JNTU ONLINE EXAMINATIONS [Mid 2 - OC]

1. The ratio is known as _____ , where n,n1 are refractive index [01D01]
a. Incidence coefficient
b. Reflection coefficient
c. Zero coefficient
d. Transmission coefficient

2. A Ga As optical source with a refractive index of 3.6 is coupled to a Silica Fiber that has a refractive index of 1.48. If the Fiber end and the source are in close physical contact, then the Fresnel reflection at interface is _____ [01D02]
a. 2
b. 0.25
c. 0.2
d. 0.174

3. The emission pattern for a lambertion source _____relation ship [01M01]
a. B (( , ) = B0 cos
b. B (θ,φ ) = B0 sinθ
c. B (θ,φ) =B0 tanθ
d. B (θ,φ) =B0 secθ

4. The output beam from a laser diode allows significantly more light to be coupled in to an optical Fiber [01M02]
a. Bulk
b. Narrower
c. Thick
d. Discontinuous

5. The freshed reflection or the reflectively at the Fiber - core end Face is _____ [01M03]
a.
b.
c.
d.

6. The amount of optical power emitted from a source that can be coupled in to Fiber is usually given by _____ [01S01]
a. Normal efficiency
b. Coupling efficiency
c. Process of coupling
d. Fly lead

7. The ratio of power coupled in to the Fiber (PF) and the power emitted from the light source (Ps) is known as _____ [01S02]
a. Efficiency
b. Fly lead
c. Coupling efficiency
d. Coupling

8. _____ is the optical power radiated in to a unit solid angle per unit emitting surface area [01S03]
a. Radiance
b. Incidence
c. Reflection
d. Transmission

9. Surface emitting L E D'S are characterized by lambertian output pattern, which means the source is equally bright when viewed from any _____ [01S04]
a. Direction
b. Glass
c. Y, Z direction
d. Incidence

10. _____ is specified in terms of watts per square centimeter per steradian [01S05]
a. Incidence
b. Reflection
c. Transmission
d. Radiance

11. The number of modes that can propagate in a graded index Fiber of core size a and index profile is _____ [02D01]
a.
b.
c.
d.

12. The function of _____ is to magnify the emitting area of the source to match exactly the core area of the Fiber end Face [02M01]
a. Micro lens
b. Mirror
c. Operator
d. Fiber

13. The value of reflectivity corresponds to a reflection percentage of the emitted optical power back into the source is given by_____ equation [02S01]
a. P coupled = (1-R) P emitted
b. P coupled = R P emitted
c. P coupled = P emitted
d. P coupled = R2 Pemitted

14. _____ Can be reduced by having an index - matching material between the source and the Fiber end [02S02]
a. Output power
b. Power loss indecibels
c. Power in watts
d. Power loss in watts

15. The optical power launched in to a Fiber depend up on the _____ of the source [02S03]
a. Wave length
b. Brightness
c. Incidence

d. Reflection

**16. The radiated power per mode, is given as _____ [02S04]**

a. Bo λ

**b. Bo 2**

c. B0

2 λ2

d. B0

2λ

**17. Two identically sized sources operating at different wave lengths but having identical radiances will launch _____ amounts of optical power into the same Fiber [02S05]**

a. Different

**b. Equal**

c. Decreasing

d. Increasing

**18. The degree of mode coupling occuring in a Fiber is primarily a function of _____ [02S06]**

**a. Core -cladding index difference**

b. Coupling

c. Fiber

d. Wave length

**19. If the emitting area of the source is smaller than the core area , a miniature lens may be placed between the source and the Fiber to improve the _____ [02S07]**

a. coupling

b. Fiber quality

c. Wave length

**d. Power coupling efficiency**

**20. _____ is most efficient lensing method [02S08]**

a. Lens

b. Mirror

**c. Non imaging micro scope**

d. Microscope

**21. _____ Separation occurs when the Fibers have the same axis but have a gap between their end Faces [03D01]**

a. Lateral

b. Angular

**c. Longitidinal**

d. Circular

**22. Fiber -to -Fiber coupling loss (LF) given in terms of Fiber -to -Fiber coupling efficiency (nF) is _____ [03M01]**

**a. LF = -1olog nF**

b. LF = -20 log nF

c. LF = nF

d. LF = 10 nF

**23. Dash missing offset reduces the common -core area of the two Fiber end Faces [03M02]**

**a. Axial**

b. Lateral

c. Longitidinal

d. Angular

**24. A light source is often supplied with a short Fiber _____ attached to it in order to Facilifate coupling the source to a system Fiber [03S01]**

