

# Exam CEM Questions Answers | Latest CEM Test Answers

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## CEM EXAM 1 QUESTIONS AND ANSWERS WITH SOLUTIONS 2024

Scientific question - ANSWER no such thing as "the scientific method"

can be answered by doing experiments, making observations, taking measurements in a replicable way

What do scientists do? - ANSWER 1. ask questions

2. design experiments

3. gather and analyze data

4. make claims (based on data and evidence)

5. Develop expectations, models and theories about how the universe behaves how it does

CLAIM, EVIDENCE, REASONING - ANSWER you need evidence if you are going to make a claim and you need to support that with data

1. CLAIM- the target of your explanation

2. EVIDENCE - scientific principal you are using to support your claim

3. REASONING- that connects your claim to evidence

ex. claim if i add milk to hot coffee the temp will decrease

scientific model - ANSWER can be a drawing or a graph or a diagram or equation physical or mental

used to help make sense or predict what will happen

they make testable, quantifiable predictions

and this can help us explain WHY

a scientific theory - ANSWER based on observations/ experiments

makes testable predictions

may change over time as new evidence becomes available

is falsifiable

restricted to natural phenomenon

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## AEE Certified Energy Manager (CEM) Sample Questions (Q29-Q34):

### NEW QUESTION # 29

A facility has the thermal cooling load profile shown in the table below. The utility rate traffic has an no-peak time-of-use period that begins at 10:00 a.m ends at 7:00 p.m. What chiller capacity (output) is required for a load-leveling operating strategy?

Time of Day	Facility Design Cooling Load	Time of Day	Facility Design Cooling Load
Midnight to 1:00 a.m.	2 GJ	Noon to 1:00 p.m.	8 GJ
1:00 a.m. to 2:00 a.m.	2 GJ	1:00 p.m. to 2:00 p.m.	9 GJ
2:00 a.m. to 3:00 a.m.	2 GJ	2:00 p.m. to 3:00 p.m.	9 GJ
3:00 a.m. to 4:00 a.m.	2 GJ	3:00 p.m. to 4:00 p.m.	9 GJ
4:00 a.m. to 5:00 a.m.	2 GJ	4:00 p.m. to 5:00 p.m.	9 GJ
5:00 a.m. to 6:00 a.m.	2 GJ	5:00 p.m. to 6:00 p.m.	8 GJ
6:00 a.m. to 7:00 a.m.	4 GJ	6:00 p.m. to 7:00 p.m.	6 GJ
7:00 a.m. to 8:00 a.m.	4 GJ	7:00 p.m. to 8:00 p.m.	6 GJ
8:00 a.m. to 9:00 a.m.	4 GJ	8:00 p.m. to 9:00 p.m.	4 GJ
9:00 a.m. to 10:00 a.m.	6 GJ	9:00 p.m. to 10:00 p.m.	4 GJ
10:00 a.m. to 11:00 a.m.	6 GJ	10:00 p.m. to 11:00 p.m.	2 GJ
11:00 a.m. to Noon	8 GJ	11:00 p.m. to Midnight	2 GJ

[Question from the previous image, which was about chiller capacity for load leveling, but the table was missing]

- A. 7.0 GJ/h
- **B. 5.0 GJ/h**
- C. 8.0 GJ/h
- D. 4.0 GJ/h

**Answer: B**

Explanation:

Comprehensive Detailed Step by Step Explanation with all AEE Energy Manager (CEM) References

\* Interpret the load profile (hourly cooling energy): The table gives the facility cooling load in GJ per hour interval (so numerically it's an hourly rate for each hour).

\* Compute the total daily cooling energy (sum of 24 hourly loads):

\* 12:00 a.m.-6:00 a.m.:  $6 \text{ hr} \times 2 = 12 \text{ GJ}$

\* 6:00-7:00 a.m.: 4 # 16 GJ

\* 7:00-8:00 a.m.: 4 # 20 GJ

\* 8:00-9:00 a.m.: 4 # 24 GJ

\* 9:00-10:00 a.m.: 6 # 30 GJ

\* 10:00-11:00 a.m.: 6 # 36 GJ

\* 11:00 a.m.-12:00 p.m.: 8 # 44 GJ

\* 12:00-1:00 p.m.: 8 # 52 GJ

\* 1:00-2:00 p.m.: 9 # 61 GJ

\* 2:00-3:00 p.m.: 9 # 70 GJ

\* 3:00-4:00 p.m.: 9 # 79 GJ

\* 4:00-5:00 p.m.: 9 # 88 GJ

\* 5:00-6:00 p.m.: 8 # 96 GJ

\* 6:00-7:00 p.m.: 6 # 102 GJ

\* 7:00-8:00 p.m.: 6 # 108 GJ

\* 8:00-9:00 p.m.: 4 # 112 GJ

\* 9:00-10:00 p.m.: 4 # 116 GJ

\* 10:00-11:00 p.m.: 2 # 118 GJ

\* 11:00 p.m.-12:00 a.m.: 2 # 120 GJ total per day

So, Total daily cooling energy = 120 GJ.

\* Apply the CEM "load-leveling" operating strategy sizing rule: In the AEE CEM Thermal Storage training material, Load Leveling is described as operating the chiller at a constant (or near constant) load for 24 hours per day, and the "load leveling chiller load calculations" are based on Total energy

/ Hours available to operate chillers- for load leveling, that operating window is 24 hours. portal.

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Therefore:

\* Why the "no-peak 10 a.m.-7 p.m." detail doesn't change the load-leveling answer: That time window is typically used when a strategy restricts chiller operation to certain hours (e.g., full load shifting). But load leveling, per the CEM training description, is the strategy where the chiller runs all day at (near) constant load, using storage to absorb the difference between constant production and variable building load

### NEW QUESTION # 30

A cooling tower delivers 29°C water to a central chilled water plant. The cooling tower is capable of delivering water to the chilled-water plant with a 6°C approach temperature to the ambient wet bulb temperature. Using this information, what type of control strategy would you recommend be added to the cooling tower operation to save additional energy?

- A. Static-pressure reset
- B. Chiller demand limiting
- C. Condenser-water temperature reset
- D. Chilled-water temperature reset

Answer: C

### NEW QUESTION # 31

In a warehouse, lights are mounted 4 meters above the floor. This provides an average light level of 150 lux.

To increase the light level without installing more lights or higher Wattage lights, you lower the light fixtures with pendants so that the lights are located 3.25 meters above the floor. Calculate the new average light level on the floor.

- A. 150 lux
- B. 227 lux
- C. 276 lux
- D. 176 lux
- E. 166 lux

Answer: D

### NEW QUESTION # 32

Using the lumen method, calculate the number of luminaires (fixtures) required to light a room to 200 lux.

Each luminaire has 2 fluorescent lamps, 3,000 lumens per lamp. The room is 20 meters by 30 meters. The total light loss factor (LLF) is 0.70 and the luminaire coefficient of utilization (CU) is 0.80.

- A. 36 luminaires
- B. 24 luminaires
- C. 12 luminaires
- D. 60 luminaires
- E. 48 luminaires

Answer: A

### NEW QUESTION # 33

Which motor parameter is the most difficult to measure with precision?

- A. Alternating current (AC) frequency
- B. Output power capacity
- C. Operating load factor
- D. Operating (rotating) speed
- E. Input power

Answer: C



