MCQ - IN401 Cloud Computing

Please check your answers against the provided solutions below.

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1. Which deployment model combines public cloud, private cloud, and on-premises infrastructure?

- **a.** Public Cloud
- **b.** Community Cloud
- **c.** Hybrid Cloud
- **d.** Federated Cloud

Correct answer: c

Explanation: Hybrid Cloud combines public, private, and on-premises infrastructure, enabling cloud bursting and flexible workload placement.

2. In which service model does the customer manage operating systems, applications, and data?

- **a.** SaaS
- **b.** PaaS
- **c.** IaaS
- **d.** FaaS

Correct answer: c

Explanation: In IaaS, customers manage OS, applications, and data, while the provider manages hardware, virtualization, storage, and networking.

3. What distinguishes elasticity from scalability in cloud computing?

- **a.** Elasticity is manual; scalability is automatic
- **b.** Elasticity dynamically adjusts resources; scalability handles growing workloads
- **c.** They are the same concept
- **d.** Elasticity only applies to storage

Correct answer: b

Explanation: Scalability handles growing workloads by adding resources. Elasticity dynamically adjusts resources in response to changing demands, including scaling down.

4. Which computing paradigm is the direct precursor to cloud's pay-per-use billing model?

- **a.** Grid Computing
- **b.** Cluster Computing
- **c.** Utility Computing
- **d.** Parallel Computing

Correct answer: c

Explanation: Utility Computing introduced service provisioning based on consumption (pay-per-use), metered like electricity, which directly influenced cloud billing models.

5. What are the two components of the future of cloud computing mentioned in the course?

- **a.** Intelligent Cloud and Quantum Computing
- **b.** Intelligent Edge and Intelligent Cloud
- **c.** Edge Computing and Fog Computing
- **d.** Distributed Cloud and Multi-Cloud

Correct answer: b

Explanation: The future combines Intelligent Edge (processing close to users/devices) with Intelligent Cloud (AI-powered centralized services).

6. Which SLA component specifies the expected service quality with metrics like uptime guarantees?

- **a.** Accountability
- **b.** Penalties
- **c.** Performance Metrics
- **d.** Warranties

Correct answer: c

Explanation: Performance Metrics in SLAs specify expected service quality, including uptime (e.g., 99.95%), response time, and throughput.

7. In the 'Trap and Emulate' mechanism, where does the Guest OS run?

- **a.** Kernel mode
- **b.** User mode
- **c.** Hypervisor mode
- **d.** Ring 0

Correct answer: `b`

Explanation: In Trap and Emulate, the Guest OS runs in user mode (restricted privilege). Privileged instructions trap to the VMM, which runs in kernel mode.

8. Which hypervisor type runs directly on hardware without a host OS?

- **a.** Type 2 Hypervisor
- **b.** Hosted Hypervisor
- **c.** Type 1 Hypervisor
- **d.** Container Runtime

Correct answer: `c`

Explanation: Type 1 (Bare Metal) hypervisors like Xen, VMware ESXi, and Hyper-V run directly on hardware, offering better performance for production environments.

9. What is the primary purpose of Domain 0 in Xen architecture?

- **a.** Run unprivileged guest VMs
- **b.** Manage hardware resources and allocate them to guest domains
- **c.** Provide network isolation
- **d.** Handle encryption

Correct answer: `b`

Explanation: Domain 0 is a privileged guest OS that manages hardware resources, allocates them to Domain U (unprivileged guests), and has direct hardware access.

10. Which storage type is accessed through APIs rather than a file system?

- **a.** Volume Storage
- **b.** File Storage
- **c.** Object Storage
- **d.** Block Storage

Correct answer: `c`

Explanation: Object Storage uses APIs for access (not file systems), storing files as objects with metadata and unique IDs. Examples: Amazon S3, Azure Blob.

11. What is a snapshot in cloud storage?

- **a.** A compressed archive of files

- **b.** An instant backup of a volume stored in object storage
- **c.** A virtual network configuration
- **d.** A security group rule

Correct answer: b

Explanation: A snapshot is an instant backup of a volume that copies all storage blocks into a file in object storage for recovery and cloning purposes.

12. In data dispersion, how many fragments must be retrieved to reconstruct a file if it was split into n fragments?

- **a.** All n fragments
- **b.** m fragments where m < n
- **c.** n/2 fragments
- **d.** Exactly 3 fragments

Correct answer: b

Explanation: Data dispersion requires only m out of n fragments (where m < n) to reconstruct the file, providing both security and availability.

