University of Mumbai
Examination 2022
QUESTION BANK

Course Code: EEDLO8041 Course Name: Illumination Engineering

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks 40 marks**
1.	Which of the following lamp gives nearly monochromatic light?
Option A:	Low pressure sodium vapor lamp
Option B:	GLS lamp
Option C:	Tube light
Option D:	Mercury vapor lamp.
2.	Light is produced in electric discharge lamps by
Option A:	heating effect of current
Option B:	magnetic effect of current
Option C:	ionization in a gas or vapor
Option D:	carbon electrodes.
3.	A 200 candle power lamp is hung 4 m above the centre of circular area of 5 m diameter. The illumination at centre of the area is
Option A:	12.5 lux.
Option B:	13.5 lux.
Option C:	17.5 lux.
Option D:	18.5 lux.
4.	A lamp has a mean spherical candle power of 25, the total flux of light from the lamp is
Option A:	25 lumens
Option B:	25 π lumens
Option C:	314 lumens
Option D:	625 lumens.
5.	Which of the following electric discharge lamp gives highest lumens/watt?
Option A:	Sodium vapor lamp
Option B:	Neon lamp
Option C:	Low Pressure Mercury Vapour lamp
Option D:	High Pressure Mercury Vapour lamp
6.	For the same wattage, which lamp is cheapest ?
Option A:	Compact Fluroscent Lamp (CFL)
Option B:	LED lamps
Option C:	Fluroscent Lamp
Option D:	Incandescent Lamp
7.	Which of the following lighting standard is applicable to indoor lighting
Option A:	IS-16101
Option B:	IS-16103

Option C:	IS-16105
Option D:	IS-3646
8.	In designing office areas where accurate colour judgment is required, the Ra of lamp selected to be
Option A:	80–90
Option B:	60-70
Option C:	50-40
Option D:	20-30
9.	The uniformity ratio, which is the ratio of minimum illuminance to average illuminance for indoor lighting is to be kept at
Option A:	1.2
Option B:	1
Option C:	0.8
Option D:	0.4
10.	In Solid state lighting, CLC filter with common mode choke is used at the input ac supply for
Option A:	minimizing the radiated EMI
Option B:	minimizing the conducted EMI
Option C:	to filter the AC ripple in supply voltage
Option D:	to filter the AC ripple in supply current
11.	Typical wattage of white LEDs used in solid state lamps is
Option A:	1-5 Watts
Option B:	50-100 Watts
Option C:	100-200 Watts
Option D:	0.1-1 Watts
12.	The recommended ratio of minimum illumination to average illumination (Emin/Eavg) in roadway lighting is
Option A:	0.3
Option B:	0.4
Option C:	0.5
Option D:	0.6
13.	The artificial LED based Circadian lighting refers to the lighting system which
Option A:	creates the daylight conditions for part of the day.
Option B:	creates the bright light conditions over the course of the day.
Option C:	create a full spectrum lighting ambiance with colour and intensity control over the course of the day.
Option D:	creates good visual ambience over the course of the day.
14.	Which of the following is not the benefit of Tunable white lighting?
Option A:	Maintains Circadian Rhythm and lighting
Option B:	Increased productivity
Option C:	Power saving
Option D:	Creates of correct working ambience

15.	One of the major reasons of failure of LED lamps observed is
Option A:	Current transients in grid supply
Option B:	Voltage transients in grid supply
Option C:	Ambient Temperature variation
Option D:	High Humidity
16.	Digital Addressable Lighting Interface is a
Option A:	proprietary international standard
Option B:	proprietary national standard
Option C:	non-proprietary international standard
Option D:	non-proprietary national standard
17.	The LED lamps are dimmable in the range of
Option A:	10-50 percent
Option B:	0-100 percent
Option C:	50-100 percent
Option D:	30-80 percent
18.	The lighting control does not facilitate
Option A:	reduction in installation cost of lighting system
Option B:	reduction in running cost of lighting system
Option C:	reduction in overall maintenance cost
Option D:	increase in life of lamps
19.	In lighting control, a 0-10V dimming method is
Option A:	Analog control method
Option B:	Digital control method
Option C:	Both digital and analog control method
Option D:	A Pulse control
20.	Typical energy saving achievable with Indoor lighting control is in the range of (percentage)
Option A:	1-2 %
Option B:	5-10%
Option C:	20-40%
Option D:	50-80%
21.	A 150 candle power lamp is hung directly above the centre of circular area. If the illumination at centre of the circular area is 60 lumens/m2, what is the height at which the lamp is suspended?
Option A:	1.5 m.
Option B:	2.5 m.
Option C:	3.5 lux.
Option D:	4.5 lux.
22.	What does color-rendering index (CRI) say about a light source?
Option A:	How many colors are shown when the light is on
Option B:	How accurately a light source reveals the true colors of objects, people, clothing, etc. when compared to how colors are shown in incandescent light or daylight
Option C:	The hue and tone of white light emitted from a specific bulb or fixture

