Sr. No.	Topic	Why (One Word)	What it Actually Does	Real-time Example
1	KIND Cluster on Windows	Testing	Creates a local Kubernetes cluster inside Docker for development & learning.	Running cluster on Windows without cloud.
2	nodeName	Fixing	Forces a pod to run on a specific node.	Pod runs only on node1.
2.1	nodeSelector	Matching	Schedules pods on nodes with matching labels.	DB pod runs only on nodes labeled disk=ssd.
2.2	nodeAffinity	Rules	Defines rules/preferences for pod placement on nodes.	Web pods prefer nodes in zone us-east1.
2.3	Taints & Tolerations	Control	Blocks pods from tainted nodes unless they tolerate it.	Only GPU pods run on GPU node.
3	Resource Requests & Limits	Fairness	Ensures pods get minimum (request) and max (limit) resources.	Pod requests 0.5 CPU, max 1 CPU.
4	Static Pods	Guarantee	Pods created by kubelet directly, not API server.	kube-proxy runs as static pod.
5	Labels & Selectors	Grouping	Organizes pods/services using key-value pairs.	Service selects app=frontend pods.
6	Rolling Update & Rollback	Upgrade	Updates apps gradually; rollback if failure occurs.	Upgrade app v1 → v2 safely.
7	ConfigMap	Settings	Stores non-sensitive config data separate from code.	API endpoint stored in ConfigMap.
8	Secret	Secure	Stores sensitive data in encrypted form.	Store DB password securely.
9	Init Containers	Prepare	Run before main container to prepare environment.	Init downloads config before app starts.
10	HPA & VPA	Scale	HPA scales pod count; VPA adjusts pod resources.	HPA adds pods when traffic spikes.
11	OS Upgrade (drain/cordon/uncordon)	Safety	Moves pods before OS upgrade to avoid downtime.	Drain node → upgrade → uncordon.
12	Cluster Upgrade Process	Update	Stepwise upgrade of control plane & worker nodes.	Upgrade K8s from v1.28 → v1.29.
13	Backup & Restore	Recovery	Saves cluster state and restores on failure.	Velero backs up workloads & volumes.
14	TLS in K8s	Encrypt	Secures communication with HTTPS/TLS certificates.	Enable HTTPS for web app.
15	Certificate API	Manage	Automates certificate issuance & renewal.	Auto-renew SSL with cert-manager.
16	Kubeconfig	Connect	Stores cluster details for kubectl access.	~/.kube/config connects to cluster.
17	Authorization	Allow/Deny	Controls whether a user/action is permitted.	Deny pod deletion if user not authorized.
18	ClusterRole & Binding	Global Access	Provides cluster-wide access permissions.	Admin role for all namespaces.
18.1	RBAC	Role-based	Permissions given by role (who can do what).	Developer role allows only deployments.
18.2	ABAC	Attribute-based	Access based on user + resource attributes.	User alice allowed only in dev ns.
18.3	Webhook Auth	External Check	Uses external service for access decisions.	API call validates pod creation.
19	ServiceAccount + Role + Binding	Identity	Gives pods/users an identity with limited rights.	Pod uses ServiceAccount to call API.
20	Security Context	Control	Defines pod/container security rules.	Run pod as non-root user UID=1000.
21	Volume & Mounting	Storage	Attaches external storage inside containers.	Logs saved in /data volume.
22	PV & PVC	Durable	PV = storage resource; PVC = user's claim of it.	DB pod requests 10Gi from PV.
23	Storage Class	Dynamic	Auto-provisions storage on demand.	Create AWS EBS volume dynamically.
24	StatefulSets	Ordered	Deploys stateful apps with fixed identity & storage.	MySQL cluster with stable names.
25	Cluster Networking	Connect	Ensures pods communicate across nodes.	Pod A (Node1) talks to Pod B (Node2).
26	Ingress & Controller	Entry	Routes external traffic into cluster services.	myapp.com/login → login pod.
27	Gateway API	Modern Routing	Advanced replacement of Ingress with more features.	gRPC + HTTP routing across clusters.
28	Network Policies	Restrict	Controls pod-to-pod communication rules.	Only frontend can talk to backend pods.
29	CRD (Custom Resource)	Extend	Adds new resource types beyond default K8s.	Create Database CRD like native objects.
30	CoreDNS	Resolve	Provides DNS for services/pods.	Resolve mysql-service → pod IP.

Sr. No.	Topic	Why (One Word)	What it Actually Does	Real-time Example
31	Cluster Setup (kubeadm/EKS)	Deploy	Creates cluster on local/cloud.	Deploy cluster on AWS EKS.
31.1	Helm Setup	Package	Manages apps as reusable Helm charts.	Install nginx via Helm chart.
31.2	ALB & Nginx Ingress	Routing	Routes cloud traffic to K8s apps.	AWS ALB + Nginx handles ingress.
32.1	Rolling Update	Gradual	Updates pods one at a time, zero downtime.	Upgrade web app step by step.
32.2	Recreate	Replace	Stops old pods before starting new ones.	Restart service with new version.
32.3	Blue-Green	Switch	Runs old+new envs, switch traffic instantly.	Switch v1 $\rightarrow$ v2 with no downtime.
32.4	Canary	Test	Sends small % of traffic to new version.	10% users test v2 before rollout.
32.5	A/B Testing	Compare	Runs multiple versions for different groups.	Group A sees v1, Group B sees v2.
33	Practice Task List	Hands-on	Practical exercises to apply K8s concepts.	Deploy, autoscale, backup, ingress tasks.