

Nokia.BL0-100.by.Tina.51q

Number: BL0-100  
Passing Score: 800  
Time Limit: 120  
File Version: 4.0

**Exam Code: BL0-100**  
**Exam Name: Nokia Bell Labs 5G Foundation Exam**



## Exam A

### QUESTION 1

Which of the following is not a component of the 5G Flexible RAN architecture?

- A. Radio Unit
- B. Distributed Unit
- C. Centralized Unit
- D. Optical Unit

**Correct Answer: D**

**Section:**

**Explanation:**

Reference: <https://www.hindawi.com/journals/wcmc/2019/5264012/>

### QUESTION 2

A company is planning to offer services to different cities worldwide so drones can be used to scan disaster areas to help identify victims' locations quickly, organize evacuations efficiently, and save lives. Drones will be connected to a 5G network. The company is planning to offer two applications running in the cloud – one to manage drones through remote control while the other offers live video streaming to drone operators. As a 5G professional, you are asked what are the network requirements for those two applications?

- A. The drone control application needs very low latency to maneuver around obstacles, while the video application would need less latency. Both applications would be running in the central cloud.
- B. The drone control application needs low latency and high reliability from the network and should run in the edge cloud. The video application needs higher throughput but it is not sensitive from the latency and reliability point of view. It can run in a central cloud.
- C. Both applications should run in the edge cloud because the drone control and video applications both require low latency and high reliability from the network.
- D. The drone control application should run through a central cloud. The video streaming application should run in the edge cloud because it carries much data, and that is expensive to run through the central cloud.

**Correct Answer: B**

**Section:**

### QUESTION 3

What is the purpose of the secondary authentication feature?

- A. To improve authentication between the User Equipment and the 5G Core.
- B. To improve authentication when connecting to different network slices.
- C. To authenticate the User Equipment coming from an untrusted non-3GPP access (N3IWF).
- D. To authenticate the User Equipment with an external data network.

**Correct Answer: A**

**Section:**

### QUESTION 4

Which of the following technologies drive 5G increased throughput capacity? (Choose three.)

- A. MU-MIMO and beamforming

- B. Higher spectral efficiency
- C. Network Slicing
- D. Multi-connectivity per User Equipment

**Correct Answer: A, B, C**

**Section:**

**QUESTION 5**

Which of the following is not a part of an E2E Network Slice?

- A. Cloud Slice
- B. Core Slice
- C. Access Slice
- D. Transport Slice

**Correct Answer: A**

**Section:**

**QUESTION 6**

What is the maximum distance of an Edge Cloud from end-user?

- A. 1,000 KM
- B. 5,000 KM
- C. 10,000 KM
- D. 300 KM

**Correct Answer: A**

**Section:**

**QUESTION 7**

You and a colleague are discussing the challenges to be resolved in order to make digitization and automation a reality in all industries. He is arguing that the solution is to have faster access connectivity, but you don't agree. You are trying to convince him of the need for an end-to-end solution. The new 5G network should be built end-to-end to enable industries' quest for value. What arguments can you provide to support your position?

- A. Increasing throughput is not enough. A faster and automated transport network, a distributed cloud where applications would run depending on their latency and reliability requirements, a core network that automatically handles any type of access, and a security framework to guarantee the security in every layer of the network are also needed.
- B. The network consists of many layers that include access, transport, core, cloud, and all of the applications running in the cloud. Increasing throughput in access is not enough. The bit rate needs to be increased in all of the other layers as well.
- C. Increasing the access throughput might be worthwhile but applications that support a higher bit rate should also be a consideration.
- D. Increasing the throughput is enough. There is no need to change the network end-to-end.

**Correct Answer: A**

**Section:**

**QUESTION 8**

What is the main benefit of Cloud RAN?

- A. Increased cell coverage



- B. Better latency
- C. Reduced cost by centralizing some radio functionalities
- D. Increase radio throughput

**Correct Answer: D**

**Section:**

**Explanation:**

Reference: <https://www.fujitsu.com/us/Images/CloudRANwp.pdf> (4)

#### QUESTION 9

What is the primary benefit of Edge Cloud?

