1. The recognized major categories of electric lamps correctly include:
   a. incandescent, fluorescent, gaseous discharge, LED
   b. incandescent, gaseous discharge, LED, other
   c. incandescent, fluorescent, gaseous discharge, metal-halide
   d. incandescent, gaseous discharge, mercury-vapor, LED

2. Tungsten halogen lamps are a particular type of:
   a. incandescent lamp
   b. LED lamp
   c. gaseous discharge lamp
   d. metal-halide lamp

3. A ballast is a required component:
   a. with every type of electric lamp
   b. only with LED lamps
   c. only with any type of gaseous discharge lamp
   d. only with incandescent lamps

4. The energy efficiency of an electric lamp is represented by its:
   a. wattage rating (W)
   b. luminous intensity profile (cd/m²)
   c. lumens output rating (lm)
   d. luminous efficacy rating (lm/W)

5. Which of the following is not a valid aspect of the operation of a fluorescent lamp:
   a. a filament is heated until it glows and emits electrons
   b. a high voltage differential establishes a flow of electrons across a fill gas
   c. interactions among electrons and fill gas produce UV radiation
   d. interaction of UV radiation with a phosphor coating produces light

6. List six specific lamp characteristics or properties that would be commonly considered when selecting a lamp for a particular building application:
   a. ______________
   b. ______________
   c. ______________
   d. ______________
   e. ______________
   f. ______________
7. The two fundamental laws that are incorporated into the point-to-point illuminance calculation method are:

   a. inverse square law and cosine law
   b. law of diminishing returns and law of unintended consequences
   c. federal law and state law
   d. Bernoulli’s law and Ocram’s law

8. Assuming all else in a lighting design situation being equal, the CU value will be highest for:

   a. an indirect luminaire
   b. a direct luminaire
   c. an LED lamp
   d. a compact fluorescent lamp

9. The Zonal Cavity analysis method is intended for use only with:

   a. task-ambient lighting systems
   b. direct distribution luminaires
   c. systems with gaseous discharge lamps
   d. design situations involving uniform illuminance distribution

10. The current IESNA recommendations for design illuminance are presented:

    a. in a number of moderately complex equations
    b. in a series of tables
    c. on an interactive computer web site
    d. as defaults within Autocad and Bentley BIM software modules

11. Three distinct illuminances are of concern to the lighting designer; they are:

    a. internal, transitional, and mixed illuminances
    b. design, initial, and maintained illuminances
    c. passive, semi-passive, and hybrid illuminances
    d. real, imagined, and perceived illuminances

12. Room surface dirt depreciation (RSDD) is an example of:

    a. an equivalent room cavity variable
    b. how to weight surface reflectances in the ceiling cavity
    c. a non-recoverable light loss factor
    d. a recoverable light loss factor
13. In a successful lighting design:

   a. initial illuminance will always precisely equal design illuminance
   b. design illuminance will exceed maintained illuminance
   c. maintained illuminance will equal or exceed design illuminance
   d. maintained illuminance will exceed initial illuminance

14. A coefficient of utilization (CU) value for a specific fixture and room combination literally represents:

   a. the lumens of light produced by the system per watt of electrical input
   b. the percentage of emitted lamp lumens that actually leave the luminaire
   c. the percentage of emitted lamp lumens that actually reach the task surface
   d. the success of the ballast in operating the lighting fixture in that room

15. The four primary types of automatic fire sprinkler systems are:

   a. wet pipe, dry pipe, hybrid, combined
   b. wet pipe, dry pipe, pre-action, deluge
   c. water, air, foam, halon
   d. active, passive, hybrid, special

16. In the event of a normal fire in a typical building equipped with a conventional automatic fire sprinkler system:

   a. all sprinkler heads in the building will operate
   b. all sprinkler heads on the floor with the fire event will operate in unison
   c. all sprinkler heads in the active fire zone will operate
   d. only one or two sprinkler heads directly affected by high temperature will operate

17. The majority of the sprinkler pipes in a *dormant* pre-action sprinkler system are:

   a. empty of water
   b. filled with a special extinguishing agent (such as high-expansion foam)
   c. pre-filled with water
   d. filled with a dry chemical extinguishing powder
18. Most active fire protection systems are designed by mechanical or electrical
engineers (or perhaps contractors); as a result:

a. architects don’t really need to know anything about these systems
b. architects need to know enough about these systems to ensure that the project
   intent and criteria are being met and building systems are coordinated
c. architects need to know enough about the systems so that they can size
   components and develop detailed system drawings and specifications
d. architects should actually not ask consultants about these systems in order to
   avoid professional liability

19. This image shows a:

a. class I standpipe system for use by trained personnel
b. class II standpipe system for use by building occupants
c. class III standpipe system for use by both occupants and trained personnel
d. a typical fire department “Siamese” connection

20. The principal means by which adequate water flow rate and pressure may be
provided to a typical standpipe or automatic sprinkler system include:

a. unpumped upfeed (direct from the main)
b. pumped upfeed
c. gravity downflow
d. hydro-pneumatic upfeed
e. all of the above
f. only a and c
g. only b and d

21. The three main subsystems comprising a water supply system are:

a. source, distribution, fixtures
b. fixtures, devices, pipes
c. source (fixtures), collection, disposal
d. pipes, valves, fittings
22. *Potable* water is best described as:
   a. water that has been appropriately pressurized for in-building distribution
   b. water from an alternative source (such as a cistern or green roof)
   c. water suitable for human consumption
   d. water that may only be used for external irrigation purposes

23. *Diversity* is best described as an architectural/engineering design concept that recognizes:
   a. that the use of products from a single fixture manufacturer is a bad idea
   b. that it is unlikely that every fixture in a larger building will be used coincidentally
   c. that comparing minimum requirements from a variety of codes is good practice
   d. that each project is unique and distinct

24. Two prime considerations in the sizing of cold water supply piping are:
   a. slope
   b. friction loss
   c. heat loss
   d. water flow noise

25. Appropriate consideration of diversity in the design of a supply water system will permit:
   a. the use of fewer fixtures than prescribed by building code
   b. the use of smaller pipes throughout all parts of the distribution system
   c. the general use of smaller pipes—except for branches that feed 1 or 2 fixtures
   d. the use of unconventional piping materials otherwise frowned upon by code

26. The term *lavatory* is the technical (code-based) name for:
   a. a general purpose sink
   b. any room that contains a water closet
   c. a water closet
   d. a toilet

27. The use of waterless urinals in a project would directly contribute to which LEED credit or prerequisite area:
   a. building energy use reduction
   b. reduction of building potable water use
   c. mitigation of site stormwater runoff quantity
   d. reduction of the urban heat island effect
28. The LEED prerequisite under the Water Efficiency category of credits requires:
   a. the use of waterless urinals
   b. the use of composting toilets
   c. the use of rainwater harvesting techniques
   d. a reduction of building potable water use (referenced to a defined baseline value)

29. The LEED concern for reduction of urban heat island effects would be best addressed by the installation of a:
   a. Living Machine
   b. drip irrigation system for landscaping
   c. green roof
   d. system of hardscape surfaces that feed a water collection cistern

30. With respect to water, the Living Building Challenge requires:
   a. a 30% reduction in water use versus code-normal
   b. a 60% reduction in water use versus code-normal
   c. a 90% reduction in water use versus code-normal
   d. a net-zero water use design (actually—net positive)

******************END***************