



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)  
Dundigal, Hyderabad - 500 043

## ELECTRONICS AND COMMUNICATION ENGINEERING

### DEFINITIONS AND TERMINOLOGY QUESTION BANK

<b>Course Name</b>	<b>OPTICAL COMMUNICATION</b>
<b>Course Code</b>	<b>AEC018</b>
<b>Program</b>	B.Tech
<b>Semester</b>	VIII
<b>Branch</b>	Electronics and Communication Engineering
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<b>Course Faculty</b>	Mr. U Soma Naidu, Assistant Professor, Department of ECE

#### OBJECTIVES:

I	To help students to consider in depth the terminology and nomenclature used in the syllabus.
II	To focus on the meaning of new words / terminology/nomenclature

#### DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
<b>UNIT-I</b>						
1	Define Fiber -optic communication.	Fiber-optic communication is a method of transmitting information from one place to another by sending pulses of infrared light through an optical fiber.	Understand	CO1	CLO 1	AEC018.01
2	Define communication.	Process by which information is exchanged Between individuals through a common system of symbols, signs, or behavior.	Understand	CO1	CLO 1	AEC018.01
3	What is optical communication?	Optical communication is a type of communication in which light is used to carry the signal to the remote end, instead of electrical currents. Optical communication relies on optical fibers to carry the signals to the destination.	Remember	CO1	CLO 1	AEC018.01
4	Define Transmitter.	Converts and transmits an electric signal into a light signal. The most commonly used transmitters are semi conductor devices such as light emitting diodes and laser diodes.	Understand	CO1	CLO 1	AEC018.01
5	Define Receiver.	Typically consists of a photo-detector, which covertes light into electricity using photoelectric effect. The photo detector is typically a semi conductor-based photo diode.	Understand	CO1	CLO 2	AEC018.01
6	What is optical fiber?	An optical fiber is the medium used to send information via fiber optics. High quality fiber is made with thin strands of glass. Plastic fiber can also be used but only for shorter distances.	Remember	CO1	CLO 1	AEC018.01

7	What Is Fiber Internet?	Fiber Internet is the latest change to the way data is transferred around the globe. It's much faster than cable, way faster than dial-up,	Remember	C01	CLO 1	AEC018.01
8	What is Optical?	Optical technology refers to anything that relates to light or vision; whether it is visible light or infrared light that performs a specific function.	Remember	C01	CLO 1	AEC018.01
9	Define Propagation of light.	Propagation of light refers to the manner in which an electromagnetic wave transfer it's energy from one point to another.	Remember	C01	CLO 2	AEC018.01
10	Define Transmission of light.	Transmission of light is the moving of electromagnetic waves (whether visible light, radio waves, ultraviolet, etc.)	Understand	C01	CLO 1	AEC018.01
11	What is optical wave?	Optics is rays, waves, and photons. Science and engineering have always relied on models to explain and predict the behavior of the physical world,	Remember	C01	CLO 1	AEC018.01
12	What is a ray of light?	An incident ray is a ray of light that strikes a surface. The angle between this ray and the perpendicular or normal to the surface is the angle of incidence.	Remember	C01	CLO 1	AEC018.01
13	What are the laws of optics?	The law of rectilinear propagation (transmission). ... When a ray of light is reflected at an interface dividing two optical media,	Remember	C01	CLO 1	AEC018.01
14	What are the properties of optical Fibers?	Optical-fiber systems have many advantages over metallic-based communication systems. These advantages include interference, attenuation, and bandwidth characteristics	Understand	C01	CLO 2	AEC018.01
15	What is fiber technology?	A technology that uses glass (or plastic) threads (fibers) to transmit data. A fiber optic cable consists of a bundle of glass threads,	Understand	C01	CLO 2	AEC018.01
<b>UNIT-II</b>						
1	What absorption means?	Absorption describes the process of absorbing or soaking up something: Sponges are good at water absorption; dark colors are better for heat absorption. ...	Understand	CO2	CLO 4	AEC018.02
2	What is scattering losses	Scattering is the loss of signal caused by the diffusion of a light beam, where the diffusion itself is caused by microscopic variations in the transmission medium.	Understand	CO2	CLO5	AEC018.02
3	what is bending losses	Attenuation occurring as a result of either a bend in an optical fiber that exceeds the minimum bend radius or an abrupt discontinuity in the core/cladding interface. ...	Understand	CO2	CLO4	AEC018.02
4	Define core and cladding losses	The core of a conventional optical fiber is a cylinder of glass or plastic that runs along the fiber's length. The core is surrounded by a medium with a lower index of refraction	Understand	CO2	CLO 4	AEC018.02
5	What is core and cladding?	The core is surrounded by a medium with a lower index of refraction, typically a cladding of a different glass, or plastic.	Understand	CO2	CLO5	AEC018.02