Option D:	That the bulb will be dim
23.	Visible light has wavelength between _____nm and _____nm.
Option A:	200 and 380
Option B:	300 and 450
Option C:	400 and 780
Option D:	650 and 950
24.	A 60 W lamp given a luminous flux of 1500 lumen. Its efficiency is
Option A:	1500 lumen/watt
Option B:	250 lumen/watt
Option C:	25 lumen/watt
Option D:	2.5 lumen/watt
25.	What is the percentage of radiant heat produced by a fluorescent lamp to that of a filament lamp of same rating?
Option A:	20%
Option B:	50%
Option C:	80%
Option D:	100%
26.	Which lamp is best suited for lighting an International sports arena?
Option A:	Incandescent
Option B:	Metal Halide
Option C:	Compact Fluorescent
Option D:	LED
27.	The Colour Rendering Index (Ra) is heighest in which light source?
Option A:	Sodium vapour Lamp
Option B:	Flourscent Lamp
Option C:	Incandescent lamp
Option D:	Day light
28.	What is the bandwidth of the emitted light in an LED?
Option A:	1 nm to 10 nm
Option B:	10 nm to 50 nm
Option C:	50 nm to 100 nm
Option D:	100 nm to 500 nm
29.	The colour of emitted light from LED depends on
Option A:	Construction of LED, that is physical dimensions
Option B:	Number of available carriers
Option C:	Type of semiconductor material used
Option D:	Number of recombinations taking place
30.	The typical value of power consumption of LED is
Option A:	Around 10 mW
Option B:	In between 15 mW and 20 mW
Option C:	In between 30 mW and 40 mW
Option D:	In between 35 mW and 50 mW

31.	The illumination level required for sports lighting is in the range of
Option A:	50-100 lm/m^2
Option B:	100-200 lm/m^2
Option C:	200-300lm/m^2
Option D:	500-1000 lm/m^2
32.	Accent lighting for park, garden complexes and sculptures use
Option A:	Spot light
Option B:	Facade light
Option C:	Wall mounted light
Option D:	Flood light
33.	The illumination level required for outdoor carparking area is around
Option A:	50 lm/m^2
Option B:	100 lm/m^2
Option C:	200 lm/m^2
Option D:	500 lm/m^2
34.	The uniformity ratio, which is the ratio of minimum illuminance to average illuminance recommended for outdoor lighting is
Option A:	1.2
Option B:	1
Option C:	0.8
Option D:	0.4
35.	Sodium vapour lamps are suitable for lighting of
Option A:	reading rooms
Option B:	street lights
Option C:	auditoria
Option D:	libraries.
36.	The 50% dimming of a LED lamps means
Option A:	50% reduction in energy consumed
Option B:	50% reduction in light produced
Option C:	50% reduction in both energy consumed and light produced
Option D:	50% reduction in light produced and heat produced
37.	---------- is not considered while designing the lighting control for indoor applications
Option A:	Occupancy Linked Control
Option B:	Time Switching Control
Option C:	Lighting Glare control
Option D:	Daylight Linked Control
38.	One of the following is not Digital Lighting Control network
Option A:	Digital Addressable Lighting Interface
Option B:	Digital Multiplex
Option C:	BACnet
Option D:	Controller Area Network

