Quiz 1

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The ratio of luminous output of a lamp to the power input of the lamp is \_\_\_\_\_\_
2. Illluminace
3. Lux
4. Color rendering index (CRI)
5. Efficacy
6. The color rendering index (CRI) is measured in the scale of \_\_\_\_\_\_
7. 1-100
8. 1-100%
9. 100-1000
10. None of the above
11. LPD (Lighting power density) is defined as lighting power divided by \_\_\_\_\_\_
12. The number of fixtures
13. The area of a room
14. The number of luminaires
15. None of the above
16. Which of the following lighting source has the lower lifetime?
17. LED
18. Mercury vapor
19. Incandescent
20. Halogen
21. The average rated life of a 4’ T8 fluorescent lamp is \_\_\_\_\_\_
22. 1,000 hours
23. 5,000 hours
24. 7,000 hours
25. >20,000 hours
26. Color Temperature is\_\_\_\_\_\_
27. A number indicating the degree of “yellowness” or “blueness” of a white light source, measured in kelvins.
28. An international system used to rate a lamp’s ability to render object colors.
29. A measure of the luminous flux or quantity of light emitted by a source.
30. None of above
31. Average Rated Lamp life is\_\_\_\_\_\_
32. When the lamp will fail
33. When you should relamp
34. When lamp lumens depreciate
35. When 50% of lamps will have failed
36. The color rendering index of halogen lamps compared to low pressure sodium vapor lamps is \_\_\_\_\_\_
37. Slightly lower
38. Significantly lower
39. Slightly higher
40. Significantly higher
41. The term “luminaire” refers to a \_\_\_\_\_\_
42. Lighting unit exclusively for roadway illumination
43. Lighting unit exclusively for interior illumination.
44. Complete lighting unit without lamps and ballasts.
45. Complete lighting unit including lamps and ballasts.
46. To saving more energy, the following lamps should be considered to be replaced \_\_\_\_\_\_
47. Incandescent
48. Halogen
49. Mercury vapor
50. All of the above

Quiz 2

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. As long as installing lighting control equipment, it will automatically save energy.
2. True
3. False
4. Which of following is NOT a type of Occupancy Sensors?
5. Passive infrared
6. Ultrasonic
7. Dual tech
8. Photocell
9. For commercial building outside parking lot lighting, which control strategy is a better candidate?
10. Switch on/off
11. Timer
12. Occupancy sensor
13. No control necessary
14. The following lighting control techniques could save both power and time, EXCEPT \_\_\_\_\_\_
15. BMS
16. Occupancy sensor
17. Daylighting control
18. Combination of control techniques
19. De-lamping could save expense in which way(s)?
20. Reducing energy (kWh) consumption
21. Reducing demand (kW)
22. Reducing maintenance cost
23. All of above
24. Which one is a good candidate for Scotopic lighting strategy?
25. HPS
26. LPS
27. Induction
28. Incandescent
29. Daylighting control often combines with dimming control.
30. True
31. False
32. Passive infrared (PIR) sensors utilize \_\_\_\_\_\_
33. A line of sight beam that reacts to heated motion across a field of view
34. A reflective wave form that reacts to disturbances in return wave form
35. The ambient light that triggers the control
36. None of the above
37. If designing lighting control for an executive office, you will choose \_\_\_\_\_\_
38. Switch on/off control
39. Occupancy sensor control
40. Daylighting control
41. Need more information to decide.
42. An office has 3 lighting fixtures (66W each). After installing occupancy sensor, the annual total operation time reduces to 1020 hours from 2550 hours. If the average electricity rate is $0.12/kWh, calculate the annual savings by installing occupancy sensor.
43. $100
44. $36
45. $24
46. $60

Final exam

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Problem 1-30: 2 points each.

