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Nokia Advanced Optical Network Design

Nokia 4A0-255

Version Demo

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QUESTION NO: 1

Which of the following about the Optical channel Transport Unit (OUT0 in ONT network is correct?

A. OUT refer to the section between two multiplexers passing through one or moreamplifiers.

B. OUT refers to the section between two amplifiers.

C. OUT enables the multiplexing of OCH connections.

D. OUT enables FEC processing.

ANSWER: A

Explanation:

“OUT refer to the section between two multiplexers passing through one or moreamplifiers.” is correct because the optical unregenerated transmission portion of a DWDM optical network describes the end-to-end optical path bounded by multiplexing/demultiplexing sites. Within that path, wavelength channels remain in the optical domain while optical amplifiers compensate for attenuation caused by fiber spans, connectors, and other passive components. An OUT can therefore contain one or more amplified spans rather than being limited to a single span or a single amplifier-to-amplifier interval. This definition is important in optical network design because the accumulated loss, gain, noise, and optical performance of every span along the complete route must be considered together. It also distinguishes the optical transport portion from functions performed at higher transport layers, such as electrical framing or forward-error-correction processing. The layered optical transport-network model and its transport entities are defined by the ITU-T in Recommendation G.872. Nokia’s optical networking portfolio uses these DWDM principles for amplified, wavelength-routed optical transport networks; see the Nokia Optical Networks overview.

QUESTION NO: 2

Where is guardbandmandatoryfor EMF?

A. Between 10G and 40G channels

B. Between 10G and 100G channels

C. Between 10G and 200G channels

D. Between 40G and 100G channels

ANSWER: C

Explanation:

Between 10G and 200G channels is correct. In Nokia EMF mixed-rate planning, the spectral characteristics of a 200G coherent channel and a neighboring legacy 10G channel require an unused spectral separation, or guardband. The guardband reduces the impact of adjacent-channel effects and preserves the expected optical performance of both services, particularly where differing channel bandwidths and modulation behaviors coexist on the same DWDM line system. This requirement is therefore a design constraint to apply when placing these two channel types adjacently in an EMF wavelength plan, rather than merely a general preference for additional spacing. Guardbands are part of practical DWDM spectrum engineering because channel allocation must account for occupied bandwidth, filter behavior, and interference margins—not just nominal center frequency. Nokia’s 1830 PSS platform supports high-capacity coherent optical transport and mixed service evolution, making disciplined spectral planning essential during upgrades and coexistence scenarios. The underlying DWDM frequency-grid framework is defined by the ITU-T in Recommendation G.694.1; Nokia platform context is available on the 1830 Photonics Service Switches page.

QUESTION NO: 3

Which of the following best describes Four Wave Mixing (FWM)?

A. FWM is a linear impairment that produces crosstalk four adjacent wavelengths are used.

B. FWM is a non-linear impairment that produces crosstalk at the sum and difference frequencies generated by interacting wavelengths.

C. FWM is a non-linear impairment resulting from varying velocities at different frequencies.

D. FWM is a linear impairment resulting from pulses broadening over ultra-longdistances

ANSWER: B

Explanation:

FWM is a Kerr-effect nonlinear optical-fiber impairment in which interacting WDM optical carriers generate additional frequency components. In its general form, three optical frequencies interact to produce a fourth, according to the relationship $f_{new} = f_i + f_j - f_k$. With two carriers, this can be observed as products at frequencies such as $2f_1 - f_2$ and $2f_2 - f_1$, commonly described as sum-and-difference mixing products. If a generated product falls on, or close enough to, an occupied WDM channel, it appears as in-band crosstalk and degrades the received signal. FWM efficiency is strongly influenced by channel spacing, launch power, fiber length, and phase matching; it is particularly significant where chromatic dispersion is low, because the interacting waves remain phase matched more effectively. This behavior is why dispersion and channel-plan choices are central considerations in dense optical-network design. The nonlinear-wave-mixing mechanism is described by the RP Photonics Four-wave Mixing reference; relevant WDM frequency-grid context is defined in ITU-T Recommendation G.694.1.

QUESTION NO: 4

Which of the following statements about Bit Error Rate (BER) is correct?

