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CDCS Exam

EXIN EPI Certified Data Centre Specialist

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Question 1. (Single Select)

Management has requested a 15-minute battery bank assuming full load on the UPS. The UPS vendor has provided the following specifications of the UPS:

- Rated power: 30 kVA
- Rectifier input voltage: 400 V/3 phase
- Rectifier input power factor: 0.8
- Battery rated voltage: 384 V
- Number of cells: 192
- End of discharge voltage: 308 V
- Inverter output voltage: 400 V/3 phase
- Inverter output power factor: 0.8

What information is missing to perform the battery calculation?

- A: UPS efficiency
- B: Inverter efficiency
- C: Load imbalance on the phases
- D: Available battery charging current

Correct Answer: A

Explanation:

To determine the required capacity of the battery bank for the 15-minute runtime at full load, one must know the total power requirement that the battery bank must supply. The specifications provided include most of the necessary details, such as rated power, input voltage, battery voltage, and discharge voltage. However, one critical piece of information is missing: the UPS efficiency.

Detailed Explanation:

In a data center UPS system, the battery bank is designed to supply power for a set duration when there is an input power failure. The UPS efficiency affects the actual power the UPS can deliver to the load compared to the power it draws from the batteries. The efficiency factor is necessary to accurately calculate the required capacity of the battery bank since it determines how much input power is needed from the batteries to supply the load at full capacity. The formula typically used to determine battery capacity involves factoring in UPS efficiency, as it allows you to understand the losses within the UPS system.

If UPS efficiency is not considered, there would be an inaccurate estimation of the actual power needed from the batteries. For instance, if a UPS has 90% efficiency, only 90% of the power drawn from the batteries reaches the load. Without knowing this efficiency, it is not possible to calculate the battery bank size accurately, as you cannot accurately estimate the losses within the UPS itself.

EPI Data Center Specialist Reference:

According to EPI Data Center Specialist training, understanding the UPS efficiency is essential for battery sizing. Without it, the calculations could lead to either undersizing or oversizing the battery bank, which affects both reliability and cost-effectiveness of the UPS system. The EPI Data Center Specialist course emphasizes that battery sizing must account for all losses within the UPS system, with efficiency being a primary factor in these calculations.

Question 2. (Single Select)

A new network storage device in a non-standard size rack of approximately 600 kg/1,300 lbs is going to be installed in the data center.

Are new floor loading calculations required?

A: No, as long as the equipment is less than 700 kg/1,500 lbs it will be within the limits.

B: No, specifications of equipment brought into the data center will already be known during the design of the data center, and therefore the floor will be able to handle it.

C: Yes, additional floor loading calculations need to be done by the floor manager, which should be verified by the safety engineer.

D: Yes, a structural engineer, approved/endorsed by the building owner, should carry out new floor loading calculations.

Correct Answer: D

Explanation:

For heavy equipment, such as a network storage device weighing approximately 600 kg/1,300 lbs, new floor loading calculations are indeed required, particularly since the rack is non-standard. A structural engineer, approved by the building owner, should conduct these calculations to ensure the floor can safely support the new load without risking structural integrity.

Detailed Explanation:

Data centers are designed with specific floor load ratings, which are determined during the design phase based on anticipated equipment. When adding or replacing equipment that is significantly heavy or non-standard, reassessing the floor's capacity is essential to avoid overloading. A structural engineer has the expertise to verify if the existing floor can accommodate the weight and, if not, can recommend reinforcement measures.

This step ensures compliance with safety standards and helps prevent damage to the infrastructure, which could lead to costly repairs or even catastrophic failure in extreme cases.

EPI Data Center Specialist Reference:

EPI Data Center Specialist training advises that any changes in the data center load, particularly involving non-standard and heavy equipment, warrant a structural assessment. Ensuring compliance with floor load capacity is a critical safety and operational concern, as underscoring data center infrastructure reliability and safety is a priority in EPI's best practices.