**a. Fly lead**

b. Cut

c. Squashed

d. Convex mirror

**25. The best coupling efficiency is achieved by _____ method [03S02]**

a. L E D

b. lens

**c. Direct - Butt**

d. Microscopic

**26. The Fiber to Fiber coupling efficiency is the ratio of common mode volume to _____ [03S03]**

**a. Number of modes in the emitting Fiber**

b. Area

c. Fiber

d. Fiber cladding

**27. The optical power in concentrated at _____ of the Fiber core [03S04]**

a. Outer

b. Inner diameter

c. External to Fiber

**d. Near the center**

**28. _____ losses result from mechanical mis alignments because the radiation core of the emitting Fiber does not match the acceptance cone of the receiving Fiber [03S05]**

a. Absorption

b. Convection

**c. Radiation**

d. Conduction

**29. _____ mis alignment results when the two axes Form an angle so that the Fiber end Faces are no longer parallel [03S06]**

a. Lateral

**b. Angular**

c. Longitidinal

d. Axial

**30. The most common mis alignment which causes the greatest power loss is _____ [03S07]**

a. Lateral

b. Angular

c. Longitidinal

**d. Axial**

**31. Normal cut off wave length of germanium semiconductor is _____ [04D01]**

a. 2.86 μ m

**b. 1.6μ m**

c. 3.2μ m
d. 5.2μm
**32. The pin photo diode consists of p and n regions separated by a very _____ doped intrinsic region [04M01]**
a. Electron
**b. Lightly n**
c. Lightly p
d. Lightly n&p
**33. In pin photo diode the time it takes for an electron or hole to recombine is known as_____ [04M02]**
a. Life time
b. Life
**c. Carrier life time**
d. Depletion time
**34. Normal cut off wavelength of silicon semiconductor is _____ [04M03]**
**a. 1.06 μm**
b. 2μm
c. 1.5μm
d. 3.2μm
**35. _____ Senses the luminescent power Falling up on it and converts the variation of this optical power into a correspondingly varying electric current [04S01]**
**a. Photo detector**
b. Multipliers
c. Diodes
d. Transistors
**36. _____ Consists a photo cathode and an electron multiplier packaged in a vacuum tube [04S02]**
**a. Photo multiplier**
b. Multipliers
c. Diodes
d. Transistors
**37. Large size and _____ requirements make them unsuitable for optical Fiber systems [04S03]**
a. Weight
**b. High voltage**
c. Low gain
d. Low noise
**38. Pyro electric photo detectors involve the conversion of _____ to heat [04S04]**
a. Electrons
b. Charges
**c. Photons**
d. Atoms
**39. _____ is used almost exclusively for Fiber optic systems because of its small size, suitable material high sensitivity and fast response time [04S05]**
a. Electrons
b. Pyroelectric
c. Multipliers
**d. Photo diode**
**40. In Pin - photo detector, the process that general Free electron - hole pairs are called as _____ [04S06]**
a. Diffusion
**b. Photo carriers**
c. Electrons
d. Ions
**41. The units of band gap energy (Eg)of the material is _____ [04S07]**
a. Volts
b. Amperes
c. Watts
**d. Electron volts**
**42. A silicon avalanche photo diode has a Quantum efficiency of 65% at a wave length at 900nm . Suppose 0.5 μw of optical power produces a multiplied photo current of calculate the multiplication M [05D01]**
a. 10
b. 20
c. 33
**d. 43**
**43. In a 100ns pulse, 6x106 photons at a wave length of 1300 nm fall on an InGaAS photo detector. on the average, 5.4x106 electron - hole pairs are generated calculate Quantum efficiency [05M01]**
a. 10%
b. 60%
c. 50%
**d. 90%**
**44. The carrier multiplication mechanics in Avalanche-photodiodes is known as _____ [05M02]**
a. High energy level
**b. Impact lonization**
c. Thermal breakdown
d. Circuit breakdown
**45. The average number of electron -hole pairs created by a carrier per unit distance travelled is called as _____ [05M03]**
**a. Ionization rate**
b. Thermal rate
c. Break down
d. Multiplication rate
**46. _____ is the number of the electron - hole carrier pairs generated per incident photon of energy [05S01]**
**a. Quantum efficiency**
b. Electron efficiency
c. Rise time
d. Speed

47. To achieve high quantum efficiency, the _____ must be thick enough to permit a large
fraction of the incident light to be absorbed [05S02]
**a. Deplection layer**
b. Avalanche
c. Wave length
d. Quantum

48. The performance of a photo diode is often characterized by the _____ [05S03]
a. Deplection layer
b. Quantum layer
**c. Responsivity**
d. Incident

