#### 2000 **INSTITUTE OF AERONAUTICAL ENGINEERING**

**(Autonomous)** Dundigal, Hyderabad - 500 043

# **ELECTRONICS AND COMMUNICATION ENGINEERING**

# **DEFINITIONS AND TERMINOLOGY**

Course Name	:	ELECTRONIC CIRCUIT ANALYSIS
Course Code	:	AEC004
Program	:	B. Tech
Semester	:	IV
Branch	:	Electronics and Communication Engineering
Section	:	A,B,C,D
Academic Year	:	2018-2019
Course Faculty	:	Mr. K. Ravi, Assistant Professor, ECE C Srihari, Assistant Professor, ECE G.Mary swarna latha, Assistant Professor, ECE J.Siva rama krishna, Assistant Professor, ECE
OBJECTIVES		

### **OBJECTIVES**

ARE

Ι	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 TERMINOLOGYQUESTION BANK

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code				
	UNIT - I								
1	Define Zparameters	The Z-parameters are defined as a impedance parameters with vltage as dependent and current as independent variables	Understand	CLO 1	AEC004.01				
2	Define Yparameers	The Y-parameters are defined as admittance prameters with current as dependent and voltage as independent parameters	Understand	CLO 1	AEC004.01				
3	Define Hparameters	The H-parameters are defined as hybrid paramters with input voltage, output current as independent and input current, output vtage as independent parameters	Understand	CLO 1	AEC004.01				
4	Define h <sub>i</sub>	It is defined as a short circuit input impedence	Understand	CLO 1	AEC004.01				
4	Define h <sub>r</sub>	It is defined as a open circuit reverse voltage transfer ratio	Understand	CLO 1	AEC004.01				
5	Define h <sub>o</sub>	It is defined as a op <mark>en circuit output admittance</mark>	Understand	CLO 1	AEC004.01				
6	Define h <sub>f</sub>	It is defined as a short circuit forward current gain	Understand	CLO 1	AEC004.01				
7	Define input impedance	Input impedance of a circuit is defined as the ratio of input vltage to input current	Understand	CLO 1	AEC004.01				
8	Define output impedance	Output impedance of a circuit is defined as the ratio of output vltage to output current	Understand	CLO 1	AEC004.01				
9	Define voltage gain	Voltage gain of an amplifier is defined as thratio of output vtage to input voltage	Understand	CLO 1	AEC004.01				
10	Define current gain	Current gain of an amplifier is defined as the ratio of output current to input current	Understand	CLO 1	AEC004.01				
12	What are hparameters?	H-parameters are one system for characterizing bipolar transistors amplifiers like voltage gain, current gain ,input resistance and output resistance.	Remember	CLO 2	AEC004.02				
13	Define miller's theorem.	The Miller's theorem establishes that in a linear circuit, if there exists a branch with impedance Z, connecting two nodes with nodal voltages $V_1$ and $V_2$ , we can replace this branch by two branches connecting the corresponding nodes to ground by impedances respectively $Z / (1-K)$ and $KZ / (K-1)$ , where $K = V_2 / V_1$ .	Understand	CLO 1	AEC004.01				
14	Define frequency response of an amplifier.	Frequency response is the quantitative measure of the output spectrum of a system or device in response to a stimulus, and is used to characterize the dynamics of the system. It is a measure of magnitude and phase of the output as a function of frequency.	Understand	CLO 1	AEC004.01				

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
15	Define bandwidth.	It is a difference between Higher and Lower cutoff frequencies.	Understand	CLO 2	AEC004.02
16	Define CE amplifier	An amplifier is said to be CE amplifier if emitter terminal is common to input and output ports	Understand	CLO 1	AEC004.01
17	Define CB amplifier	An amplifier is said to be CB amplifier if base terminal is common to input and output ports	Understand	CLO 1	AEC004.01
18	Define CC amplifier	An amplifier is said to be CC amplifier if collector terminal is common to input and output ports	Understand	CLO 1	AEC004.01
19	Define two-port network	Two-port network of an equivalent circuit is defined as circuit having input port and output port	Understand	CLO 1	AEC004.01
20	Define a Q-point	Q-point is a operating point of a transistor amplifier	Understand	CLO 1	AEC004.01
21	Define ac input	The ac input to a circuit is defined as sinusoidal signal with certain amplitude and frequency	Understand	CLO 2	AEC004.02
22	Define DC input	The DC input to a circuit is defined as biasing voltage to the transistor amplifier	Understand	CLO 2	AEC004.02
23	Define amplifier?	An electronic circuit that increases the amplitude of input signal by keeping the frequency unchanged.	understanding	1	CAEC004.01
24	What are transistor h- parameters?	These are the process parameters of the transistor which can decide the performance of transistor.         They are         (i)       Input impedance (h <sub>11</sub> )         (ii)       Reverse Voltage Gain (h <sub>12</sub> )         (iii)       Forward Current Gain (h <sub>21</sub> )         (iv)       Output admittance (h <sub>22</sub> )	remembering	1	CAEC004.01
25	Define Miller's theorem?	Millers theorem states that if impedance is connected in between and in series with input and output ports then that impedance is replaced by its equivalent input and output impedances.	Understanding	3	CAEC004.03
26	Define dual of Miller's Theorem?	It states that if impedance is connected in between and in parallel with input and output ports then that impedance is replaced by its equivalent input and output impedances.	understanding	3	CAEC004.03
27	What is meant by coupling?	In electronic circuits, coupling is the process of making a connection between two stages.	Understanding	2	CAEC004.02
28	List various coupling schemes	(i) RC coupling (ii) LC coupling (iii) Transformer coupling Direct coupling	Remembering	2	CAEC004.02

