

KATHMANDU UNIVERSITY  
End Semester Examination  
March, 2022

Marks Scored:

Level : B.E.

Course : EPEG 423

Year : IV

Semester : II

Exam Roll No. :

Time : 30 mins.

F. M. : 10

Registration No. :

Date :

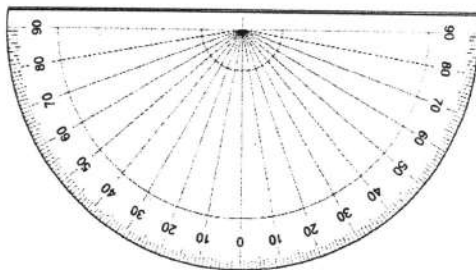
SECTION "A"

[20Q.  $\times$  0.5 = 10 marks]

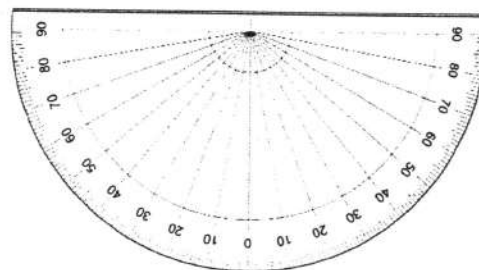
Encircle the most appropriate option.

1. Which of the following is the advantage of a low-pressure sodium lamp over a fluorescent lamp?  
a. High CRI  
b. Long life  
c. High luminous efficacy  
d. all the above
2. Which of the following is not a category of the human visual field?  
a. Central vision  
b. Binocular vision  
c. Monocular vision  
d. Specular vision
3. According to IESNA, a luminaire is considered to be a wide flood if the view angle is greater than \_\_\_\_\_.  
a. 40  
b. 50  
c. 60  
d. 70
4. Optimal luminous intensity distribution curve in road lighting installation does *not* depend on \_\_\_\_\_.  
a. pole height  
b. pole arrangement  
c. road width  
d. CCT of the light source
5. In which of the following reflector types, the outward beam is parallel?  
a. Circular  
b. Parabolic  
c. Elliptical  
d. None of the above
6. Spectral sensitivity range of medium type cone cell is in the range of \_\_\_\_\_ nm.  
a. 380-400  
b. 400-500  
c. 450-630  
d. 650-780
7. What is the prime concern in the design of a LED driver circuit?  
a. Constant voltage  
b. Constant current  
c. EMC  
d. PF
8. In landscape lighting which of the following lighting scheme produces the shadow effect?  
a. Spotlighting  
b. Silhouette lighting  
c. Uplighting with directional viewing  
d. Moonlighting
9. Preferred value of light source CRI for sports lighting is greater than \_\_\_\_\_.  
a. 50  
b. 60  
c. 70  
d. 80
10. Which of the following luminaire is applicable for an indirect lighting scheme?  
a. Downlight  
b. Suspended troffers  
c. Spotlight  
d. None of the above
11. 100 lumens from a light source fall on a table of  $2m^2$ , illuminance is \_\_\_\_\_ lux.  
a. 25  
b. 50  
c. 100  
d. 200

12. In a two-lane highway, the width of the road is 16 m and the height of the pole (luminaire mounting height) is 9 m. Which of the following pole arrangement is preferred?
- Single-sided
  - Staggered
  - Opposite
  - None of the above
13. Which of the following is *not* true for luminance?
- Describes the brightness of a surface.
  - Describes density of light.
  - Reveals amount of light reaching the surface
  - Luminance and differences in luminance are perceived by the human eye.
14. View angle of a luminaire is defined as \_\_\_\_\_.
- the angle at which peak luminous intensity is observed.
  - the angle at which half of peak luminous intensity is observed.
  - twice the angle at which peak luminous intensity is observed.
  - twice the angle at which half of peak luminous intensity is observed.
15. If you are asked to design lighting for a stadium hosting world cup cricket, which of the following lighting class will you choose?
- Class I
  - Class II
  - Class III
  - Class IV
16. Which of the following parameter is not considered in the definition of lighting-class for sports lighting?
- Glare rating
  - Contrast ratio
  - Horizontal illuminance
  - Illuminance uniformity
17. Unpredictable scheduling lighting control scheme using occupancy/motion sensor can provide energy saving up to \_\_\_\_\_ percent.
- 10
  - 20
  - 40
  - 60
18. Which of the following is not considered light pollution?
- Excessive light
  - Light trespass
  - Uneven light
  - Skyglow
19. Which of the following factor do not contribute to the external quantum efficiency of LED?
- Feeding efficiency
  - Injection efficiency
  - Internal quantum efficiency
  - Optical efficiency
20. Draw conical and batwing angular illumination distribution patterns.



Conical



Batwing

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Level : B.E.  
Year : IV  
Time : 2 hrs. 30 mins.

Course : EPEG 423  
Semester : II  
F. M. : 40

SECTION "B"

[5Q. × 8 = 40 marks]

Attempt *ANY FIVE* questions.

1.
  - a. Draw and explain about illumination distribution pattern of a typical light source. Using appropriate figures explain the working of the goniophotometer. [4]
  - b. What is lumen maintenance lighting control strategy, explain with an appropriate figure how issues associated with lumen depreciation and constant illumination is addressed with this control strategy. [4]
2.
  - a. Write about radiative and non-radiative recombination. Draw and explain double heterostructure and its significance in increasing radiative recombination. [3]
  - b. Write about colour mixing and explain how additive colour mixing is utilized in obtaining white light from its complementary colours. [3]
  - c. Write about different photometric units and explain their significance. [2]
3.
  - a. With an appropriate example, explain about five applications where LED technology has fulfilled the limitation of conventional lighting technology and light sources. [3]
  - b. Briefly describe working principle and application of different types of OLED. [3]
  - c. Write about CIE CRI and explain methods of increasing the CRI of a phosphor-converted white LED light source. [2]
4.
  - a. Write about different criteria used to define lighting for traffic routes where motorized vehicles are dominant. [3]
  - b. Write about various aspects of situation that needs to be considered while designing lighting for sports activities. [3]
  - c. Explain lighting glare and explain how glare measure for indoor is different from outdoor applications. [2]
5.
  - a. Write about luminaire classification based on light orientation. [4]
  - b. Write about and image and colour perception of human vision. [4]
6. Write short notes on (*ANY FOUR*) [4 × 2 = 8]
  - i. Tradeoff between CRI and Luminous efficacy
  - ii. Radiative and non-radiative recombination
  - iii. Human visual field.
  - iv. Room utilization factor.
  - v. IP rating of a luminaire.
  - vi. Discomfort and disability glare.