A. BER is the ratio of redundant bits to correct bits.

B. BER is measured at both the transmitted and receiving ends.

C. BER can be measured before and after FEC decoding.

D. BER can be accurately measured in a short period of time , for any rate.

ANSWER: C

Explanation:

BER is a measure of transmission quality: it expresses the proportion of received bits that are erroneous relative to the total number of bits evaluated. In optical transport systems using forward error correction (FEC), BER is commonly characterized at two important processing points: before FEC decoding and after FEC decoding. Pre-FEC BER represents the error performance of the received optical signal before the decoder applies its error-correction capability. It is particularly important for assessing link margin and determining whether the received signal remains within the FEC decoder’s correction threshold. Post-FEC BER represents the residual errors remaining after decoding and is the relevant indicator of delivered client-side bit integrity. Monitoring both values provides a practical view of raw transmission impairment and the effectiveness of FEC in correcting it. This terminology and use of pre- and post-FEC error measurements are consistent with optical transport FEC practice specified in ITU-T Recommendation G.975.1. The ITU’s overview of transport-network recommendations is available through the ITU-T G-series recommendations.

QUESTION NO: 5

Which of the following statements about Bit Error Rate (BER) is correct?

A. BER is the ratio of redundant bits to correct bits.

B. BER is measured at both the transmitted and receiving ends.

C. BER can be measured before and after FEC decoding.

D. BER can be accurately measured in a short period of time , for any rate.

ANSWER: C

Explanation:

BER can be measured before and after FEC decoding. In an optical transport system, the pre-FEC BER represents the error performance of the received signal before the forward-error-correction decoder has repaired any correctable errors. It is an important indicator of the underlying optical link margin and signal quality, because it exposes impairments such as noise, dispersion, nonlinear effects, and insufficient optical signal-to-noise ratio. The post-FEC BER is assessed after FEC processing and represents the residual, uncorrected errors delivered after the decoder. It is therefore the relevant metric for the quality of the corrected client-facing payload. Comparing these two values shows both the raw condition of the transmission path and the effectiveness of the FEC scheme. This distinction is central to coherent optical design and troubleshooting: a link may have a relatively high pre-FEC BER while still delivering an acceptably low post-FEC BER, provided the received error rate remains within the applicable FEC threshold. ITU-T's optical transport network recommendations describe the use of FEC in transport interfaces, while the FEC recommendation specifies performance-related FEC capabilities. See ITU-T G.709 and ITU-T G.975.1.

QUESTION NO: 6

Which of the following statements about the recovery time for protection and restoration combined (PRC) is correct?

A. PRC can be as fast as SNCP

B. PRC is as fast as restoration mechanisms.

C. PRC has a recovery time that depends on the broken links.

D. PRC has a typical recovery time greater than 50 ms.

ANSWER: B

Explanation:

PRC is as fast as restoration mechanisms. Protection and restoration combined is a hybrid survivability approach: it is intended to retain the capacity-efficiency advantages of restoration while providing a protection-oriented service model. Following a fault, the network must identify an eligible alternate route and allocate the necessary resources through restoration signalling and control-plane processing. Consequently, PRC recovery is characterized by the restoration process rather than by the deterministic, pre-established switching interval associated with a dedicated protection scheme. In practical optical networks, the actual elapsed time can vary with network state, route computation, signalling, and resource availability, but its recovery-time class is that of restoration. This distinction is important during network design because service recovery objectives must be matched to the survivability mechanism selected; applications needing a tightly bounded protection-switching interval require an explicitly preprovisioned protection design. Nokia's optical transport documentation and training material describe the protection and restoration mechanisms supported by the 1830 Photonic Service Switch family; consult the Nokia 1830 PSS documentation portal and Nokia's 1830 Photonic Service Switch product information for platform-specific survivability capabilities and configuration guidance.

QUESTION NO: 7

Consider an OTN-based network controlled by GMPLS. Which of the following statements is correct?

A. An OCH LSP can be routed through an ODU LSP.

B. An ODU LSP can be routed through an OCH LSP.

C. An ODU LSP is routed between two photonic layer nodes.

D. The routing of the individual ODU frames is based on their label

ANSWER: B

Explanation:

“An ODU LSP can be routed through an OCH LSP.” is correct because GMPLS represents the transport hierarchy as client and server layer LSPs. An Optical Data Unit connection is a digital-layer transport entity, while an Optical Channel connection provides the wavelength-based optical transport path beneath it. Consequently, an ODU LSP may use an OCh LSP as its server-layer resource: the ODU signal is mapped onto an optical channel and transported over the selected wavelength path between the relevant optical nodes.

This relationship is important in multilayer OTN control. The GMPLS control plane can establish and advertise resources at distinct switching capabilities, allowing an ODU service to be provisioned over an already established, or dynamically created, photonic connectivity resource. The OCh layer supplies wavelength continuity and photonic reach, whereas the ODU layer supplies digital framing, multiplexing, and switching for client traffic. This client/server layering enables coordinated path computation and resource allocation across both electrical ODU switching and photonic OCh switching domains. The GMPLS OTN routing and signaling extensions describe these OTN layers and their associated labels and switching capabilities. See RFC 7139 and the OTN architecture described in ITU-T Recommendation G.872.