13. What is the main security benefit of the NoHype architecture?

- **a.** Better performance
- **b.** Eliminates hypervisor as attack surface
- **c.** Easier resource management
- **d.** Lower cost

Correct answer: b

Explanation: NoHype removes the hypervisor layer entirely, eliminating VM escape attacks and hypervisor vulnerabilities, though it sacrifices flexibility.

14. Which encryption approach keeps the encryption engine in the instance but manages keys externally?

- **a.** Instance-managed encryption
- **b.** Externally-managed encryption
- **c.** Proxy encryption
- **d.** Transparent encryption

Correct answer: b

Explanation: Externally-managed encryption runs the encryption engine in the instance but stores keys in

an external HSM or key management service.

15. What is the primary difference between vertical and horizontal scaling?

- **a.** Vertical adds more servers; horizontal increases server resources
- **b.** Vertical increases server resources; horizontal adds more servers
- **c.** They are the same
- **d.** Vertical is cheaper than horizontal

Correct answer: b

Explanation: Vertical scaling (scale up) increases resources of a single server (CPU/RAM). Horizontal scaling (scale out) adds more server instances.

16. Which load balancing algorithm routes traffic to the server with the fewest active connections?

- **a.** Round Robin
- **b.** Least Connections
- **c.** IP Hash
- **d.** Weighted Round Robin

Correct answer: b

Explanation: Least Connections algorithm routes traffic to the server with the fewest active connections, optimizing load distribution.

17. What is the key difference between Docker images and containers?

- **a.** Images are dynamic; containers are static
- **b.** Images are read-only templates; containers are running instances
- **c.** They are the same thing
- **d.** Containers are stored on disk; images run in memory

Correct answer: b

Explanation: Docker images are read-only templates (static). Containers are running instances of images (dynamic, mutable) with a thin read/write layer.

18. In Docker's layered architecture, where do runtime changes occur?

- **a.** In the base image layer
- **b.** In all layers simultaneously
- **c.** In the thin read/write container layer

- **d.** In a separate volume

Correct answer: `c`

Explanation: Runtime changes occur only in the thin read/write layer on top of read-only image layers, keeping base images unchanged and shareable.

19. What does the EXPOSE instruction in a Dockerfile specify?

- **a.** The port the container will listen on
- **b.** The network interface to use
- **c.** The firewall rules
- **d.** The load balancer configuration

Correct answer: `a`

Explanation: EXPOSE specifies the port where the application will be accessible, though port mapping is still needed to access it from the host.

20. What is Docker Compose primarily used for?

- **a.** Building single container images
- **b.** Managing and running multiple containers as a single application
- **c.** Deploying to production only
- **d.** Creating Dockerfiles

Correct answer: `b`

Explanation: Docker Compose orchestrates multiple containers defined in a YAML file, managing services like web servers, databases, and caches together.

21. Which PaaS platform is tightly coupled with Google's Go programming language?

- **a.** Heroku
- **b.** AWS Elastic Beanstalk
- **c.** Google App Engine
- **d.** Azure App Service

Correct answer: `c`

Explanation: Google App Engine is tightly coupled with Go and provides App Engine's Go SDK for application development.

22. What type of database does Google App Engine Datastore use?

- **a.** Relational SQL
- **b.** NoSQL schema-less object-based
- **c.** Graph database
- **d.** Time-series database

Correct answer: b

Explanation: App Engine Datastore is a NoSQL schema-less object-based data storage with entities (like tables) and properties (like columns).

23. What is the main purpose of Service Oriented Architecture (SOA) in SaaS?

- **a.** To increase server capacity
- **b.** To break applications into independent, reusable services
- **c.** To reduce network latency
- **d.** To eliminate databases

Correct answer: b

Explanation: SOA breaks applications into independent, reusable services that communicate over a network, enabling flexibility and reducing dependencies.

24. In multi-tenancy architecture, what is the 'noisy neighbor' problem?

- **a.** Network routing issues
- **b.** One tenant using excessive resources slows performance for others
- **c.** Database corruption
- **d.** Security breach

Correct answer: b

Explanation: The noisy neighbor problem occurs when one tenant's excessive resource usage (CPU, memory, I/O) degrades performance for other tenants sharing infrastructure.

25. Which multi-tenancy architecture provides the highest isolation?

- **a.** Shared Application + Shared Database
- **b.** Shared Application + Separate Database
- **c.** Separate Application + Separate Database
- **d.** All provide equal isolation

Correct answer: c

Explanation: Separate Application + Separate Database provides highest isolation (used for

banking/government) but is most expensive and least scalable.