- A. Lower latency
- B. Higher Availability
- C. Larger Bandwidth
- D. Lower Cost

**Correct Answer: A**

**Section:**

**Explanation:**

Reference: <https://www.nokia.com/networks/portfolio/edge-cloud/>

#### QUESTION 10

The network of the future is the key to supporting the digitization and automation of many industries. This network should support diverse requirements from different applications using it. To do that, the network should have a new architecture. Which of the following best describe the elements of the new 5G end-to-end network architecture?

- A. Wireless Access, Optical Transport, and a dedicated Core Network for wireless access running in a Central Cloud.
- B. Multiple access types (not only wireless), Optical Transport, Multi-cloud, and dedicated Core for every type of access.
- C. Public sector element, a smart city element, a health element, a transport and logistics element, and an industrial element.
- D. Massive Scale Access combining many wireless and wired access types, Smart Network Fabric as transport (combining optical and IP network elements, controlled by SDN), a Universal Adaptive Core network supporting all access types, a Multi-cloud system including central, regional, edge, public, private, and hybrid cloud, and Automation and Analytics providing flexibility in the network to serve different applications.

**Correct Answer: D**

**Section:**

#### QUESTION 11

Which of the following statements about 5G Transport is incorrect?

- A. Widely diverse end to end services will require the ability to create a Transport Slice with guaranteed SLAs.
- B. Ultra Reliable Machine to Machine communication will require dependable low latency communication.
- C. Internet of things devices will require a massive increase in network connectivity.
- D. Explosive traffic growth will require statically defined manually configured end to end QoS based services.

**Correct Answer: C**

**Section:**

#### QUESTION 12

Which one of the following requires a network service package defined in a catalog?

- A. Cloud software platform
- B. Cloud infrastructure software
- C. Cloud orchestration
- D. Software defined network

**Correct Answer: C**

**Section:**

#### QUESTION 13

What does the acronym SOAR stand for?

- A. Security Orchestration Automation and Recovery
- B. Security Optimization Accountability Recovery
- C. Security Orchestration Automation and Response
- D. Securitization, Optimization, Access Control, and Resiliency

**Correct Answer: C**

**Section:**

**Explanation:**

Reference: <https://www.fireeye.com/products/helix/what-is-soar.html>

#### QUESTION 14

What are the benefits of the stateless or state-efficient aspects of network functions?

- A. Avoid massive database corruption
- B. Provide real time access to the databases
- C. Enable scalability and extreme resiliency in the 5G Core
- D. Ensure the database integrity

**Correct Answer: C**

**Section:**

**Explanation:**

Reference: <https://www.nokia.com/about-us/news/releases/2018/01/29/nokia-implements-futurex-network-architecture-for-5g-to-deliver-breakthrough-network-performance-and-reduce-costs/>

#### QUESTION 15

Which of the following defines a vertical Network Slice?

- A. When it serves a given customer for a specific purpose, such as a national energy network.
- B. When it cross all the network layers from the radio up to the core.
- C. When it serves a given common purpose, for a use case with a defined QoS (eg a use case in transportation, in energy).
- D. When it operates on the same layer of the ISO/OSI model.

**Correct Answer: A**

**Section:**

**Explanation:**



Reference: [https://www.gsma.com/futurenetworks/wp-content/uploads/2018/06/Network-Slicing-Use-Case-Requirements-\\_-Final-.pdf](https://www.gsma.com/futurenetworks/wp-content/uploads/2018/06/Network-Slicing-Use-Case-Requirements-_-Final-.pdf)

**QUESTION 16**

What are the benefits of traffic engineering in Transport networks? (Choose three.)

- A. Scaling access points
- B. Better utilization of network capacity
- C. Traffic steering
- D. Resiliency

**Correct Answer: B, C, D**

**Section:**

**QUESTION 17**

Which of the following is a valid NFV attack?

