



BRAINWARE UNIVERSITY

Term End Examination 2022 Programme - B.Tech.(ECE)-2019 **Course Name – Fiber Optic Communications** Course Code - PEC-ECEL702A (Semester VII)

Full Marks: 60 Time: 2:30 Hours [The figure in the margin indicates full marks. Candidates are required to give their answers in their

own words as far as practicable.]

c) When V number is very high

(viii) When the incidence angle is ___

a) Dispersion

c) Absorption

a) more than

(vii) The loss in signal power as light travels down a fiber is called

bend along the intersection line of two different mediums of propagation.

Group-A

(Multiple Choice Type Question) 1 x 15=15 1. Choose the correct alternative from the following: (i) Which of the following detectors is suitable for detection of weak optical signal? a) P-n photodiode b) P-i-n photodiode c) Avalanche photodiode d) photoconductor (ii) Which among the following is a key process adopted for the laser beam formation as it undergoes the light amplification? a) Spontaneous Emission b) Stimulated Emission c) Both (a) and (b) d) None of these (iii) Compression of pulse takes place due to ____ a) Scattering b) Attenuation c) Nonlinearity d) Splicing (iv) Which reason/s is/are responsible for the occurrence of non-linear Cross Phase Modulation (XPM)? a) Difference in transmission phase of peak b) Third-order optical non-linearity pulse & leading or trailing edges of pulse c) Intensity dependence of refractive index d) All of these (v) Given step-index optical fiber parameters n1 = 1.45, n2 = 1.444, core radius = 4.2 ?m, and operating wavelength of 1550 nm, V-number of the fiber is a) 2.73 b) 3.45 c) 2.24 d) 2.91 (vi) Evanescent field coupling is possible a) When V number is very low b) When core radius is very large

b) Scattering

b) less than

d) Attenuation

d) When core diameter is very large

_ the specified critical angle, the light rays

(ix	c) equal to d) not related with d) Optical fiber communication operates in the wavelength band		
(x)	a) 400 μm to 700 μm c) 400 nm to 700 nm) Which rays exhibit the variation in the light acc	b) 800 μm to 1600 μm d) 800 nm to 1600 nm eptability ability of the fiber?	
(xi	a) Meridionalc) Leaky) Â In optical fiber, the outer layer is	b) Skew d) All of these and inner layer is	
(xii	a) core, claddingc) reflect, transmiti) Single mode optical fiber is mainly used for	b) cladding, cored) transmit, reflect	
(xii	a) Long haul communicationc) Medium haul communicationi) The most important property of LASER light is	b) Short haul communicationd) None of these	
(xiv	a) It is a coherent sourcec) Its beam width is larger) An LED source produces light when	b) It is a non-coherent sourced) Its speed is very high	
	a) It is reverse biased	b) Holes and electrons are combined in depletion region	
	c) The depletion region becomes wider	d) Electrons are emitted from junction s	urface
	Grou (Short Answer Ty	•	3 x 5=15
 Explain NEP (Noise Equivalent Power) of optical detector. Explain how DWDM technique facilitates the optical network Compare the merits and demerits of fiber optic communication system. Explain step index and graded index fiber mentioning their refractive index profile. Prepare a comparative study between stimulated emission and spontaneous emission			(3) (3) (3) (3) (3)
•			(5)
	Grou (Long Answer Ty	•	5 x 6=30
7.	7. Discuss on photonic crystal fiber.		(5)
8. A step index fiber has a core with refractive index of 1.55 and a cladding with a refractive index of 1.51. Evaluate the acceptance angle and numerical aperture of the fiber.		(5)	
9.	9. Identify different losses associated with optical fiber.		(5)
10. Explain the amplification mechanism of an EDFA.			(5)
11. A multimode step index fiber with a core diameter of 80 μ m and a relative index difference (of 1.5% is operating at a wavelength of 0.85 μ m. If the core refractive index is 1.48, estimate the normalized frequency and the number of guided modes.			ce (5)
12.	Explain the primary characteristics of light detect	tors.	(5)

Write the advantages and drawbacks of laser in comparison with LED for use as a source	e in (5)
optical fiber communication.	
