Total No. of Questions : 4]

SEAT No. :

PE-521

[Total No. of Pages : 2

[6577]-2
F.E. (Insem.)
ENGINEERING PHYSICS
(2019 Pattern) (Semester - I) (107002)

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

Instructions to the candidates:

1) ***Answer Q1 or Q2, and Q3 or Q4.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable data, if necessary***

Q1) a) Explain with neat labelled diagram interference in thin parallel film of uniform thickness in the reflected system, when it is illuminated by monochromatic light. Calculate total path difference and obtain the conditions of darkness and brightness. **[6]**

b) State and Explain Malus Law using neat labelled diagram. Also explain when resultant intensity will be maximum & minimum. **[5]**

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

OR

Q2) a) Explain Huygens theory of double refraction for uniaxial crystal. **[6]**

b) What is Interference? Explain with the suitable diagram, how interference is used in anti-reflective coating. **[5]**

c) A parallel beam of light of wavelength 5893 Å is incident on a thin film of Refractive index 1.5, such that the angle of refraction is 60°. Find the minimum thickness of the uniform thin film which will make it to appear dark by reflection. **[4]**

P.T.O.

Q3) a) Explain construction of optical fiber in brief. Explain the role of (i) acceptance angle (ii) critical angle and (iii) total internal reflection in the propagation of light in the optical fiber. **[6]**

b) What is holography? Differentiate between photography and holography (Any two points). **[5]**

c) Explain in brief (i) Pumping (ii) Metastable state **[4]**

OR

Q4) a) Explain the principle, construction and working of CO_2 laser with neat labelled diagram. **[6]**

b) Distinguish between step index fiber and graded index fiber. (Any five points). **[5]**

c) The difference in Refractive index of core and cladding is 0.08 and while their addition is 2.78. Calculate Numerical Aperture (NA) and Acceptance angle. **[4]**