Printed Pages : 3

EIC011

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 132651

Roll No.

B. Tech.

(SEM. VI) THEORY EXAMINATION, 2014-15
OPTO ELECTRONICS

Time : **2** Hours]　　　　　　　　　　　　[Total Marks : **50**

Note :　Attempt All Questions. Each questions carry equal marks.

1　Attempt any four parts of the following :　　$3\frac{1}{2} \times 4 = 14$

　(a)　A symmetric Step Index(SI) planar wave guide is made of glass with n_1 =1.5 and n_2 =1.49. The thickness of the guide layer is 9.82 μm and the guide is excited by a source of wavelength $\lambda = 0.85$ μm. What is the range of propagation constants? What is the maximum number of mode supported by the guide?

　(b)　Derive Modulation Response of an LED.

　(c)　Discuss Laser Action in semiconductors and derive its external quantum efficiency.

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(d) Discuss the working of p-i-n photodiode and compare it with Avalanche photo diode.

(e) With suitable diagram explain the working of displacement sensors using optical fiber.

(f) Review various laws of optics used in optical communication.

2   Attempt any TWO parts of the following: 6x2=12

(a) With the help of suitable diagram and mathematics explain the working of Longitudinal Electro optic Phase Modulator.

(b) Discuss the Salient features of Birefringent crystals. Name four materials which shows birefringence. Calculate the thickness of quarter wave plate made of Calcite and to be used with sodium light (λ = 0.589 μm). It is mentioned that for calcite n_o and n_e are 1.658 and 1.486, respectively.

(c) Discuss the working of Electro optic Intensity Modulators. Design TE to TM convertor based on electro optic effect in GaAs.

3   Attempt any TWO parts of the following: **6x2=12**

    (a)   With the help of suitable diagram explain the working of Integrated Optical spectrum Analyzer.

    (b)   How Holography is important in three dimensional imaging. What is Sagnac effect and how it is used in designing fiber Optic Gyroscope.

    (c)   With Mathematical support discuss how thin lens can be used fo fourier transformation of optical Image .

4   Attempt any FOUR parts of the following :   **3×4=12**

    (a)   With the help of figures discuss the working of Spatial light Modulator.

    (b)   Subtract $(28)_{10}$ and $(7)_{10}$ in MSD arithmetic.

    (c)   Perform 46+12 using residue arithmetic with the bases 2,5,7.

    (d)   Discuss the working of Analog optical Adder.

    (e)   What is Homomorphic system and where it is used ? Explain it with suitable example.

    (f)   Discuss substitution rules for MSD addition.

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