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
29	Define frequency response and its bands for an amplifier?	Frequency response describes the behavior of the system (Amplifier) at various frequencies of input signal. Frequency response consists of three bands. They are (i) Low frequency band (ii) Mid frequency band High frequency band	Understanding	3	CAEC004.03
30	List various types of analysis associated with an amplifier?	<ul> <li>(i) DC analysis</li> <li>(ii) Small Signal Analysis (Mid Band Analysis)</li> <li>(iii) AC Analysis</li> <li>Low Frequency Analysis</li> <li>High Frequency Analysis</li> </ul>	Remembering	1	CAEC004.01
31	What is the use of low frequency analysis?	This type of ac analysis is used to know the behavior of the system (Amplifier) at low frequencies of the signal and helps to find the lower cutoff frequency.	Remembering	2	CAEC004.02
32	Define lower cutoff frequency?	The low frequency of the signal at which gain of the system (Amplifier) drops by 3dB from its maximum value	Understanding	2	CAEC004.02
33	What is the effect of coupling and bypass capacitors at low frequency?	At low frequencies, the coupling and bypass capacitors offers some reactance. Due to this reactance there is reduction in gain of the system at low frequency. And these capacitors play an important role in deciding lower cut off frequency for an amplifier.	Understanding	3	CAEC004.03
34	What is circuit analysis?	The process of studying and analyzing the various electrical quantities involved, especially the nodal voltages and currents through calculations in an electrical circuit is known as circuit analysis.	Understand	CLO 1	AEC004.01
35	What is an amplifier?	An amplifier is an electronic device that increases the voltage, current, or power of a signal. Amplifiers are used in wireless communications and broadcasting, and in audio equipment of all kinds.	Understand	CLO 1	AEC004.01
36	Define voltage.	It is defined as amount of pressure required to force a current of one ampere through a resistance of one Ohm. The unit of voltage is Volt (V).	Understand	CLO 1	AEC004.01
37	Define circuit.	<i>Circuit</i> comes from the word <i>circle</i> . A circuit is a collection of real components, power sources, and signal sources, all connected so current can flow in a complete circle.	Understand	CLO 1	AEC004.01
38	Define closed circuit	A circuit is <i>closed</i> if the circle is complete, if all currents have a path back to where they came from.	Understand	CLO 1	AEC004.01
39	Define open circuit	A circuit is <i>open</i> if the circle is not complete, if there is a gap or opening in the path.	Understand	CLO 1	AEC004.01
40	Define Short circuit	A short happens when a path of low resistance is connected (usually by mistake) to a component. The resistor shown below is the intended path for current, and the curved wire going around it is the short. Current is diverted away from its intended path, sometimes with damaging results. The wire <i>shorts out</i> the resistor by providing a low-resistance path for current	Understand	CLO 1	AEC004.01

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code			
41	Define electronic circuit	An electronic circuit is composed of individual electronic components such as resistors, transistors, capacitors, inductors and diodes.	Understand	CLO 1	AEC004.01			
42	Define analog circuits	Analog circuits are those in which current or voltage may vary continuously with time to correspond to the information being represented.	Understand	CLO 2	AEC004.02			
43	Define digital circuits	Digital circuits are those in which electric signals take on discrete values, to represent logical and numeric values.	Understand	CLO 1	AEC004.01			
44	Define current.	It is defined as the quantity of current forced by a pressure of one volt through a resistance of one Ohm. The unit of current is Ampere (A).	Understand	CLO 1	AEC004.01			
	UNIT – II							
1	Define common base amplifier	A single transistor <b>BJT</b> amplifier in which the input signal is applied to the emitter terminal, the output is taken from the collector terminal, and the base terminal is connected to a constant voltage.	Understand	CLO 2	AEC004.02			
2	Define common collector amplifier	A single transistor BJT amplifier in which the input signal is applied to the base terminal, the output is taken from the emitter terminal, and the collector terminal is connected to a constant voltage.	Remember	CLO 2	AEC004.02			
3	What is common emitter?	A basic transistor whose emitter is common to both input and output ports.	Remember	CLO 3	AEC004.03			
4	Define common emitter amplifier	A single transistor BJT amplifier in which the input signal is applied to the base terminal.	Remember	CLO 3	AEC004.03			
5	Define gain– bandwidth product	The product of gain-bandwidth of an amplifier.	Understand	CLO 6	AEC004.06			
6	Define Miller capacitance	Miller capacitance is an excess amount of capacitance that appears in parallel with the input of an inverting amplifier stage.	Understand	CLO 2	AEC004.02			
7	Define processing amplifier.	High-performance amplifier that regenerates as well as amplifies the signal being processed.	Understand	CLO 2	AEC004.02			
8	Define active RC filter.	An electronic circuit made up of resistors, capacitors, and operational amplifiers that provide well- controlled linear frequencydependent functions, e.g.,low-, high-, and bandpass filters.	Understand	CLO 2	AEC004.02			
9	Define active region.	Semiconductor material doped such that electrons and/or holes are free to move when the material is biased.	Remember	CLO 3	AEC004.03			
10	Define biasing	The technique of applying a direct current voltage to a transistor or an active network to establish the desired operating point.	Understand	CLO 2	AEC004.02			
11	Define cutoff region.	The region in which both emitter and collector base junctions are reverse biased.	Understand	CLO 5	AEC004.05			
12	Define emitter capacitance.	Diffusion or emitter Capacitance is the capacitance due to transport of charge carriers between two terminals of a device, for example, the diffusion of carriers from anode to cathode in forward bias mode of a diode or from emitter to baseforward-biased junction for a transistor	Understand	CLO 2	AEC004.02			

