

Practice Exam

As with the Chapter Review Tests and the Final Exam, the Practice Exam tests your understanding of the materials underlying the learning objectives. After you've reviewed your answers to the Chapter Review Tests, try your hand at this 50-question Practice Exam to become still more comfortable with taking a multiple-choice test. Remember, topics covered in this exam may likewise be covered in the Final Exam, but the wording of the questions will never be identical.

1. Facilities with refrigeration systems that currently use CFCs are permitted to:
 - a. maintain them with CFC refrigerants but must replace them by specific dates.
 - b. seek alternative HCFC (hydrochlorofluorocarbon) refrigerants now and eventually replace the system.
 - c. maintain those systems with CFC refrigerants until they need to be replaced.
 - d. seek alternative CFC refrigerants now and operate the system until it is beyond repair.

2. (Fill in the blank) By increasing indoor temperature from 70°F to 74°F when air conditioning is working, there is an approximate energy savings of __%.
 - a. 5
 - b. 10
 - c. 15
 - d. 20

3. To improve the efficiency of a dual-duct system, when only heating loads are present:
 - a. vary the system temperature with outdoor temperature.
 - b. use it as a single-duct system.
 - c. convert the cooling system to a heat pump.
 - d. increase the fan speed to improve heat transfer.

4. The amount of energy used per day in a lighting system is calculated in:
 - a. luminaries per day.
 - b. watts per day.
 - c. kWh (kilowatt-hours).
 - d. lumens per hour.

5. For a building complex with a central plant and several remote mechanical equipment rooms, the **best** EMCS (energy management control system) to use is a:
 - a. fully distributed system.
 - b. localized single-function system.
 - c. centralized station.
 - d. localized multi-function system.

6. If the electrical demand charge from the utility bill is recorded in kVA (kilovolt-amperes):
 - a. power factor is part of the demand.
 - b. fuel adjustment is factored into the demand.
 - c. the demand is a percentage of kWh use.
 - d. the demand charge is only an estimate.

7. Inadequate ventilation can cause all of the following problems **except**:
 - a. office machine damage.
 - b. damage to cooling coils.
 - c. headaches or dizziness for occupants.
 - d. breathing problems for occupants.

8. A building in a climate with a high amount of solar gain and a long cooling season would be best suited for windows with:
 - a. clear glass.
 - b. antireflective coatings.
 - c. reflective glass.
 - d. decorative blinds.

9. The quantity of heat in a substance is measured in:
 - a. Btu (British thermal units).
 - b. kW (kilowatts).
 - c. the Rankine scale.
 - d. the Kelvin scale.

10. Determination of the number of demand control functions needed for an electrical system depends on the:
 - a. load intervals.
 - b. load sizes.
 - c. number of loads.
 - d. other energy saving equipment.

11. As a general rule, the most economically viable application of solar energy heating technology is:
 - a. SWH (service water heating).
 - b. hot-air space heating.
 - c. hot-water space heating.
 - d. emergency heating.

12. To conserve energy, elevators that have not been used for a while should be set to:
 - a. time out and shut down immediately in nonpeak periods.
 - b. time out and shut down immediately.
 - c. return automatically to the ground floor.
 - d. consume power during idling about equal to the power needed to start them.

13. An easy way to monitor the performance of energy retrofits, factoring in variables between years, is to:
 - a. implement degree-day analysis.
 - b. use energy analysis software.
 - c. conduct a walk-through energy audit.
 - d. use energy accounting software.

14. An example of HVAC optimization using an EMS is:
 - a. operation of the best mix of chillers.
 - b. monthly performance of preventive maintenance.
 - c. calibration of humidity controls.
 - d. logging of equipment repair data.

15. One characteristic of antireflective coatings is that they:
 - a. block ultraviolet light.
 - b. stop heat loss.
 - c. absorb heat.
 - d. let in more energy.

16. A control system that receives constant feedback about the temperature, pressure, or humidity status is a:
 - a. closed-loop system.
 - b. self-contained control system.
 - c. open-loop system.
 - d. pneumatic control system.