1. What code lists the minimum building efficiencies for California?
2. Title 20
3. Title 24
4. LEED
5. CBC
6. Which of the following lighting source has the lower lifetime?
7. LED
8. Mercury vapor
9. Incandescent
10. Halogen
11. Which of the following lamp has the highest efficacy?
12. Incandescent
13. Fluorescent
14. Metal Halide
15. Low Pressure Sodium
16. Flicker checker is used to identify the types of \_\_\_\_\_\_
17. Ballast
18. Occupancy sensor
19. Lamps
20. None of the above
21. Passive infrared (PIR) sensors utilize \_\_\_\_\_\_
22. A line of sight beam that reacts to heated motion across a field of view
23. A reflective wave form that reacts to disturbances in return wave form
24. The ambient light that triggers the control
25. None of the above
26. An office has 3 lighting fixtures (68W each). After installing occupancy sensor, the annual total operation time reduces to 1020 hours from 2550 hours. If the average electricity rate is $0.13/kWh, calculate the annual savings by installing occupancy sensor.
27. $100
28. $36
29. $41
30. $60
31. The term “luminaire” refers to a \_\_\_\_\_\_
32. Lighting unit exclusively for roadway illumination
33. Lighting unit exclusively for interior illumination.
34. Complete lighting unit including lamps and ballasts.
35. Complete lighting unit without lamps and ballasts.
36. Ballast Factor (BF) is \_\_\_\_\_\_
37. This is the percentage of a lamp’s rate lumen output that can be expected when operated on a specific, commercially available ballast.
38. The value is used to evaluate various lighting systems based on light output and power input.
39. A measure of the effectiveness with which an electrical device converts volt-amperes to watts.
40. Measure of the ballast life.
41. 1 footcandle = \_\_\_\_\_\_\_\_ lux
42. 1
43. 10
44. 0.1
45. None of the above
46. Illuminance is \_\_\_\_\_\_
47. The density of light falling on a surface
48. Measured in footcandles
49. Also measured in lux
50. All of the above
51. Occupancy sensors are preferred to be installed in \_\_\_\_\_\_
52. Executive offices
53. Public restrooms
54. College classrooms
55. All of the above
56. The principal of designing skylight is the bigger the more saving.
57. True
58. False
59. Which of the following buildings may need skylights?
60. Schools
61. Grocery stores
62. Warehouses
63. All of the above
64. Which of following is NOT a type of Occupancy Sensors?
65. Photosensor
66. Ultrasonic
67. Dual tech
68. Passive infrared
69. For commercial building employee lounge lighting, which control strategy is a better candidate?
70. Switch on/off
71. Timer
72. Occupancy sensor
73. Photosensor
74. The average rated life of a LED lamp is \_\_\_\_\_\_
75. 1,000 hours
76. 5,000 hours
77. 10,000 hours
78. >50,000 hours
79. If designing lighting control for a college classroom, you will choose \_\_\_\_\_\_
80. Switch on/off control
81. Occupancy sensor control
82. Daylighting control
83. Need more information to decide.
84. When designing lighting for an office building, how do you decide how much lighting output is enough to conduct the work?
85. Referring to Title 24
86. Referring to ADA
87. Referring to UL
88. Referring to IES Lighting Handbook
89. Choose the correct statement:\_\_\_\_\_\_
90. Title 24 is a national standard.
91. Title 24 is good enough that amendment is not necessary.
92. Title 24 regulates the minimum building energy efficiency in California.
93. Title 24 supplies the guideline to maximum energy savings.
94. Which of the following about LED is NOT true?
95. LED is dimmable.
96. LED has a long life time.
97. LED only has “cool” color.
98. LED can be used in a cold environment.
99. Which of the following is a possible lighting EEM for an office building?
100. De-lamping
101. Installing occupancy sensors
102. Daylighting control
103. All of the above
104. Which of the following lamps is NOT one type of HID?
105. Halogen
106. Metal Halide
107. Mercury Vapor
108. High Pressure Sodium
109. F32T8/835 means\_\_\_\_\_\_\_
110. To saving more energy, the following lamps should be considered to be replaced except \_\_\_\_\_\_
111. Incandescent
112. Halogen
113. Mercury vapor
114. All of the above
115. Using electronic ballast consumes less energy than using magnetic ballast.
116. True
117. False
118. The following type of lamps are point lighting sources EXCEPT\_\_\_\_\_\_
119. Incandescent
120. Halogen
121. CFL
122. Metal Halide
123. Lighting control strategies involve\_\_\_\_\_\_
124. Reduction of the rate of consumption.
125. Reduction of the duration of consumption.
126. Reduction of both the rate and duration of consumption.
127. All of the above.
128. If one EEM reduces both power and operating time, the energy saved will be calculated by:
129. ∆ Energy = ∆ Power X Time = (Power1– Power2 )X Time2
130. ∆ Energy = Power X ∆Time = Power X (Time1 – Time2)
131. ∆ Energy = Power1 X Time1 – Power2 X Time2
132. None of the above.
133. When designing skylights, one needs to consider the following:
134. Visual and thermal comfort.
135. Heat loss and heat gain.
136. Structural and safety concerns.
137. All of the above.
138. Which one is a good candidate for Scotopic lighting strategy?
139. HPS
140. LPS
141. Induction
142. Incandescent
143. A 40 ft X 50 ft office has 20 lighting fixtures, each with 87 input watts. Calculate LPD in this office. (5 points)
144. 6 high efficiency CFL fixtures (13 watts each) are used to replace 6 incandescent lamps (60 watts each) at a dormitory hallway. They are on 24 hours/day. If the cost of electricity is $0.15/kWh, what is the annual savings in electricity cost? (Ignore the initial cost of the light and its installation.) (5 points)
145. A warehouse has 56 fixtures of 48”, four (4) T8 lamps with 2 electronic ballast in series. The lighting level is 60 fcd. Delamping in half will still provide acceptable light, according to IES illumination level standard, assuming the lighting pattern is distributed well through out the area.

The fixtures have 4 units of 32W T8 and 2 units of 10W electric ballasts. Working time is 5600 hours a year. It takes 15 minutes to delamp a fixture, and the labor cost is $32/hour. If the average Energy rate is $0.13/kWh, and Demand rate is $10/kW, calculate: (15 points)

* + 1. Total annual energy savings
    2. Simple payback period

34) An air compressor room is lit by 9 F32-T8 2-lamp fixtures. According to maintenance, these lights are left on during plant operating hours even though the area is rarely occupied.

 According to product description, their F32T8 2-lamp fixture draws about 68 Watts. Maintenance estimates that the lights are currently on for 24 hours per day, 6 days per week and 51 weeks per year, but really only should be on for about 4 hours per day. (15 points)

1. Calculate total annual energy savings by installing an occupancy sensor wall switch at both entrances to the room.
2. If an infrared occupancy sensor wall switch costs about $90, and it takes 2 hours to install too sensors at a labor rate of $38 per hour. Calculate the simple payback period.

Answers:

Q1: d a b c d a d d d d

Q2: b d b b d c a a d b

Final: b c d a a b c a b d

d b d a c d d d c c

d a d d a c d c d c