49. _____ internally multiply the primary signal photo current before it enters the input
circuitry of the following amplifier [05S04]
a. Pin photo diode
**b. Avalanche photo diode**
c. Diode
d. Transistor

50. The phenomenon of impact ionization to gaining high energy which is accelerated by the high
electric field is _____ [05S05]
a. Ionization
**b. Avalanche effect**
c. Thermal effect
d. Break down effect

51. The multiplication (M) for all carriers generated in the photo diode is defined as _____
[05S06]
**a.**
b.
c. Mm
d.

52. The power signal-to-noise ratio at the output of an optical receiver is defined by _____
[06M01]
**a.**
b.
c.
d.

53. In Fiber optic communication systems, the photo diode is generally required to detect _____
[06S01]
a. good optical signals
**b. very weak optical signals**
c. high signals
d. photons

54. The photo detector should have _____ to generate a large signal power [06S02]
a. low efficiency
b. current
c. high power
**d. high quantum efficiency**

55. the photo detector and amplifier noises should be kept as _____ as possible [06S03]
a. high
**b. low**
c. constant
d. infinte

56. The _____ of a photo detector in an optical fiber communication system is describable in
terms of minimum detectable opticalpower [06S04]
a. efficiency
b. output power
**c. sensitivity**
d. selectivity

57. _____ noise arises from the statistical nature the production and collecion of photo
electrons
when an signal is incident on a photo detector. [06S05]
**a. Quantum**
b. Dark current
c. Fluctuations
d. Leakage current

58. The quantum noise current has a mean square value in a bandwidth B which is proportional to
the average value of the _____ [06S06]
a. voltage
b. power
**c. photo current**
d. leakage current

59. The _____ noise is the current of the continuous to flow through the bias circuit of the
device
when no light is incident on the photodiode [06S07]
a. quantum
**b. photodiode dark current**
c. fluctuations
d. leakage current

60. The bulk dark current is directly proportional to the _____ [06S08]
**a. surface area**
b. power
c. current
d. quantum

61. The _____ mechanism of an avalanche photodiode is temperature sensitive [06S09]
a. surface
b. current
c. quantum
**d. gain**

62. Longer links usually required operation in the _____ wave length region [07D01]
a. 300 nm
b. 400 nm
**c. 1300 nm**
d. 20, 000 nm

**63. The normal wave length range of silicon pin photodiode is _____ [07M01]**
a. 100-300 nm
b. 300 nm
**c. 400-1100 nm**
d. 600-8000 nm
**64. The wave length range of Germanium avalanche photodiode is ____ [07M02]**
**a. 800-1650 nm**
b. 300-800 nm
c. 400-1100 nm
d. 500-600 nm
**65. The Dark current of Germanium pin photodiode is _____ [07S01]**
a. 300-1000 nA
**b. 50-500 nA**
c. 0-10 nA
d. 300-2000 nA
**66. The Band width of InGaAS pin photodiode is _____ [07S02]**
a. 10-20 GHZ
b. 6-20 GHZ
**c. 1-2 GHZ**
d. 0 to 25 GHZ
**67. The Band width of Germanium avalanche photodiode is _____ [07S03]**
a. 3-100 GHZ
**b. 2-10 GHZ**
c. 3-80GHZ
d. 50-250 GHZ
**68. The rise time for silion pin photodiodes is _____ [07S04]**
a. 2-3 ns
**b. 0.5-1 ns**
c. 10-30 ns
d. 50-100 ns
**69. the Bias voltage for InGaAs pin photodiode is _____ [07S05]**
a. 10 V
b. 1000 V
**c. 5V**
d. 300 V
**70. the Bias voltage for Si avalanche photodiodes is _____ [07S06]**
a. 30 V
b. 200 V
c. 150-1000 V
**d. 150-400 V**
**71. For _____ applications, Si devices operaing around 850 nm provide inexpensive solutions for most links [07S07]**
a. long distance
**b. short distance**
c. less gain
d. less voltage
**72. Normally for langer links _____ based photo diodes are used [07S08]**
a. Si
b. Ge
**c. In Ga AS**
d. Si Ge
**73. The most useful criteria for measuring the performance of a digital communication system is _____ [08M01]**
a. desigin engineer
**b. average error probability**
c. system design
d. error filtering pattern
**74. _____ provides a larger gain factor and a broder band width [08M02]**
a. transmitter
b. receiver
c. source
**d. optical pre amplifier**
**75. An _____ consists of a photo detctor, an amplifier and signal processing circuitry [08S01]**
a. optical source
b. transmitter
**c. optical receiver**
d. energy device
**76. _____ converts the optical energy from the fiber in to an electrical signal [08S02]**
a. conductor
b. electrons
c. photo transistor
**d. photo detector**
**77. Most of the fiber optic systems use a _____ signal [08S03]**
a. Analog
**b. Two-level binary digital**
c. Discrete
d. Non-periodic
**78. the transmitted signal is a two-level binary data stream consisting of either a 0 or a 1 in a time slot of duration Tb and this time slot is referred as _____ [08S04]**
a. duration
**b. bit period**
c. Quantum
d. Data line
**79. the optical signal that gets coupled from the light source to the fiber becomes attenuated and _____ as it propogates along the fiber wave guide [08S05]**
a. simplified
b. binary format
**c. distorted**
d. linear
**80. A decision circuit compares the signal in each time slot with a certain reference voltage known as the _____ level [08S06]**

