

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

PAPER ID : 0316

Roll No.

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B. Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION
2010-11

OPTOELECTRONICS

Time : 3 Hours

Total Marks : 100

Note : Attempt all questions. All questions carry equal marks.

1. Attempt any **four** parts of the following : (5×4=20)
 - (a) Discuss the role of various materials used for LED fabrication.
 - (b) Explain propagation mode in dielectrical slab wave guide.
 - (c) What is internal quantum efficiency of LED and derive the expression for life time reduction caused by interfacial recombination ?
 - (d) Distinguish between LED and LASER diode.
 - (e) An optical fiber has a NA of 0.20 and a cladding refractive index of 1.59 determine
 - (i) the acceptance angle for the fiber in water which has a refractive index of 1.33.
 - (ii) critical angle at the core cladding interface.
 - (f) How single mode operation is achieved in LASER diode ?

2. Attempt any **four** parts of the following : (5×4=20)
 - (a) Explain the principle and operation of parametric amplification.

- (b) Explain Electro optic intensity modulators with relevant figure.
- (c) Explain Pockel's effect, solitons and self modulation with reference to non-linear effects.
- (d) Discuss the Birefringence phenomenon. In which material it is present ? How induced Birefringence phenomenon is achieved ?
- (e) Explain the principle and operation of optical spectrum analyzer.
- (f) What is Acousto optics ? Explain the working of Ramanath effect.

Attempt any **two** of the following : **(10×2=20)**

- (a) Explain principles of Holography. What is Holographic optical elements ? Explain its two applications.
- (b) What is Image forming properties of lens and also describe interferometry ?
- (c) Explain optical data storage with applications. Explain LASER interferometry.

Attempt any **two** of the following : **(10×2=20)**

- (a) What are basic principle of optical fiber sensors ? Explain any four optical fiber sensor.
- (b) What is phase modulated optical sensors and describe its application ? Explain the working of Gyroscope.
- (c) Explain in brief :
 - (i) Pressure sensors
 - (ii) Stress sensors
 - (iii) Displacement sensors.

Attempt any **four** of the following :

(5×4=20)

- (a) What is Halftone processing ? How can this technique be applied to image ?
- (b) Add $34 + 16$ in modified signed digit Binary number system.
- (c) Explain with suitable examples analog arithmetic operation. How addition and multiplication is achieved ?
- (d) Explain the working of Spatial Light Modulators (SLM).
- (e) Using examples, explain how multiplication and division can be achieved in optical processing ?
- (f) Add 24 and 06 in residue number system (3, 5, 7). Explain with suitable example Threshold logic.