Yashwantrao Chavan College of Science, Karad

Question Bank

Subject Code:- 81711   **Subject Name:-** Electronics Paper XIV

Common subject Code (if any) _____

1	----- is not the characteristics of the optical source A) Better linearity B) High coupling efficiency. C) High optical output power. D) Heavy in weight	
2	In an optical fiber communication system, which among the following is not a typical transmitter function? a. Coding for error protection b. Decoding of input data c. Electrical to optical conversion d. Recoding to match output standard	
3	------------- is the longform of ILD A)Induction Laser Diode b) Injection Laser Diode b) Intrinsic Laser Diode d) Injection Light Diode	
4	---- is the longform of the LASER A) Light Amplitude by the Stimulated Emission of Radiation B) Light Amplification by the Series Emission of Radiation C) Light Amplification by the Stimulated Emission of Radiation D) Light Amplification by the Stimulated Emission of Ratio	
5	. Stimulated Raman scattering may have an optical power threshold of may be three orders of magnitude _____ a) Lower than Brillouin threshold b) Higher than Brillouin threshold c) Same as Brillouin threshold d) Higher than Rayleigh threshold	

6	. The cladding performs the following functions
	   A) Reduces loss of light from the core into the surrounding air
	   B) Reduces scattering loss at the surface of the core
	   C) Protects the fiber from absorbing surface <u>contaminants</u> D) All the above	

7	0.4 dB/km, 1.4μm, 6μm, 550MHz. Find threshold optical power for stimulated Raman scattering. a) 1.98 W b) 1.20 W c) 1.18 W d) 0.96 W	

8	8. The avalanche diode has ----------- A)Wide bandwidth B) High quantum efficiency C) High response speed	
	D) All the above	
9	A -------- is an electronic switching and current amplification component which relies on exposure to light to operate. A) Capacitor b) resistor c) Photoransistor d) diode	
10	A multimode fiber has refractive indices n1 = 1.15, n2 = 1.11 and an operating wavelength of 0.7μm. Find the radius of curvature? a) $8.60\mu m$ b) $9.30\mu m$ c) $9.1\mu m$ d) $10.2\mu m$	
11	A permanent joint formed between two different optical fibers in the field is known as a _____ a) Fiber splice b) Fiber connector c) Fiber attenuator d) Fiber dispersion	
12	A photodiode is one type of ---------- detector A) Current b) light c) voltage d) temperature	
13	A PIN photodiode is made of p region and n region separated by a highly resistive ------------ A) Extrinsic layer B) depletion layer C) conducting layer d) intrinsic layer	
14	A single mode fiber has refractive indices n1=1.50, n2 = 2.23, core diameter of 8μm, wavelength = 1.5μm cutoff wavelength = 1.214μm. Find the radius of curvature? a) 12 mm b) 20 mm c) 34 mm d) 36 mm	
15	A single-mode optical fiber has an attenuation of 0.3dB/km when operating at wavelength of 1.1μm. The fiber core diameter is 4μm and bandwidth is 500 MHz. Find threshold optical power for stimulated Brillouin scattering. a) 11.20 mw b) 12.77 mw c) 13.08 mw d) 12.12 mw	
16	Absorption losses due to atomic defects mainly include _____ a) Radiation b) Missing molecules, oxygen defects in glass c) Impurities in fiber material d) Interaction with other components of core	
17	As ionization radiation increases the attenuation --------- A) decreases b) increases c) remains constant d) becomes zero	

18	Attenuation is a general term that refers to any ----------- in the strength of a signal. A) increase b) reduction c) unmatched d) amplification	
19	Attenuation loss is measured in dB/km. a) dB/m b) dB/cm c) dB/km d) dB/mm	
20	core and outer jacket (protective layer is separated by --------- a) cladding b) core d) inversion layer d) resistive material	
21	Dominant intrinsic loss mechanism in low absorption window between ultraviolet and infrared absorption tails is _____	

	a) Mie scattering b) Rayleigh scattering c) Stimulated Raman scattering d) Stimulated Brillouin scattering	
22	For non-permanent connections, one can also use-------------- a) splitters b) connectors c) joints d) all the above.	
23	How many mechanisms are there which causes absorption? a) One b) Three c) Two d) Four	
24	How many types of fiber splices are available? a) One b) Two c) Three d) Four	
25	How the potential macro bending losses can be reduced in case of multimode fiber? a) By designing fibers with large relative refractive index differences b) By maintaining direction of propagation c) By reducing the bend d) By operating at larger wavelengths	
26	If a light travels in a certain medium and it gets reflected off an optically denser medium with high refractive index, then it is regarded as _____ a. External Reflection b. Internal Reflection c. Both a and b d. None of the above	
27	In an optical fiber, the concept of Numerical aperture is applicable in describing the ability of _____ a. Light Collection b. Light Scattering c. Light Dispersion d. Light Polarization	
28	In optical fibre losses due to curvature and losses caused by an abrupt change in radius of curvature are referred to as ---------- A) Mie scattering loss b) bending loss c) Rayleigh scattering loss d) stimulated Raman scattering loss	