Question 3. (Single Select)

A data center has its own power supply from the public utility and receives chilled water supply from the building owner.

What needs to be taken into consideration when calculating the PUE?

- A: Nothing, as the chiller plant in the building also uses electrical power
- B: You will need to take the value for COP of the chiller plant into consideration
- C: You will need to take a weight factor of 0.4 for district chilled water into consideration
- D: PUE calculations are not possible in shared buildings

Correct Answer: C

Explanation:

When calculating Power Usage Effectiveness (PUE) in a data center that uses chilled water from an external source, like from a building owner, a weight factor for district chilled water must be applied. This is because PUE calculations aim to measure the energy efficiency of the data center's own operations, and external utilities like district chilled water aren't directly powered by the data center. A weight factor of 0.4 is typically used to account for the energy consumed to produce and deliver the chilled water, reflecting the indirect impact on the data center's total energy consumption.

Detailed Explanation:

PUE is calculated as the ratio of the total facility energy to the IT equipment energy. If the cooling is provided by an external chilled water source, it's necessary to adjust the calculations to accurately reflect the energy impact. By incorporating the 0.4 weight factor, data centers can calculate a more accurate PUE, aligning with standard methods and industry best practices.

EPI Data Center Specialist Reference:

EPI training on PUE highlights the importance of adjusting for external energy sources, such as district cooling, in the calculations. This ensures that PUE values remain accurate and comparable across different data centers, even when external utilities are used.

Question 4. (Single Select)

What is the main reason to install Earth Leakage protection?

- A: Protection of ICT equipment against high-frequency noise currents
- B: Protection of human lives
- C: Improvement of the data center grounding/earthing system
- D: Protection against lightning strikes

Correct Answer: B

Explanation:

Earth Leakage Protection is primarily installed to protect human lives by detecting and disconnecting power when a fault current flows to the ground. This type of protection is essential to avoid electrical shock hazards that could occur when insulation fails, or equipment is improperly grounded.

Detailed Explanation:

Earth leakage currents can occur due to insulation faults or accidental contact with live parts. Earth Leakage Protection systems, such as Residual Current Devices (RCDs), quickly detect these faults and disconnect the circuit to prevent harm to personnel. This is especially crucial in environments like data centers where high-powered equipment is continuously running and any electrical fault can pose significant safety risks.

EPI Data Center Specialist Reference:

EPI emphasizes that human safety is paramount in data center operations. Proper grounding and leakage protection are fundamental safety measures, and EPI guidelines align with this focus, underscoring the importance of protecting personnel from electrical hazards through appropriate safety systems.

Question 5. (Single Select)

The noise levels in the data center are approximately 91 dB (A).

Do employers need to take precautions?

A: No, anything less than 100 dB (A) is acceptable.

B: There are no regulations regarding noise levels inside a building. Regulations only apply to noise pollution outside of the building.

C: As long as the data is compliant to ISO/IEC 27001 it is acceptable.

D: Yes, since it is mandated by regulations.

Correct Answer: D

Explanation:

In a data center with noise levels of 91 dB (A), employers are indeed required to take

precautions to protect personnel, as this level exceeds commonly accepted safety thresholds for occupational noise exposure. Regulations, such as those from the Occupational Safety and Health Administration (OSHA) or similar agencies, mandate specific controls and protections for environments with high noise levels.

Detailed Explanation:

Noise levels above 85 dB (A) typically trigger requirements for hearing conservation programs. At 91 dB (A), steps like providing ear protection, conducting regular noise assessments, and possibly implementing engineering controls to reduce noise should be taken. Extended exposure to such levels can lead to hearing loss, so regulatory compliance ensures both immediate and long-term protection for personnel.

EPI Data Center Specialist Reference:

EPI guidelines for data center safety address noise exposure as part of the environmental safety measures. EPI recommends adhering to local occupational health regulations, as excessive noise can harm personnel and affect operational efficiency due to potential health hazards.



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