with target tracking
B) Lambda with provisioned concurrency
C) ECS with Service Auto Scaling
D) Lambda without provisioned concurrency

Q8. A company runs Windows-based applications requiring SMB file shares accessible from hundreds of EC2 instances across multiple AZs. What storage solution should be used?

A) Amazon EFS
B) Amazon FSx for Windows File Server
C) Amazon EBS Multi-Attach
D) Amazon S3 with Windows File Gateway

Q9. An application must process 1 million messages per day with varying processing times (1-30 minutes). Messages must be processed exactly once. What architecture is BEST?

A) SQS Standard Queue with Lambda
B) SQS FIFO Queue with Lambda
C) SQS Standard Queue with ECS tasks
D) Kinesis Data Streams with Lambda

Q10. A containerized application requires persistent storage that can be shared across multiple containers running on different EC2 instances. What should be used?

A) EBS volumes with Multi-Attach
B) EFS file system
C) Instance store volumes
D) S3 mounted via S3FS

Section 3: Storage & Databases

Q11. A company stores 500 TB of archival data that must be retained for 10 years for compliance. Data is accessed once per year. What is the MOST cost-effective solution?

A) S3 Standard-IA
B) S3 One Zone-IA
C) S3 Glacier Flexible Retrieval
D) S3 Glacier Deep Archive

Q12. An application requires a database that provides single-digit millisecond latency, automatic scaling, and can handle millions of requests per second. Which database is BEST?

A) RDS Aurora with read replicas
B) DynamoDB with on-demand capacity
C) DocumentDB
D) RDS MySQL Multi-AZ

Q13. A database workload has 80% reads and 20% writes. Read queries are causing performance issues on the primary database. What solution improves read performance?

A) Enable Multi-AZ deployment
B) Increase database instance size
C) Add read replicas and route read traffic to them
D) Enable automated backups

Q14. A company needs to migrate a 10 TB on-premises database to AWS with less than 1 hour of downtime. The company has a 1 Gbps internet connection. What is the BEST approach?

A) Use AWS Database Migration Service (DMS) with CDC
B) Export database, upload to S3, import to RDS

C) Use AWS Snowball Edge with DMS
D) Use AWS DataSync to transfer the data

Q15. An application stores user session data that expires after 24 hours. Data must be available with low latency. What storage solution is MOST appropriate?

A) RDS with TTL columns
B) DynamoDB with TTL enabled
C) ElastiCache Redis with TTL
D) S3 with lifecycle policies

Section 4: Security & Compliance

Q16. A company must encrypt data at rest using customer-managed keys with automatic key rotation and audit logging of all key usage. What solution meets these requirements?

A) S3 Server-Side Encryption with S3-managed keys (SSE-S3)
B) S3 Server-Side Encryption with KMS (SSE-KMS) using customer managed keys
C) Client-side encryption with custom keys
D) S3 Server-Side Encryption with customer-provided keys (SSE-C)

Q17. An application in a VPC needs to access S3 without traffic traversing the internet. What is the BEST solution?

A) Use a NAT Gateway
B) Use VPC Peering to S3
C) Deploy a VPC endpoint for S3 (Gateway endpoint)
D) Use AWS PrivateLink

Q18. A company must ensure that IAM users can only launch EC2 instances with specific approved AMIs. How can this be enforced?

A) Use AWS Organizations SCPs
B) Create an IAM policy with Condition on ec2:ImageId
C) Use AWS Config rules to check compliance
D) Enable CloudTrail logging and alert on violations

Q19. A web application must authenticate users via corporate Active Directory. Users should use existing credentials without password sync. What solution provides this?

A) Amazon Cognito User Pools
B) AWS Directory Service for Microsoft AD with AD Connector
C) AWS Single Sign-On (SSO)
D) IAM users with SAML federation

Q20. A company must prevent S3 buckets from being made public and enforce encryption at rest organization-wide. What is the MOST effective approach?

A) Create IAM policies denying public access
B) Use S3 Block Public Access at organization level via AWS Organizations
C) Enable S3 default encryption on all buckets
D) Use AWS Config rules to detect violations

Section 5: High Availability & Disaster Recovery

Q21. An application requires 99.99% availability (52 minutes downtime/year). The RTO is 1 hour and RPO is 15 minutes. What DR strategy is MOST cost-effective?

A) Backup and Restore
B) Pilot Light
C) Warm Standby
D) Multi-Site Active-Active

Q22. A database must failover to another region within 1 minute with zero data loss. What solution meets these requirements?

