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Photometry HC Verma Concepts of Physics Solutions
Photometry HC Verma Concepts of Physics Solutions Chapter 22

1. Radiant Flux = $\dfrac{\text{Total energy emitted}}{\text{Time}}$ = $\dfrac{45}{15s}$ = 3W

2. To get equally intense lines on the photographic plate, the radiant flux (energy) should be same.
   S0, 10W × 12sec = 12W × t
   $\Rightarrow t = \dfrac{10W \times 12\,sec}{12W}$ = 10 sec.

3. it can be found out from the graph by the student.

4. Relative luminousity = $\dfrac{\text{Luminous flux of a source of given wavelength}}{\text{Luminous flux of a source of 555 nm of same power}}$

   Let the radiant flux needed be P watt.
   Ao, 0.6 = $\dfrac{\text{Luminous flux of source 'P' watt}}{685\ P}$
   ∴ Luminous flux of the source = (685 P)× 0.6 = 120 × 685
   $\Rightarrow P = \dfrac{120}{0.6}$ = 200W

5. The luminous flux of the given source of 1W is 450 lumen/watt
   ∴ Relative luminosity = $\dfrac{\text{Luminous flux of the source of given wavelength}}{\text{Luminous flux of 555 nm source of same power}}$ = $\dfrac{450}{685}$ = 66%

   [∴ Since, luminous flux of 555nm source of 1W = 685 lumen]

6. The radiant flux of 555nm part is 40W and of the 600nm part is 30W
   (a) Total radiant flux = 40W + 30W = 70W
   (b) Luminous flux = (L.Fllux)$_{555nm}$ + (L.Flux)$_{600nm}$
       = 1 × 40× 685 + 0.6 × 30 × 685 = 39730 lumen
   (c) Luminous efficiency = $\dfrac{\text{Total luminous flux}}{\text{Total radiant flux}}$ = $\dfrac{39730}{70}$ = 567.6 lumen/W

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