



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad-500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	ANALOG ELECTRONICS
Course Code	:	AECB02
Program	:	B.Tech
Semester	:	III
Branch	:	Electrical and Electronics Engineering
Section	:	A & B
Course Faculty	:	Ms M Sreevani, Assistant Professor Mr P Sandeep Kumar, Assistant Professor

COURSE OBJECTIVES:

I	Explain the components such as diodes, BJTs and FETs their switching characteristics, application.
II	Learn the concepts of high frequency analysis of transistors.
III	Describe the various types of basic and feedback amplifier circuits such as small signal, cascaded, large signal and tuned amplifiers.
IV	Discuss the basic building blocks of linear integrated circuits.
V	Understand the concepts of waveform generation and introduce some special function ICs.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

SNo	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I						
1	Define Electronics.	The branch of engineering which deals with conduction of current through vacuum or gas or a semiconductor.	Remember	CO1	CLO 1	AECB02.01
2	Define conductivity.	Conductivity is the ability of a metal to conduct electricity when a potential difference (Voltage) is applied.	Remember	CO1	CLO 1	AECB02.01
3	Define voltage.	Potential difference in charge between two points in an electrical field. The unit of voltage is Volt (V).	Understand	CO1	CLO 1	AECB02.01
4	Define current.	Current is a flow of electrical charge carriers, usually electrons or electron-deficient atoms.	Understand	CO1	CLO 1	AECB02.01
5	Define Resistance.	The opposition offered to the flow of electrons.	Understand	CO1	CLO 1	AECB02.01
6	Define circuit.	Circuit comes from the word circle. A circuit is a collection of real components, power sources, and signal sources, all connected so current can flow in a complete circle.	Understand	CO1	CLO 1	AECB02.01

7	Define electronic circuit.	An electronic circuit is composed of individual electronic components such as resistors, transistors, capacitors, inductors and diodes.	Remember	CO1	CLO 1	AECB02.01
8	Define conductor.	A conductor is a material which has very high conductivity. Ex: Copper, Aluminum, Silver.	Understand	CO1	CLO 1	AECB02.01
9	Define semiconductor.	A semiconductor is a material that has its conductivity lies between the insulator and conductor. Ex: Si & Ge.	Understand	CO1	CLO 1	AECB02.01
10	What is an insulator?	An insulator is a material that offers a very low level of conductivity when voltage is applied. Ex: Wood, Glass.	Understand	CO1	CLO 1	AECB02.01
11	Define Intrinsic Semiconductor.	A pure form of semiconductor is called as intrinsic semiconductor. Ex: Si and Ge	Understand	CO1	CLO 1	AECB02.01
12	Define Extrinsic Semiconductor.	The current conduction capability of intrinsic semiconductor can be increased significantly by adding a small amount of impurity to the intrinsic semiconductor.	Remember	CO1	CLO 1	AECB02.01
13	Define Diode.	A p-n junction diode is a basic semiconductor device that controls the flow of electric current in a circuit.	Remember	CO1	CLO 1	AECB02.01
14	What is Static resistance?	The resistance of a diode at a particular operating point is called the dc or static resistance diode. $R_D = V_D / I_D$	Remember	CO1	CLO 1	AECB02.01
15	What is Dynamic resistance?	The ac resistance is determined by a straight line drawn between the two intersections of the maximum and minimum values of input voltage. $r_d = \Delta V_D / \Delta I_D$	Remember	CO1	CLO 1	AECB02.01
16	Define Drift current.	Drift current is the electric current, or movement of charge carriers, which is due to the applied electric field, often stated as the electromotive force over a given distance.	Remember	CO1	CLO 1	AECB02.01
17	Define Diffusion current.	Diffusion Current is a current in a semiconductor caused by the diffusion of charge carriers. This is the current which is due to the transport of charges occurring because of non-uniform concentration of charged particles in a semiconductor.	Remember	CO1	CLO 1	AECB02.01
18	What is Capacitance?	Capacitance is the ability of a component or circuit to collect and store energy in the form of an electrical charge.	Remember	CO1	CLO 1	AECB02.01
19	Define Diffusion capacitance.	Diffusion Capacitance is the capacitance due to transport of charge carriers between two terminals of a device. $C_D = dQ / dV$	Remember	CO1	CLO 1	AECB02.01
20	Define Transition capacitance.	The amount of capacitance changed with increase in voltage is called transition capacitance.	Remember	CO1	CLO 1	AECB02.01
21	What is load line?	A load line is a line drawn on the characteristic curve, a graph of the current vs. voltage in a nonlinear device like a diode.	Remember	CO1	CLO 1	AECB02.01
22	Define storage	The time period for which the diode remains in	Remember	CO1	CLO 1	AECB02.01

