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QUESTION NO: 1

Which of the following statements are applicable to the technology of massive MIMO?

(Select 3)

A. Several data flows are sent at the same time on the same frequency.

B. The signals on each antenna are made orthogonal.

C. The data flows are sent at the same time on different frequencies.

D. Transmit diversity is used in case of poor radio conditions.

ANSWER: A B D

Explanation:

Massive MIMO uses a large antenna array together with channel-state information and precoding to exploit the spatial dimension of the radio channel. This enables several independently encoded data flows, commonly called spatial layers or streams, to be transmitted concurrently while reusing the same time and frequency resources. The flows are separated by their spatial signatures, which substantially increases spectral efficiency and capacity. In this context, the antenna-array processing makes the transmitted spatial layers as mutually orthogonal or separable as practical at their intended receivers. This is the key beamforming and multi-user MIMO principle represented by “The signals on each antenna are made orthogonal.” Massive-MIMO systems can also use transmit-diversity techniques when the propagation environment or radio conditions do not support reliable high-rank spatial multiplexing. Diversity improves link robustness by providing multiple transmission paths rather than relying on a single fading path. These capabilities allow the radio to adapt its transmission strategy to channel conditions, balancing throughput, coverage, and reliability. The physical-layer framework for multi-antenna transmission and precoding is specified in 3GPP TS 38.211; Nokia also describes Massive MIMO as a key 5G radio technology at Nokia 5G networks.

QUESTION NO: 2

Which of the following are characteristics of the 5G Service Based Architecture? (Choose three.)

A. Control-plane network functions can expose services to other network functions.

B. Network functions can register their service profiles with the NRF.

C. Consumer network functions can discover suitable producer network functions.

D. All user-plane traffic is exchanged through the NRF.

ANSWER: A B C

Explanation:

The 5G Service Based Architecture uses service-based interfaces between control-plane network functions. A network function can act as a service producer by exposing services that other network functions consume. This supports a modular architecture in which functions can be deployed, scaled, and evolved independently.

Service registration and discovery are also key characteristics. A network function can register its profile and available services with the NRF, and a consumer can use the NRF to find a suitable producer instance. The service-based interactions commonly use HTTP/2-based APIs and standardized service operations. The User Plane Function is different because it primarily uses reference points for user-plane forwarding rather than acting as a service-based control-plane producer in the same way. See 3GPP TS 23.501 and 3GPP TS 29.500.

QUESTION NO: 3

Your manager started a brainstorming session during a meeting on how automation can be driven in the network. He asks what tools can be used to increase automated services in the network. What would you answer be?

A. We need to find a software company that will write software to automate the network services.

B. We can create rule-based automation. We can also use Artificial Intelligence and Machine Learning to automate network services.

C. We can write scripts that will be executed at certain times when a specific event happens and the service will be automated in this way.

D. We can use big data. It is the main tool that should be used for network automation.

ANSWER: B

Explanation:

We can create rule-based automation. We can also use Artificial Intelligence and Machine Learning to automate network services. This is correct because network automation is normally introduced through a combination of deterministic and intelligence-driven capabilities. Rule-based automation translates known operational policies, conditions, and workflows into repeatable actions, enabling consistent execution of common service-management tasks. Artificial intelligence and machine learning extend this approach by processing operational data to identify patterns, detect anomalies, predict likely issues, and support closed-loop decisions where appropriate. Together, these techniques can increase the scope, speed, and reliability of automated network operations while allowing automation to evolve from predefined procedures toward more adaptive operations. Nokia describes autonomous-network automation as using analytics and AI/ML to improve operational decision-making and enable closed-loop automation. Its automation portfolio also emphasizes intent, orchestration, assurance, and policy-driven operations as complementary building blocks. The practical objective is not merely executing isolated actions, but using rules and AI/ML capabilities to automate suitable service and operational workflows according to their maturity, available data, and risk controls. See Nokia's network automation overview and its autonomous networks overview.

QUESTION NO: 4

Which deployment option is used by initially deployed 5G non-standalone networks?

A. Option 4

B. Option 2

C. Option 3x

D. Option 7

ANSWER: C

Explanation:

Option 3x is the deployment architecture used for the initial wave of 5G non-standalone deployments. It implements E-UTRA–NR Dual Connectivity (EN-DC), in which the established LTE radio network acts as the master node and provides the control-plane anchor, while NR is introduced as a secondary node to add 5G radio capacity and throughput. This approach allowed operators to launch 5G services while reusing their existing LTE coverage, mobility procedures, and EPC-based core-network investment, rather than waiting for a complete 5G Core rollout. In the 3x variant, user-plane connectivity can be handled efficiently through the NR secondary node as well as the LTE master-node side, supporting the high-data-rate goals of early commercial 5G. The architecture is therefore a practical migration step: LTE supplies broad, reliable anchoring and NR supplies the new radio capabilities. 3GPP specifies the EN-DC framework and its master-node/secondary-node operation in 3GPP TS 37.340. The role of NSA as an early 5G deployment path is also described in the GSMA 5G Implementation Guidelines.

