

Minor Examination 1
DSL-731 Optical Components and Basic Instrumentation

Total Marks: 30 Marks

Date: 08th November 2020

Time: 12:00 PM

- 1. Marks will be scaled down to 25.**
- 2. Submit answer sheets within 1:15 hrs.**

Ques. I:

1. (a) Define meridional (tangential) plane and sagittal plane.
(b) Define Chief Ray (Principal Ray) and skew rays. **(1)**
2. (a) How coma affects the imaging.
(b) What is the meaning of positive and negative coma? (Either write in language or demonstrate through the figure). **(1)**
3. On what factors comatic aberration depends? Show comatic aberration with proper ray diagram. **(1)**
4. Under what conditions an optical system can be free from the spherical aberration and coma? **(1)**
5. Define distortion. Demonstrate with ray diagram positive and negative distortion. **(1)**
6. Positive lenses introduce inward curvature of the petzval surface. **(Yes or No or both are wrong)**.
Negative lenses introduce backward curvature of the petzval surface. **(Yes or No or both are wrong)**. **(1)**
7. (a) How the circularly polarized light can be created by using plain polarized light?
(b) How the plane of polarization of plain polarized light can be rotated? **(1)**

Ques. II: (a) Show with the ray diagrams how the Porro prisms are arranged in binoculars? **(3)**

(b) Show with the ray diagram how Penta prism turns the beam direction through right angle irrespective of angle of incidence. **(2)**

Ques. III: Give the difference between Glan Taylor Polarizer and Glan-Thomson prism polarizer. **(3)**

Ques. IV: Give the working of Wollaston Prism. Show with the ray diagram how Wollaston Prism produce angular shear in between o-ray and e-ray? How Wollaston Prism can be used to make polarimetric sensors? **(6)**

Ques. V: (a) Derive grating equation. What is the meaning of Littrow configuration in the use of grating? **(3)**

(b) Define the meaning of dispersion and explain the significance in grating based instruments. **(3)**

Ques. VI: Explain the meaning of blazing in transmission grating and grating blaze efficiency. **(3)**