6	Define signal distortion in optical waveguide.	Signal distortion cause that optical pulses to broaden as they travel along a fiber, the overlap between neighboring pulses, creating errors in the receiver output,	Understand	CO2	CLO6	AEC018.02
7	Define Material Dispersion	Material dispersion is a phenomenon in which different optical wavelengths propagate at different velocities, depending on the refractive index of the material used in the fibre core.	Understand	CO2	CLO 3	AEC018.02
8	Define Waveguide Dispersion.	A type of dispersion caused by the different refractive indexes of the core and cladding of an optical fiber. Regardless of the nature of the light source and optical fiber,	Understand	CO2	CLO 3	AEC018.02
9	Define Semiconductor fabrication.	Semiconductor device fabrication is the process used to manufacture semiconductor devices, typically the metal-oxide-semiconductor (MOS) devices used in the integrated circuit (IC) chips that are present in everyday electrical and electronic devices.	Understand	CO2	CLO 3	AEC018.02
10	Define LED.	a light-emitting diode (a semiconductor diode which glows when a voltage is applied)	Understand	CO2	CLO 3	AEC018.02
11	Define LASER Diode.	A laser diode, also known as an injection laser or diode laser, is a semiconductor device that produces coherent radiation	Understand	CO2	CLO 4	AEC018.02
12	Define principles of operation	Operating Principles, or as they are often referred to, a company's operating system, are essentially the way that organizations put their values into practice and get things done.	Understand	CO2	CLO5	AEC018.02
13	Define phase noise.	phase noise is the frequency-domain representation of random fluctuations in the phase of a waveform,	Understand	CO2	CLO 3	AEC018.02
14	Define switching	Switch data to transmit it between specific points on a network. There are 3 common switching techniques: Circuit Switching. Packet Switching.	Understand	CO2	CLO 3	AEC018.02
15	Define modulation.	Modulation is the process of varying one or more properties of a periodic waveform, called the carrier signal, with a modulating signal that typically contains information to be transmitted.	Understand	CO2	CLO 5	AEC018.02

### UNIT-III

1	Define optical detector.	Optical Detector. a device whose change in state or response under the action of a flux of optical radiation is used to detect the radiation,	Understand	CO3	CLO 6	AEC018.05
2	What is PIN diode?	A semiconductor diode comprising of two heavily doped p-type and n-type semiconductor materials separated by a very high resistivity	Understand	CO3	CLO7	AEC018.05
3	Define Point contact diode.	One of the early microwave devices. It uses a metal semiconductor junction and was used earlier for microwave mixing and detection applications.	Understand	CO3	CLO9	AEC018.05
4	Define frequency pulling.	Magnetron is also sensitive to frequency variation due to changes in load impedance. These frequency variations are known as frequency pulling.	Understand	CO3	CLO8	AEC018.05