a. zero
b. infinite
c. unknown
**d. threshold**

**81. Optical amplifier is placed a head of the photo diode to _____ the optical signal level before photo detection [08S07]**
**a. boost**
b. lessen
c. zero level
d. introduce noise in

**82. Optical amplifier is placed such that _____ degradation caused by thermal noise in the receiver electronics can be suppressed [08S08]**
a. gain
b. signal
**c. signal to noise ratio**
d. input

**83. In avalanche photodiode, the additional shot noise arises from _____ [09M01]**
a. current
**b. avalanche gain**
c. voltage
d. power rating

**84. Thermal noises are of _____ nature, so they can be readily treated by standard techniques [09M02]**
a. Fardays
b. Max wells
**c. Gaussian**
d. Avalanche

**85. The term _____ is used customarily to describe unwanted components of an electrical signal that tend to disturb the transmission [09S01]**
a. Signal
**b. noise**
c. transmitter
d. receiver

**86. The noise is caused by the _____ of current or voltage in electric circuits [09S02]**
a. Signal
b. Value
**c. Spontaneous Fluctuations**
d. Receiver

**87. _____ noise arises in electronic device because of the discrete natur of current flow in the device [09S03]**
**a. shot**
b. thermal
c. error
d. detectron

**88. _____ noise arises from the radom motion of electrons in a conductor [09S04]**
a. shot
**b. thermal**
c. detectron
d. amplifier

**89. The random arrival rate of _____ produces a quantum on shot noise in the photo detector [09S05]**
a. electrons
b. current
**c. signal photons**
d. charges

**90. _____ photo diode, gives additional shot noise due to statistical nature of the multiplication process [09S06]**
a. Pin
**b. Avalanche**
c. Current
d. Dark current

**91. Other than quantum and thermal noise the additional photo detector noises come from the _____ and _____ [09S07]**
a. detection, current
b. dark current, thermal current
**c. dark current, leakage current**
d. bias resistor, dark current

**92. _____ noises arising from the detctor load resistor and from the amplifier electronics tend to dominate in applications with low signal to noise ratio when a pin photodiode is used [09S08]**
**a. thernal**
b. quantum
c. bias
d. friction

**93. The binary digital pulse train incident on the photo detector can be given as _____ [10D01]**
**a.**
b. P(t)=bn hp
c.
d. P(t)=e-t sinwt

**94. The equalizer in Receiver configuration is a _____ shaping filter [10M01]**
**a. linear frequency**
b. voltage
c. current
d. heat

**95. The primary photo current generatd by the photodiode is a _____ poisson's process resulting from the random arrival of photons at the detector [10S01]**
a. constant
**b. time varying**
c. instant
d. fixed time

**96. If the detector is illuminated by an optical signal P(t) then the average number of electronhole pairs generated in a time z is _____ [10S02]**
**a.**

b.
c.
d.

**97. ____ source error results from pulse spreading in the optical fiber [10S03]**

a. Interference
b. Noise
c. Quantum
**d. Inter symbol Interference**

**98. The mean gain for a pin photo diode is _____ [10S04]**

a. 0
b. 2
**c. 1**
d. infinite

**99. The amplifying function in a photo diode is represented by the voltage-controlled current source which is characterized by a _____ [10S05]**

a. impedance
**b. transconductance**
c. reactance
d. voltage

**100. The input noise current source arises from the _____ of the amplifier input resistance [10S06]**

a. quantum
b. speak noise
**c. thermal noise**
d. wave noise

**101. The equalizer in Receiver configuration is used to mitigate the effects of ____ and inter symbol interference [10S07]**

a. voltage
b. current
**c. signal distortion**
d. source

**102. In some cases, _____ may be used to correct the electric frequency response of the photo detector and the amplifier [10S08]**

**a. equalizer**
b. transmitter
c. photo detector
d. amplifier

**103. The high impedance pre amplifier produces a large input _____ time constant [11D01]**

a. R
b. C
**c. RC**
d.