26. What does MFA stand for in SaaS authentication?

- **a.** Multiple File Access
- **b.** Multi-Factor Authentication
- **c.** Master File Allocation
- **d.** Managed Function Authentication

Correct answer: `b`

Explanation: MFA (Multi-Factor Authentication) adds additional verification like SMS codes, OTPs, or biometrics to improve security beyond passwords.

27. Which authentication method allows users to log in once and access multiple systems?

- **a.** Multi-Factor Authentication
- **b.** Token-Based Authentication
- **c.** Single Sign-On (SSO)
- **d.** OAuth 2.0

Correct answer: `c`

Explanation: Single Sign-On (SSO) allows users to authenticate once and access multiple systems using protocols like SAML 2.0 or OAuth 2.0.

28. What is the difference between authentication and authorization?

- **a.** They are the same
- **b.** Authentication verifies identity; authorization determines permissions
- **c.** Authorization verifies identity; authentication determines permissions
- **d.** Authentication is for APIs only

Correct answer: `b`

Explanation: Authentication verifies who a user is. Authorization determines what that authenticated user is allowed to do (which data/features they can access).

29. Which API type uses XML and strict contracts for enterprise systems?

- **a.** REST API
- **b.** SOAP API
- **c.** GraphQL

- **d.** Webhooks

Correct answer: `b`

Explanation: SOAP API uses XML and strict contracts, commonly used in enterprise systems like Salesforce SOAP API.

30. What are webhooks in SaaS integration?

- **a.** Database queries
- **b.** Event-driven push notifications from one app to another
- **c.** User interface components
- **d.** Encryption methods

Correct answer: `b`

Explanation: Webhooks are event-driven push notifications that one application sends to another when specific events occur (e.g., Stripe payment success).

31. What is the main advantage of microservices over monolithic architecture?

- **a.** Simpler deployment
- **b.** Independent scaling and fault isolation
- **c.** Requires less network bandwidth
- **d.** Easier to debug

Correct answer: `b`

Explanation: Microservices allow independent scaling of services and fault isolation—if one service fails, others continue working, unlike monolithic apps.

32. How do microservices communicate asynchronously?

- **a.** Direct API calls
- **b.** Shared database
- **c.** Message brokers like RabbitMQ
- **d.** File sharing

Correct answer: `c`

Explanation: Asynchronous communication uses message brokers (e.g., RabbitMQ, Kafka) for decoupled communication between microservices.

33. According to Amdahl's Law, if 10% of a program is sequential ($\alpha = 0.10$), what is the maximum theoretical speedup achievable with infinite processors?

- **a.** 5×
- **b.** 10×
- **c.** 20×
- **d.** 100×

Correct answer: b

Explanation: Amdahl's Law: $S \approx 1/\alpha$. With $\alpha = 0.10$, maximum speedup = 1/0.10 = 10×, regardless of the number of processors.

34. What is a 'cold start' in serverless computing?

- **a.** Starting a server in winter
- **b.** Initial delay when provisioning resources for the first request
- **c.** Rebooting a crashed function
- **d.** Deploying code to production

Correct answer: b

Explanation: Cold start is the delay on the first request because the cloud provider must provision resources. Subsequent requests are faster (warm start).

35. What does FaaS stand for?

- **a.** File as a Service
- **b.** Function as a Service
- **c.** Framework as a Service
- **d.** Firewall as a Service

Correct answer: b

Explanation: FaaS (Function as a Service) is serverless compute that runs event-driven code without managing servers (e.g., AWS Lambda, Azure Functions).

36. What is the maximum execution time for AWS Lambda functions?

- **a.** 5 minutes
- **b.** 10 minutes
- **c.** 15 minutes
- **d.** 30 minutes

Correct answer: c

Explanation: AWS Lambda has a maximum execution time of 15 minutes per function invocation.

37. What is the Backend for Frontend (BFF) pattern in API Gateways?

- **a.** Using one gateway for all clients
- **b.** Creating different gateways for different client types (mobile vs web)
- **c.** Storing backend data in the frontend
- **d.** Bypassing the API gateway

Correct answer: b

Explanation: BFF pattern creates separate API gateways optimized for different client types (mobile, web, IoT) to tailor responses to each client's needs.

38. What is the sidecar pattern in service mesh?

- **a.** Running services side-by-side on the same server
- **b.** Using a lightweight proxy alongside every microservice instance
- **c.** Deploying backup services
- **d.** Load balancing technique

Correct answer: b

Explanation: Sidecar pattern deploys a lightweight proxy (e.g., Envoy) alongside each microservice instance to handle all traffic, enabling mTLS, retries, and observability.

