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Question: 1

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

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 References:
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

The pipes of a VESDA smoke detection system are installed at the air intake of the air conditioner inside the computer room.
Is this a good practice from an early smoke detection point of view?

A. It depends on the type of gas-based fire suppression which will be installed.
B. Yes, as this reduces the amount of piping to be installed in the data center, as all air will go through the air conditioner.
C. No, the piping should be installed at the air exhaust of the air conditioner, as there can also be a fire inside the air conditioner itself.
D. No, it will give a longer reaction time for the smoke detection system and there might also be bypass airflow.

Answer: D

Explanation:
For optimal early smoke detection in a data center, it is crucial that the Very Early Smoke Detection Apparatus (VESDA) system be installed at locations where smoke will be detected as soon as it appears. Positioning the VESDA pipes at the air intake of the air conditioner inside the computer room is not ideal.
This placement could result in a delayed detection response and the potential for bypass airflow to occur, which would impede the system's ability to detect smoke effectively.
Detailed Explanation:
When VESDA pipes are installed at the air intake, the detection system relies on the smoke to be drawn into the air conditioning unit before detection can occur. This setup increases the reaction time as the smoke has to travel through the intake and get processed by the air conditioner. Furthermore, bypass airflow—a phenomenon where not all the air containing smoke particles passes through the VESDA pipes—could also delay or even prevent the system from detecting smoke early.
Ideally, VESDA pipes should be positioned where smoke is likely to accumulate first, such as near the ceiling or in the return airflow path to detect smoke at the earliest possible stage. This ensures that the detection system can quickly trigger alarms, providing more time to address potential fire hazards.
EPI Data Center Specialist References:
EPI Data Center Specialist training highlights that smoke detection should prioritize early response capabilities to maximize safety. The preferred installation for VESDA pipes is generally at points where smoke would naturally accumulate, rather than relying on air conditioning intakes where airflow can vary and delay detection. In their course materials, EPI emphasizes minimizing reaction time and reducing the impact of airflow dynamics on smoke detection efficiency.

Question: 3

You need to determine the strategy for the cooling audit. All the servers are based on a front-to-rear (FR) airflow design.
Which location for the temperature/humidity measurement should you recommend for the audit?

A. At the back/rear of the server at 50 mm/2 inch
B. At 1.5 meters/5 feet above the floor in the middle of the cold aisle
C. At the front/intake of the server at 50 mm/2 inch
D. At 1.5 meters/5 feet above the floor in the middle of the hot aisle

Answer: C

Explanation:
For a cooling audit in a data center, it is essential to measure temperature and humidity where air enters the servers to accurately assess cooling performance. In this case, since all servers have a front-to-rear
(F-R) airflow design, measuring at the front/intake of the server will provide a precise understanding of the cooling conditions that the equipment is experiencing.
Detailed Explanation:
Servers with a front-to-rear airflow design draw in cool air from the cold aisle at the front, which is then exhausted into the hot aisle at the rear. By measuring temperature and humidity 50 mm/2 inches from the front intake, you gather data on the air conditions right before it enters the servers, providing an accurate representation of the cooling environment as it directly impacts the equipment.
Measuring in the cold aisle at the front intake ensures that the readings reflect the actual conditions of the incoming air that the servers depend on for effective cooling. This approach is consistent with best practices for maintaining thermal conditions in a data center, as it helps confirm that the cooling systems
are delivering air within the required temperature and humidity specifications.
EPI Data Center Specialist References:
According to the EPI Data Center Specialist curriculum, the optimal placement for temperature and humidity sensors is at the intake of the equipment in the cold aisle, as it directly correlates to the environmental conditions affecting the servers. This positioning allows for a more effective audit of cooling performance, which is critical for maintaining the reliability and efficiency of the data center's operations.

Question: 4

You are installing new copper cabling.
What is the advantage or disadvantage of choosing pre-terminated category 6 or 6A cabling?

A. Pre-terminated cabling is already factory tested and saves installation time.
B. There is no advantage as most new copper cabling network designs are based on category 3 or 5E for horizontal cabling.
C. Pre-terminated cabling has a higher fire rating.
D. Pre-terminated cabling makes ordering of the copper cables more complex, as you need to know in advance on which side the male or female connector needs to be located.

Answer: A

Explanation:
Choosing pre-terminated category 6 or 6A cabling provides several advantages, primarily related to time savings and reliability. Since pre-terminated cables are factory tested, they ensure consistent quality and performance, reducing the need for additional testing during installation. This makes installation faster and more efficient, which can significantly reduce labor costs and deployment times.
Detailed Explanation:
Pre-terminated cabling systems are manufactured and tested in controlled environments, which ensures they meet industry standards for performance. This factory testing process minimizes the likelihood of faults, reducing the need for troubleshooting and retesting on-site. Moreover, pre-terminated solutions can help to streamline installations because they eliminate the need for on-site terminations, which can be time-consuming and require skilled labor.
This is especially beneficial for data centers, where rapid deployment and minimizing potential points of failure are critical to maintaining uptime. However, it is important to note that pre-terminated cables require accurate planning, as lengths and connector configurations must be predetermined.
EPI Data Center Specialist References:
According to EPI Data Center Specialist guidelines, pre-terminated cabling is advantageous in data center environments due to reduced installation time and enhanced reliability from factory testing. These attributes align with best practices for efficient data center management, where maintaining performance and minimizing downtime are priorities.

Question: 5

When are the wet bulb and dry bulb temperatures identical?

A. When the dry bulb's temperature is at the lowest allowable temperature for IT equipment as per ASHRAE
B. When the dry bulb's temperature is at the highest allowable temperature for IT equipment as per ASHRAE
C. When the relative humidity is at the best practice value for relative humidity, being 50% RH
D. When the relative humidity is 100%

Answer: D

Explanation:
The wet bulb and dry bulb temperatures become identical when the relative humidity reaches 100%. At this point, the air is fully saturated with moisture, meaning it can no longer absorb additional water vapor. As a result, the rate of evaporation decreases, and there is no difference between the dry bulb and wet bulb temperatures.
Detailed Explanation:
The dry bulb temperature measures the air temperature, while the wet bulb temperature takes into account the cooling effect of evaporation. When relative humidity is at 100%, the air has reached its saturation point, and no further evaporation occurs. This causes both the wet bulb and dry bulb thermometers to display the same temperature reading. This condition is critical in understanding

environmental conditions, particularly in HVAC and data center environments, where humidity control is essential to avoid equipment overheating or corrosion.

EPI Data Center Specialist References:

The EPI Data Center Specialist training includes understanding humidity levels and their impact on data center environments. Knowing when wet bulb and dry bulb temperatures align helps data center operators manage moisture levels effectively, which is essential for preventing issues related to high humidity, such as condensation on IT equipment.

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