PHYSICS

BOOKS - NN GHOSH PHYSICS (HINGLISH)

CHROMATIC ABERRATION OF LENSES

Others

1. The focal lengths of a thin convex lens are 1m and 0.968m for red and blue rays,

respectively. Calculate the chromatic aberration and dispersive power of the material of the lens.

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2. An achromatic converging combination of focal length 60m is formed by placing a convex lens of crown glass and a concave lens of fibt glass in contact with each other. Calculate their focal lengths. If dispersive power of

crown glass is 0.03 and that of flint glass is 0.05 .

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3. It is required to from a converging achromatic system of length 30m consistng of two lenses made of the the same matrial. If one lenses be convex and of focal length 0.20m, find (a) the foocal length of the other and also (b) the distance between the lenses.

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4. A camera lens (f=0.20m) is made of two components, one of crown glass (dispersive power 0.02) and the other of flint glass (dispersive power 0.04) Find the focal length of the component lenses.

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5. The focal lengths of a thin convergent lens are 0.5m and 0.484m for red and blue rays, respectively. Find the chromatic aberration

and dispersive power of the material of the lens.

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6. The focal lengths of a thin convergent lens are 0.20m and 0.21m for voilet and red lights, respectively, An object is placed at a distance of 0.15m. Calculate the chromatic aberration in the image.

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7. An achromatic telescope objective of focal length 1.5m is consists of two thin lenses of dispersive power 0.050 and 0.075, respectively, placed in contact. Find the focal length of each lens.

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8. Show that in order to obtain a converging achromatic combination the dispersive power of the material of the concave lens must be

greater than that of the material of the convex lens.

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9. Two convex lenses of the same material and power + 10D and + 12.5D are available. How will you arrange them to obtain an achromatic combination and what will be the power of the combination?

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10. Calculate the focal length of a convex lens of crown glass of dispersive power 0.012 and concave lens of dispersive power 0.020 that from an achromatic converging comination of focal length 0.3m when placed in contact.

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11. An achromatic objective of focal length 1.5m is to be constructed with a crown glass convex lens $(\mu = 1.51, \omega = 0.21)$ and a flint glass concave lens $(\mu = 1.65, \omega = 0.45)$ One face

of the concave lense is in complete contact with the convex lens and the other face is plane. Calculate the curvatures of the surfaces.

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12. Show that the power of the achromatic combination of two convex lenses of the same material is equal to the mean power of the lenses.

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