39. Which Kubernetes component is the only one that talks to etcd?

- **a.** Kubelet
- **b.** Kube-Proxy
- **c.** Kube-API Server
- **d.** Scheduler

Correct answer: c

Explanation: The Kube-API Server is the only component that directly communicates with etcd, the distributed key-value store holding cluster state.

40. What is a Pod in Kubernetes?

- **a.** A cluster of servers
- **b.** The smallest deployable unit, wrapping one or more containers

- **c.** A network interface
- **d.** A storage volume

Correct answer: `b`

Explanation: A Pod is Kubernetes' smallest deployable unit—a wrapper around one or more containers representing a single instance of a running application.

41. What is the role of the Kubelet?

- **a.** Managing the API server
- **b.** Storing cluster configuration
- **c.** Ensuring containers are running on each node
- **d.** Load balancing traffic

Correct answer: `c`

Explanation: Kubelet is the node agent that ensures containers are running as specified, watches the API server for Pod specs, and reports status.

42. What is the difference between declarative and imperative IaC?

- **a.** Declarative specifies steps; imperative specifies desired state
- **b.** Declarative specifies desired state; imperative specifies steps
- **c.** They are the same
- **d.** Declarative is only for networks

Correct answer: `b`

Explanation: Declarative IaC (Terraform) specifies the desired final state. Imperative IaC (Ansible) defines step-by-step instructions.

43. What does CI/CD stand for?

- **a.** Continuous Integration / Continuous Deployment
- **b.** Cloud Infrastructure / Cloud Development
- **c.** Container Integration / Container Deployment
- **d.** Central Intelligence / Central Development

Correct answer: `a`

Explanation: CI/CD stands for Continuous Integration (frequent code merges with automated tests) and Continuous Deployment/Delivery (automated deployment to production/staging).

44. What are Security Groups in cloud computing?

- **a.** Physical firewalls
- **b.** Stateful virtual firewalls controlling traffic to cloud resources
- **c.** User access roles
- **d.** Encryption keys

Correct answer: b

Explanation: Security Groups are stateful virtual firewalls that control inbound and outbound traffic at the resource level (instances, load balancers).

45. What does 'stateful' mean for Security Groups?

- **a.** They remember previous configurations
- **b.** If inbound traffic is allowed, outbound response is automatically permitted
- **c.** They require manual configuration
- **d.** They only work with TCP

Correct answer: b

Explanation: Stateful means if inbound traffic is allowed, the corresponding outbound response is automatically permitted (and vice versa).

46. What is a key advantage of referencing Security Groups instead of IP addresses?

- **a.** Faster performance
- **b.** Dynamic, identity-based network security
- **c.** Lower cost
- **d.** Better encryption

Correct answer: b

Explanation: Referencing Security Groups enables dynamic, identity-based security. As instances scale, security policies automatically apply without hardcoding IPs.

47. What is the 'new security perimeter' in cloud computing?

- **a.** Network firewalls
- **b.** Physical data centers
- **c.** Identity (IAM)
- **d.** Encryption keys

Correct answer: c

Explanation: In cloud environments, identity becomes the new security boundary, replacing traditional

network perimeters, and governs access through IAM policies.

48. Which access control model assigns permissions grouped into roles?

- **a.** Attribute-Based Access Control (ABAC)
- **b.** Role-Based Access Control (RBAC)
- **c.** Policy-Based Access Control
- **d.** Discretionary Access Control

Correct answer: b

Explanation: RBAC groups permissions into roles, which are then assigned to identities. It's widely used in Kubernetes and cloud IAM systems.

49. What is the difference between data residency and data sovereignty?

- **a.** They are the same
- **b.** Residency is physical location; sovereignty is legal jurisdiction
- **c.** Residency is legal; sovereignty is physical
- **d.** Residency only applies to backups

Correct answer: b

Explanation: Data residency is the physical location where data is stored. Data sovereignty is the legal jurisdiction governing that data based on its location.

50. Under GDPR, what is the maximum penalty for non-compliance?

- **a.** €1 million
- **b.** €10 million or 2% of global revenue
- **c.** €20 million or 4% of global revenue
- **d.** €50 million

Correct answer: c

Explanation: GDPR can impose penalties up to €20 million or 4% of global annual revenue, whichever is higher, for serious violations.

51. What is envelope encryption?

- **a.** Encrypting emails
- **b.** Using a Key Encryption Key (KEK) to encrypt the Data Encryption Key (DEK)
- **c.** Physical security for keys

- **d.** Encrypting only metadata

Correct answer: b

Explanation: Envelope encryption uses a KEK to encrypt the DEK. The DEK encrypts data. This protects the key that protects the data, with KEK never leaving KMS.