**104. typical error rates for optical fiber telecommunication systems range from _____ to _____ [11M01]**

a. 103 to 105
**b. 10-9 to 10-12**
c. 10-6 to 108
d. 10-9 to 10-25

**105. For unbiased data with equal probability of 1 and 0 occurences, a=b=_____ in error probility [11M02]**

a. 1
b. 0.6
c. 0
**d. 0.5**

**106. The ratio of number of errors occuring over a time intervolt by the number of pulses(Nt) transmitted during this interval is _____- [11S01]**

**a. Bit-error rate**
b. Pulses
c. Count
d. Efficiency

**107. The error rate depends on _____ at the receiver [11S02]**

a. Signal
b. Noise
**c. Signal to noise ratio**
d. Type

**108. To compute the bit error rate at the receiver we have to known the _____ of the signal at the equalizer output [11S03]**

a. type
**b. probability distribution**
c. nolse
d. count

**109. If a signal S is the gaussian probability distribution function_____ is usd to measure the width of the probability distribution [11S04]**

a. variance
**b. standard deviation**
c. Mean
d. Parabolic

**110. The _____ is widely used to specify receiver performance since it is related to the signaltonoise ratio required to achieve a specific bit-error rate [11S05]**

a. error probability
**b. -parameter**
c. variance
d. noise

**111. The signal-to-noise ratio at which the transition occur is called the _____- [11S06]**

**a. Threshold level**
b. Inching effect
c. Biasing point
d. Link level

**112. The low impedance pre-amplifier do not provide a _____ receiver sensitivity [11S07]**

a. low
**b. high**
c. zero
d. equal

113. The transmitted optical power in the amplitude modulaion form is _____ [12M01]
a. P(t)=Pt[1+s(t)]
b. P(t)=Pt[1+ms(t)]
c. P(t)=Ptms(t)
d. P(t)=0
114. For a Analog receiver, the performance fidelity is measured in terms of a _____ ratio [12S01]
a. Noise
b. Signal-to-Noise
c. Frequency
d. Source
115. Signal to Noise ratio is defined as the ratio of the mean-square signal current to the _____ [12S02]
a. Noise
b. Interference
c. Mean-Square noise current
d. Impulse current
116. Analog technique is to use amplitude modulation of the _____ [12S03]
a. source
b. receiver
c. noise
d. power
117. _____ is the ratio of variation in current about the bias point to the input drive current [12S04]
a. modulation index
b. noise-signal
c. power relation
d. signal current
118. In order not to introduce distortion in to the optical signal, the modulation must be confined to the _____ region [12S05]
a. Bias
b. Linear
c. Unlinear
d. Power
119. In analog receivers, the signal of the photo diode output current and inversely proportional to the _____ of the circuit [12S06]
a. thermal noise
b. source
c. impulse
d. frequrncy
120. For large optical incident on a pin photodiode, the _____ noise associated with the signal detecion process dominates [12S07]
a. quantum
b. bit rate
c. thermal
d. band width
121. When an avalanche photodiode is employed at low signal levels and with low values of gain M. the _____ term dominates [12S08]
a. quantum
b. circuit noise
c. thermal
d. bit-rat
122. For a given set of operating conditions in avalanche photo diode, the optimum value of the avalanche gain, the signal to noise ratio is _____ [12S09]
a. small
b. maximum
c. zero
d. infinite
123. For low signal levels an _____Photodiode yields a higher signal to noise ratio [12S10]
a. Pin
b. Avalanche
c. Pyroelectric
d. Multipliers
124. For large received optical power levels a _____ photo diode gives better performance [12S11]
a. Pin
b. Avalanche
c. Pyroelectric
d. Multiplier
125. The individual frequency signals can be extracted from the combined frequency division multiplexing signal by appropriate _____ at the receiver terminal [13M01]
a. time sharing
b. electrical filtering
c. bands
d. energy levels
126. _____ multiplexing technique requires an increase in the number of opticl components required within a particular system and therefore has not been widely used [13M02]
a. frequency division
b. time division
c. pulse division
d. space division
127. The dominant design criteria for a specific application using either digital or analog transmission techniques are _____ and _____ [13S01]
a. transmission distance, rate of information transfer
b. distance delay
c. delay, non periodic
d. peridic, non periodic
128. In order to maximize the information transfer over an opticl fiber communication link it is usual

to _____- serval signals on to a single fiber [13S02]
a. de multiplex
**b. multiplex**
c. grouped
d. tied