- A. Hijack attack on hypervisor
- B. DDoS attack on the SDN switches
- C. Poor NFV implementation
- D. Hypervisor resources leakage

**Correct Answer: A**

**Section:**

**Explanation:**

Reference: [https://www.etsi.org/deliver/etsi\\_gs/nfv-sec/001\\_099/001/01.01.01\\_60/gs\\_nfvsec001v010101p.pdf](https://www.etsi.org/deliver/etsi_gs/nfv-sec/001_099/001/01.01.01_60/gs_nfvsec001v010101p.pdf)

**QUESTION 18**

What is Unified Data Management (UDM)?

- A. This network function stores or retrieves subscriptions, profiles and authentication data to or from the data repositories. It offers services to the AMF, SMF, NEF and AUSF using the Service Based Interface.
- B. This network function supports authentication for 3GPP and non-3GPP accesses.
- C. This network function is part of data repositories in the Common Data Layer and in opposition to the UDR, it stores non-standardized unstructured data.
- D. This network function provides registration and discovery functionality to enable other network functions/ services to discover and communicate with each other.

**Correct Answer: B**

**Section:**

**Explanation:**

Reference:

[https://docs.oracle.com/communications/F25434\\_01/docs.10/UDM%20User%27s%20Guide/GUIDF0678B8F-501C-4BE5-A0D7-141CED2DFE70.htm](https://docs.oracle.com/communications/F25434_01/docs.10/UDM%20User%27s%20Guide/GUIDF0678B8F-501C-4BE5-A0D7-141CED2DFE70.htm)

**QUESTION 19**

In a 5G Transport network, the encryption protection of the user and control plane are provided by which of the following?

- A. IPSec
- B. Access Control List
- C. SSH
- D. X25

**Correct Answer: A**

**Section:**

**Explanation:**

Reference: <https://www.ericsson.com/en/security/a-guide-to-5g-network-security>

**QUESTION 20**

Imagine that you are defining the 5G network requirements for the Industrial Automation of a port, what is the set of 5G technology enablers and horizontal applications that makes sense?

- A. Automation of cargo handling and integration with the logistics chain is an Autonomous Container Transport vehicles that requires 5G NR, Edge cloud and High SLA slices.
- B. Automation of cargo handling and integration with shorter ship turnaround times through improved predictability of operations is a video inspection system of important large infrastructure that requires 5G NR, FWA and High SLA slices.
- C. Automation of cargo handling and integration with the logistics chain is an Autonomous Container Transport vehicles that requires 5G NR, central cloud and FWA.
- D. Automation of cargo handling and integration with shorter ship turnaround times through improved predictability of operations is a video inspection system of important large infrastructure that requires 5G NR and central cloud.

**Correct Answer: A**

**Section:**

**QUESTION 21**

In terms of scalability, flexibility, and capacity, which of the following would overcome 4G limitations?

- A. Service based architecture, stateless network functions, Cloud-ready network functions and modular network functions.
- B. Client/Server architecture, stateless network functions, Cloud-ready network functions and modular network functions.
- C. Client/Server architecture, Cloud-ready network functions, and modular network functions.

**Correct Answer: B**

**Section:**

**QUESTION 22**

When considering Cloud and Transport orchestration, evaluate whether the following statement is true or false: NFVO is to Cloud what SDN is to Transport.

- A. False
- B. True

**Correct Answer: A**

**Section:**

**QUESTION 23**

Which of the following is not a benefit of Network Slicing?

- A. Priority between different flows
- B. Privacy and segmentation between flows
- C. Recovery of network flows when they fail
- D. Differentiated QoS flows, for different services

**Correct Answer: C**

**Section:**

**QUESTION 24**

What is the role of 5G in meeting the automation needs of Industry 4.0?