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
14	Define transconductance.	It is defined as the ratio of the change in current at the output terminal to the change in the voltage at the input terminal of an active device.	Remember	CLO 3	AEC004.03
15	What is an emitter follower?	A common collector amplifier (also known as an emitter follower) is one of three basic single- stage bipolar junction transistor (BJT) amplifier topologies, typically used as a voltage buffer.	Remember	CLO 3	AEC004.03
16	Define schematic.	A <i>schematic</i> is a drawing of a circuit. A schematic represents circuit elements with symbols and connections as lines.	Understand	CLO 6	AEC004.06
17	Define node and branch.	A junction where 2 or more elements connect is called a node. Branches are the connections between nodes. A branch is an element (resistor, capacitor, source, etc.). The number of branches in a circuit is equal to the number of elements.	Understand	CLO 2	AEC004.02
18	Define loop.	A loop is any closed path going through circuit elements. To draw a loop, select any node as a starting point and draw a path through elements and nodes until the path comes back to the node where you started. There is only one rule: a loop can visit (pass through) a node only one time. It is ok if loops overlap or contain other loops.	Understand	CLO 2	AEC004.02
19	Define small signal amolifier.	Small signal amplifies are designed to amplify very small signal voltage levels of only a few micro-volts ( $\mu$ V) from sensors	Understand	CLO 2	AEC004.02
20	What Pi- Capacitance?	It is the capacitance developed across base and emitter terminals of the transistor in active mode of operation.	Remembering	5	CAEC004.05
21	What is Pi- Conductance?	It is the conductance developed across base and emitter terminals of the transistor in active mode of operation.	Remembering	5	CAEC004.05
22	Define Depletion capacitance	It is the capacitance developed across base and emitter terminals of the transistor under thermal equilibrium condition.	Understanding	5	CAEC004.05
23	Define Diffusion Capacitance?	It is also called as base storage capacitance. It is due to the presence of minority charge in base region for some time.	Understanding	5	CAEC004.05
24	Define forward base transit time?	It is defined as the average time a charge carrier spends in crossing the base. Typically its value ranges from 10ps to 100ps.	Understanding	5	CAEC004.05
25	What is the effect of coupling and bypass capacitors at high frequency?	At high frequencies, these capacitors offer negligible reactance. So, they are replaced by short circuits at high frequencies.	Remembering	6	CAEC004.06
26	What is beta cutoff frequency?	It is defined as the signal frequency at which short circuit current gain $(h_{fe})$ of the transistor drops by 3dB from its maximum value	Understanding	6	CAEC004.06
27	What is transition frequency?	It is the signal frequency at which short circuit current gain of the transistor becomes 0dB. It is also as unity gain frequency or unity gain bandwidth.	Understanding	6	CAEC004.06
28	Define bandwidth of an amplifier?	Bandwidth is defined as the range of frequencies allowed by an amplifier to produce undistorted amplified output.	Understanding	6	CAEC004.06
29	What is Gain bandwidth product?	It is figure of merit of an amplifier and it is the multiplication of gain and bandwidth	Remembering	6	CAEC004.06

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code		
30	What is voltage gain?	Voltage gain is term related to amplifier capacity, amplifier amplify the amplitude of signal it means convert Vin (low ) to Vout(high). It is ratio of this output to input is called voltage gain.	Understand	CLO 2	AEC004.02		
31	Define broadband	A transmission medium with enough bandwidth to carry multiple voice, video, or data channels simultaneously.	Understand	CLO 2	AEC004.02		
32	Define gain.	The amount of amplification accomplished by an amplifier circuit. For instance, a gain of 2 would mean the output is scaled to twice the amplitude of the input.	Understand	CLO 2	AEC004.02		
33	Define hybridpi model	The hybrid-pi model is a popular circuit model used for analyzing the small signal behavior of bipolar junction and field effect transistors at high frequencies. Sometimes it is also called Giacoletto model because it was introduced by L.J. Giacoletto in 1969.	Remember	CLO 3	AEC004.03		
34	What is bypass capacitor	A bypass capacitor is a capacitor that shorts AC signals to ground, so that any AC noise that may be present on a DC signal is removed, producing a much cleaner and pure DC signal.	Understand	CLO 2	AEC004.02		
35	What is coupling capacitor	A coupling capacitor is a capacitor which is used to couple or link together only the AC signal from one circuit element to another. The capacitor blocks the DC signal from entering the second element and, thus, only passes the AC signal.	Understand	CLO 2	AEC004.02		
36	Define cutoff frequency	The cutoff frequency by definition is the halfpower frequency and is the frequency where the power gain is half at a mid-band frequency – i.e. between the lower and upper cutoff frequencies where frequency effects can be ignored.	Remember	CLO 2	AEC004.02		
37	Define Alpha cutoff frequency	Alpha cutoff frequency ( $f_{\alpha}$ ) is a particular frequency, that occurs when the common base DC current gain ( $\alpha$ ) drops to 0.707 of its low frequency value.	Remember	CLO 3	AEC004.03		
38	Define beta cutoff frequency	Beta cutoff frequency $(f_{\beta})$ is a particular frequency that occurs when the common emitter current gain $(\beta)$ value drops to 0.707 of its low frequency value.	Remember	CLO 3	AEC004.03		
39	Define gain– bandwidth product	The gain–bandwidth product (designated as GBWP, GBW, GBP, or GB) for an amplifier is the product of the amplifier's bandwidth and the gain at which the bandwidth is measured	Understand	CLO 6	AEC004.06		
40	Define frequency $f_T$	The frequency at which the magnitude short ckt. current gain of $C_E$ amplifier reduces to unity is defined as frequency $f_{T_c}$	Understand	CLO 5	AEC004.05		
UNIT – III							
1	Define AC coupling	AC coupling a method of connecting two circuits that allows displacement current to flow while preventing conductive currents. Reactive impedance devices	Understand	CLO 9	AEC004.09		
2	Define active load.	Active load a transistor connected so as to replace a function that would conventionally be performed by a passive component such as a resistor, capacitor, or inductor	Remember	CLO 9	AEC004.09		
3	Define amplitude response	Amplitude response the magnitude of the steady-state response of a fixed, linear system to a unit- amplitude input sinusoid.	Understand	CLO 9	AEC004.09		

