



NAME AND SURNAME

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Selected issues:

**GENERAL PHYSICS COMPETITION FOR ENGINEERING STUDENTS
"ION I. AGARBICEANU"**

XI Edition 2023 13 May 2023

Experimental test, Physical Section 2,

Determination of the radius of curvature of a cylindrical mirror

Materials provided:

1. "Light box and optical set" kit consisting of:

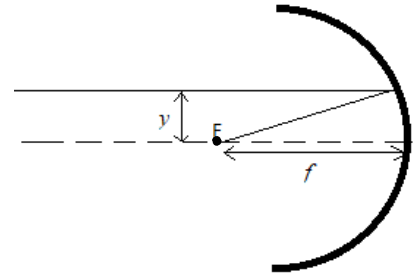
- Mirrors: flat mirror, cylindrical mirror with circular section, mirror with parabolic section
- Rectangular diaphragms: one thick slit, one thin slit, 4 thin slits, 3 thin slits
- Light source: The light source produces convergent, divergent, or parallel beams. One end of the box is constructed with adjustable cylindrical convex lenses for parallel beams. The other end has triple opening system for color mixing experiments (the side holes have an adjustable hinged mirror). All openings are designed with vertical channels to support slotted tiles and color filters
- *Transparent elements: biconcave lens, thin biconvex lens, thick biconvex lens, 3 optical prisms with different angles, transparent semicylindrical block, transparent rectangular block*
- *Set of 7 color filters*
- *Set of colored cardboards*

2. 12V power supply

3. Graph paper
4. Graduated ruler

Workload:

Using the cylindrical mirror of circular section and the attached light source (the end with cylindrical lens for the emission of a parallel beam), a variation of the point of intersection of the ray reflected on the mirror is observed with displacement on the axis Oy of the direction of propagation of the incident beam. (see figure).



The variation of focal length with shift y is determined by the law of:

$$f = \frac{R}{2} \left(2 - \frac{1}{\sqrt{1 - \frac{y^2}{R^2}}} \right)$$

Using the materials provided, determine the radius of curvature of the mirror from the relation $f = f(y)$.

The following will be pursued:

- realization and schematic presentation of the experimental assembly
- description of how it works
- presentation of results (mean value and standard deviation)

Note:

Choose at least 5 experimental metrics.