- A. 5G plays a minor role on Industry 4.0 because the requirements are mainly focused on mMTC and IoT.
- B. 5G requirements for Industry 4.0 are mainly focused on Ultra high bandwidth needs.
- C. 5G plays an important role on Industry 4.0 because it enables the cloud automation with baremetal platforms.
- D. 5G requirements for Industry 4.0 are mainly focused on ultra low latency characteristics but also from high throughput and massive connectivity.

**Correct Answer: D**

**Section:**

**QUESTION 25**

Which of the following drive 5G higher reliability?

- A. Higher spectral efficiency
- B. Multi-connectivity per User Equipment
- C. Connectionless radio access
- D. Lower Time Transmission Interval (TTI)

**Correct Answer: A**

**Section:**

**Explanation:**

Reference:

[https://learningstore.nokia.com/doc/5g/5G\\_Foundation\\_Study\\_Guide\\_BL00125\\_M\\_%202002.pdf](https://learningstore.nokia.com/doc/5g/5G_Foundation_Study_Guide_BL00125_M_%202002.pdf) (9)

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**QUESTION 26**

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 all 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.

**Correct Answer: B**

**Section:**

**QUESTION 27**

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

**Correct Answer: C**

**Section:**



**QUESTION 28**

Which of the following statements about Network Slicing are correct? (Choose three.)

- A. Multiple slices create multiple virtual network instances.
- B. Unique Quality of Service can be allocated to a given slice.
- C. Specific resources can be allocated to a given slice.
- D. Network Slicing is a way to physically partition the common network infrastructure.

**Correct Answer: A, B, C**

**Section:**

**QUESTION 29**

Which of the following are 4G limitations that justify a roll-out to 5G? (Choose three.)

- A. Low peak and end-user-experience throughput
- B. Low reliability
- C. High latency
- D. Beamforming is not supported

**Correct Answer: A, B, C**

**Section:**

**Explanation:**

Reference: <https://www.raconteur.net/technology/5g/4g-vs-5g-mobile-technology/>

**QUESTION 30**

Is it possible for a User Equipment to connect simultaneously to multiple slices in 5G?

- A. No
- B. Yes

**Correct Answer: B**

**Section:**

**Explanation:**

Reference: [https://www.researchgate.net/publication/340976923\\_Slice\\_Selection\\_In\\_5G\\_Networks\\_Novel\\_Approach\\_for\\_Accessing\\_Multiple\\_Slices\\_Simultaneously](https://www.researchgate.net/publication/340976923_Slice_Selection_In_5G_Networks_Novel_Approach_for_Accessing_Multiple_Slices_Simultaneously)

**QUESTION 31**

What does 5G bring to Industry 4.0? (Choose two.)

- A. 5G will generate a huge amount of data and Information Technology will provide the computing platform with analytics and AI.
- B. 5G provides the connectivity (bandwidth, latency and reliability) needed to exchange data for OT and IT functionality.
- C. 5G brings nothing to Industry 4.0.
- D. 5G will generate a huge amount of data with mMTC and IT platforms are expected to suffer from this.

**Correct Answer: A, B**

**Section:**

**Explanation:**

Reference: <https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwIj3MSz5eTvAhUUQEEAHVYtAJkQFjAAegQIAxAD&url=https%3A%2F%2Fwww.mdpi.com%2F2673-4001%2F1%2F1%2F5%2Fpdf&usq=AOvVaw2pcA-zrM3BgCPfsBYztcsA>



**QUESTION 32**

What functionality is applied by SDN to find an alternative path in case of failure in the Transport Network?

- A. Path Correlation Engine
- B. Alternative Route Finding
- C. Alternative Path Computing
- D. Path Computation Engine

**Correct Answer: C**

**Section:**

**Explanation:**

Reference: [https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwj01tmp5uTvAhUQO8AKHbvUB5c\\_QFjAAegQIBxAD&url=https%3A%2F%2Fwww.mdpi.com%2F2071-1050%2F12%2F10%2F4255%2Fpdf&usg=AOvVaw2Jd6iravRnpP8tfxjldKWK](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwj01tmp5uTvAhUQO8AKHbvUB5c_QFjAAegQIBxAD&url=https%3A%2F%2Fwww.mdpi.com%2F2071-1050%2F12%2F10%2F4255%2Fpdf&usg=AOvVaw2Jd6iravRnpP8tfxjldKWK)

**QUESTION 33**

Which of the following drive 5G low latency? (Choose two.)