39.	Which sensor is used to for Smart Room lighting control?
Option A:	Temperature sensor
Option B:	Current Sensor
Option C:	Occupancy sensor
Option D:	Humidity sensor
40.	Which Power converter topology is preferred in LED Street-light lamps drivers?
Option A:	Boost converter
Option B:	Buck converter
Option C:	Flyback converter
Option D:	Buck-boost
41.	What is a lumen?
Option A:	The color of light emitted from a bulb
Option B:	A bright star in the sky
Option C:	Another name for an LED chip
Option D:	A measurement of the amount of light produced by a source
42.	To avoid glare
Option A:	object should be viewed from a distance
Option B:	object should be moved constantly
Option C:	object should be viewed from a close vicinity
Option D:	viewer should move constantly
43.	When a sodium vapor lamp is switched on, initially the color is
Option A:	Pink
Option B:	Yellow
Option C:	Green
Option D:	Blue
44.	What are lighting hot spots?
Option A:	Spots of light that are visible to the eye
Option B:	Spots that will burn if you touch them
Option C:	Where you go to connect to the internet
Option D:	The best place to buy light bulbs
45.	Which of the following may be the most energy-effective choice for accent lighting
Option A:	low voltage
Option B:	High voltage
Option C:	Low frequency
Option D:	High frequency
46.	High-pressure **sodium lamps** have efficicacy of
Option A:	about 100 lumens per watt
Option B:	50-75 lumens per watt
Option C:	30-55 lumens per watt
Option D:	20-35 lumens per watt
47.	An LED lamp without driver can be operated on

Option A:	Both DC and AC supply
Option B:	Only AC supply
Option C:	Only DC supply
Option D:	Satisfactory on any of the supply
48.	Semi-indirect lightning scheme is used in
Option A:	High Ceiling
Option B:	Work Shop
Option C:	Street light
Option D:	Decoration purpose
49.	What are not the most common applications for HID lights?
Option A:	Parking lots
Option B:	Living rooms
Option C:	Warehouses
Option D:	Outdoor sports arenas
50.	The coefficient of utilisation is obtained from which of the following diagrams?
Option A:	Polar Light intensity diagram
Option B:	Cone diagram
Option C:	Spectral power distribution curve
Option D:	Isolux diagram
51.	Which of the following outdoor will need lowest level of illumination ?
Option A:	Roadways
Option B:	Highways
Option C:	Railway platform
Option D:	Sports ground
52.	In lighting control, a 0-10V dimming method is
Option A:	Analog control method
Option B:	Digital control method
Option C:	Both digital and analog control method
Option D:	A Pulse control
53.	DMX Controller can be used for
Option A:	Lighting control only
Option B:	Audio control only
Option C:	Scenario control only
Option D:	Lighting, Audio and Scenario control
54.	Typical energy saving achievable with Indoor lighting control is in the range of
Option A:	1-2 %
Option B:	5-10%
Option C:	20-40%
Option D:	50-80%
55.	The Correlated Color Temperature (CCT) of warm white LED lamp is
Option A:	1500K
Option B:	3000K

Option C:	5500K
Option D:	8000K
56.	Remotely monitored street lighting control network is most preferably on
Option A:	Wired network only
Option B:	Wireless network only
Option C:	Both Wired and wireless network
Option D:	Optical Fibre network
57.	Dimming control used in LED lamps is based on
Option A:	LED string voltage control
Option B:	LED string current control
Option C:	Both LED string voltage and current control
Option D:	LED temperature control
58.	Solar powered LED street lighting system incorporates
Option A:	Solar PV Panel and LED street lamp only
Option B:	Solar PV, Battery and LED street lamp only
Option C:	Solar PV, Battery, charge controller and LED street lamp only
Option D:	Light sensor and LED street lamp only
59.	In color controlled LED lighting, the desirable light color is obtained by
Option A:	Control of Red-Green-Blue colored LEDs
Option B:	Control of Red-Yellow-Blue colored LEDs
Option C:	Control of Red-Green-Yellow colored LEDs
Option D:	Control of Yellow-Green-Blue colored LEDs
60.	If a LED lamp constructed with 10 white LEDs each of 5 Watts connected in series, the voltage across the LED string will be in the range of
Option A:	32-34 volts
Option B:	3.2-3.4 volts
Option C:	50-55 volts
Option D:	15-17 volts