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
4	Define common drain amplifier	Common drain amplifier a single tran- sistor FET amplifier in which the input signal is applied to the gate terminal, the output is taken from the source terminal.	Understand	CLO 9	AEC004.09
5	Define common gate amplifier	Common gate amplifier a single- transistor FET amplifier in which the input signal is applied to the source terminal, the output is taken from the drain terminal, and the gate terminal is connected to a constant voltage.	Remember	CLO 9	AEC004.09
6	Define common source amplifier	Common source amplifier a single- transistor FET amplifier in which the input signal is applied to the gate terminal, the out- put is taken from the drain terminal, and the source terminal is connected to a constant voltage.	Understand	CLO 7	AEC004.07
7	Define conduction angle	Conduction angle the period during which a device is conducting, i.e., carrying current.	Understand	CLO 8	AEC004.08
8	Define DC input power	DC input power the total DC or bias power dissipated in a circuit, which is usually dependent on signal amplitudes, expressed in watts.	Remember	CLO 7	AEC004.07
9	Define Series Tuned Circuit	The inductor and capacitor connected in series make a series tuned circuit. At resonant frequency, a series resonant circuit offers low impedance which allows high current through it.	Understand	CLO 7	AEC004.07
10	Define Parallel Tuned Cicuit	The inductor and capacitor connected in parallel make a parallel tuned circuit.	Remember	CLO 7	AEC004.07
12	Define decibel	Decibel (dB)a unit of measure that de- scribes the ratio between two quantities in terms of a base 10 logarithm.	Understand	CLO 8	AEC004.08
13	What is the effect of cascading?	The demand for additional gain and bandwidth at high frequency normally presents the need to cascade amplifying circuits. However cascading technique always has a drawback of shrinking bandwidth. Cascade-cascode amplifier is hereby modified to have an enhanced bandwidth through the application of negative feedback.	Understand	CLO 9	AEC004.09
15	Define stability of an tuned amplifier.	Stability and Power Gain of Tuned Transistor Amplifiers. Abstract: The transistor is a non unilateral device which, if appropriately terminated, can become unstable at frequencies where its "internal feedback" is sufficiently large.	Understand	CLO 9	AEC004.09
16	What is stagger tuned amplifier?	In this configuration one or more tuned amplifiers are cascaded each amplifier stage is tuned to different frequencies. This results in decreased gain and increased bandwidth.	Understand	CLO 9	AEC004.09
17	What is the effect of 'Q' on stability?	Higher the value of Q provides better selectivity, but smaller bandwidth and larger gain. Hence it provides less stability.	Remember	CLO 9	AEC004.09
18	What is meant by unloaded and loaded Q of tank circuit?	Unloaded Q is the ratio of stored energy to dissipated energy in a reactor or resonator. The loaded Q (or) QL of a resonator is determined by how tightly the resonator is coupled to its terminations.	Understand	CLO 7	AEC004.07

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
19	What is amplitude stabilization circuit?	A circuit used to obtain a precise oscillation amplitude of oscillators. These circuits are used in instrumentation when it is required to increase the purity of output signal and reduce the frequency depression of the main harmonic by higher harmonics.	Understand	CLO 8	AEC004.08
20	Define open loop gain.	he gain of an operational amplifier with no feedback applied (with the negative feedback loop "open").	Remember	CLO 7	AEC004.07
21	Define closed loop gain.	he gain of an opera- tional amplifier circuit with negative feed- back applied (with the negative feedback loop "closed").	Understand	CLO 7	AEC004.07
22	Define double tuned	double tuned is a circuit, amplifier, or other device having a response that is the same as two single-tuned circuits	Remember	CLO 7	AEC004.07
23	Define single-tuned circuit	single-tuned circuit a circuit which is tuned by varying only one of it's omponents, e.g., an IF transformer in which only the sec- ondary coil (rather than both primary and sec- ondary) is tuned.	Understand	CLO 8	AEC004.08
24	What is multi stage amplifier?	An amplifier consisting of more than one internal amplifying stages is called multi-stage amplifier	Understanding	7	CAEC004.07
25	What is RC Coupling?	If the connection is made between two adjacent stages in system is through an RC network then that kind of connection is called RC coupling	Understanding	7	CAEC004.07
26	What is LC coupling?	If the connection is made between two adjacent stages in system is through an LC network then that kind of connection is called LC coupling	Understanding	7	CAEC004.07
27	What is transformer coupling?	If the connection is made between two adjacent stages in system is through a transformer then that kind of connection is called Transformer coupling	Understanding	7	CAEC004.07
28	What is direct coupling?	If the connection is made between two adjacent stages in system is directly through a wire then that kind of connection is called direct coupling	Understanding	7	CAEC004.07
29	What is cascading?	The process of connecting two similar stages such that output of preceding stage is connected to input of succeeding stage is called cascading.	Understanding	8	CAEC004.08
30	What is cascoding?	Cascading of CE and CB configurations respectively is called cascoding. This type of configuration is used in high gain and wide band applications.	Understanding	8	CAEC004.08
31	What is Darlington Pair?	The multistage amplifier obtained by cascading two CC amplifiers is called Darlington Pair. It is used in impedance matching applications.	Understanding	8	CAEC004.08
32	What is tuned amplifier?	It is the amplifier that increases the amplitude of the input signal of particular frequency. That particular frequency of the signal is decided by the tuned circuit of the amplifier.	Understanding	9	CAEC004.09
33	Define Q-factor?	The quality factor or $Q$ factor is a dimensionless parameter that describes how under damped an oscillator or resonator is, and characterizes a resonator's bandwidth relative to its centre frequency.	Understanding	10	CAEC004.10

