Total No. of Questions : 4]

SEAT No. :

P1269

[Total No. of Pages : 2

OCT/FE/INSEM-2
F.E. (Phase - I)
ENGINEERING PHYSICS
(2019 Pattern)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates:

1) ***Solve any one question out of Q.1 or Q.2 and Q.3 or Q.4.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Use of electronic calculator allowed.***
5) ***Assume suitable data.***

Q1) a) Derive an expression for resultant amplitude and resultant intensity between the diffracted waves in Fraunhofer diffraction due to a single slit. **[6]**

b) Write the expression of path difference between the waves reflected in wedge shaped thin film. State the conditions for maxima and minima. Explain the application of wedge shaped thin film for testing of optical flatness. **[5]**

c) Polarizer and analyser are arranged so that amount of light transmitted them is maximum. What will be the percentage reduction in intensity of transmitted light when the analyser is rotated through i) 30°, ii) 90°. **[4]**

OR

Q2) a) What is polarised and unpolarised light? Explain how the phenomenon of polarisation of light is used in liquid crystal displays (LCD). **[6]**

b) Whis is diffraction? What are its types? Find the half angular width of the central principal maxima in the Fraunhofer diffraction pattern due to a single slit having width 12×10^{-5} cm when illuminated by light of wavelength 6000Å. **[5]**

c) A parallel beam of sodium light strikes a film of oil floating on water, when viewed at an angle of 30° from the normal, 8^{th} dark band is seen. Determine the thickness of the film.

(Given - R.I of Oil = 1.46, λ = 5890A°) **[4]**

P.T.O.

Q3) a) With the help of energy band diagram explain construction and working of single hetero-junction semiconductor laser. **[6]**

b) Define criticle angle. A step index fibre has core and cladding refractive indices 1.65 and 1.48 respectively. Calculate the values of numerical aperture and acceptance angle if it is placed in air. **[5]**

c) Explain stimulated emission of radiations. Explain its significance in production of laser. **[4]**

OR

Q4) a) What is laser? State characteristics of laser. Explain in brief any one industrial application of laser. **[6]**

b) State factors for attenuation and losses in optical fibre, explain any two factors in brief. **[5]**

c) A step index fibre has core refractive index 1.46 an a numerical aperture of 0.65. Calculate the refractive index of cladding and maximum angle at entrance when fibre is placed in air. **[4]**