A) RDS Multi-AZ deployment
B) RDS with cross-region read replica
C) Aurora Global Database
D) DynamoDB with Global Tables

Q23. An application must continue operating even if an entire AWS region fails. The application uses EC2, RDS, and S3. What architecture provides this?

A) Multi-AZ deployment within one region
B) Multi-region active-passive with Route 53 failover
C) Multi-region active-active with Route 53 weighted routing
D) CloudFront with multiple origin regions

Q24. An Auto Scaling group must distribute instances evenly across 3 AZs to maximize availability. What configuration achieves this?

A) Configure Auto Scaling with Availability Zone Balance
B) Set equal desired capacity in each AZ manually
C) Use placement groups across AZs
D) Deploy separate Auto Scaling groups per AZ

Q25. Application logs must be retained for 7 years but only accessed during audits. What is the MOST cost-effective solution?

A) Store in CloudWatch Logs with 7-year retention
B) Export to S3 Standard with lifecycle policy to Glacier Deep Archive after 30 days
C) Store in S3 Glacier Deep Archive immediately
D) Export to EBS volumes and snapshot periodically

Section 6: Cost Optimization & Performance

Q26. A company's AWS bill is $100,000/month with 80% from EC2 instances running 24/7. How can costs be reduced by 50%+ without architecture changes?

A) Use Spot Instances
B) Purchase Compute Savings Plans
C) Switch to smaller instance types
D) Use Auto Scaling to reduce capacity

Q27. CloudFront is serving static content from S3, but costs are high due to frequent requests for the same objects. How can costs be reduced?

A) Increase CloudFront TTL values
B) Use S3 Transfer Acceleration
C) Enable S3 Intelligent-Tiering
D) Add more CloudFront edge locations

Q28. An application reads the same DynamoDB items thousands of times per second. Response time must be under 1ms. What improves performance and reduces costs?

A) Enable DynamoDB Auto Scaling
B) Deploy DynamoDB Accelerator (DAX)
C) Switch to provisioned capacity
D) Add Global Secondary Indexes

Q29. A company uses On-Demand instances for production workloads. Usage analysis shows consistent baseline load with periodic spikes. How should compute be optimized?

A) Convert all instances to Reserved Instances
B) Convert all instances to Spot Instances
C) Use Reserved Instances for baseline, On-Demand for spikes
D) Use Spot Instances for baseline, On-Demand for spikes

Q30. An EBS volume type is needed for a database with 50,000 random IOPS requirement and 500 MB/s throughput. What should be selected?

A) gp3 with 16,000 IOPS provisioned
B) io2 Block Express with 50,000 IOPS provisioned
C) gp2 with maximum IOPS
D) st1 throughput optimized

Instructions

Try to answer all questions before checking the answer key below.

Test your knowledge and understanding of AWS services and architectural best practices. Focus on:

- Understanding the trade-offs between different solutions
- Cost optimization considerations
- High availability and disaster recovery strategies
- Security best practices
- Service selection based on specific requirements

Answer Key with Detailed Explanations

Section 1: Networking & Content Delivery

Q1. Answer: C
A single NAT Gateway is the most cost-effective option for basic internet access. While option B provides high availability across AZs, the question asks for the MOST cost-effective solution. NAT Gateway is managed and more reliable than NAT Instances (option D), and an Internet Gateway alone (option A) won't work for private subnets without public IPs.

Q2. Answer: D
Latency-based routing directs users to the region with the lowest latency. Combined with health checks, it automatically routes to the next-best region if the primary fails. Geoproximity (B) routes based on geographic location and bias, not actual latency. Geolocation (A) routes based on user location but doesn't consider actual network latency.

Q3. Answer: C
Transit Gateway with Direct Connect Gateway allows a single Direct Connect connection to be shared across multiple VPCs and accounts. It provides centralized connectivity and supports transitive routing. Option B works but doesn't scale well and doesn't support transitive routing. Options A and D are inefficient and costly.

Q4. Answer: B
Elastic IP (EIP) is a static IPv4 address that can be quickly remapped between instances for failover. While ENI (A) can have an EIP attached, the EIP itself is what provides the static IP capability. NLB (D) provides static IPs but doesn't allow movement between EC2 instances. ALB (C) doesn't support static IPs directly.