29	In the fiber optic link, power transfer from one fiber to another and from fiber to detector must take place with _____coupling efficiency. a. maximum b. stable c. minimum d. unpredictable	
30	In the given equation, state what αr suggests? a) Radius of curvature b) Refractive index difference c) Radiation attenuation coefficients d) Constant of proportionality	
31	In the structure of fiber, the light is guided through the core due to total internal _____ a. reflection b. refraction c. diffraction d. dispersion	
32	**It is a device that distributes light from a main fiber into one or more branch fibers.** **a) Optical fiber coupler** b) Optical fiber splice c) Optical fiber connector d) Optical isolator	
33	**Losses caused by factors such as core-cladding diameter, numerical aperture, relative refractive index differences, different refractive index profiles, fiber faults are known as _____** **a) Intrinsic joint losses** b) Extrinsic losses c) Insertion losses d) Coupling losses	

34	Mie scattering has in-homogeneities mainly in _____ a) Forward direction b) Backward direction c) All direction d) Core-cladding interface	
35	Normally, used photosensor in optical receiver is the -------------------- A) Pin diode b) PN diode c) avalanche photodiode d) Injection laser diode	
36	**Optical fiber couplers are also called as _____** a) Isolators b) Circulators **c) Directional couplers** d) Attenuators	
37	How many mechanisms are there which causes absorption? a) One **b) Three** c) Two d) Four	
38	Optical fibers are composed primarily of A) silicon dioxide B) Silicon chloride C)Gallium arsenide D) Gallium Phosphate	

39	Optical fibers are composed primarily of -------- A) germanium tetrachloride b) silicon dioxide c) silicon tetrachloride d) phosphorus oxychloride	

40	Photo diode is operated in --------- bias mode
	    A) Forward
	    B) Reverse
	    C) Divider bias
	    D) none	

41	Photodiode is used to detect --- A) Visible light B) Invisible light C) No light D) Bothe visible and invisible light	
42	Phototransistor is operated on ----- A) Current B) Voltage c) light d) Capacitance	
43	PIN photodiodes generate -------- electric current than the PN junction photodiodes with the same amount of light energy A) more B) less C) zero d) abnormal	
44	Pulse spreading in fiber is referred as ----------- a) Loss b) scattering c) absorption d) dispersion	
45 46	Raman and Brillouin scattering are usually observed at _____ a) Low optical power densities b) Medium optical power densities c) High optical power densities d) Threshold power densities	

47	Rayleigh scattering and Mie scattering are the types of _____ a) Linear scattering losses b) Non-linear scattering losses c) Fiber bends losses d) Splicing losses	
48	Refractive index of the core is --------------- than cladding A) More B) Less C) Equal D) none	
49	signal in the optical fibre is in the form of ---------. A) current b) light c) sound 3) none	

50	Stimulated Brillouin scattering is mainly a _____ a) Forward process b) **Backward process** c) Upward process d) Downward process	
51	Stimulated Raman scattering occur in _____ a) Forward direction b) Backward direction c) Upward direction d) Forward and backward direction	
52	The advantage of PIN diode is A.Higher resistivity of intrinsic region B.Higher powers handled C.Easier fabrication D.All of the above	
53	The cladding which surrounds the fiber core (A) is used to reduce optical interference (B) is used to protect the fiber (C) acts to help guide the light in the core (D) ensures that the refractive index remains constant	
54	The effects of intrinsic absorption can be minimized by _____ a) Ionization b) Radiation c) Suitable choice of core and cladding components d) Melting	
55	The extent of attenuation is usually expressed in units called -------------- A) decibels b) seconds c) mA c) mV	
56	The fiber types for fiber optic connectors are categorized into --------- fiber connectors A) simplex b) duplex c) multiple d) all	
57	The function of the optical receiver is to ------ the incoming optical power and extract from it the signal that is being transmitted A) connect b) detect c) remove d) amplify	
58	The higher the index number (A) the higher the speed of light (B) the lower the speed of light (C) has no effect on the speed of light (D) the shorter the wavelength propagation	
59	The main material used in the construction of PIN diodes is A.GaAs B.Si C.Ge D.Se	
60	The mechanical splice is best suited for (A) quicker installation under ideal conditions (B) minimum attenuation losses	