**129. Digital pulse modulation schemes may be extended to multi channel operation by _____ multiplexing [13S03]**
**a. Time division**
b. Pulse
c. Source
d. Signal receiver

**130. In _____ multiplexing the optical channel band width is divided in to a non over lapping bands and each signal is arrigned one of these bands of frequencies [13S04]**
a. Time division
b. Pulse division
**c. Frequency division**
d. Signal

**131. The separation and extration of the multiplexes signals (ie wave length separation) is performed with _____ [13S05]**
**a. Optical filters**
b. Suppressors
c. dividers
d. Multi channel

**132. Multiplexing technique which does not involve the application of several message signls on to single fiber is known as _____ multiplexing [13S06]**
a. source
b. signal
c. power
**d. space division**

**133. In _____ multiplexing each signal channel is carried on a separate fiber with in a fiber bundle [13S07]**
a. frequency division
**b. space division**
c. time division
d. multi channel

**134. The good optical isolation offered by fiber meansd the cross coupling between channels can be made _____ [13S08]**
a. zero
b. infinite
**c. negligible**
d. to increase

**135. Two analyses are usually carried out to ensure that the derived system performance can be met by using link power budget and the _____ [14M01]**
a. bit-error rate
**b. system rise time budget analysis**
c. receiver
d. band width

**136. If the distance over which the data are to be transmitted is not too far, we may sperate in _____ region [14M02]**
a. 500-600 nm
b. 1300-1400 nm
c. 200-300 nm
**d. 800-900 nm**

**137. Pin Photo diodes bias voltages are normally less than ____ volts [14M03]**
a. 200
b. 300
**c. 5**
d. 1

**138. The system parameters involved in deciding between the use of an LED and a laserdiode are signal dispersion data rate, _____ and _____ [14M04]**
**a. transmission distance, cost**
b. distance , power
c. power, Fiber thickness
d. losses, speed

**139. To increase the end-to end fidelity of an optical transmission line, _____ can be used if the bit-error rate is limited by optical noise and dispersion [14S01]**
**a. forward error correction**
b. slew rate
c. systems
d. signal-to-noise

**140. The simplest transmission link is a point-to -point line that has a transmitter on one end and _____ on the other [14S02]**
a. point
**b. receiver**
c. system
d. bandwidth

**141. If the transmission distance is long, we may operate in _____ region [14S03]**
a. 500-600 nm
**b. 1300-1550 nm**
c. 200-300 nm
d. 600-800 nm

**142. _____ receiver is simpler more stable with changes in temperature, less expensive [14S04]**
a. avalanche photodiode
b. pyroelectric
**c. pin photo diod**
d. photo transistor

**143. Avalanche photodiode bias voltages range are normally from _____ V ito several hundread volts [14S05]**

a. 5
b. 3
**c. 40**
d. 20

**144. For low optical power levels _____ photo diode is very usefull [14S06]**
a. pin
**b. avalanche**
c. pyroelectric
d. photo transistor

**145. Modal nois is not aproblem for links operating below ____ [15D01]**
a. 10 Mb/s
b. 0.1 Mb/s
c. 0.003 Mb/s
**d. 100 Mb/s**

**146. The link loss expressed in decibels are _____ [15M01]**
a. loss=10 log
**b. loss=10 log**
c. loss=
d. loss=

**147. The optical power received at the photo detector depends on the amount of light coupled in to the fiber and the occuring in the fiber [15S01]**
**a. losses**
b. output
c. budget
d. link

**148. A _____ analysis is a convenient method for determining the dispersion limitation of an optical fiber link [15S02]**
a. loss
b. power
**c. rise-time budget**
d. pulse

**149. The _____ limit depends on material and modal dispersion [15S03]**
**a. dispersion**
b. power
c. loss
d. pulse

**150. The achievable transmission distances are those that fall below the _____ and to the left of the dispersion line [15S04]**
a. dispersion
**b. attenuation limit curve**
c. pulse
d. material limit

**151. Greater transmission distances are possible when a Dash is missing is used in conjunction with an avalanche photo diode [15S05]**
a. Pin photo diode
b. Transistor
**c. Laser diode**
d. spectral

**152. _____ uses a set of rules for arranging the signal symbols in a particular pattern [15S06]**
a. single mode links
b. encoding
c. decoding
**d. signal encoding**

**153. _____ noise arises when the light from a coherent laser is coupled in to a multimode fiber [15S07]**
a. thermal
b. modal
**c. mode-partition**
d. chirping

**154. Passive devices operate completely in the optical domain to _____ and _____ light streams [16M01]**
**a. Split, combine**
b. Split, uncombine
c. Zero,one
d. Light,dark

