Photometry Assignment

1. "Lux" is a unit of
(a) Luminous intensity of a source (b) Illuminance on a surface
(c) Transmission coefficient of a surface (d) Luminous efficiency of source of light

2. Total flux produced by a source of 1 *cd* is
(a) $\frac{1}{4\pi}$ (b) 8π (c) 4π (d) $\frac{1}{8\pi}$

3. If the luminous intensity of a 100 *W* unidirectional bulb is 100 candela, then total luminous flux emitted from the bulb is
(a) 861 *lumen* (b) 986 *lumen* (c) 1256 *lumen* (d) 1561 *lumen*

4. The maximum illumination on a screen at a distance of 2 *m* from a lamp is 25 *lux*. The value of total luminous flux emitted by the lamp is
(a) 1256 *lumen* (b) 1600 *lumen* (c) 100 *candela* (d) 400 *lumen*

5. A small lamp is hung at a height of 8 feet above the centre of a round table of diameter 16 *feet*. The ratio of intensities of illumination at the centre and at points on the circumference of the table will be
(a) 1 : 1 (b) 2 : 1 (c) $2\sqrt{2}:1$ (d) 3 : 2

6. Lux is equal to
(a) 1 *lumen/m*^{2} (b) 1 *lumen/cm*^{2} (c) 1 *candela/m*^{2} (d) 1 *candela/cm*^{2}

7. Five *lumen/watt* is the luminous efficiency of a lamp and its luminous intensity is 35 *candela*. The power of the lamp is
(a) 80 *W* (b) 176 *W* (c) 88 *W* (d) 36 *W*

8. A lamp rated at 100 *cd* hangs over the middle of a round table with diameter 3 *m* at a height of 2 *m*. It is replaced by a lamp of 25 *cd* and the distance to the table is changed so that the illumination at the centre of the table remains as before. The illumination at edge of the table becomes *X* times the original. Then *X* is
(a) $\frac{1}{3}$ (b) $\frac{16}{27}$ (c) $\frac{1}{4}$ (d) $\frac{1}{9}$

9. The distance between a point source of light and a screen which is 60 *cm* is increased to 180 *cm*. The intensity on the screen as compared with the original intensity will be
(a) (1 / 9) times (b) (1 / 3) times (c) 3 times (d) 9 times

10. A source of light emits a continuous stream of light energy which falls on a given area. Luminous intensity is defined as
(a) Luminous energy emitted by the source per second (b) Luminous flux emitted by source per unit solid angle
(c) Luminous flux falling per unit area of a given surface (d) Luminous flux coming per unit area of an illuminated surface

11. Venus looks brighter than other stars because
(a) It has higher density than other stars (b) It is closer to the earth than other stars
(c) It has no atmosphere (d) Atomic fission takes place on its surface

12. To prepare a print the time taken is 5 sec due to lamp of 60 watt at 0.25 *m* distance. If the distance is increased to 40 *cm* then what is the time taken to prepare the similar print
(a) 3.1 *sec* (b) 1 *sec* (c) 12.8 *sec* (d) 16 *sec*

13. A lamp is hanging 1 *m* above the centre of a circular table of diameter 1*m*. The ratio of illuminaces at the centre and the edge is
(a) $\frac{1}{2}$ (b) $\left(\frac{5}{4}\right)^{\frac{3}{2}}$ (c) $\frac{4}{3}$ (d) $\frac{4}{5}$

14. Two stars situated at distances of 1 and 10 light years respectively from the earth appear to possess the same brightness. The ratio of their real brightnesses is
(a) 1 : 10 (b) 10 : 1 (c) 1 : 100 (d) 100 : 1

15. The intensity of direct sunlight on a surface normal to the rays is I_0. What is the intensity of direct sunlight on a surface, whose normal makes an angle of 60^o with the rays of the sun
(a) I_0 (b) $I_0\left(\frac{\sqrt{3}}{2}\right)$ (c) $\frac{I_0}{2}$ (d) $2I_0$

16. Inverse square law for illuminance is valid for
(a) Isotropic point source (b) Cylindrical source (c) Search light (d) All types of sources

