Registration No : | | | | | | | | | | |

Total Number of Pages : 02 **M.Sc.I**

FPYC202

2nd Semester Back Examination 2018-19
OPTICS(GEOMETRICAL & PHYSICAL OPTICS)
BRANCH : M.Sc.I(AP)
Time : 3 Hours
Max Marks : 70
Q.CODE : F233

Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2 x 10)**

a) Why the principal points of a lens system are called unit points?
b) What is the position of the first focal point of a coaxial system of two thin lenses separated by a distance d?
c) Why is it necessary to use an eyepiece consisting of more than one lens?
d) Define wave front. What are different types of wavefronts?
e) A biprism is placed 5 cm from a slit illuminated by sodium light (λ=5893 Å). The fringe width obtained on the screen is 0.9523 mm. The screen is at a distance of 75 cm from the biprism. Find the distance between the two coherent sources.
f) Explain colours of thin films.
g) What is the difference between Fresnel and Fraunhoffer diffraction?
h) Two plane diffraction gratings A and B have the same width of ruled surface but A has greater number of lines than B. Compare the intensity and width of principal maximum.
i) Critical angle in a certain substance is 45^0. What is the polarizing angle?
j) What are the laws of optical rotation?

Q2 **a)** Compare Ramsden's eyepiece with Huygen's eyepiece. **(5)**
b) Two thin convex lenses of focal lengths 30 cm and 12 cm are separated by a distance of 25 cm in air. Calculate the positions of the cardinal points. **(5)**

Q3 **a)** A Huygen's eye-piece is to be designed with the help of two plano-convex lenses of focal lengths 6cm and 2 cm. What should be the separation between the lenses? **(5)**
b) Describe Newton's ring experiment to determine the wavelength of incident monochromatic light. **(5)**

Q4 **a)** Explain the construction and working of Michelson's interferometer and explain how it can be used to determine the thickness of a thin transparent film or plate. **(5)**
b) A soap film of 5000Å thickness is viewed at an angle of 35^0 to the normal. Find the wavelengths in the visible light which will be absent in the reflected light. The refractive index of the film is 1.33. **(5)**

Q5 **a)** Explain the phenomenon of diffraction due to a straight edge. Determine the position of maximum and minimum intensity. **(5)**
b) A plane transmission grating has 40,000 lines in all with grating element 12.5×10^{-5} cm. Calculate the maximum resolving power for which it can be used in the range of wavelength 5000Å. **(5)**

Q6 **a)** The radius of the first half period zone of a zone plate is 0.06 cm. What should be the position of a screen so that the brightest spot is formed on the screen when plane monochromatic light of wavelength 6500Å is incident normally on the zone plate? **(5)**

b) Discuss the theory of Double refraction. **(5)**

Q7 Explain in detail about different methods to produce plane polarized light. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Nodal points and Nodal planes

b) Febry-perot interferometer

c) Resolving power of optical instruments

d) Babinet compensator