Q5. Answer: B
AWS Network Firewall integrated with Transit Gateway provides centralized, stateful inspection of traffic between VPCs. Traffic is routed through the firewall for inspection. Security Groups (A) and NACLs (D) provide filtering but not deep packet inspection. VPC Flow Logs (C) provide logging, not active inspection or blocking.

Section 2: Compute Services

Q6. Answer: C
Spot Instances offer up to 90% discount and are ideal for fault-tolerant, flexible workloads. Since the application can handle interruptions and runs at unpredictable times, pure Spot Instances (C) are most cost-effective. Spot Fleet with On-Demand (D) adds unnecessary cost. Reserved Instances (B) aren't suitable for unpredictable schedules.

Q7. Answer: B
Lambda with provisioned concurrency keeps functions initialized and ready to respond in milliseconds, handling sudden spikes effectively. EC2 Auto Scaling (A) takes minutes to launch instances. Lambda without provisioned concurrency (D) may experience cold starts. ECS Service Auto Scaling (C) is faster than EC2 but slower than provisioned Lambda.

Q8. Answer: B
FSx for Windows File Server provides native Windows file system with SMB protocol support, Active Directory integration, and multi-AZ availability. EFS (A) is for Linux/NFS. EBS Multi-Attach (C) only supports 16 instances in same AZ. S3 with File Gateway (D) adds latency and doesn't provide native Windows features.

Q9. Answer: C
SQS Standard Queue with ECS tasks handles variable processing times and provides at-least-once delivery with message deduplication. Lambda (A, B) has a 15-minute timeout limit, too short for 30-minute tasks. FIFO (B) has throughput limits (3000 messages/sec). Kinesis (D) is for streaming, not message queuing with exactly-once processing.

Q10. Answer: B
EFS provides shared, persistent file storage accessible from multiple instances simultaneously across AZs. EBS Multi-Attach (A) is limited to 16 instances in same AZ and requires special configuration. Instance store (C) is ephemeral. S3FS (D) is not recommended for file system operations due to performance and consistency limitations.

Section 3: Storage & Databases

Q11. Answer: D
S3 Glacier Deep Archive offers the lowest storage cost (about $1/TB/month) for data accessed once or twice per year with 12-48 hour retrieval time. It's designed for compliance archives. Glacier Flexible Retrieval (C) is more expensive. Standard-IA and One Zone-IA (A, B) are for data accessed monthly.

Q12. Answer: B
DynamoDB with on-demand capacity provides single-digit millisecond latency, automatic scaling, and can handle millions of requests per second without capacity planning. Aurora (A) provides millisecond latency but requires capacity planning and manual read replica scaling. DocumentDB (C) and RDS (D) don't match the performance requirements.

Q13. Answer: C
Read replicas offload read traffic from the primary database, improving overall performance. Multi-AZ (A) is for high availability, not read scaling. Increasing instance size (B) helps but is less cost-effective than horizontal scaling with read replicas. Automated backups (D) don't improve read performance.

Q14. Answer: A
AWS DMS with Change Data Capture (CDC) performs full load replication while capturing ongoing changes, minimizing downtime to minutes. With 1 Gbps, 10 TB can transfer in about 24 hours (initial load), then CDC keeps sync. Snowball (C) adds shipping time. S3 export/import (B) creates longer downtime. DataSync (D) is for file transfers, not databases.

Q15. Answer: C
ElastiCache Redis provides in-memory caching with microsecond latency and native TTL support, perfect for session data. DynamoDB with TTL (B) works but has higher latency. RDS (A) is overkill for session data. S3 (D) has eventual consistency and isn't designed for session management.

Section 4: Security & Compliance

Q16. Answer: B
SSE-KMS with customer managed keys provides automatic rotation, audit logging via CloudTrail, and full key control. SSE-S3 (A) uses AWS-managed keys without customer control. SSE-C (D) requires customer to provide keys each time and doesn't offer automatic rotation. Client-side encryption (C) requires manual key management.

Q17. Answer: C
S3 Gateway VPC endpoint allows private connectivity to S3 without internet gateway or NAT device, with no additional charges. NAT Gateway (A) routes through internet. VPC Peering (B) isn't possible with S3 (not a VPC). PrivateLink (D) is for services, not S3 gateway access.

Q18. Answer: B
IAM policy with a Condition key on ec2:ImageId explicitly allows only specific AMIs, preventing launches with unapproved AMIs at the API level. SCPs (A) work but are broader organization controls. Config (C) detects violations after the fact. CloudTrail (D) only logs, doesn't prevent.

