PAPER ID-310070

Subject Code: REC075

Roll No: | | | | | | | | | | | | | |

B. TECH
(SEM-VII) THEORY EXAMINATION 2020-21
OPTICAL COMMUNICATION

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a.	Explain Graded Index Fiber Structure?
b.	What is Reflection and Refraction?
c.	Explain Advantage of Optical fiber Communication?
d.	Explain Critical Angle?
e.	What is Total Internal Reflection (TIR)?
f.	Explain Numerical Aperture (NA)?
g.	The total efficiency of an injection laser with a GaAs active region is 18%. The voltage applied to the device is 2.5 V and the bandgap energy for GaAs is 1.43 eV. Calculate the external power efficiency of the device

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a.	Explain Ray Transmission Theory?
b.	A light ray is incident from medium-1 to medium-2. If the refractive indices of medium-1 and medium-2 are 1.5 and 1.36 respectively then determine the angle of refraction for an angle of incidence of 30^0
c.	What is Propagation in Optical Fiber explain both condition? also Explain Acceptance Cone.
d.	Explain Graded Index Fiber? Explain difference between graded and step index fiber.
e.	An LED operating at 850 nm has a spectral width of 45 nm. What is the pulse? spreading in ns/km due to material dispersion?
f.	Explain LED with direct and Indirect bandgap? Also define internal quantum efficiency

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Calculate the NA, acceptance angle and critical angle of the fiber having n1 (Core refractive index) = 1.50 and refractive index of cladding = 1.45.
(b)	Write a short note on polarization.

4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	For a 30 km long fiber attenuation 0.8 dB/km at 1300nm. If a 200 μ watt power is launched into the fiber, find the output power
(b)	Explain PIN Photodiode? what is Response Time**.**

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Calculate the number of modes of an optical fiber having diameter of 50 μm, n1 = 1.48, n2 = 1.46 and λ = 0.82 μm.
(b)	A fiber has normalized frequency V = 26.6 and the operating wavelength is 1300nm. If the radius of the fiber core is 25 μm. Compute the numerical aperture.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Explain LASER diode operation with suitable diagram?
(b)	What you understand by Phototransistor? Explain it's working.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	What is Detector Responsivity also explain optical receiver**?**
(b)	Explain Material Dispersion and waveguide dispersion in detail?