B	**10 marks each**
1.	What are the recent trends in lighting control schemes design? Describe with reference to particular examples. What is their role in achieving energy efficient lighting design?
2.	Illustrate with suitable examples and schemes, how the daylight integration leads to significant energy efficient lighting design.
3.	Design the lighting scheme for a major road having two way light traffic. The specifications are as follows: Total width of the road = 16 meters; width of the divider = 1 meters and straight stretch of the road = 2.0 km. Specify all quantitative and qualitative design considerations for the above applications. Use 150 W LED streetlights with 14000 lumen output. Clearly specify the selection and justification for: (i) Type of arrangements of poles (ii) Pole height and spacing (iii) Number of poles and lamps (iv) Electrical load per kilometer of lighting scheme. Clearly specify what way your road lighting scheme will add to beauty of the surroundings.

4.	Define the following and describe their importance in the lighting design. (i) Luminous Flux (ii) Luminance (iii) Correlated Color Temperature (CCT) (iv)Disability and discomfort glare and (v) Illuminance.
5.	A 1.5 km long road with 20 m width is to be lighted to an average maintained illumination level of 25 lux, HPSV 250 W with 25000 lumen output is to be used. Find the number of lamps, luminaires, spacing required and arrangement of lamps. Specify assumptions with justification.
6.	Describe lighting design considerations for an outdoor swimming pool with proper justification.
7.	Consider an office with dimensions 30m X 20m X 5m to be illuminated with an average illumination of 500 Lux. Assume utilization factor 0.8 and maintenance factor 0.8. Calculate number of lamps and luminaires required. Draw the lighting layout indicating spacing between luminaires. Specify assumptions with justification.
8.	Describe lighting design considerations for an office area with proper justification.
9.	What are the recent trends in lighting control schemes design? Describe with reference to particular examples. What is their role in achieving energy efficient lighting design?
10.	Illustrate with suitable examples and schemes, how the daylight integration leads to significant energy efficient lighting design.

	5 marks each
1.	Illustrate different means and ways to minimize the glare in indoor lighting design.
2.	State and explain various design considerations used in outdoor sport lighting design with the help of suitable examples.
3.	Explain the Circadian Rhythm and Human Centric lighting considerations.
4.	Compare Accent lighting and General lighting design requirements for indoor lighting design
5.	Compare and contrast the photometric characteristics of LED lamp and Tungsten Halogen lamp for indoor lighting requirement.
6.	Explain the basic schematic of LED lamp driver and dimming control used in it.
7.	What is photometry? Explain operation of integrating type photometer.
8.	Two lamps of 250 cd and 350 cd are suspended 10 m apart and at a height of 3.5 m above the ground. Calculate i) The illuminance on the ground midway between lamps ii) The illuminance below each lamp
9.	State the requirements of illumination of indoor sports area with proper justification.
10.	Consider an industrial workshop with dimensions 50m X 30m X 7.5m to be illuminated with an average illumination of 200 Lux. Assume utilization factor 0.65 and maintenance factor 0.6. Calculate number of lamps and luminaires required. Draw the lighting layout indicating spacing between luminaires. Specify assumptions with justification.
11.	With neat diagram explain construction and working of Compact Fluorescent lamp. State its features, advantages, disadvantages and applications.

12.	Define utilization factor, maintenance factor, room index and depreciation factor. State their importance in interior lighting design.
13.	State basic components of LED lighting system. State the advantages and applications of LED lighting system.
14.	Explain the effect of contrast and uniformity in lighting design.
15.	State and explain laws of illumination. Define CRI and CCT of lamp.
16.	What is importance of lighting level in interior lighting? What are the recommended levels of illumination as per standards in different interior areas?
17.	With neat diagram explain construction and working of High Pressure Sodium Vapour (HPSV) lamp. State its applications.
18.	Illustrate different means and ways to minimize the glare in indoor lighting design.
19.	State and explain various design considerations used in outdoor sport lighting design with the help of suitable examples.
20.	Explain the Circadian Rhythm and Human Centric lighting considerations.