- A. Support of up to 1 billion of IoT and sensors devices per km<sup>2</sup>
- B. Lower Time Transmission Interval (TTI)
- C. Higher spectral efficiency
- D. Edge Clouds

**Correct Answer: B, C**

**Section:**

**QUESTION 34**

What are the five key features of 5G Core?

- A. Dynamic Control plane, Adaptive Architecture, Converged-Access-Network, Stateless and Network Self- healing
- B. Dynamic Control plane, Service Based Architecture, Multi-Access-Network, State-efficiency and Network Slicing
- C. Dynamic Control plane, Adaptive Architecture, Multi-Access-Network, Stateless and Network Slicing
- D. Control and User Planes Separation, Service Based Architecture, Multi-Access-Network, Stateefficiency and Network Slicing

**Correct Answer: A**

**Section:**

**QUESTION 35**

What is the "sweet spot" for Industry 4.0?

- A. The "sweet spot" for industry 4.0 is the intersection of URLLC, eMBB and mMTC.
- B. The "sweet spot" for industry 4.0 is a double-digit revenue growth.
- C. The "sweet spot" for industry 4.0 is a deployment strategy for delivering the required capacity and coverage for industrials.
- D. The "sweet spot" for industry 4.0 is the intersection of operational, information and communications technologies.

**Correct Answer: D**

**Section:**



**QUESTION 36**

You are working in a logistics company. Your manager is telling you that automation is very important to create more opportunities for the company. His idea is to deliver parcels using drones. With this in mind, he asks you if a 4G network provides good connectivity for controlling the delivery drones.

How would you answer him and why?

- A. Yes, 4G provides a connectivity network but, it is quite expensive. WIFI may be a preferable option.
- B. No, a 4G network is not a good choice for drone control because big operators (with whom we cannot deal) mainly deliver it.
- C. No, a 4G network cannot deliver the required connectivity. It is not able to guarantee the latency and reliability required for drone control.
- D. Yes, the drone control application can be hosted in the cloud and the 4G network can provide the speed needed to reach the application and control the drones.

**Correct Answer: D**

**Section:**

**QUESTION 37**

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.

**Correct Answer: A, B, D**

**Section:**

**QUESTION 38**

Which of the following is not a component of a 5G Transport network?

- A. TDM Network
- B. IP Network
- C. Access Backhaul
- D. Optical Transport

**Correct Answer: A**

**Section:**

**QUESTION 39**

Which of the following industries are the most digitized today?

- A. Transport and Health
- B. Robotics and Media
- C. Factories and Transport
- D. Media and Commerce

**Correct Answer: D**

**Section:**



**QUESTION 40**

What will 5G bring in terms of supporting requirements of industry automation? (Choose three.)

- A. Low latency characteristics in the range of 5 to 10 ms for High Speed Discrete Automation Applications.
- B. Low latency characteristics in the range of 0.1 to 1 ms for Video Monitoring and AR.
- C. Low latency characteristics in the range of 100 to 200 ms for Remote Control Tele-operation Applications.
- D. Low latency characteristics in the range of 50 to 100 ms for Discrete and Process Automation Applications.

**Correct Answer: A, C, D**

**Section:**

**Explanation:**

Reference: <https://www.symmetryelectronics.com/blog/how-will-5g-transform-industrialiot/#:~:text=5G%20Technology%20Enables%20Industry%204.0%20Integration&text=For%20applications%20in%20industrial%20automation,power%20necessary%20for%20industrial%20control>

**QUESTION 41**

What is the Network Repository Function (NRF)?

