BE SEM: VII
CBCGS-H
OC MOCK paper

1.In an optical fiber, the concept of Numerical Aperture is applicable in describing the ability of __ (01)

a. Light collection
b. Light scattering
c. Light Dispersion
d. Light Polarization

2.The performance characteristics of multimode graded index fibers are (01)
a) Better than multimode step index fibers.
b) Same as multimode step index fibers.
c) Lesser than multimode step index fibers
d) Negligible

3. If a light travel in a certain medium and it gets reflected off an optically denser medium with high refractive index, then it is regarded as _____ (01)
a. External Reflection
b. Internal Reflection
c. Both a and b
d. None of the above

4. Snell's law relates….. (01)
a. light absorption
b. light refraction
c. light transmission
d. light diffraction

5. When total internal reflection occurs... (01)
(a) the angle of incidence is greater than 90°.
(b) the angle of incidence is greater than the angle of refraction.
(c) the angle of refraction is greater than 90°.
(d) the angle of incidence is equal to 90°.

6. The expression for refractive index is given by (01)
a) N = v/c
b) N = c/v
c) N = cv
d) N = 1/cv

7. Find the refractive index of a medium having a velocity of 1.5×10^8. (02)
a) 0.5
b) 5
c) 0.2
d) 2

8. A certain optical fiber has the following parameters: core radius of 4 μm, core and cladding refractive indices of 1.45 and 1.444 respectively, and operating wavelength of 1064 nm. V number of the fiber is (02)

a. 3.11
b. 1.82
c. 2.405
d. 3.5

9. For the fiber given in Problem 8 to act as a single mode fiber, the minimum operating wavelength is (02)

a. 1550 nm
b. 1377 nm
c. 1250 nm
d. 880 nm

10. If a mode propagating in an optical fiber has $|Hz| > |Ez|$ ($Ez \neq 0$, $Hz \neq 0$), the mode is called as a _____ (01)

a. TM mode
b. TE mode
c. HE mode
d. EH mode

11. If a photo-detector which can detect minimum power of -13 dBm is used at the fiber output and a pulse having launch power of 4 dBm is launched in the fiber having loss coefficient 0.046 km^{-1} , to detect the input pulse the fiber can have maximum length of_____ (02)

a. 85.12 km
b. 140.2 km
c. 35 km
d. 100 km

12. The measurement of dispersion allows the _____ of the fiber to be determined. (01)

a) Capacity
b) Frequency
c) Bandwidth
d) Power

13. In optical communication, as optical power is increased, BER goes on decreasing till a certain BER value is reached after which BER goes on increasing. This increase in BER is observed because of____ (01)

a. Nonlinear effects
b. Dispersion
c. Attenuation
d. Thermal noise

14. In waveguide dispersion, refractive index is independent of____ (01)

a) Bit rate
b) Index difference
c) Velocity of medium
d) Wavelength

15. Determine total channel loss if connector loss at source and detector is 3.5 and 2.5 dB and attenuation of 5 dB/km. (02)

a) 34 dB
b) 35 dB
c) 36 dB
d) 38 dB

16. Signal amplification is obtained in (01)

a. Raman fiber system
b. Brillion fiber amplifier
c. Erbium doped fluo-zir-carbonate fiber multimode
d. Rare earth doped fiber amplifier

17. A communication system uses 10 km of fiber that has a 2.5-dB/km loss characteristic. Find the output power if the input power is 400 mW. (02)

a. 1.265 mW
b. 0.987 mW
c. 1.89 mW
d. 2.165 mW

18. In an eye diagram, digital signals with very bad interference resembles the shape of (01)

a. Circle
b. Rectangle
c. Triangle
d. Straight line

19. Multimode step index fiber has (01)

a) Large core diameter & large numerical aperture
b) Large core diameter and small numerical aperture
c) Small core diameter and large numerical aperture
d) Small core diameter & small numerical aperture

20. The fibers mostly not used nowadays for optical fiber communication system are_____ (01)

a) Single mode fibers
b) Multimode step fibers
c) Coaxial cables
d) Graded index fibers

