Total No. of Questions : 4]

SEAT No. : ____

P-5368

[Total No. of Pages : 2

[6185]-51

F.E. (Common) (Insem)

ENGINEERING PHYSICS

(2019 Pattern) (Semester - I) (107002)

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

Instructions to the candidates:

1) ***Solve Q1 or Q2 and solve Q3 or Q4.***
2) ***Neat diagram must drawn wherever necessary.***
3) ***Figures to the right indicates full marks.***
4) ***Assume Suitable data, if necessary.***

Q1) a) Derive expression for path difference in reflected system for thin film of uniform thickness and obtain condition for maxima and minima. **[6]**

b) The resultant amplitude of wave when monochromatic light is diffracted from a single slit is $E_\theta = E_m\left(\frac{\sin\alpha}{\alpha}\right)$ starting from this obtain the condition of principal maxima and minima. **[5]**

c) How should the polarizer and analyzer be oriented so that intensity of transmitted light becomes to i) 0.50 ii) 0.25 times the maximum intensity? **[4]**

OR

Q2) a) What is double refraction? Explain Huygen's theory of double refraction. **[6]**

b) Explain the use of thin film as Antireflection coating along with equation of thickness of coating. **[5]**

c) In a plane transmission grating, the angle of diffraction for the second order principal maximum for wavelength 5×10^{-5} cm is 30º. Calculate the number of lines / cm of the grating surface. **[4]**

P.T.O.

Q3) a) Explain with neat labelled diagram construction and working of a carbon dioxide laser. **[6]**

b) What is optic fibre? Give the difference between step Index and Graded Index optic fibre (any 2). **[5]**

c) Calculate the numerical aperture and acceptance angle of an optical fibre having $n_1 = 1.49$ and $n_2 = 1.44$. **[4]**

OR

Q4) a) Explain the process of fiber optics communication system with neat block diagram. State any two advantages of fiber optics communication. **[6]**

b) What is Holography? Explain the process of hologram recording. **[5]**

c) Describe the terms in laser : **[4]**

i) Stimulated emission

ii) Pumping

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