52. Which type of cryptographic key uses the same key for encryption and decryption?

- **a.** Asymmetric keys
- **b.** Symmetric keys
- **c.** Public keys
- **d.** Session keys

Correct answer: b

Explanation: Symmetric keys use the same key for both encryption and decryption. They're fast and used for data encryption (e.g., AES).

53. What is the primary benefit of key rotation?

- **a.** Faster encryption
- **b.** Limits impact of key compromise
- **c.** Reduces storage cost
- **d.** Improves network speed

Correct answer: b

Explanation: Key rotation periodically replaces keys, limiting the impact if a key is compromised and reducing the amount of data encrypted with a single key.

54. In the shared responsibility model for IaaS, who is responsible for patching the operating system?

- **a.** Cloud provider
- **b.** Customer
- **c.** Both equally
- **d.** Third-party vendor

Correct answer: b

Explanation: In IaaS, the customer is responsible for OS patching, application security, and data protection. The provider manages physical infrastructure and hypervisor.

55. Which storage type would be best for a database requiring high I/O performance?

- **a.** Object Storage
- **b.** File Storage
- **c.** Volume Storage (Block)
- **d.** Archive Storage

Correct answer: c

Explanation: Volume Storage (Block Storage) acts as a raw disk with fast read/write access, making it ideal for databases and OS storage.

56. What happens to data in Docker's container layer when the container is deleted?

- **a.** It's saved to the image
- **b.** It's permanently lost
- **c.** It's backed up automatically
- **d.** It's moved to a volume

Correct answer: b

Explanation: The container's read/write layer is ephemeral—all runtime changes are permanently lost when the container is deleted unless stored in volumes.

57. Which component in Kubernetes decides which node a Pod should run on?

- **a.** Kubelet
- **b.** Controller Manager
- **c.** Scheduler
- **d.** API Server

Correct answer: c

Explanation: The Scheduler filters and scores nodes based on resources, taints/tolerations, and affinity rules, then binds the Pod to the selected node.

58. What is the main difference between containers and virtual machines?

- **a.** Containers are larger
- **b.** Containers share the host OS kernel; VMs each have a full OS
- **c.** VMs are faster to start
- **d.** Containers require a hypervisor

Correct answer: b

Explanation: Containers share the host OS kernel (process-level isolation), making them lightweight (MBs)

and fast. VMs each have a full OS (hardware-level isolation), making them heavier (GBs).

59. In microservices architecture, what does 'database per service' mean?

- **a.** All services share one database
- **b.** Each microservice has its own independent database
- **c.** Databases are eliminated
- **d.** Services share database instances but separate schemas

Correct answer: `b`

Explanation: Database per service means each microservice manages its own database independently, enabling loose coupling and independent scaling.

60. Which serverless pricing model is most accurate?

- **a.** Pay for reserved capacity
- **b.** Pay only for execution time and requests
- **c.** Flat monthly fee
- **d.** Pay per server hour

Correct answer: `b`

Explanation: Serverless uses pay-per-use pricing based on number of requests, execution time, and memory/CPU usage. You pay nothing when idle (scales to zero).

61. What is the purpose of etcd in Kubernetes?

- **a.** Container runtime
- **b.** Distributed key-value store holding cluster state
- **c.** Load balancer
- **d.** Network proxy

Correct answer: `b`

Explanation: etcd is a distributed, strongly consistent key-value store that holds all cluster state, including resource definitions, secrets, configs, and node state.

62. Which factor does NOT contribute to cloud cost optimization?

- **a.** Auto-scaling based on demand
- **b.** Using reserved instances for stable workloads
- **c.** Keeping all resources running 24/7

- **d.** Right-sizing instances

Correct answer: `c`

Explanation: Keeping all resources running 24/7 wastes money. Cost optimization includes auto-scaling, reserved instances for predictable loads, and right-sizing.

63. What is the US CLOUD Act's impact on data sovereignty?

- **a.** It prevents data access by US authorities
- **b.** It allows US authorities to request data from US providers even if stored abroad
- **c.** It only applies to US-stored data
- **d.** It has no impact on cloud data

Correct answer: `b`

Explanation: The US CLOUD Act allows US authorities to request access to data from US-based providers, even if physically stored in other countries, impacting data sovereignty.

64. What is the primary goal of Green Computing?

- **a.** To increase the processing power of supercomputers
- **b.** To reduce energy consumption, carbon emissions, and electronic waste
- **c.** To exclusively use solar power for data centers
- **d.** To create biodegradable computer hardware

Correct answer: `b`

Explanation: Green computing refers to environmentally responsible computing practices that aim to reduce energy consumption, carbon emissions, and electronic waste throughout the lifecycle of technology products.

