PD3

SEAT No. :

[Total No. of Pages : 2

[Max. Marks : 30

[6408]-103

F.E. (Common) (Insem) **ENGINEERING PHYSICS**

(2019 Pattern) (Semester-II) (Credit System) (107002)

Time : 1 Hour]

Instructions to the candidates:

- Solve (Q.1 OR Q.2) AND (Q.3 OR Q.4) 1)
- Figures to the right indicate full marks. 2)
- Use of logarithmic tables, slide rule. electronic pocket calculator is allowed. 3)
- Assume suitable data, if necessary. 4)
- *Q1*) a) By using neat ray diagram, derive the expression of amplitude for Fraunhoffer's diffraction due to single slit. [6]
 - Explain the use of thin film interference to design anti reflection coating.[5] b)
 - *At what angle should the polarizer and analyzer be oriented so that intensity c) of natural beam of light is (i) 20% and (ii) 60% of its original intensity.[4]

OR.

- When uniform thin film is Huminated with monochromatic light, derive *Q2*) a) expression for the effective path difference for reflected system. [6]
 - State and prove law of Malus. b)
 - c) Find the angular position of first minimum in the Fraunhoffer diffraction pattern due to single slit of width 6.6×10^{-7} m, when illuminated by light of wavelength 6000 AU. [4]
- Explain Construction and working of CO₂ laser. **Q3)** a)
 - What is optical fiber? Differentiate between step index & graded index b) optical fibers.(any 4 points). [5]
 - Define the following and only write down its equations-[4] c)
 - Acceptance angle **i**)
 - Numerical aperture for optical fiber. ii)

OR

[6]

- *Q4*) a) Define:
 - i) Critical angle
 - ii) Total internal reflection

In an optical fiber, the core material has R.I. 1.49 and R.I. of clad material is 1.44.

Calculate the value of maximum entrance angle & Numerical aperture.

- b) Explain the use of laser for hologram recording and reconstruction. [5]
- c) What is stimulated emission of radiations? Explain its role in the laser [4]