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
		Higher Q indicates a lower rate of energy loss relative to the stored energy of the resonator; the oscillations die out more slowly			
34	What is the effect of cascading on gain of the amplifier?	Cascading between two amplifiers increases the overall gain of the circuit.	Remembering	10	CAEC004.10
35	What is the effect of cascading on bandwidth of the amplifier?	Cascading between two amplifiers decreases the overall bandwidth of the circuit by increasing lower cutoff frequency and decreasing higher cutoff frequency.	Remembering	10	CAEC004.10
36	Define cascade amplifier.	A cascade amplifier is any two-port network constructed from a series of amplifiers, where each amplifier sends its output to the input of the next amplifier in a daisy chain. The complication in calculating the gain of cascaded stages is the non-ideal coupling between stages due to loading.	Understand	CLO 7	AEC004.07
37	Define cascode amplifier.	The cascode is a two-stage amplifier that consists of a common-emitter stage feeding into a common-base stage.	Understand	CLO 8	AEC004.08
38	What is RC Coupled Amplifier	A Resistance Capacitance (RC) Coupled Amplifier is basically a multi-stage amplifier circuit extensively used in electronic circuits. Here the individual stages of the amplifier are connected together using a resistor–capacitor combination due to which it bears its name as RC Coupled.	Remember	CLO 7	AEC004.07
39	What is direct coupled amplifier?	A direct-coupled amplifier or DC amplifier is a type of amplifier in which the output of one stage of the amplifier is coupled to the input of the next stage in such a way as to permit signals with zero frequency, also referred to as direct current, to pass from input to output.	Understand	CLO 7	AEC004.07
40	What is transformer coupled amplifier?	A transformer coupled amplifier is a type of amplifier in which the output of one stage of the amplifier is coupled to the input of the next stage in the low resistance of one stage or load can be reflected as a high load resistance to the previous stage. Transformer coupling is normally used when the load is small. It is mostly used for power amplification.	Remember	CLO 7	AEC004.07
41	what is Darlington amplifier	A Darlington pair is two transistors that act as a single transistor but with a much higher current gain. This mean that a tiny amount of current from a sensor, micro-controller or similar can be used to drive a larger load	Understand	CLO 8	AEC004.08
42	What is the effect of cascading?	The demand for additional gain and bandwidth at high frequency normally presents the need to cascade amplifying circuits. However cascading technique always has a drawback of shrinking bandwidth. Cascade-cascode amplifier is hereby modified to have an enhanced bandwidth through the application of negative feedback.	Understand	CLO 7	AEC004.07
43	What do you mean by Tuned amplifier?	Tuned amplifiers are amplifiers that are designed to reject a certain range of frequencies below a lower cut off frequency $\omega L$ and above a upper cut off frequency $\omega H$ and allows only a narrow band of frequencies.	Understand	CLO 9	AEC004.09
44	Define resonance?	The reactance of the capacitor equals that ofthe inductor reactance.i.e $\omega C. = 1 / \omega L.$	Remember	CLO 9	AEC004.09

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
45	What is Quality factor?	The ratio of inductive reactance of the coil at resonance to its resistance is known as quality factor. Q = XL / R	Understand	CLO 9	AEC004.09
46	Define gain bandwidth product of a tuned amplifier?	The gain bandwidth (GBW) product is a figure of merit defined in terms of mid band gain and upper 3-db frequency fh as GBW =   Aim fh   = $gm / 2\pi c$	Understand	CLO 9	AEC004.09
		UNIT - IV			
1	Define stability of an Oscillator?	The frequency stability of an Oscillation is a measure of its ability to maintain the required frequency as precisely constant as possible over a long period of time interval.	Remember	CLO 11	AEC004.11
2	What is meant by resonant Circuit Oscillators?	LC Oscillators are known as resonant circuit oscillator because the frequency of operation of LC Oscillator is nothing but a resonant frequency of tank circuit or LC tank circuit produces sustained Oscillation at the resonant circuit oscillator.	Understand	CLO 13	AEC004.13
3	What is negative resistance?	It is defined as the resistance of a device which offers when operated in the negative resistance region.	Remember	CLO 13	AEC004.13
4	Define phase Margin?	It is defined as 1800 minus the Magnitude of angle of A $\beta$ at the frequency at which $/A\beta$ / is unity.	Understand	CLO 12	AEC004.12
5	Define gain Margin?	It is defined as the value of $\langle A\beta \rangle$ in decibels at the frequency at which the phase angle of $A\beta$ is 180°.	Remember	CLO 12	AEC004.12
6	What is a beat frequency oscillator?	Beat frequency Oscillator (BFO) is an Oscillator in which a deserved signals frequency such as the beat frequency produced by combining the different signal frequencies such as on different radio frequencies.	Remember	CLO 10	AEC004.10
7	Define CMRR	The common-mode rejection ratio(CMRR) of a differential amplifier is defined as the ratio of the differential-mode gain to commonmode gain.	Understand	CLO 10	AEC004.10
8	What is a differential amplifier?	An amplifier, which is designed to give the difference between two input signals, is called the differential amplifier.	Understand	CLO 10	AEC004.10
9	Define stability?	The variation of input is applied to the system; to get the constant output is called stability.	Understand	CLO 11	AEC004.11
10	Define switch?	A switch is a device which opens or closes the electrical circuit, i.e., can turn on or off current in an electrical circuit. An ideal switch has zero internal resistance when it is closed an infinite leakage resistance when it is open.	Remember	CLO 10	AEC004.10
11	Define loop gain?	The signal Vi is multiplied by 'A' in passing through the amplifier is multiplier by ' $\beta$ '. In transmission through the feedback network and is multiplied by '-1' in the mixer. The product of '-A $\beta$ ' is called the loop gain.	Remember	CLO 10	AEC004.10
12	Define RC Oscillators?	There oscillators use resistors and capacitors and are used to generate low or audio-frequency signals. Thus they are also known as audio-frequency (A.F.) oscillators. Such oscillators are Phase – shift and Wein-bridge oscillators.	Remember	CLO 10	AEC004.10