17. 1% of light of a source with luminous intensity 50 *candela* is incident on a circular surface of radius 10 *cm*. The average illuminance of surface is
(a) 100 *lux* (b) 200 *lux* (c) 300 *lux* (d) 400 *lux*

18. Two light sources with equal luminous intensity are lying at a distance of 1.2 *m* from each other. Where should a screen be placed between them such that illuminance on one of its faces is four times that on another face
(a) 0.2 *m* (b) 0.4 *m* (c) 0.8 *m* (d) 1.6 *m*

19. Two lamps of luminous intensity of 8 *Cd* and 32 *Cd* respectively are lying at a distance of 1.2 *m* from each other. Where should a screen be placed between two lamps such that its two faces are equally illuminated due to two sources
(a) 10 *cm* from 8 *Cd* lamp (b) 10 *cm* from 32*Cd* lamp (c) 40 *cm* from 8 *Cd* lamp (d) 40 *cm* from 32 *Cd* lamp

20. A lamp is hanging along the axis of a circular table of radius *r.* At what height should the lamp be placed above the table, so that the illuminance at the edge of the table is $\frac{1}{8}$ of that at its center

(a) $\frac{r}{2}$ (b) $\frac{r}{\sqrt{2}}$ (c) $\frac{r}{3}$ (d) $\frac{r}{\sqrt{3}}$

21. A point source of 100 *candela* is held 5*m* above a sheet of blotting paper which reflects 75% of light incident upon it. The illuminance of blotting paper is

(a) 4 *phot* (b) 4 *lux* (c) 3 *phot* (d) 3 *lux*

22. A lamp is hanging at a height 40 *cm* from the centre of a table. If its height is increased by 10 *cm* the illuminance on the table will decrease by

(a) 10 % (b) 20% (c) 27% (d) 36%

23. Which has more luminous efficiency

(a) A 40 *watt* bulb (b) A 40 *watt* fluorescent tube (c) Both have same (d) Cannot say

24. A small of light is to be suspended directly above the centre of a circular table of radius *R*. What should be the height of the light source above the table so that the intensity of light is maximum at the edges of the table compared to any other height of the source

(a) $\frac{R}{2}$ (b) $\frac{R}{\sqrt{2}}$ (c) R (d) $\sqrt{2}R$

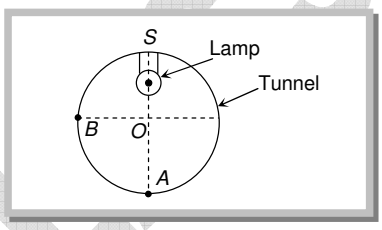
25. An electric lamp is fixed at the ceiling of a circular tunnel as shown is figure. What is the ratio the intensities of light at base *A* and a point *B* on the wall

(a) 1 : 2

(b) $2:\sqrt{3}$

(c) $\sqrt{3}:1$

(d) $1:\sqrt{2}$



26. When sunlight falls normally on earth, a luminous flux of $1.57\times10^{5}\ lumen/m^{2}$ is produced on earth. The distance of earth from sun is $1.5\times10^{8}\ Km$. The luminous intensity of sun in candela will be

(a) 3.53×10^{27} (b) 3.53×10^{25} (c) 3.53×10^{29} (d) 3.53×10^{21}

27. In the above problem, the luminous flux emitted by sun will be

(a) $4.43\times10^{25}\ lm$ (b) $4.43\times10^{26}\ lm$ (c) $4.43\times10^{27}\ lm$ (d) $4.43\times10^{28}\ lm$

28. A screen receives 3 *watt* of radiant flux of wavelength 6000 *Å*. One lumen is equivalent to $1.5\times10^{-3}\ watt$ of monochromatic light of wavelength 5550 *Å*. If relative liminosity for 6000 *Å* is 0.685 while that for 5550 Å is 1.00, then the luminous flux of the source is

(a) $4\times10^{3}\ lm$ (b) $3\times10^{3}\ lm$ (c) $2\times10^{3}\ lm$ (d) $1.37\times10^{3}\ lm$