65. What is 'Cloud Bursting' in the context of a Hybrid Cloud?

- **a.** A security breach in the cloud
- **b.** The process of deleting data to save space
- **c.** Scaling workloads from a private cloud to a public cloud during demand spikes
- **d.** Moving all operations permanently to the public cloud

Correct answer: `c`

Explanation: Cloud bursting allows an organization to use its private cloud for normal workloads and 'burst' into a public cloud to access additional resources during times of high demand.

66. Where does a Type-2 (Hosted) Hypervisor run?

- **a.** Directly on the bare metal hardware
- **b.** On top of a host operating system
- **c.** Inside a Docker container
- **d.** It replaces the BIOS

Correct answer: `b`

Explanation: Type-2 Hypervisors (like VMware Workstation) run as an application on top of a host operating system, unlike Type-1 hypervisors which run directly on hardware.

67. Which virtualization technique allows users to access an application from a separate computer without installing it locally?

- **a.** Network Virtualization
- **b.** Storage Virtualization
- **c.** Application Virtualization
- **d.** Server Virtualization

Correct answer: `c`

Explanation: Application virtualization allows users to access and use an application from a separate computer (often via a server) without installing it on their local machine.

68. What does 'Horizontal Scaling' refer to in a PaaS environment?

- **a.** Increasing the CPU and RAM of a single server
- **b.** Adding more server instances to distribute the workload
- **c.** Optimizing the application code for speed
- **d.** Moving the application to a larger data center

Correct answer: `b`

Explanation: Horizontal scaling (Scale Out) involves adding more instances of a server or application to handle increased load, whereas vertical scaling involves adding power to a single instance.

69. Which instruction in a Dockerfile is used to specify the base image?

- **a.** RUN
- **b.** CMD
- **c.** FROM
- **d.** COPY

Correct answer: `c`

Explanation: The 'FROM' instruction initializes a new build stage and sets the Base Image for subsequent instructions (e.g., 'FROM openjdk').

70. What is the 'Noisy Neighbor' problem in Multi-Tenancy?

- **a.** Tenants sending spam emails to each other
- **b.** One tenant using excessive resources, degrading performance for others
- **c.** A security breach where tenants can see each other's data
- **d.** Loud cooling fans in the server room

Correct answer: `b`

Explanation: In a shared multi-tenant environment, a 'noisy neighbor' is a tenant that consumes a disproportionate amount of resources (CPU, memory), negatively affecting the performance of other tenants.

71. Which SaaS integration method involves an event-driven push notification from one app to another?

- **a.** REST API
- **b.** SOAP API
- **c.** GraphQL
- **d.** Webhooks

Correct answer: `d`

Explanation: Webhooks are used for event-driven communication, allowing one application to send real-time data (push notifications) to another when a specific event occurs.

72. What is the smallest deployable unit in Kubernetes?

- **a.** Container
- **b.** Pod
- **c.** Node
- **d.** Service

Correct answer: `b`

Explanation: A Pod is the smallest deployable unit in Kubernetes. It represents a single instance of a running application and can contain one or more tightly coupled containers.

73. What is a 'Cold Start' in Serverless computing?

- **a.** The time it takes to reboot a physical server
- **b.** The delay experienced when a function is invoked after being idle
- **c.** Deploying code to a cold data center
- **d.** The initial setup of an AWS account

Correct answer: b

Explanation: A Cold Start refers to the latency experienced when a serverless function is invoked for the first time or after a period of inactivity, as the provider must provision the runtime environment.

74. How do Security Groups differ from Network ACLs regarding state?

- **a.** Security Groups are stateful; Network ACLs are stateless
- **b.** Security Groups are stateless; Network ACLs are stateful
- **c.** Both are stateless
- **d.** Both are stateful

Correct answer: a

Explanation: Security Groups are stateful (return traffic is automatically allowed), while Network ACLs are stateless (return traffic must be explicitly allowed).

75. In the CIA Triad of Cloud Security, what does 'Integrity' ensure?

- **a.** Data is accessible only to authorized users
- **b.** Data and systems are accurate and free from unauthorized tampering
- **c.** Services are available 99.9% of the time
- **d.** Users are who they say they are

Correct answer: b

Explanation: Integrity ensures that data and systems remain accurate and consistent over their lifecycle and have not been altered by unauthorized parties.

76. Which computing paradigm is described as a collection of resources owned by multiple organizations that are coordinated to solve a common problem?

- **a.** Utility Computing
- **b.** Grid Computing
- **c.** Cluster Computing
- **d.** Edge Computing

Correct answer: b

Explanation: Grid computing is defined as a collection of resources owned by multiple organizations that are coordinated to allow them to solve a common problem.