Q19. Answer: B
AD Connector proxies authentication requests to on-premises Active Directory, allowing users to authenticate with existing credentials without synchronization. Cognito (A) requires identity federation setup. SSO (C) is for AWS account access. IAM SAML (D) is for AWS console access, not application authentication.

Q20. Answer: B
S3 Block Public Access at the organization level enforces the policy across all accounts and buckets, preventing public access even if users try to enable it. IAM policies (A) can be circumvented. Config rules (D) detect but don't prevent. Default encryption (C) only addresses encryption, not public access.

Section 5: High Availability & Disaster Recovery

Q21. Answer: B
Pilot Light maintains minimal resources in DR region (database replicas) that can be quickly scaled up, meeting 1-hour RTO requirement cost-effectively. Backup/Restore (A) typically exceeds 1-hour RTO. Warm Standby (C) meets requirements but costs more. Multi-Site (D) is overkill for these requirements and most expensive.

Q22. Answer: C
Aurora Global Database provides <1 minute RPO and <1 minute RTO with physical replication across regions. Multi-AZ (A) is within-region only. RDS read replicas (B) have replication lag and slower promotion. DynamoDB Global Tables (D) work but the question specifies a database requiring this capability, pointing to relational.

Q23. Answer: B
Multi-region active-passive with Route 53 health checks and failover routing ensures operation if primary region fails. Multi-AZ (A) doesn't protect against region failure. Active-active (C) is more complex and costly when not required. CloudFront (D) alone doesn't provide application failover.

Q24. Answer: A
Auto Scaling's AZ Balance feature automatically distributes instances evenly across all configured AZs, rebalancing when needed. Manual configuration (B) doesn't adapt to failures. Placement groups (C) are for performance, not HA. Separate ASGs (D) add management complexity and don't rebalance automatically.

Q25. Answer: B
S3 Standard for initial 30 days allows quick access for recent logs, then lifecycle transition to Glacier Deep Archive provides lowest cost for long-term retention. CloudWatch Logs (A) is expensive for 7 years. Immediate Glacier (C) works but S3 Standard for recent logs provides better accessibility. EBS snapshots (D) are not cost-effective for logs.

Section 6: Cost Optimization & Performance

Q26. Answer: B
Compute Savings Plans provide up to 66% discount for committed usage on 24/7 workloads, requiring no

architecture changes. Spot Instances (A) work but require fault-tolerant architecture. Smaller instances (C) may impact performance. Auto Scaling (D) is an architecture change.

Q27. Answer: A
Increasing TTL reduces origin requests to S3, lowering data transfer and request costs by serving more content from CloudFront cache. S3 Transfer Acceleration (B) is for uploads. Intelligent-Tiering (C) doesn't reduce CloudFront costs. More edge locations (D) increases costs.

Q28. Answer: B
DAX provides microsecond latency in-memory caching for DynamoDB, reducing read load and costs. Auto Scaling (A) doesn't improve latency. Provisioned capacity (C) may reduce costs but doesn't improve latency. GSIs (D) are for query patterns, not caching.

Q29. Answer: C
Reserved Instances for predictable baseline (60-70% discount) with On-Demand for spikes provides optimal cost/flexibility balance. All Reserved (A) wastes capacity during low periods. Spot for baseline (D) risks interruption for critical workloads. All Spot (B) is too risky for production.

Q30. Answer: B
io2 Block Express supports up to 256,000 IOPS and 4,000 MB/s, meeting both requirements. gp3 (A) maxes at 16,000 IOPS. gp2 (C) maxes at 16,000 IOPS based on volume size. st1 (D) is for throughput-oriented workloads, not high IOPS.

Scoring Guide

- **27-30 correct**: Expert level - Ready for AWS Solutions Architect Professional
- **23-26 correct**: Advanced level - Review weak areas
- **18-22 correct**: Intermediate level - More study needed
- **Below 18**: Foundational level - Consider reviewing AWS fundamentals

Key Topics to Master

- Multi-AZ vs Multi-Region strategies
- RTO/RPO requirements and DR strategies
- Cost optimization with Reserved/Spot/Savings Plans
- Database selection criteria (RDS vs Aurora vs DynamoDB)
- Network architecture (Transit Gateway, Direct Connect, VPC design)
- Storage classes and lifecycle policies
- Security best practices (KMS, IAM, VPC endpoints)
- High availability and fault tolerance patterns