5	Define Light Emitting Diode.	The LED is a PN-junction diode which emits light when an electric current passes through it in the forward direction. In the LED, the recombination of charge carrier takes place.	Understand	CO3	CLO7	AEC018.05
6	Define Light wave detection.	You are surrounded by electromagnetic waves. They're everywhere! From the light you can see, to the infrared your body is producing, to the ultraviolet coming through	Understand	CO3	CLO9	AEC018.05
7	Define modulation property	A property of the Fourier transform in which the Fourier transform of a modulated signal $c(t)e^{j\omega t}$ is equal to $C(\omega - \omega_0)$ , where $C(\omega)$ is the Fourier transform of $c(t)$ .	Understand	CO3	CLO8	AEC018.05
8	Define modulated signal.	The resultant signal after the process of modulation is called as a modulated signal.	Understand	CO3	CLO7	AEC018.05
9	What is over modulation?	Over modulation is the condition that prevails in telecommunication when the instantaneous level of the modulating signal exceeds the value necessary to produce 100% modulation of the carrier	Understand	CO3	CLO7	AEC018.05
10	What is need for modulation?	Baseband signals are incompatible for direct transmission. For such a signal, to travel longer distances, its strength has to be increased by modulation	Understand	CO3	CLO9	AEC018.05
11	Define Demodulation.	Recovery of message signal from modulated wave is called demodulation	Understand	CO3	CLO 8	AEC018.05
12	What is communication system?	Communication system is used to transfer the message signal from transmitter to receiver.	Understand	CO3	CLO 7	AEC018.06
13	Define high level modulation.	High level modulation is the modulation in which modulation is done at high power level.	Understand	CO3	CLO 9	AEC018.06
14	What is multichannel CRM?	With a CRM platform that provides multichannel customer data in the form of profiles, it's easy for you to engage with customers in ways that you know will be beneficial to them. ...	Understand	C02	CLO 7	AEC018.05
15	Define Frequency Modulation.	Frequency modulation is the encoding of information in a carrier wave by varying the instantaneous frequency of the wave.	Remember	C02	CLO 9	AEC018.05
16	What is definition of modulation?	The modulation is the process of varying one or more properties of a periodic waveform, called the carrier signal,	Remember	C02	CLO 8	AEC018.06
17	Define of Multichannel.	Multichannel marketing can be defined in a number of ways, but at the most basic level it breaks down as follows: Multichannel marketing is the implementation ...	Remember	C02	CLO 7	AEC018.06
<b>UNIT-IV</b>						
1	Define optical amplifiers	An optical amplifier is a device that amplifies an optical signal directly, without the need to first convert it to an electrical signal. An optical amplifier may be thought of as a laser without an optical cavity,	Understand	C04	CLO 10	AEC018.07
2	Define semiconductor amplifier	A semiconductor optical amplifier is an optical amplifier based on a semiconductor gain medium. It is essentially like a laser diode where the end mirrors have been replaced with anti-reflection coatings	Understand	C04	CLO 11	AEC018.07



3	What is optical fiber amplifier?	An optical fiber amplifier is a fiber optic device used to amplify optical signals directly without conversion into electrical signals.	Understand	C04	CLO 12	AEC018.07
4	Define erbium-doped fiber amplifier	An erbium-doped fiber amplifier (EDFA) is a device that amplifies an optical fiber signal. It is used in the telecommunications field and in various types of research fields.	Understand	C04	CLO 10	AEC018.07
5	Define Raman amplifier	A Raman amplifier is an optical amplifier based on Raman gain, which results from the effect of stimulated Raman scattering. The Raman-active medium is often an optical fiber,	Understand	C04	CLO 11	AEC018.07
6	Why is Erbium used in EDFA?	EDFA - erbium-doped fiber amplifier. Erbium-doped fiber amplifier (EDFA) is an optical repeater device that is used to boost the intensity of optical signals being carried through a fiber optic communications system.	Remember	C04	CLO 12	AEC018.07
7	Who invented EDFA?	I think we all agree on the fact that the real inventor of EDFA concept is Snitzer who made work on neodymium and Erbium fiber amplifiers.	Remember	C04	CLO 10	AEC018.08
8	Define Brillouin amplifier	Characteristics of fibre Brillouin amplification are a narrow bandwidth and a high small-signal gain. With a bandwidth of around 10 MHz,	Understand	C04	CLO 12	AEC018.08
9	Define amplifier noise.	Noise in Amplifier. ... Noise is an unwanted signal that creates disturbance to the desired signal content in the system. This can be an additional signal that is produced within the system	Understand	C04	CLO 11	AEC018.07
10	What is transit time noise?	Transit-time noise is a similar phenomenon to shot noise in that it affects systems more as they get smaller due to the quantized nature of electricity.	Understand	C04	CLO 12	AEC018.08
11	Define signal to noise ratio	Signal-to-noise ratio is a measure used in science and engineering that compares the level of a desired signal to the level of background noise. SNR is defined as the ratio of signal power to the noise power,	Understand	C04	CLO 12	AEC018.08
12	Define gain	The factor by which power or voltage is increased in an amplifier or other electronic device, usually expressed as a logarithm.	Understand	C04	CLO 11	AEC018.08
13	Define gain bandwidth	The Gain-Bandwidth of the circuit (usually amplifier) is the product of the bandwidth and the gain at which the bandwidth is measured. For an operational amplifier,	Understand	C04	CLO 12	AEC018.08
14	Define gain and noise dependencies.	It is the increase in noise power of a device from the input to the output that is greater than the signal gain. In effect, it is the amount of decrease of the signal-to-noise ratio.	Understand	C04	CLO 11	AEC018.08
15	Define inter modulation effects	Inter modulation causes spurious emissions that can create minor to severe interference to other operations on the signal. Although IMD may affect many types of signal data,	Understand	C04	CLO 12	AEC018.08
<b>UNIT-V</b>						
1	Define Optical networks	An optical network is a type of data communication network built with optical fiber technology.	Understand	CO5	CLO13	AEC018.09