	(C) field service conditions (D) situations in which cost of equipment is not a factor	

61	**The optical power coupled from one fiber to another is limited by _____** a) Numerical apertures of fibers b) Varying refractive index of fibers c) Angular power distribution at source d) **Number of modes propagating in each fiber**	
62	The phenomenon of achieving population inversion, i.e the process which raises the atoms from lower energy state to higher energy state in the active medium is called ------- A) Pumping B) Population inversion c) Absorption d) Lasing	
63	The PIN diode is must suited for......applications A.Microwave oscillating B.Microwave switching C.Microwave amplifying D.Microwave rectifying	
64	The PIN diode is used as A.Sin wave modulator B.Triangular wave modulator C.Low frequency rectifier	
65	The PIN diode is used as A.Amplifier B.Voltage controlled attenuator C.Rectifier D.None of these	
66	The PIN diode was first proposed by A.L. Fleming B.Gunn C.Esaki D.R.N Hall	
67	The PIN diode works as rectifier at A.High frequency B.Low frequency C.All frequencies D.None of these	
68	The process of joining two fibers is called as ------. a) bending b) splicing c) joints d) cleaning	
69	The scattering resulting from fiber imperfections like core-cladding RI differences, diameter fluctuations, strains, and bubbles is? a) Rayleigh scattering b) Mie scattering c) Stimulated Brillouin scattering d) Stimulated Raman scattering	

70	The small electric current under the absence of light in PN Junction photodiode is called ------- current. A) light B) excess C) dark d) normal	
71	The term critical angle describes (A) the point at which light is refracted (B) the point at which light becomes invisible	

	(C) the point at which light has gone from the refractive mode to the reflective mode (D) the point at which light has crossed the boundary layers from one index to another	
72	The term dispersion describes the process of (A) separating light into its component frequencies (B) reflecting light from a smooth surface (C) the process by which light is absorbed by an uneven rough surface (D) light scattering	
73	The terms single mode and multimode are (A) the number of fibers placed into a fiber-optic cable (B) the number of voice channels each fiber can support (C) the number of wavelengths each fiber can support (D the index number	
74	The three major groups in the optical system are (A) the components, the data rate and response time (B) the source, the link, and the receiver (C) the transmitter, the cable, and the receiver (D) the source, the link, and the detector	
75	The transmission fiber is usually a ------------- in the case of medium or long-distance transmission A) Multimode fibre B) Single mode fibre c) Greadded index multimode d) none	
76	Total internal reflection happens when a propagating wave strikes a medium boundary at an angle --------- particular critical angle. A) equal to b) greater than c) less than d) none	
77	total internal reflection to occur when the light travels from a ------ A) denser medium to lower medium B) Rarer medium to denser medium C) when both media are equal in dense D) None	

78	When connector losses, splice losses, and coupler losses are added, what is the final limiting factor? (A) Source power (B) Fiber attenuation (C) Connector and splice losses (D) Detector sensitivity	
79	**When considering source-to-fiber coupling efficiencies, the _____ is an important parameter than total output power.** a) Numerical aperture **b) Radiance of an optical source** c) Coupling efficiency d) Angular power distribution	
80	When forward bias voltage is applied to the PIN photodiode, it behaves like a --------- A) Capacitor b) resistor c) Transistor d) diode	
81	Which of the following devices has negative resistance? A.Gas diode B.Vacuum diode C.Tunnel diode D.None of the above	

82	Which of the following is not a metallic impurity found in glass in extrinsic absorption? a) Fe_{2+} b) Fe_{3+} c) Cu d) Si	
83	Which of the following statements best explain the concept of material absorption? a) A loss mechanism related to the material composition and fabrication of fiber b) A transmission loss for optical fibers c) Results in attenuation of transmitted light d) Causes of transfer of optical power	
84	--------- is used for particularly high sensitivity of optical receivers . A) PIN diode B) PN diode c) Avalanche diode d) Zener diode	
85	--------- loss is related to the material composition and fabrication process of fiber. a) Bending b) cutting c) absorption d) diffraction	
86	---------- has a thinner inner core. A) Step index multimode B) graded index multimode c) monomode d) step index single mode	
87	------------ is a loss due to small bending or distortions. a) micro-bending b) macro-bending c) nano-bending d) laser bending	
88	--------- detector device A) LED B) Photodiode C) Diode D) All the above	