77. Which cloud characteristic ensures that resources can be dynamically adjusted to meet varying workloads without manual intervention?

- **a.** Broad Network Access
- **b.** Resource Pooling
- **c.** Rapid Elasticity
- **d.** Measured Service

Correct answer: c

Explanation: Elasticity refers to the ability of a system to dynamically adjust its resource allocation in response to changing demands, enabling efficient resource utilization.

78. Which type of cloud storage is ideal for unstructured data (like images and videos) and is accessed via APIs rather than a file system?

- **a.** Block Storage
- **b.** Volume Storage
- **c.** Object Storage
- **d.** File Storage

Correct answer: c

Explanation: Object storage is a file repository used to store individual files ('objects') like images and videos, and is accessed through an API rather than a network share.

79. What is a characteristic of a Type-1 (Bare Metal) Hypervisor?

- **a.** It runs as an application inside a host operating system
- **b.** It runs directly on the underlying host hardware
- **c.** It requires a Windows installation to function
- **d.** It is primarily used for desktop virtualization only

Correct answer: b

Explanation: A Type-1 Hypervisor (Native/Bare metal) runs directly on the underlying host system and does not require a base server operating system.

80. Which load balancing algorithm distributes traffic to the server that currently has the lowest number of active sessions?

- **a.** Round Robin
- **b.** IP Hash
- **c.** Least Connections
- **d.** Random Selection

Correct answer: `c`

Explanation: The 'Least Connections' technique sends traffic to the server with the fewest active connections, preventing overload on busy servers.

81. In the context of Docker, what is the purpose of the 'docker build' command?

- **a.** To download an image from a registry
- **b.** To run a container from an image
- **c.** To create a Docker image from a Dockerfile
- **d.** To stop all running containers

Correct answer: `c`

Explanation: The 'docker build' command is used to build a docker image using a Dockerfile located in the specified directory.

82. What is a key principle of Service Oriented Architecture (SOA) regarding dependencies?

- **a.** Tight Coupling
- **b.** Loose Coupling
- **c.** Monolithic Design
- **d.** Hard Dependencies

Correct answer: `b`

Explanation: SOA promotes 'Loose Coupling', meaning applications interact with services through standardized interfaces, reducing dependencies so that the failure of one system does not impact others.

83. Which API type relies on XML and strict contracts, and is traditionally used in enterprise systems?

- **a.** REST API
- **b.** GraphQL
- **c.** SOAP API
- **d.** Webhooks

Correct answer: `c`

Explanation: SOAP APIs use XML and strict contracts, making them common for enterprise systems, whereas REST uses JSON and HTTP methods.

84. In Kubernetes, what is the role of 'etcd'?

- **a.** It acts as the front door for API requests
- **b.** It schedules pods to worker nodes
- **c.** It is a distributed key-value store that holds the cluster state
- **d.** It manages the network traffic between services

Correct answer: `c`

Explanation: etcd is a distributed, strongly consistent key-value store that holds the cluster state, including resource definitions, secrets, and configs.

85. What is the 'Database per Service' pattern in Cloud Native architectures?

- **a.** All microservices share a single massive database
- **b.** Each microservice has its own dedicated database to ensure loose coupling
- **c.** Databases are only used for the frontend application
- **d.** Data is stored exclusively in local text files

Correct answer: `b`

Explanation: In a cloud-native environment, each microservice typically uses its own database (Database per Service pattern) to ensure independence and scalability.

86. In cloud security, what effectively replaces the traditional network perimeter?

- **a.** Physical Firewalls
- **b.** Identity and Access Management (IAM)
- **c.** Antivirus Software
- **d.** The Hypervisor

Correct answer: `b`

Explanation: In cloud environments, IAM (Identity and Access Management) is the cornerstone of security and effectively replaces the traditional network perimeter, making identity the new security boundary.

87. Which statement accurately describes Cloud Security Groups?

- **a.** They are stateless and require explicit allow rules for return traffic

- **b.** They operate at the subnet level
- **c.** They are stateful; if inbound traffic is allowed, return traffic is automatically permitted
- **d.** They support explicit deny rules

Correct answer: `c`

Explanation: Security Groups are stateful, meaning if inbound traffic is allowed, the corresponding outbound response is automatically permitted.

88. Which command is used to create a Docker image from a Dockerfile?

- **a.** docker run
- **b.** docker build
- **c.** docker create
- **d.** docker commit

Correct answer: `b`

Explanation: The 'docker build' command is used to build a Docker image from a Dockerfile, often using the '-t' flag to tag the image.