QUESTION NO: 5

Resource elasticity in Cloud enables which of the following actions? (Choose two.)

A. Relocate VMs between data centers when a fault is detected.

B. Deploy VMs across data centers when a new slice is needed.

C. Add resources to existing VMs when traffic is high.

D. Add VMs when traffic is high.

ANSWER: C D

Explanation:

Cloud resource elasticity is the ability to dynamically adjust allocated compute capacity in response to changing workload demand. “Add resources to existing VMs when traffic is high” describes vertical scaling (scale up): additional virtual CPU, memory, or similar resources are assigned to an already running virtual-machine workload when supported by the platform and workload design. This is an elastic response because capacity grows with demand.

“Add VMs when traffic is high” describes horizontal scaling (scale out): additional VM instances are created or activated to share a rising traffic load. Horizontal scaling is a core cloud elasticity pattern, commonly automated through monitoring policies, orchestration, and load balancing. When demand later decreases, the cloud can correspondingly remove excess capacity, which is the complementary scale-in behavior.

The NIST cloud-computing definition characterizes rapid elasticity as capabilities that can be elastically provisioned and released, often automatically, to scale rapidly outward and inward according to demand. This directly supports both increasing resources available to a VM and increasing the number of VM instances. See the NIST definition of cloud computing and Nokia’s overview of cloud and network services.

QUESTION NO: 6

What is the best solution for deploying an optimal network function distribution?

A. Using duplicated Virtual Network Functions

B. Using Virtual Network Functions to control the routing

C. Using Virtual Network Functions orchestrated across various Cloud Data Centers

D. Using Virtual Network Functions in Access

ANSWER: C

Explanation:

Using Virtual Network Functions orchestrated across various Cloud Data Centers is the best solution because orchestration provides a centralized, policy-driven way to place and manage network functions where they best satisfy service, capacity, latency, resiliency, and resource-efficiency requirements. Rather than treating each function as an isolated deployment, an NFV orchestration layer maintains visibility of available compute, storage, networking, and cloud resources across multiple sites. It can therefore select an appropriate data center or edge location, instantiate the function, connect it to dependent services, and adjust placement or scale as demand and network conditions change.

This distributed-cloud approach is particularly important for 5G, where some workloads benefit from centralized deployment while latency-sensitive services may require locations closer to users. Orchestration also supports lifecycle automation, including onboarding, scaling, healing, and updating virtualized network functions consistently across the infrastructure estate. Nokia describes its 5G Core as cloud-native and deployable across centralized and distributed cloud environments, while ETSI NFV defines management and orchestration as the framework for coordinating virtualized network services and infrastructure resources. See Nokia 5G Core and ETSI NFV.

QUESTION NO: 7

How is a slice identified in the network?

A. By the single network slice assistance information (S-NSSAI).

B. By the QoS class ID (QCI).

C. By the assigned customer and the slice IDs (CU-S-ID).

D. By the customer ID (CU-ID).

ANSWER: A

Explanation:

By the single network slice assistance information (S-NSSAI) is correct because 5G systems use S-NSSAI as the standardized identifier for a network slice. Defined by 3GPP, an S-NSSAI comprises a Slice/Service Type (SST), which indicates the expected service behavior, and, where required, a Slice Differentiator (SD), which distinguishes slices having the same SST. This identifier is carried and used across 5G procedures so that the UE, access network, and 5G Core can select and provide service on the requested or allowed slice. A UE can have an NSSAI containing one or more S-NSSAIs, while each individual S-NSSAI identifies a particular slice type and differentiator within the applicable PLMN context. The network uses this information during registration, slice selection, and PDU session establishment to associate service with the appropriate network-slice resources and policies. This terminology and structure are specified in 3GPP TS 23.501, particularly its definitions of network slicing, NSSAI, and S-NSSAI. See 3GPP TS 23.501 archive and the 3GPP 5G System overview.

QUESTION NO: 8

Which of the following are benefits of a 5G private wireless network for an industrial enterprise? (Choose three.)

A. Controlled wireless coverage and mobility for industrial assets.

B. QoS that can be differentiated for distinct industrial applications.

C. Security policies and local handling of enterprise traffic.

D. Elimination of all application-level functional-safety requirements.

ANSWER: A B C

Explanation:

A 5G private wireless network can provide a dedicated connectivity environment designed around the enterprise site and its operational requirements. Controlled coverage and mobility allow machines, workers, vehicles, sensors, and mobile robots to remain connected across an industrial area. Predictable QoS can be configured for different application classes, such as video inspection, automated guided vehicles, and industrial control. Enterprise-controlled security policies and local data handling can support protection of operational technology traffic and sensitive industrial information. A private wireless network does not remove the need to design applications and processes according to their relevant safety requirements.

Nokia describes private wireless as supporting secure, reliable, and high-performance industrial connectivity in its industrial private wireless portfolio. Industrial 5G requirements are also described by 5G-ACIA.