Course/Branch : BE/ECE	**Year / Semester** : IV/VlI	Format No.	NAC/TLP-07a.13
Subject Code :EC8751	**Subject Name**:Optical Communication	Rev. No.	02
Unit No :1	**Unit Name :** Introduction To Optical Fibers	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1.	Which law gives the relationship between refractive index of the dielectric? a) Law of reflection **b) Law of refraction (Snell's Law)** c) Millman's Law d) Huygen's Law	L1
2.	The light sources used in fibre optics communication are _____ **a) LED's and Lasers** b) Phototransistors c) Xenon lights d) Incandescent	L1
3.	The _____ ray passes through the axis of the fiber core. a) Reflected b) Refracted **c) Meridional** d) Shew	L5
4.	Light incident on fibers of angles_____the acceptance angle do not propagate into the fiber. a) Less than **b) Greater than** c) Equal to d) Less than and equal to	L3
5.	What is the numerical aperture of the fiber if the angle of acceptance is 16 degree? a) 0.50 b) 0.36 c) 0.20 **d) 0.27**	L3
6.	The ratio of speed of light in air to the speed of light in another medium is called as _____ a) Speed factor b) Dielectric constant c) Reflection index **d) Refraction index**	L2
7.	When a ray of light enters one medium from another medium, which quality will not change? a) Direction **b) Frequency** c) Speed d) Wavelength	L3
8.	Which equations are best suited for the study of electromagnetic wave propagation? **a) Maxwell's equations** b) Allen-Cahn equations c) Avrami equations d) Boltzmann's equations	L2

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9.	When λ is the optical wavelength in vacuum, k is given by k=2Π/λ. What does k stand for in the above equation? **a) Phase propagation constant** b) Dielectric constant c) Boltzmann's constant d) Free-space constant	L2
10.	Constructive interference occur when total phase change after two successive reflections at upper and lower interfaces is equal to? (Where m is integer) **a) 2Πm** b) Πm c) Πm/4 d) Πm/6	L1
11.	When light is described as an electromagnetic wave, it consists of a periodically varying electric E and magnetic field H which are oriented at an angle? **a) 90 degree to each other** b) Less than 90 degree c) Greater than 90 degree d) 180 degree apart	L1
12.	A monochromatic wave propagates along a waveguide in z direction. These points of constant phase travel in constant phase travel at a phase velocity V_p is given by? **a) $V_p=\omega/\beta$** b) $V_p=\omega/c$ c) $V_p=C/N$ d) V_p=mass/Acceleration	L2
13.	Which is the most important velocity in the study of transmission characteristics of optical fiber? a) Phase velocity **b) Group velocity** c) Normalized velocity d) Average velocity	L3
14.	What is refraction? **a) Bending of light waves** b) Reflection of light waves c) Diffusion of light waves d) Refraction of light waves	L2
15.	The phenomenon which occurs when an incident wave strikes an interface at an angle greater than the critical angle with respect to the normal to the surface is called as _____ a) Refraction b) Partial internal reflection **c) Total internal reflection** d) Limiting case of refraction	L3

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16.	A multimode step index fiber has a normalized frequency of 72. Estimate the number of guided modes. a) 2846 **b) 2592** c) 2432 d) 2136	L1
17.	A graded-index fiber has a core with parabolic refractive index profile of diameter of 30μm, NA=0.2, λ=1μm. Estimate the normalised frequency. a) 19.32 **b) 18.84** c) 16.28 d) 17.12	L1
18.	A step-index fiber has core refractive index 1.46 and radius 4.5μm. Find the cutoff wavelength to exhibit single mode operation. Use relative index difference as 0.25%. a) 1.326μm b) 0.124μm **c) 1.214μm** d) 0.123μm	L3
19.	A single-mode step-index fiber or multimode step-index fiber allows propagation of only one transverse electromagnetic wave. **a) True** b) False	L2
20.	One of the given statements is true for intermodal dispersion. Choose the right one. **a) Low in single mode and considerable in multimode fiber** b) Low in both single mode and multimode fiber c) High in both single mode and multimode fiber d) High in single mode and low in multimode fiber	L3
21.	For lower bandwidth applications _____ a) Single mode fiber is advantageous b) Photonic crystal fibers are advantageous c) Coaxial cables are advantageous **d) Multimode fiber is advantageous**	L2
22.	Most of the optical power is carried out in core region than in cladding. **a) True** b) False	L3

