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TPH–101

B. TECH. (FIRST SEMESTER)

MID SEMESTER EXAMINATION, NOV., 2021

(All Branches)

ENGINEERING PHYSICS

Time : 1½ Hours

Maximum Marks : 50

Note : *(i)* Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each question carries 10 marks.

1. (a) In Fresnel's biprism experiment, deduce the expression to determine the distance between two virtual sources using either displacement or deviation method. 10 Marks (CO1)

OR

(b) Derive the expression for path difference in a wedge-shaped film in reflected light. 10 Marks (CO1)

2. (a) In Newton's ring experiment, deduce the relation between the thickness of the air film and the radius of the *n*th ring. 10 Marks (CO1)

OR

(b) In N-slits Fraunhofer diffraction using the expression of resultant intensity; deduce the intensity and position of principal maxima and minima. 10 Marks (CO1)

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3. (a) In Newton's ring experiment after introducing the liquid below the convex surface, the diameter of the fifth dark ring is reduced to half its original value. Calculate the refractive index of the liquid.

10 Marks (CO1)

OR

(b) In a plane transmission grating the angle of diffraction for second order principal maxima for wavelength 5000 Å is 30 degree. Calculate the number of lines per cm of the grating. Also calculate the resolving power of the grating in second order. 10 Marks (CO1)

4. (a) Derive the expression for numerical aperture and acceptance angle in an optical fiber. 10 Marks (CO2)

OR

(b) Discuss the working principle of fiber optics. Also distinguish between various types of optical fiber. 10 Marks (CO2)

5. (a) An optical fiber the refractive index of the core is 1.36 and the fractional refractive index change is 0.025. Find the refractive index of cladding and the numerical aperture. 10 Marks (CO2)

OR

(b) In an optical fiber the refractive index of core and cladding are 1.55 and 1.50 respectively. Calculate the acceptance angle and numerical aperture. 10 Marks (CO2)