89. Which flag is used with the 'docker run' command to map a host port to a container port?

- **a.** -v
- **b.** -d
- **c.** -p
- **d.** -it

Correct answer: `c`

Explanation: The '-p' flag is used for port mapping (e.g., '-p 80:80') to map a port on the host machine to a port inside the container.

90. What is the function of the command 'docker system prune'?

- **a.** It stops all running containers
- **b.** It removes all unused data including stopped containers, unused networks, and dangling images
- **c.** It pushes all local images to Docker Hub
- **d.** It updates the Docker engine to the latest version

Correct answer: `b`

Explanation: The 'docker system prune' command removes all unused Docker resources, such as stopped containers, unused networks, and build caches.

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91. Which command specifically removes one or multiple Docker images?

- **a.** docker rm
- **b.** docker del
- **c.** docker rmi
- **d.** docker erase

Correct answer: `c`

Explanation: The 'docker rmi' command is used to force remove one or multiple images, whereas 'docker rm' is used for containers.

92. Which Docker Compose command builds images and runs containers defined in the YAML file?

- **a.** docker-compose start
- **b.** docker-compose run
- **c.** docker-compose up
- **d.** docker-compose build

Correct answer: `c`

Explanation: The 'docker-compose up' command builds all images and runs the containers specified in the docker-compose.yml file.

93. Which instruction in a Dockerfile sets the directory from which subsequent commands are run?

- **a.** MKDIR
- **b.** CD
- **c.** WORKDIR
- **d.** COPY

Correct answer: `c`

Explanation: The 'WORKDIR' instruction specifies the working directory inside the container where execution application files will be placed and commands run.

94. What does the '-it' flag allow you to do when running 'docker run'?

- **a.** Run the container in the background (detached mode)
- **b.** Run the container interactively
- **c.** Automatically remove the container when it exits
- **d.** Map network ports

Correct answer: b

Explanation: The '-it' flag allows you to run the container interactively, often used to open a bash shell inside the container.

95. Which command is used to stop and remove all services (containers, networks) created by 'docker-compose up'?

- **a.** docker-compose stop
- **b.** docker-compose down
- **c.** docker-compose halt
- **d.** docker-compose delete

Correct answer: b

Explanation: The 'docker-compose down' command stops containers and removes the resources (networks, containers) created by 'docker-compose up'.

96. In the context of DevOps, what is the primary practice of 'Continuous Integration' (CI)?

- **a.** Automatically deploying every change to production immediately
- **b.** Developers frequently merging code changes into a shared repository where automated tests run
- **c.** Manually copying code files to a server once a month
- **d.** Writing infrastructure configuration files using Python

Correct answer: b

Explanation: Continuous Integration (CI) involves developers frequently merging code changes into a shared repository, where automated tests run to ensure code quality.

97. What distinguishes 'Continuous Deployment' from 'Continuous Delivery'?

- **a.** Continuous Deployment automatically deploys code to production after passing tests, whereas Continuous Delivery may stop at staging
- **b.** Continuous Deployment involves manual testing, while Continuous Delivery is fully automated
- **c.** Continuous Deployment is for hardware, while Continuous Delivery is for software
- **d.** There is no difference; they are synonyms

Correct answer: a

Explanation: Continuous Deployment/Delivery (CD) automatically deploys code to production (CD) or staging (Delivery) after passing all tests.

98. What is the primary function of AWS Elastic Beanstalk?

- **a.** It is a SaaS application for email marketing
- **b.** It is a PaaS that automatically handles the provisioning, deployment, and scaling of web applications
- **c.** It is an IaaS service that provides raw bare-metal servers
- **d.** It is a database service for storing unstructured data

Correct answer: b

Explanation: AWS Elastic Beanstalk is a PaaS for deploying and scaling web applications where the platform automatically handles the provisioning of resources (EC2, load balancers, etc.).

99. How is billing determined for AWS Lambda functions?

- **a.** You pay a flat monthly fee regardless of usage
- **b.** You pay based on the number of servers provisioned
- **c.** You pay only for the duration the function runs (execution time) and the number of requests
- **d.** It is free for all users

Correct answer: c

Explanation: With AWS Lambda, you pay only for the execution time (ms-based) and the number of requests; you do not pay for idle time.

100. Which AWS service is an example of 'Declarative' Infrastructure as Code (IaC)?

- **a.** AWS EC2
- **b.** AWS Lambda
- **c.** AWS CloudFormation
- **d.** Amazon S3

Correct answer: c

Explanation: AWS CloudFormation is listed as an example of a Declarative IaC approach, where you specify the desired final state of the infrastructure.