17. Under the practice of TLR (timely lamp replacement), lamps are replaced when:
 - a. 10 percent of the bulbs have burned out.
 - b. lamps reach 20,000 hours of usage.
 - c. lamps reach 75 percent of their rated life.
 - d. lamp output is at 50 percent efficiency.

18. If the liquid line leaving the strainer feels cooler than the liquid line entering the strainer:
 - a. the strainer is normal.
 - b. the strainer is clogged.
 - c. the system is low on refrigerant.
 - d. the system pressure is too high.

19. Degree-day data is essential when comparing:
 - a. a building' EUIs (energy use indexes) from different periods.
 - b. a heating system's performance with manufacturer specifications.
 - c. the efficiency of two separate buildings.
 - d. the efficiency of heat pumps and boiler systems in a building.

20. A switch designed to sense pneumatic pressure and trigger an electrical device is used in a pneumatic control system for:
 - a. turning on the compressor.
 - b. turning on the controller.
 - c. turning off the controller.
 - d. preventing overload of the system.

21. The information gathered in a detailed audit is used to determine:
 - a. when equipment should be replaced.
 - b. which operations are the most efficient or inefficient.
 - c. why a building consumes as much energy as it does.
 - d. how the building compares to other similar buildings.

22. To determine the amount of heat in Btu required to change the temperature of a substance a specific number of degrees without changing the substance' state, all of the following information is required **except** the:
 - a. weight of the substance in pounds.
 - b. specific heat of the substance.
 - c. temperature change in degrees Fahrenheit.
 - d. latent heat of the substance.

23. Which kind of system provides comfort in a building's conditioned areas by varying the temperature of the air?
- CAV
 - VAV
 - both CAV and VAV
 - neither CAV nor VAV
24. Surveys indicate that considerable energy is wasted when maximum lighting and heating levels are maintained in a building when:
- daylight working hours are in effect.
 - workers are using floating holidays.
 - it is occupied by only the cleaning crew.
 - a long interval has occurred between energy audits.
25. The part of the pneumatic controller that acts on the nozzle flapper of the pilot circuit is the:
- sensing element.
 - feedback gain.
 - output control pressure.
 - pilot relay's supply and exhaust valve.
26. The supply of air for most air-conditioning systems is:
- all fresh air from outside the building.
 - a mixture of outdoor air and recirculated air.
 - all recirculated air from the area near the HVAC system.
 - all recirculated air from throughout the building.
27. A type of SWH distribution system that moves water from the heater to building fixtures and then back to the heater in a continuous loop is a(n):
- point-of-use system.
 - modular system.
 - recirculating system.
 - instantaneous system.

28. (Fill in the blank) All of the following forms of energy are directly relevant to normal building operations **except** ____.
- thermal
 - nuclear
 - mechanical
 - electrical
29. In an EMCS, data is transmitted to and from the CPU (central processing unit) through the:
- DDC (direct digital control) panel.
 - DTM (data transmission media).
 - IFIDs (intelligent field interface devices).
 - sensors.
30. When making any system adjustments to heating and cooling systems remember to also:
- balance air and hydronic systems.
 - drain and refill water in the system.
 - clean the duct system.
 - bleed or blowdown the system.
31. A device that converts signals from pneumatic to electronic or vice-versa is a(n):
- transformer.
 - binary converter.
 - analog converter.
 - transducer.
32. All of the following are methods for regulating the volume or static pressure of air in an air handling system **except**:
- changing the pitch angle of fan blades.
 - changing the direction of the inlet vane.
 - restricting the air intake opening.
 - changing the fan speed.

33. A building engineer must have CFC (chlorofluorocarbon) technician certification training for all of the following situations **except**:
- when only responsible for inspection or routine maintenance.
 - when the technician has adequate training.
 - when working on small refrigeration systems.
 - when all refrigeration work is subcontracted.
34. (Fill in the blank) The type of cool storage system which is **least** efficient is the ___ storage system.
- ice
 - chilled water
 - eutectic salts
 - dry ice
35. Oil filters in the air compressor should be replaced when the pressure drop across the filter reaches about:
- 30 psig.
 - 10 psig.
 - 20 psig.
 - 5 psig.
36. The primary voltage is:
- used in a building's distribution system.
 - supplied by the utility company.
 - supplied to the first load of a series.
 - generated at an electric power plant.
37. A boiler is gradually using more fuel but has reduced steam output and an increase in stack temperature. The problem therefore, is most likely:
- scaling/scale formation.
 - a faulty thermostat.
 - a leaking valve.
 - a fouled burner.

