Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17PH3006** | **Duration :** | **3hrs** |
| **Sub. Name :** | **PHYSICAL OPTICS** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Develop the three basic operators for reflection, refraction and translation for an optical system consisting of a large number of optical elements. | CO1 | 16 |
| b. | A contact lens is made of plastic with an index of refraction of 1.5.  The lens has an outer radius of curvature of 2 cm and an inner radius of curvature of 2.5 cm. What is the focal length of the lens? | CO2 | 4 |
| **(OR)** | | | | |
| 2. |  | Thick lenses can also be used for separate lenses and mirrors. Demonstrate it by calculating the position of the principal points. | CO2 | 20 |
|  |  |  |  |  |
| 3. |  | Obtain an expression for path difference between two light waves using Young’s double slit experiment. Calcuate the distribution of intensity using analytical expressions. | CO1 | 20 |
| **(OR)** | | | | |
| 4. | a. | Discuss the conditions for constructive interference and destructive interference with suitable diagrams and equations. | CO3 | 16 |
| b. | In a Young’s double slit experiment, the slits are separated by 0.28 mm and the screen is placed 1.4 m away. The distance between the central bright fringe and the fourth bright fringe is measured to be 1.2 cm. Determine the wavelength of light used. | CO2 | 4 |
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| 5. | a. | Explain in detail the circular polarization and elliptical polarization with a neat sketch. | CO3 | 16 |
| b. | Illustrate and explain how a Nicol prism can be used as a polarizer and analyzer. | CO3 | 4 |
| **(OR)** | | | | |
| 6. |  | Enumerate the polarization by scattering and reflection. | CO4 | 20 |
|  |  |  |  |  |
| 7. |  | Michelson’s interferometer is used to study interference pattern. How it is used to calculate difference in wavelength? Explain. | CO4 | 20 |
| **(OR)** | | | | |
| 8. |  | Derive an expression for the angular distribution of the intensity in the Fraunhofer pattern and sketch it, indicating the relative distances from the centre to any minima in intensity. | CO5 | 20 |
|  | | **Compulsory:** |  |  |
| 9. |  | Find the Fourier Transform of . | CO6 | 20 |