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
13	Define Crystal Oscillators?	These oscillators use quartz crystals and are used to generate highly stabilized output signal with frequencies up to 10 MHz. The Piezo oscillator is an example of a crystal oscillator.	Understand	CLO 10	AEC004.10
14	Define Negativeresistance Oscillator?	These oscillators use negative-resistance characteristic of the devices such as tunnel devices. A tuned diode oscillator is an example of a negative-resistance oscillator.	Remember	CLO 10	AEC004.10
15	Define degenerative feedback?	An amplifier with positive feedback produces its output to be in phase with the input and increases the strength of the signal. Positive feedback is also called as degenerative feedback or direct feedback. This kind of feedback makes a feedback amplifier, an oscillator.	Remember	CLO 10	AEC004.10
16	Define sensitivity?	Sensitivity is defined as the ratio of percentage change in voltage gain with feedback to the percentage change in voltage gain without feedback.	Remember	CLO 11	AEC004.11
17	What is transfer gain?	It is the ratio of the output signal to the input signal. It is denoted by A A=Xo/Xi	Understand	CLO 11	AEC004.11
18	.Define the feedback factor $\beta$ ?	It is the ratio between the feedback voltages to the output voltage of the amplifier. $\beta = Vf/Vo$	Understand	CLO 11	AEC004.11
19	What is Barkhausan criterion?	The conditions for oscillator to produce oscillation are given by Barkhausan criterion. They are: (i). the total phase shift produced by the circuit should be 360° or 0°.	Understand	CLO 10	AEC004.10
20	What is piezo electric effect?	The piezo electric Crystals exhibit a property that if a mechanical stress is applied across one face the electric potential is developed across opposite face. The inverse is also live. This phenomenon is called piezo electric effect.	Understand	CLO 11	AEC004.11
21	Define Desensitivity D?	Desensitivity is defined as the reciprocal of sensitivity. It indicates the factor by which the voltage gain has been reduced due to feedback network. Desensitivity factor (D) = 1+A $\beta$ . Where, A = Amplifier gain. $\beta$ = Feedback factor.	Remember	CLO 12	AEC004.12
22	What is feedback Amplifier?	An amplifier in which some portion of output is fed back to the input is called feedback amplifier.	Understanding	12	CAEC004.12
23	List various feedback amplifiers?	(i) Negative feedback amplifiers Positive feedback amplifiers	Remembering	12	CAEC004.12
24	Explain voltage series feedback configuration in brief?	It is the negative feedback amplifier configuration in which some portion of the output voltage is connected in series with input.	Understanding	13	CAEC004.13
25	Explain voltage shunt feedback configuration in brief?	It is the negative feedback amplifier configuration in which some portion of the output voltage is connected in parallel with input.	Understanding	13	CAEC004.13

S No	QUESTION	ANSWER	Blooms Level	CLO	CLO Code
26	Explain current series feedback configuration in brief?	It is the negative feedback amplifier configuration in which some portion of the output current is connected in series with input.	Understanding	13	CAEC004.13
27	Explain current shunt feedback configuration in brief?	It is the negative feedback amplifier configuration in which some portion of the output current is connected in parallel with input.	Understanding	13	CAEC004.13
28	Define oscillator?	An electronic circuit that generates a signal of fixed frequency is called oscillator. This signal frequency is decided by the circuit itself.	Understanding	11	CAEC004.11
29	What are linear oscillators?	The oscillators that generate sinusoidal signals are called linear oscillators.	Understanding	11	CAEC004.11
30	What are non linear oscillators?	The oscillators that generate non linear signals such as square ware, triangular wave, and rectangular wave are called non linear oscillators. They are also called as multivibrators	Understanding	11	CAEC004.11
31	What is audio oscillator	An oscillator that generates a signal of audio frequency range are called audio frequency oscillator. Example: RC oscillators	Understanding	11	CAEC004.11
32	What is radio oscillator?	An oscillator that generates a signal of radio frequency range are called audio frequency oscillator. Example: LC oscillators.	Understanding	11	CAEC004.11
33	List the conditions for oscillations in a circuit?	(i) Total phase shift of the circuit is 0 or 360 degrees. Loop gain is greater than or equals to 1.	Remembering	11	CAEC004.11
34	What is the total phase shift provided by the feedback network in RC Phase shift oscillator?	180 degrees	Remembering	11	CAEC004.11
35	What is the total phase shift provided by each RC section of feedback network in RC Phase shift oscillator?	60 degrees	Remembering	11	CAEC004.11
36	Define Hartley oscillator?	It is one of the LC oscillators consisting of LC network between input (base) and output (collector). The feedback is achieved by the way of inductive divider.	Understanding	11	CAEC004.11
37	Define colpitts oscillator?	It is one of the LC oscillators consisting of LC network between input (base) and output (collector). The feedback is achieved by the way of capacitive divider.	Understanding	11	CAEC004.11
38	Define crystal oscillator?	An oscillator that uses a crystal like Quartz to produce signals of fixed frequency is called crystal oscillator. It is most stable oscillator.	Understanding	11	CAEC004.11
39	What is stagger tuning?	Staggered tuning is a technique used in the design of multi-stage tuned amplifiers whereby each stage is tuned to a slightly different frequency.	Understanding	11	CAEC004.11