- A. This network function is part of data repositories in the Common Data Layer and in opposition to the UDR, it stores non-standardized - unstructured — data.
- B. This network function is part of data repositories in the Common Data Layer. It stores 3GPP standardized data.
- C. This network function stores or retrieves subscriptions, profiles and authentication data to or from the data repositories. It offers services to the AMF, SMF, NEF and AUSF using the Service Based Interface.
- D. This network function provides registration and discovery functionality to enable other network functions/services to discover and communicate with each other.

**Correct Answer: C**

**Section:**

**QUESTION 42**

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

- A. Option 4
- B. Option 2
- C. Option 3x
- D. Option 7

**Correct Answer: B**

**Section:**

**QUESTION 43**

What is the Authentication Server Function (AUSF)?

- A. This network function is part of data repositories in the Common Data Layer. It stores 3GPP standardized data.
- B. This network function supports authentication for 3GPP and non-3GPP accesses.
- C. This network function exposes 5G Core network functionalities available to 3rd parties, so that 3rd party capabilities and events may be securely exposed by the Network Exposure Function (NEF).
- D. This network function stores or retrieves subscriptions, profiles and authentication data to or from the data repositories. It offers services to the AMF, SMF, NEF and AUSF using the Service Based Interface.

**Correct Answer: B**

**Section:**

**QUESTION 44**

A rental car company wants to offer a service to their clients where the renter can leave a self-driving car wherever they want when the rental period is up. A company operator will then remotely drive the left vehicles back to the rental location. Where should the application for remote car control and driving reside and why?

- A. It should run in the central cloud as latency is not very important here. Reliability is guaranteed by the central cloud.
- B. The application should run in the central cloud, with very high access throughput to support low latency.
- C. It should be installed locally on the car computer and the company operator should remotely connect to it. This approach is more secure.
- D. It should be running in the edge cloud because latency is very important for the remote control of vehicles in motion and also for reliability purposes.

**Correct Answer: D**

**Section:**

**QUESTION 45**

New virtual machines are deployed to support higher peak load for an existing VNF. What is this type of scaling called?

- A. Spatial
- B. Data Center
- C. Vertical
- D. Horizontal

**Correct Answer: C**

**Section:**

**QUESTION 46**

How many slices can a User Equipment be connected simultaneously with 4G Core based network?

- A. 1
- B. 8
- C. unlimited
- D. 4

**Correct Answer: B**

**Section:**

**QUESTION 47**

Which of the following are the elements that drive Access capacity growth? (Choose three.)

- A. Support of wireless backhauling
- B. Integration of 4G and Wi-Fi radio in 5G access
- C. More micro, small and ultra-small cells
- D. 5G Home box can provide 5G wireless access

**Correct Answer: A, C, D**

**Section:**

**QUESTION 48**

In terms of universal access requirements, which of the following would overcome 4G limitations?

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- A. Unified access across 3GPP and non-3GPP technologies, Multi-Access and Wireline-Wireless convergence.
- B. Universal database with unstructured data repository and Wireline-Wireless convergence.
- C. Multi-Access and Point-to-point APIs.
- D. Universal database with unstructured data repository and Wireline-Wireless convergence.

**Correct Answer: D**

**Section:**

**QUESTION 49**

Which of the following are benefits of massive MIMO? (Choose three.)

- A. Increased spectral density
- B. Increased transmission robustness with transmit diversity
- C. Increased throughput per user
- D. Reduced latency

**Correct Answer: A, B, C**

**Section:**

**QUESTION 50**

Which one of the following solutions best reduces latency?

- A. Using redundant NFV resources.
- B. Centralizing packet switching.
- C. Putting applications in a centralized data center.
- D. Putting the application and user plane functions to the Edge or Far-Edge of the network.

**Correct Answer: D**

**Section:**

**QUESTION 51**

Which of the following is not a 5G Transport challenge?

- A. Dynamic & elastic traffic patterns
- B. High Density and Flexible X-haul
- C. Explosive traffic growth
- D. End-to-End TDM Synchronization

**Correct Answer: D**

**Section:**