**155. The technology of combining a number of wave lengths on to the same Fiber is known as _____ multi plexing [16S01]**
**a. Wave length division**
b. Pulse division
c. Frequency division
d. Time division

**156. Wave length dividion multiplexing is same as _____ multiplexing [16S02]**
a. Pulse division
**b. Frequency division**
c. Pulse division
d. Time division

**157. Wave length division must be properly spaced to avoid_____ [16S03]**
a. Noise
b. Thermal
c. Quantum
**d. Inter channel Interference**

**158. The application of wave length division multiplexing is _____ of existing point -to - point Fiber optic transmission links [16S04]**
**a. Capacity upgrade**
b. Interference
c. Wavelength
d. Capacity decrease

**159. _____ is that each optical channel can carry any transmission Format [16S05]**
a. Pulse division
b. Frequency division
**c. Wave length division**
d. Quantum

160. Wave length division multiplexing is essentially frequency division multiflexing at _____ frequencies [16S06]
a. Low
b. HIgh
**c. Optical carrier**
d. channel

161. _____ wave length division components include tunable optical filters,tunable sources ,and optical amplifiers [16S07]
a. Passive
b. Real
**c. Active**
d. Inductance

162. To prevent spurious signals from entering a receiving channel, the demultiplexer must exhibit _____ spectral operation [16S08]
a. Broader
b. Zero
c. Infinite
**d. Narrow**

163. _____ components can be fabricated by means of planar optical wave guides using material such as lithium niobate [16S09]
a. Active
**b. Passive**
c. Lumped
d. Distributed

164. _____ measures the degree of isolation between the input at one port and the optical power back in to the other input port [17D01]
a. Splitting
b. Insertion
c. Coupler
**d. Cross talk**

165. _____ is define as the ratio of the input to the total output power, in a 2X2 coupler [17D02]
a. Noise
b. Quantum
**c. Excess loss**
d. Heat loss

166. Most passive wave length division multiplexing devices are variations of a _____ concept [17M01]
a. Normal
**b. Star - coupler**
c. Wind - coupler
d. Delta - coupler

167. The cross talk optical power equation is given as _____ [17M02]
**a.**
b.
c.
d.

168. The phase of the driven Fiber always _____ behind the phase of the driving Fiber [17M03]
a. Leads 900
**b. Lags 900**
c. Inphase
d. Lags 1800

169. The excess loss for a 2×2 coupler is _____ [17M04]
**a.**
b.
c.
d.

170. A common fabrication method for an NXN splitter is to fuse together the cores of _____ single mode Fibers over length of a few millimeters [17S01]
a. (N-1)
b. (N+2)
c. (N-2)
**d. N**

171. Any size star coupler can be made, in principle, provided that all Fibers can be heated uniformly during the _____ process [17S02]
a. Heating
b. Coupler
**c. Coupler- Fabrication**
d. Gain

172. For a NXM coupler, the coupler has _____ inputs and _____outputs [17S03]
**a. N, M**
b. (N-1),(M-1)
c. (N+1),(M+1)
d. (N-1)(M+1)

173. _____ devices makes the tapers very gradual, so that only a negligible fraction of the incoming optical power is reflected back in to either of the input ports [17S04]
**a. Directional couplers**
b. Tapered coupler
c. Fused coupler
d. Reverse coupler

174. The _____loss refers to the loss for a particular port - to - port path [17S05]
a. Excess
b. Splitting
**c. Insertion**
d. Coupler

175. The attenuation of the cable in decibels by insertion loss method is _____ [18D01]
**a.**

b.
c.
d.

**176. IF pF and Pn respect the output powers of the far and near ends of the Fiber, the average loss in decibels per kilometer is given by _____ [18M01]**

**a.**
b.
c.
d.

**177. _____ of optical power in a Fiber wave guide is a result of bsorption processes, scatlering mechanisms and wave guide effects [18S01]**

a. Dispersion
**b. Attenuation**
c. Line loading
d. Single mode fibers

**178. Measuring the optical power transmitted through a long and a short length of the same fiber using identical input couplings method is known as_____ [18S02]**

a. Attenuation
**b. Cut back technique**
c. Coding
d. Analyzer

**179. A less accurate but non destrictive method is the _____ method,which is useful for cables with connectots on them [18S03]**

a. Thermal loss
b. Quantum loss
**c. Insertionloss**
d. Heat loss

**180. The _____ is a destructive method requiring access to both ends of the Fiber [18S04]**

a. Attenuation technique
**b. Cut back technique**
c. Connectors
d. Optical system