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40	What is a Feedback?	Feedback is basically the concept of taking output and using it as input, either to further drive the system or produce a desired output.	Remember	CLO 10	AEC004.10		
41	What is Positive feedback?	The feedback in which the feedback energy i.e., either voltage or current is in phase with the input signal and thus aids it is called as Positive feedback.	Understand	CLO 10	AEC004.10		
42	What is Negative feedback?	The feedback in which the feedback energy i.e., either voltage or current is out of phase with the input and thus opposes it, is called as Negative feedback.	Remember	CLO 10	AEC004.10		
43	What is Voltage series feedback?.	A fraction of the output voltage is applied in series with the input voltage through the feedback circuit. This is also known as shuntdriven series-fed feedback.	Remember	CLO 10	AEC004.10		
44	What is Voltage shunt feedback?	A fraction of the output voltage is applied in parallel with the input voltage through the feedback network. This is also known as shunt-driven shunt-fed feedback.	Remember	CLO 11	AEC004.11		
45	What is Current series feedback	A fraction of the output voltage is applied in series with the input voltage through the feedback circuit. This is also known as seriesdriven series-fed feedback.	Understand	CLO 11	AEC004.11		
46	What is Current shunt feedback	A fraction of the output voltage is applied in series with the input voltage through the feedback circuit. This is also known as seriesdriven shunt-fed feedback	Understand	CLO 11	AEC004.11		
47	Define Oscillator	An oscillator generates output without any ac input signal. An electronic oscillator is a circuit which converts dc energy into ac at a very high frequency. An amplifier with a positive feedback can be understood as an oscillator.	Understand	CLO 10	AEC004.10		
48	Define Sinusoidal Oscillator	The oscillators that produce an output having a sine waveform are called sinusoidal or harmonic oscillators. Such oscillators can provide output at frequencies ranging from 20 Hz to 1 GHz.	Understand	CLO 11	AEC004.11		
49	Define Non-Sinusoidal Oscillator	The oscillators that produce an output having a square, rectangular or saw-tooth waveform are called non-sinusoidal or relaxation oscillators. Such oscillators can provide output at frequencies ranging from 0 Hz to 20 MHz.	Remember	CLO 12	AEC004.12		
50	Define Tuned Circuit Oscillators	These oscillators use a tuned-circuit consisting of inductors (L) and capacitors (C) and are used to generate high-frequency signals. Thus they are also known as radio frequency R.F. oscillators. Such oscillators are Hartley, Colpitts, Clapp-oscillators etc.	Understand	CLO 12	AEC004.12		
	UNIT - V						
1	What is the configuration used in complementary symmetry power amplifier?	Matched pair of complementary symmetry transistor is used in Common Collector configuration t provide impedance matching.	Remember	CLO 16	AEC004.16		
2	What is Amplitude distortion?	Amplitude distortion occurs when the peak values of the frequency waveform are attenuated causing distortion due to a shift in the Q-point and amplification may not take place over the whole signal cycle	Remember	CLO 15	AEC004.15		

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3	Why CE configuration is most popular in amplifier circuits?	The current, voltage and power gains are quite high and the ratio of output impedance and input impedance are quite moderate.	Understand	CLO 15	AEC004.15
4	What is the function of a differential amplifier?	The function of a differential amplifier is to amplify the difference of two signal inputs	Understand	CLO 16	AEC004.16
5	What is Full bridge Amplifier?	A class-D amplifier based on a full-bridge inverter configuration.	Understand	CLO 15	AEC004.15
6	What is DC input power?	The dc input power is the power delivered to the power amplifier from the dc supply and is equal to the dc supply voltage times the current drawn from the supply (i.e. Q point current).	Understand	CLO 14	AEC004.14
7	What is Power Amplifier efficiency?	Amplifier efficiency is the ratio of ac output power (load power) to dc supply power. It measures how much of the dc power can be turned into ac signal power	Understand	CLO 14	AEC004.14
8	What is Thermal runaway?	The self destruction of an unstabilised transistor is known as thermal runaway.	Understand	CLO 15	AEC004.15
9	What is the use of compensation technique in electronic circuits?	Compensation technique is the use of temperature sensitive devices such as diodes, thermistors, sensistors etc., to stabilize the operating point instead of d.c. biasing circuits.	Remember	CLO 16	AEC004.16
10	What is the function of the Q-point?	Q- point identifies the transistor collector current and collector-emitter voltage when there is no input signal at the base.	Remember	CLO 14	AEC004.14
11	What is meant by amplifier rise time?	The difference between t2 and t1 is called the rise time tr, where, t2 is the time required for VO to reach nine tenth of its final value, and t1 is the time required for VO to reach one tenth of its final value.	Understand	CLO 14	AEC004.14
12	Define distortion?	Distortion is defined as the change of output wave shape from the input wave shape of the amplifier. An amplifier that has lesser distortion, produces a better output and hence considered efficient.	Understand	CLO 14	AEC004.14
13	Define Push-Pull configuration?	the Class A amplifier by using a combinational transistor pair called as Push-Pull configuration.	Understand	CLO 14	AEC004.14
14	Define heat sink?	A heat sink is a passive heat exchanger that transfers the heat generated by an electronic or a mechanical device to a fluid medium	Remember	CLO 14	AEC004.14
15	Define efficiency?	The efficiency of a power amplifier is defined as ratio of average signal power delivered to load to the average power drawn dc source.	Understand	CLO 14	AEC004.14
16	What is cross over distortion?	This is caused by the nonlinear input characteristics of the transistor. In the region of small input current, the output ismuch smaller. This effect is called cross over distortion.	Remember	CLO 15	AEC004.15
17	Define Harmonic distortion?	lineardynamic characteristics curve of an active device. Here new frequencies are produced in the output which arent present in the input.	Remember	CLO 16	AEC004.16