2	Define SONET.	Synchronous optical networking (SONET) is a standardized digital communication protocol that is used to transmit a large volume of data over relatively long distances using a fiber optic medium.	Understand	CO5	CLO15	AEC018.09
3	What is a Sonet ring?	SONET rings, known as "self-healing rings," use two or more transmission paths between network nodes, which are typically digital cross-connects (DCSs)	Remember	CO5	CLO15	AEC018.09
4	Define ATM.	a machine that dispenses cash or performs other banking services when an account holder inserts a bank card.	Understand	CO5	CLO 14	AEC018.09
5	What is a IP	The Internet Protocol (IP) is the method or protocol by which data is sent from one computer to another on the Internet. Each computer (known as a host)	Remember	CO5	CLO15	AEC018.09
6	Define wavelength routed networks	A network which uses this procedure is called a wavelength routed network . A wavelength router may be looked upon as a fixed wavelength de multiplexer which directs different wavelengths to different ports.	Remember	CO5	CLO 14	AEC018.09
7	Define communication system.	communication system is a collection of individual communications networks, transmission systems, relay stations, tributary stations, and data terminal equipment (DTE)	Understand	CO5	CLO 13	AEC018.09
8	Define fiber soliton.	A soliton is a special form of light pulse that can be transmitted over a fiber optic channel. Potentially, a soliton retains its shape or wavelength over a longer distance than ordinary light pulses	Understand	CO5	CLO 15	AEC018.09
9	Define solitonbased communication system design	In optics, the term soliton is used to refer to any optical field that does not change during propagation because of a delicate balance between nonlinear and linear effects in the medium. .	Understand	CO5	CLO15	AEC018.09
10	Define sdh	SDH (Synchronous Digital Hierarchy) is a standard technology for synchronous data transmission on optical media. ..	Understand	CO5	CLO 13	AEC018.09
11	What is SDH frame structure?	The STM-1 frame is on the basic transmission format for SDH (Synchronous Digital Hierarchy). A STM-1 frame has a byte-oriented structure with 9 rows and 270 columns of bytes,	Understand	CO5	CLO 15	AEC018.09
12	Define optical networks.	An optical network is a type of data communication network built with optical fiber technology. It utilizes optical fiber cables as the primary communication medium for converting data and passing data as light pulses between sender and receiver nodes.	Understand	CO5	CLO15	AEC018.09
13	What is ATM in simple words?	The full form of ATM is Automated Teller Machine for short, is a machine that lets people take out (withdraw) cash from their bank accounts. ...	Understand	CO5	CLO 13	AEC018.09
14	What is the history of ATM?	The ATM made its debut at Barclays' Enfield Town branch in north London in June 1967. Its invention is credited to British inventor John Shepherd-Barron.	Remember	CO5	CLO 15	AEC018.09

15	Define high capacity and WDM soliton	High Performance Soliton WDM Optical Communication System ... and capacity of optical data solitary pulse were indeed possible theoretically. .	Remember	CO5	CLO15	AEC018.09
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