21. A GaAs planar LED emitting at a wavelength of 0.85 μm has an internal quantum efficiency of 60% when passing a forward current of 20 mA s^{-1}. Estimate the optical power emitted by the device (02)

a. 18.55 mW
b. 17.52 mW
c. 18.52 mW
d. 16.02 mW

22. A semiconductor diode laser has a peak emission wavelength of 1.55 μm. Find its band gap in eV. (02)

a. 0.68 eV
b. 0.92 eV
c. 0.78 eV
d. 0.8 eV

23. The phenomenon when an excited electron jumps from an energy state E_2 to energy state E_1 ($E_2 > E_1$) without any external energy being supplied is called as (01)

a. Absorption
b. Stimulated emission
c. Spontaneous emission

24. In a graded index optical fiber ($\alpha = 2$) having V = 10, the total number of modes guided are (02)

a. 50
b. 75
c. 25
d. 10

25. A simple fiber optic system would consist of: (01)
(a) a light source, an optic fiber and a photo-electric cell
(b) a laser, an optic fiber and an LED
(c) a copper coaxial cable, a laser and a photo-electric cell
(d) an LED, a cathode ray tube and a light source

26. Optic fiber is normally made from: (01)
(a) coherent glass and xenon
(b) copper
(c) water
(d) silica glass or plastic

27. Plastic optic fibers: (01)
(a) have lower losses than glass fibers
(b) are used in the automobile industry
(c) are suitable for long distance communications
(d) are used as a form of electrical to optical converter

28. If a light ray crosses the boundary between two materials with different refractive indices: (01)
(a) no refraction would take place if the angle of incidence was 0°
(b) refraction will always occur
(c) the speed of the light will not change if the incident ray is traveling along the normal
(d) the speed of light never changes

29. A power level of 50 μW could be expressed as: (02)
(a) 1.69 dBm
(b) -4.3 dBm
(c) 1 dBm
(d) -13 dBm

30. Absorption loss is caused by: (01)
(a) water absorption (OH-ions)
(b) changes in the density of the fiber due to uneven rates of cooling
(c) microscopic cracks in the cladding which allow leakage of the vacuum in the core
(d) impurities in the fiber

31. Intramodal dispersion: (01)
(a) only occurs in multimode fiber
(b) is also called chromatic dispersion
(c) does not occur in multimode fiber
(d) could not occur in an all-plastic fiber

32. A 4 X 4 coupler would have a total of: (01)
(a) 16 ports
(b) 4 ports
(c) 9 ports
(d) 8 ports

33. Coupling ratio is also known as: (01)
(a) directionality loss
(b) coupling loss
(c) splitting ratio
(d) directivity ratio

34. An APD: (01)
(a) can produce visible light as well as infrared light at 850 nm, 1300 nm and 1550 nm
(b) has good electrical output in low light conditions
(c) has a lower dynamic range than a PIN diode
(d) is cheaper than a PIN diode

35. The second optical window is centred at _____ (01)
(a) 850 nm
(b) 1100 nm
(c) 1310 nm
(d) 1550 nm

36. Changing the spectral width of the light source would affect the: (01)
(a) fiber bandwidth in a single mode system
(b) system bandwidth of a multimode system but not a single mode one
(c) aging losses
(d) number of likely repairs

37.If the transmitter and the receiver rise times were 0.5 ns and 1.5 ns respectively, and the fiber rise time was 25 ps, the system rise time would be approximately: (02)
(a) 25.05 ns
(b) 1.42 ns
(c) 1.58 ns
(d) 5.19 ns

38. In an optical fiber, Rayleigh scattering results from_____ (01)
(a) inhomogeneities that are small in size
(b) impurities in fiber optic
(c) cracks in the fibre optic
(d) presence of water ions in the firber

39. The radiative and non-radiative recombination lifetimes of the minority carriers in the active region of a double heterojunction LED are 70 ns and 90 ns respectively. The total carrier recombination lifetime is _____ (02)

a. 160 ns

b. 39.375 ns

c. 75 ns

d. 90 ns