**181. In_____ Fiber, different launch conditions can yield different loss values [18S05]**

a. Single mode
**b. Multi mode**
c. Photo detector
d. Madrel wrap

**182. In insertion -loss method the launch and detector coupling are made through _____ [18S06]**

a. Points
b. Joints
**c. Couplers**
d. Separation

**183. In insertion -loss method,_____ is the sum of the loss of the cabled Fiber and the connector between the launch connector and the cable [18S07]**

a. Measurment
**b. Attenuation**
c. Wave length
d. Frequency

**184. In cut -back technique, if the spot size is small and its numerical operture is less than that of the Fiber core, the optical power is concentrated in the _____of the core [18S08]**

a. Side
b. Surface
**c. Center**
d. Distribution

**185. For pulse dispersion the Fiber transfer function must not roll off to less than _____ of its low frequency value for frequencies up to half the desired bit rate [19M01]**

a. 1
**b. 0.5**
c. 3
d. 4

**186. For pulse dispersion, the r.m.s width of the Fiber impulse response must be less than _____ of the pulse spacing [19M02]**

a. Half
b. 3
**c. One Quarter**
d. 1

**187. _____ produce pulse broadening of light wave signals in optical Fiber, there by limiting the information - carrying capacity [19S01]**

a. AQttenuation
**b. Dispersion**
c. Insertion
d. Cut-back

**188. In multimode Fibers _____ arises from the Fact that each mode in an optical pulse travels a slightly different distance and thus arrives at the Fiber end at slightly off set times [19S02]**

a. Inter modal dispersion
**b. Intramodal dispersion**
c. Chromatic dispersion
d. Polarization

**189. _____ sterms from the variation inthe propagation speed of the individual wave length components of an optical signal [19S03]**

**a. Chromatic dispersion**
b. Intermodal dispersion
c. Intramodal dispersion
d. Polarization

**190. _____dispersion arises from the splitting of a polarized signal into orthogonal polarization modes, each of which has a different propagation speed [19S04]**
a. chromatic
b. Intermodal
**c. Polarization**
d. Intramodal dispersion

**191. The transfer function of a Fiber optic cable is of importance because it contains _____ information of the system [19S05]**
a. Gain
**b. Band width**
c. Output pattern
d. Input pattern

**192. Chromatic dispersion is the primary dispersive mechansm is _____ Fibers [19S06]**
**a. Single-mode**
b. Multi-mode
c. Co-axial
d. Light

**193. _____ is the resulting difference in propagation times between the two orthogonal polarization modes ata given wave length will result in pulse spreading [19S07]**
a. Chromatic dispersion
**b. Polarization - mode dispersion**
c. Phase - shift method
d. Dispersion method

**194. _____occurs when light eners a medium that has a different index of refraction [19S08]**
**a. Fresnel refletion**
b. Dispersion
c. Trace
d. Scatlering

**195. The Pseudorandom binary sequence pattern length is of the form _____ [20M01]**
a. 2N
b. (2*N)
**c. (2N-1)**
d. (1-2N)

**196. _____ in an optical fiber system arises from noise in the receiver and puls distortion in the optical fiber [20M02]**
a. noise
b. pattern
**c. timing jitter**
d. accuracy

**197. _____ technique is a simple but power measurement method for assessing the datahandling ability of a digital transmission system [20S01]**
a. dispersion
**b. eye-pattern**
c. error
d. measurement

**198. Eye patterns has been usd extensively for evaluating the performance of wire systems and can also be applied to _____ [20S02]**
a. eye
b. light
**c. optical Fiber data link**
d. oscilloscope

**199. The eye pattern measurements are made in the _____ and allow the effects of wave form distortion [20S03]**
**a. Time domain**
b. Patterns
c. Fall time
d. reflects

**200. To measure system performance with the eye pattern technique, a varity of _____ should be provided [20S04]**
a. time pattern
**b. word pattern**
c. fall time
d. reflects

**201. _____ defines the time interval over which the received signal can be sampled with out error from inter symbol interference [20S05]**
a. binary sequence
**b. width of the eye opening**
c. interval
d. pattern

**202. _____ is the percentage ratio of the peak signal voltage V1 for an alternating bit sequence to the maximum signal voltage V2 as measured from the threshold level [20S06]**
a. Jitter
**b. Noise Margin**
c. Eye pattern
d. Sequence

**203. The rate at which the eye closes as the sampling time is varied (i e the slope of the eyepattern sides)determines the _____ for the system to timing errors [20S07]**
a. accuracy
b. noise
c. pattern
**d. sensitivity**

**204. _____- is defined as the time interval betwen the point where the rising edge of the signal reaches 10 percent of its final amplitude [20S08]**
a. fall time
**b. rise time**
c. noise
d. mid time