物理电子学院2004年研究生招生复试试题

适用科目：基础光学

共5道题，任选4题，每题25分，满分100分。

闭卷考试，可带英汉词典和计算器。

考试时间120分钟，可用英文或中文答题。证明题和计算题均需写出推导过程。

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1. A spherical lens has two convex surfaces of radii 0.80m and 1.20m. Its index of refraction is n=1.50. Find (1) Its focal length;

(2) The position of the image of a point 2.00m from the lens;

(3) Magnification.

2. According to the **Fermat's principle**, prove the reflection law and refraction law.

(Note: **Fermat:** 费马)

3. A lens with the index of refraction n =1.5 is located in the air, the left radius and the right radius are 5.0cm and 10.0cm respectively, and the thick of the lens is 10.0cm, Shown as in Fig.1, one object with height 1mm (note: the object is perpendicular to the optical axis) is located in front of the lens 20.0cm.

(1) find the location of the image;

(2) find the Magnification of the lens.

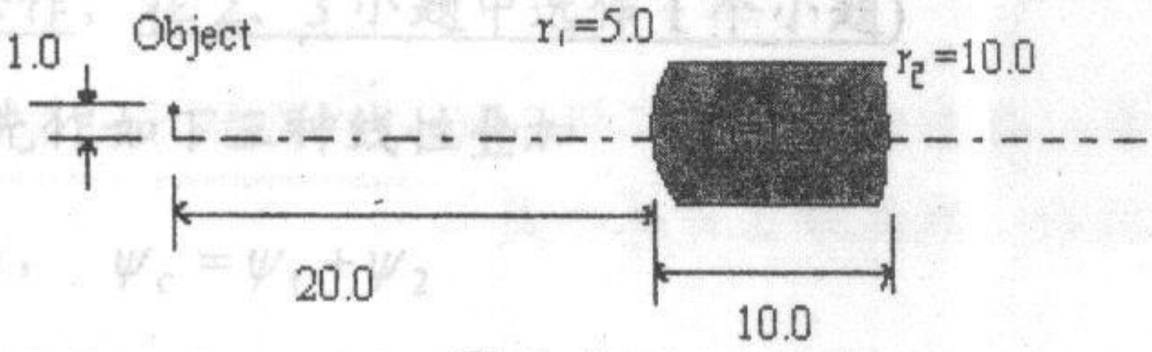

Fig.1

4. Shown as in Fig.2,a screen is separated from a double-silt source by L=1.2 m. The distance between the two slits is d=0.03 mm. The second –order bright fringe (m=2) is measured to be 4.5 cm from the center line. Determine

(a) the wavelength of the light ;

(b) the distance between the second and the third bright fringes.

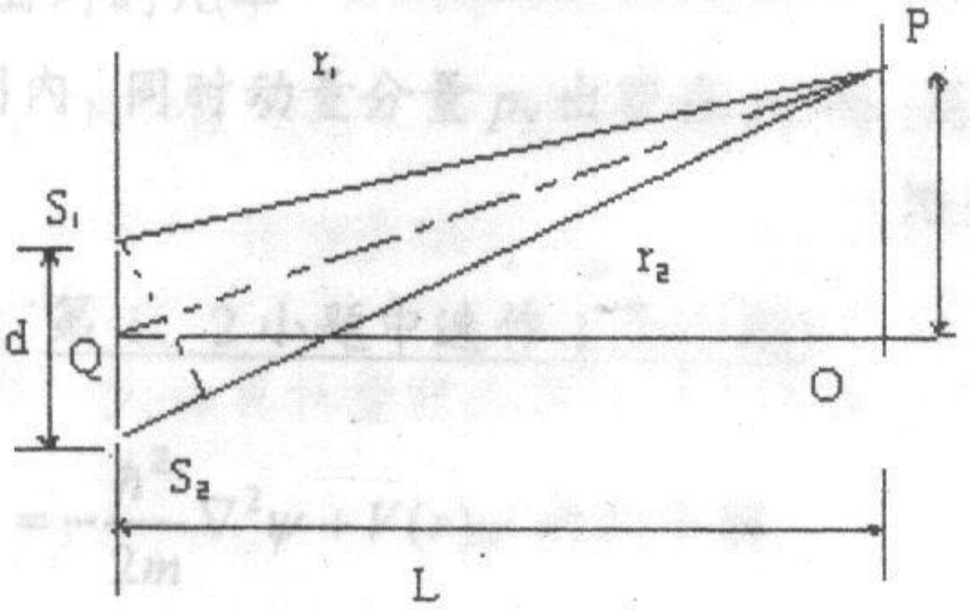

Fig.2

5. Shown as in Fig. 3, a prism is a medium bounded by two plane surfaces making an angle A. We assume that the medium has an index of refraction n and that it is surrounded by a medium having unity index, such as air. An incident ray such as PQ suffers two refractions and emerges deviated angle δ relative to the incident direction. Find the minimum of the deviated angle δ_{min}.

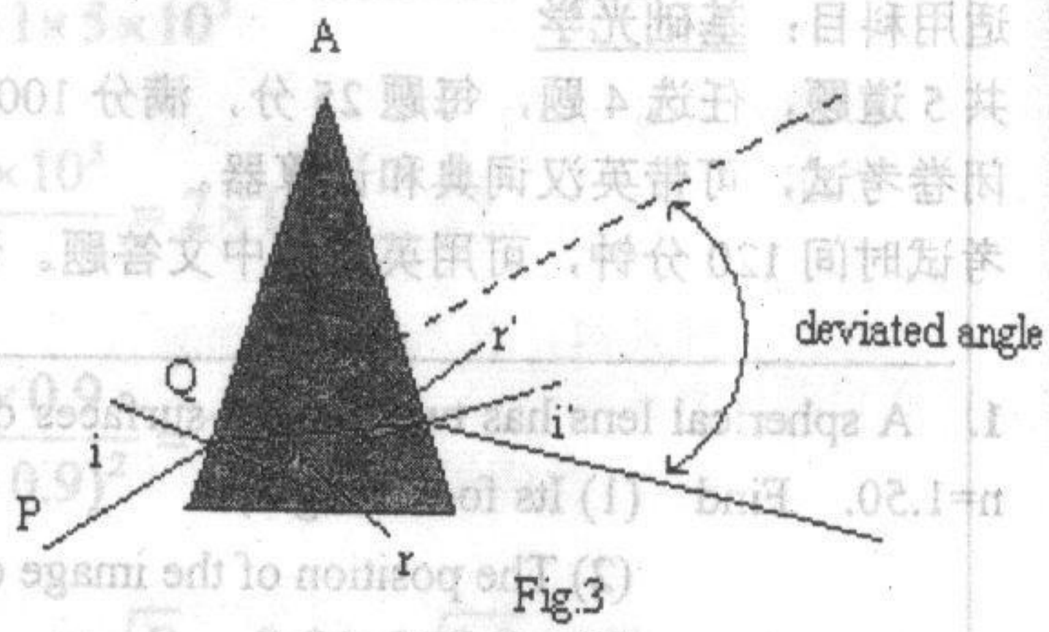

Fig.3