29. In a grease spot photometer light from a lamp with dirty chimney is exactly balanced by a point source distance 10 *cm* from the grease spot. On clearing the chimney, the point source is moved 2 *cm* to obtain balance again. The percentage of light absorbed by dirty chimney is nearly

(a) 56% (b) 44% (c) 36% (d) 64%

30. A point source of 3000 *lumen* is located at the centre of a cube of side length 2*m*. The flux through one side is

(a) 500 *lumen* (b) 600 *lumen* (c) 750 *lumen* (d) 1500 *lumen*

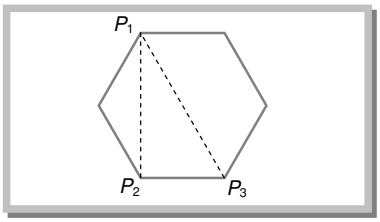
31. A light source is located at P_1 as shown in the figure. All sides of the polygon are equal. The intensity of illumination at P_2 is I_0 . What will be the intensity of illumination at P_3

(a) $\frac{3\sqrt{3}}{8}I_0$

(b) $\frac{I_0}{8}$

(c) $\frac{3}{8}I_0$

(d) $\frac{\sqrt{3}}{8}I_0$



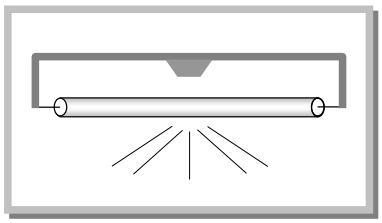
32. Light from a point source falls on a small area placed perpendicular to the incident light. If the area is rotated about the incident light by an angle of 60°, by what fraction will the illuminance change

(a) It will be doubled (b) It will be halved (c) It will not change (d) It will become one-fourth

33. A point source of light moves in a straight line parallel to a plane table. Consider a small portion of the table directly below the line of movement of the source. The illuminance at this portion varies with its distance *r* from the source as

(a) $E\propto\frac{1}{r}$ (b) $E\propto\frac{1}{r^{2}}$ (c) $E\propto\frac{1}{r^{3}}$ (d) $E\propto\frac{1}{r^{4}}$

34. Figure shows a glowing mercury tube. The illuminances at point *A, B* and *C* are related as



(a) $B > C > A$

(b) $A > C > B$

(c) $B = C > A$

(d) $B = C < A$

35. The relative luminosity of wavelength 600 *nm* is 0.6. Find the radiant flux of 600 *nm* needed to produce the same brightness sensation as produced by 120 *W* of radiant flux at 555 *nm*

(a) $50W$ (b) $72W$ (c) $120 \times (0.6)^2 W$ (d) $200W$

36. The separation between the screen and a plane mirror is 2*r*. An isotropic point source of light is placed exactly midway between the mirror and the screen. Assume that mirror reflects 100% of incident light. Then the ratio of illuminances on the screen with and without the mirror is

(a) 10 : 1 (b) 2 : 1 (c) 10 : 9 (d) 9 : 1

37. The separation between the screen and a concave mirror is 2*r*. An isotropic point source of light is placed exactly midway between the mirror and the point source. Mirror has a radius of curvature *r* and reflects 100% of the incident light. Then the ratio of illuminances on the screen with and without the mirror is

(a) 10 : 1 (b) 2 : 1 (c) 10 : 9 (d) 9 : 1

38. Find the luminous intensity of the sun if it produces the same illuminance on the earth as produced by a bulb of 10000 *candela* at a distance 0.3 *m*. The distance between the sun and the earth is $1.5 \times 10^{11} m$

(a) $25 \times 10^{22} cd$ (b) $25 \times 10^{18} cd$ (c) $25 \times 10^{26} cd$ (d) $25 \times 10^{36} cd$

39. A point light source is to be suspended above the centre of a circular table of radius *R*. In order to produce maximum illuminance at the edges of the table, the height of the light source must be

(a) R (b) $2R$ (c) $\frac{R}{\sqrt{2}}$ (d) $\sqrt{2} \times R$

40. A lamp is hanging at a height of 4*m* above a table. The lamp is lowered by 1*m*. The percentage increase in illuminace will be

(a) 40 % (b) 64% (c) 78% (d) 92%