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23.	Meridional rays in graded index fibers follow _____ a) Straight path along the axis **b) Curved path along the axis** c) Path where rays changes angles at core-cladding interface d) Helical path	L2
24.	What is the unit of normalized frequency? a) Hertz b) Meter/sec c) Coulombs **d) It is a dimensionless quantity**	L1
25.	Skew rays follow a _____ a) Hyperbolic path along the axis b) Parabolic path along the axis **c) Helical path** d) Path where rays changes angles at core-cladding interface	L1
26.	What is needed to predict the performance characteristics of single mode fibers? a) The intermodal delay effect **b) Geometric distribution of light in a propagating mode** c) Fractional power flow in the cladding of fiber d) Normalized frequency	L2
27.	Which equation is used to calculate MFD? a) Maxwell's equations **b) Peterman equations** c) Allen Cahn equations d) Boltzmann's equations	L3
28.	The difference between the modes' refractive indices is called as _____ a) Polarization b) Cutoff **c) Fiber birefringence** d) Fiber splicing	L1
29.	. A single mode fiber has a beat length of 4cm at 1200nm. What is birefringence? a) $2*10^{-5}$ b) $1.2*10^{-5}$ **c) $3*10^{-5}$** d) 2	L2
30.	How many propagation modes are present in single mode fibers? a) One **b) Two** c) Three d) Five	L2

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31.	Numerical aperture is constant in case of step index fiber. **a) True** b) False	L2
32.	Plastic fibers are less widely used than glass fibers. **a) True** b) False	L1
33.	Photonic crystal fibers also called as _____ a) Conventional fibers b) Dotted fibers c) Stripped fibers **d) Holey fibers**	L5
34.	Conventional optical fibers has more transmission losses than photonic crystal fibers. **a) True** b) False	L2
35.	Losses in photonic crystal fibers are reduced to a level of _____ a) 0.1dB/km b) 0.2dB/km **c) 0.3dB/km** d) 0.4dB/km	L2
36.	The periodic arrangement of cladding air holes in photonic band gap fibers provides for the formation of a photonic band gap in the _____ a) H-plane of fiber b) E-plane of fiber c) E-H-plane of fiber **d) Transverse plane of fiber**	L1
37.	In index-guided photonic crystal fiber structure, the dark areas are air holes. What does white areas suggests? a) Air b) Silica c) Water **d) Plasma**	L2

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38.	Which is the unit of measurement of attenuation in optical fibers? a) km b) dB **c) dB/km** d) Coulomb's	L3
39.	The optical fiber incurs a loss in signal power as light travels down the fiber which is called as _____ a) Scattering **b) Attenuation** c) Absorption d) Refraction	L1
40.	If the input power 100μW is launched into 6 km of fiber, the mean optical power at the fiber output is 2μW. What is the overall signal attenuation through the fiber assuming there are no connectors or splices? a) 15.23dB **b) 16.98dB** c) 17.12dB d) 16.62dB	L2
41.	A device that reduces the intensity of light in optical fiber communications is _____ a) compressor **b) Optical attenuator** c) Barometer d) Reducer	L2
42.	When the input and output power in an optical fiber is 120μW & 3μW respectively and the length of the fiber is 8 km. What is the signal attenuation per km for the fiber? a) 3dB/km **b) 2dB/km** c) 1dB/km d) 4dB/km	L3