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18	What is intermodulation distortion?	Intermodulation distortion is also a non linear distortion which occurs when the input signal consists of more than one frequency.	Remember	CLO 15	AEC004.15
19	Define large signal amplifier?	It is also known as power amplifiers whose main aim is to deliver a substantial amount of power to a load.	Understand	CLO 15	AEC004.15
21	What is class AB amplifier?	Class AB mode of operation, the output current flows for more than one half cycle but less than full cycle.	Remember	CLO 14	AEC004.14
22	What is frequency distortion?	The signal components at different frequencies are amplified by different amount.	Understand	CLO 16	AEC004.16
23	Define thermal resistance in the context of power amplifier?	The resistance offered by the bipolar junction transistor to the flow of heat is called thermal resistance. The thermal resistance measured in $^{\circ}C/W = (TJ - TA)/PD$ .	Understand	CLO 16	AEC004.16
24	Classify power amplifiers?	(i) Class A (ii) Class B (iii) Class AB (iv) Class C Class D	Remembering	15	CAEC004.15
25	Define class A power amplifier?	A power amplifier that conducts the collector current for full cycle of the input signal.	Understanding	15	CAEC004.15
26	Define class B power amplifier?	A power amplifier that conducts the collector current for half cycle of the input signal.	Understanding	15	CAEC004.15
27	Define class AB power amplifier?	A power amplifier that conducts the collector current for more than half cycle of the input signal.	Understanding	15	CAEC004.15
28	Define class C power amplifier?	A power amplifier that conducts the collector current for less than half cycle of the input signal.	Understanding	15	CAEC004.15
29	Define Efficiency of power amplifier?	It defined as the capability of the power amplifier in converting DC power to AC power.	Understanding	16	CAEC004.16
30	What is push pull amplifier?	A push pull amplifier is an amplifier which has an output stage that can drive a current in either direction through the load.	Understanding	15	CAEC004.15
31	What is complementary symmetry push pull amplifier?	Push-pull amplifiers use two "complementary" or matching transistors, one being an NPN-type and the other being a PNP-type with both power transistors receiving the same input signal together that is equal in magnitude, but in opposite phase to each other. This results in one transistor only amplifying one half or 180° of the input waveform cycle while the other transistor amplifies the other half or remaining 180° of the input waveform cycle with the resulting "two- halves" being put back together again at the output terminal.	Understanding	15	CAEC004.15

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32	What is the application of power amplifier?	Power amplifier finds its application in public audio system	Understanding	16	CAEC004.16
33	List various distortions in power amplifiers?	(i)Non linear distortion(ii)Frequency distortionPhase distortion	Remembering	15	CAEC004.15
34	What is heat sink?	A heat sink is a passive heat exchanger that transfers the heat generated by an electronic or a mechanical device to a fluid medium, often air or a liquid coolant, where it is dissipated away from the device, thereby allowing regulation of the device's temperature at optimal levels.	Understanding	15	CAEC004.15
35	What is a Power transistor?	A transistor that is manufactured to suit the purpose of power amplification is called as a Power transistor.	Understand	CLO 14	AEC004.14
36	Define Voltage Amplifier.	Voltage amplifier is to raise the voltage level of the signal. A voltage amplifier is designed to achieve maximum voltage amplification. The voltage gain of an amplifier is given by $Av=\beta(Rc/Rin)$ .	Remember	CLO 14	AEC004.14
37	Define Power Amplifier.	Power amplifier is to raise the power level of input signal. It is required to deliver a large amount of power and has to handle large current.	Remember	CLO 14	AEC004.14
38	What is Audio Power Amplifier?	The audio power amplifiers raise the power level of signals that have audio frequency range (20 Hz to 20 KHz). They are also known as Small signal power amplifiers.	Understand	CLO 14	AEC004.14
39	What is Radio Power Amplifier?	Radio Power Amplifiers or tuned power amplifiers raise the power level of signals that have radio frequency range (3 KHz to 300 GHz). They are also known as large signal power amplifiers.	Remember	CLO 15	AEC004.15
40	What is Class A Power amplifier?	When the collector current flows at all times during the full cycle of signal, the power amplifier is known as class A power amplifier.	Remember	CLO 16	AEC004.16
41	What is Class B Power amplifier?	When the collector current flows only during the positive half cycle of the input signal, the power amplifier is known as class B power amplifier.	Remember	CLO 15	AEC004.15
42	What is Class C Power amplifier?	When the collector current flows for less than half cycle of the input signal, the power amplifier is known as class C power amplifier.	Understand	CLO 15	AEC004.15
43	Define Power dissipation capability.	Power dissipation capability can be defined as the ability of a power transistor to dissipate the heat developed in it. Metal cases called heat sinks are used in order to dissipate the heat produced in power transistors.	Remember	CLO 14	AEC004.14
44	Define collector efficiency.	When the DC supply is given by the battery but no AC signal input is given, the collector output at such a condition is observed as collector efficiency.	Remember	CLO 16	AEC004.16
45	Define Dead band.	The zero voltage point, the transition period of switching over the transistors from one to the other, has its effect which leads to the instances where both the transistors are OFF at a time. Such instances can be called as Flat spot or Dead band on the output wave shape.	Remember	CLO 16	AEC004.16

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