38. All of the following are basic types of heat recovery systems **except**:
- a. hydronic recovery systems.
 - b. hygroscopic recovery systems.
 - c. heat-pump recovery systems.
 - d. air-to-air recovery systems.
39. When calculating the EUI, power used is multiplied by conversion factors to determine the:
- a. rate of consumption.
 - b. efficiency rating.
 - c. fuel costs.
 - d. MBtu used.
40. In addition to chemical treatment, a device for reducing scale buildup in a boiler is a:
- a. system filter.
 - b. blowdown control.
 - c. descaling snake.
 - d. burner flame diffuser.
41. A control device that consists of an electric motor that repositions a potentiometer to balance a signal received from a thermostat is a:
- a. balancing control.
 - b. fan speed control.
 - c. inlet vane control.
 - d. position control.
42. The EPA's (Environmental Protection Agency's) FVC (Financial Value Calculator) does all of the following **except**:
- a. allows you to track your energy performance improvements over time through continued use.
 - b. allows you to measure your company's energy performance.
 - c. shows you how to purchase utilities at the lowest cost.
 - d. shows you how your building measures up in the industry based on industry averages.

43. The ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers) guideline for the commissioning of HVAC (heating, ventilating, and air-conditioning) systems is provided to:
- make certain that new HVAC systems do not leak refrigerant.
 - verify that HVAC systems operate in conformity with design intent.
 - give guidelines for cleaning construction dust and contaminants out of a system.
 - establish routine and preventive maintenance procedures.
44. In a steam heating system, if a plume of steam is coming out of the condensate tank vent, it is an indication that:
- the system pressure is too high.
 - the system is operating normally.
 - one or more steam traps are defective.
 - the system temperature is too high.
45. Which is **false** concerning utility bills?
- each utility bill should be checked in detail, starting with the meter readings
 - most utility companies will furnish customers with their scheduled meter-reading dates a year in advance
 - building staff should take utility meter readings four times or fewer per year
 - one of the most effective practices to reduce energy costs is to scrutinize utility bills monthly
46. When setting the deadband range for a building static pressure regulator, set a larger deadband range when the:
- temperature fluctuations are large.
 - area is small.
 - environment is windy.
 - exhaust damper cycling is excessive.
47. All of the following are advantages of firetube boilers **except** their:
- relatively low operating costs.
 - simple and rugged construction.
 - good energy efficiency.
 - ability to meet large and sudden load fluctuations.

48. A pneumatic control system that can control both heating and cooling is called a:
- proportional control.
 - dual-pressure station.
 - single-pressure station.
 - floating action controller.
49. A refrigeration system in which the motor, drive shaft, and compressor are all enclosed in one housing is called a(n):
- hermetic compressor.
 - open compressor.
 - self-contained compressor.
 - submersible compressor.
50. All of the following can be handled by an EMS (energy management system) **except**:
- lighting demands and security systems.
 - monitoring carbon dioxide in garages.
 - controlling sensitivity adjustment.
 - preheating or precooling.

Practice Exam Answers

- | | | | |
|-----|---|-----|---|
| 1. | B | 26. | B |
| 2. | A | 27. | C |
| 3. | B | 28. | B |
| 4. | C | 29. | B |
| 5. | C | 30. | A |
| 6. | A | 31. | D |
| 7. | B | 32. | C |
| 8. | C | 33. | D |
| 9. | A | 34. | A |
| 10. | C | 35. | B |
| 11. | A | 36. | B |
| 12. | D | 37. | A |
| 13. | D | 38. | B |
| 14. | A | 39. | D |
| 15. | D | 40. | B |
| 16. | A | 41. | D |
| 17. | C | 42. | C |
| 18. | B | 43. | B |
| 19. | A | 44. | C |
| 20. | A | 45. | C |
| 21. | C | 46. | D |
| 22. | D | 47. | A |
| 23. | A | 48. | B |
| 24. | C | 49. | A |
| 25. | A | 50. | C |