89	-------------- is are not non-linear scattering loss in optical fibre a) Stimulated Raman Scattering b) Mie Scattering.	
90	---- is not absorption mechanisms in optical fibre. a) Intrinsic b) Extrinsic c) atomic effects d) bending effects	
91	----- is not the basic elements of a fiber optic communication system. A) Compact Light Source B) Low loss Optical Fiber C) Photo Detector d) current sensor	
92	What is the strip width of injection laser? a) 12 μm b) 11.5 μm c) Less than 10 μm d) 15 μm	
93	_____ results from small lateral forces exerted on the fiber during the cabling process. a) Attenuation b) Micro-bending c) Dispersion d) Stimulated Emission	
94	Microscopic meandering of the fiber core axis that is micro-bending is caused due to _____ a) Environmental effects b) Rough edges of the fiber c) Large diameter of core d) Polarization	
95	What does micro-bending losses depend on _____ a) Core material b) Refractive index c) Diameter d) Mode and wavelength	

96	Mie scattering has in-homogeneities mainly in _____ a) Forward direction b) Backward direction c) All direction d) Core-cladding interface	
97	Multimode graded index fibers are manufactured from materials with _____ a) Lower purity b) Higher purity than multimode step index fibers. c) No impurity d) Impurity as same as multimode step index fibers.	
98	The performance characteristics of multimode graded index fibers are _____ a) Better than multimode step index fibers b) Same as multimode step index fibers c) Lesser than multimode step index fibers d) Negligible	
99	In single mode fibers, which is the most beneficial index profile? a) Step index b) Graded index c) Step and graded index d) Coaxial cable	

100	The fibers mostly not used nowadays for optical fiber communication system are _____ a) Single mode fibers b) Multimode step fibers c) Coaxial cables d) Multimode graded index fibers	
101	---- is not the layer of IOT architecture A) Network B) Perceptual Layer C) data layer d) Support layer	

102	**Things" in the IoT sense, is the mixture of ------**
	    A) Software, feedback, data
	    B) **hardware, software, data, and services**.
	    C) **Data, services only**
	    D) Software and hardware only	

103	----- is /are applications of IOT A) Hone automization b) Agriculture C) Health care d) All the above	
104	Sensors, actuators, devices ------- are not present in this Sensing layer. A) Sensors B) Actuators C) generators D)converters	

105	---- is processing unit of IOT system
	    A) Network layer c) Data processing layer
	    B) Application layer d) sensing layer	

106	IoT security has been introduced to the industry in ------- ways: A) 2 B) 3 C) 4 D) 5	
107	------- wireless technologies uses less power A) Bluetooth B) Zigbee C) WiFi D) CDMA/GSM	
108	Which of the following is not concerned in IOT A) Security B) throughput C) Data storage D) Privacy	

109	The role of sensor in smart grid architecture of IOT is ------ A)
	    Provide Security C) Filter data
	    B) Storage data D) Transfer data	

110	---- ---- is not the feature of IOT A) Turn off automatically when not in use	
	B) Remotely controllable C) Programmable D) Doesn't need Internet	

.

Q2 Short answer Questions

1) What is IOT and explain its four applications 2)

What is impact of IOT on Society /

3) Explain the various smart devices of IOT.

4) Explain IOT based Smart Home nano grit monitoring system. 5) Explain the optical fiber communication system 6) Explain the basic Structure of optical fiber.

7) State the advantages and disadvantages of optical fiber system 8) Explain the applications of optical fiber system.

9) Explain step index multimode fiber

10) Explain the characteristics of optical sources

11) Explain the absorption, spontaneous emission, stimulated emission in Laser.

12) Explain the characteristics of LASER diode

13) Write note on PIN diode

14) Explain avalanche photodiode with its advantages and disadvantages.

15) Write brief note on optical receiver. 16) Explain the PN junction photodiode.

17) Explain attenuation in optical fiber

18) Explain Rayleigh scattering loss

19) Write note on Fiber connectors

20) Write brief note on Fusion splicing in optical fiber

Q3 Long answer Questions
1) Explain in brief any four trends in IOT.
2) Explain four stage IOT Architecture .
3) What is IOT Security? Explain best IOT Security technologies in brief. 4) Explain the various modes of Optical transmission mode in detail 5) Explain the fiber optical transmitter system in brief.
6) Explain the fiber optical receiver system in detail.
7) Explain the semiconductor injection laser
8) Explain the different types of Photodiodes
9) Explain the construction and working Phototransistor and its application
10) Explain different types of absorptions in optical fiber
11) Explain the different types of bending losses in optical fiber
12) Explain the linear and non linear scattering losses in optical fiber.