QUESTION:

1) the current in a 100w, 220v electric light is ?
2) in a red light a lens has a focal length 25cm. in blue light the probable
focal length will be----
a) 25.5 b) 24.5 c) 15 d) 35

SOLUTION
1. According to the Joule's law:

$$P = IU$$

$$I = \frac{P}{U}$$

$$I = 0.4545\ A = 454.5\ mA$$

2. The relation between optical power, focal length and refractive index is:

$$D = \frac{1}{f} = (n-1)(\frac{1}{R_1} - \frac{1}{R_2})$$

Because of dispersion the index of refractivity of glass is slightly greater for a blue light than for a red light (for visible light, refraction indices n of glass decrease with increasing wavelength λ). Hence for a blue light focal length is slightly smaller and probably is 24.5 cm.

ANSWER
1. 454.5 mA
2. b) 24.5 cm