## T.C.

# GEBZE TECHNICAL UNIVERSITY 

## PHYSICS DEPARTMENT

## OPTICS LABORATORY <br> EXPERIMENT REPORT FOCAL LENGTH DETERMINATION of LENSES

$\qquad$
DATA and RESULTS
Name:
TA:
Department: $\qquad$
Partners:

1. Calculate the focal lengths for three different object position for both lenses by using lens equation, record your value in Tables below.
2. Calculate the magnification for three different object position for both lenses, record your value in Tables below.

|  | $\mathrm{D}_{\text {object }}(\mathrm{cm})$ | $\mathrm{D}_{\text {image }}(\mathrm{cm})$ | $\mathrm{H}_{\text {object }}(\mathrm{cm})$ | $\mathrm{H}_{\text {image }}(\mathrm{cm})$ | Focal Length ${ }_{\text {exp }}(\mathrm{cm})$ | Magnification $_{\text {exp }}(\mathrm{cm})$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |

Table 2: for ... focal length lens

|  | $\mathrm{D}_{\text {object }}(\mathrm{cm})$ | $\mathrm{D}_{\text {image }}(\mathrm{cm})$ | $\mathrm{H}_{\text {object }}(\mathrm{cm})$ | $\mathrm{H}_{\text {image }}(\mathrm{cm})$ | Focal Length ${ }_{\text {exp }}(\mathrm{cm})$ | Magnification $_{\text {exp }}(\mathrm{cm})$ |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| 1 |  |  |  |  |  |  |
| 2 |  |  |  |  |  |  |
| 3 |  |  |  |  |  |  |

Table 3: for ... focal length lens
3. Define magnification ratio. What is the expression for ratio between object and image sizes?
4. How do you calculate radius of curvature of convergent and divergent lenses with given focal lengths?
5. According to the given object-image distance values for a converging lens plot ray paths and images on a graph paper (with the care of proportions). Object size and focal legth is up to you. $\mathrm{g}=3 \mathrm{f}$, $\mathrm{g}=2 \mathrm{f}, \mathrm{g}=\mathrm{f}, \mathrm{g}=\mathrm{f} / 2$
6. According to the given object-image distance values for a diverging lens plot ray paths and images on a graph paper (with the care of proportions). Object size and focal legth is up to you. $\mathrm{g}=2 \mathrm{f}$, $\mathrm{g}=\mathrm{f}$
7. By considering fundamental facts about lenses, arrange necessary number and type of lenses to get: i) magnifying glass ii) microscope iii) telescope iv) binoculars. Please explain each systems of lenses. How do they work?

## DISCUSSION \& CONCLUSION

1. What are the possible errors in the experiment?
2. What kind of approximations did you take into consideration while you were obtaining the physical quantities and how do they affect your results?
3. What discrepancies did you encounter between the calculated quantities and theoretical or literature values?
4. What is your overall conclusion?