	time.	the conduction state even in the reverse biased state, is called as Storage time.				
23	Define transition time.	The time elapsed in returning back to the state of non-conduction, i.e. steady state reverse bias, is called Transition time.	Remember	CO1	CLO 1	AECB02.01
24	Define forward recovery time.	The time required for the diode to change from reverse bias to forward bias is called as Forward recovery time.	Remember	CO1	CLO 1	AECB02.01
25	Define reverse recovery time.	The time required for the diode to change from forward bias to reverse bias is called as Reverse recovery time.	Remember	CO1	CLO 1	AECB02.01
26	What is a rectifier?	A circuit that converts ac voltage of main supply into pulsating dc voltage using one or more PN junction diodes is called rectifier.	Remember	CO1	CLO 2	AECB02.02
27	Define PIV.	Peak inverse voltage (PIV) or peak reverse voltage (PRV) is the maximum value of reverse voltage which occurs at the peak of the input cycle when the diode is reverse-biased.	Remember	CO1	CLO 2	AECB02.02
28	Define ripple factor.	The ratio of the root mean square (rms) value of the ripple voltage to the absolute value of the DC component of the output voltage.	Remember	CO1	CLO 2	AECB02.02
29	Define efficiency.	Efficiency signifies a level of performance that describes using the least amount of input to achieve the highest amount of output.	Remember	CO1	CLO 2	AECB02.02
30	Define Clipper.	Clipper circuits, also called limiter circuits, are used to eliminate portion of a signal that are above or below a specified level– clip value.	Understand	CO1	CLO 2	AECB02.02
31	Define cut-in voltage.	The forward voltage at which the current through the junction starts increasing rapidly, is called the knee-voltage or cut-in voltage.	Remember	CO1	CLO 2	AECB02.02
32	Define Clamper.	A circuit which adds DC value to an AC wave form without changing its waveform.	Remember	CO1	CLO 2	AECB02.02
33	What is a transistor?	An active semiconductor device capable of amplification, oscillation and switching action. The name is a contraction of transfer of resistance from low to high.	Remember	CO1	CLO 3	AECB02.03
34	What is BJT?	A bipolar junction transistor (BJT) consists of three terminals: emitter, base, and collector.	Remember	CO1	CLO 3	AECB02.03
35	What is biasing?	Biasing is the process of setting a transistors DC operating voltage or current conditions to the correct level so that any AC input signal can be amplified correctly by the transistor.	Remember	CO1	CLO 4	AECB02.04
36	What is amplification?	The process of producing a larger voltage, current, or power using a smaller input signal.	Remember	CO1	CLO 5	AECB02.05
37	What are junctions in BJT?	Emitter-base junction or emitter junction and collector-base junction or collector junction.	Remember	CO1	CLO 3	AECB02.03
38	What are the operating regions of BJT?	Operating regions of BJT are Saturation region, Active region and Cut-off region.	Remember	CO1	CLO 5	AECB02.05

39	What is voltage gain?	The ratio of output voltage to input voltage.	Remember	CO1	CLO 3	AECB02.03
40	What is Q-point?	The point at which DC (VCE & IC) load line intersects the middle point of active region.	Understand	CO1	CLO 4	AECB02.04
MODULE-II						
1	What is MOSFET?	The MOSFET (Metal Oxide Semiconductor Field Effect Transistor) transistor is a semiconductor device which is widely used for switching and amplifying electronic signals in the electronic devices.	Remember	CO2	CLO 6	AECB02.06
2	What are the other names for MOSFET?	MOSFET is also called as IGFET.(Insulated GATE field effect transistor).	Remember	CO2	CLO 6	AECB02.06
3	What is input impedance?	Input impedance of a circuit is defined as the ratio of input voltage to input current	Remember	CO2	CLO 6	AECB02.06
4	What is output impedance?	Output impedance of a circuit is defined as the ratio of output voltage to output current.	Remember	CO2	CLO 6	AECB02.06
5	Define pinch-off voltage?	It is the voltage at which the channel is pinched off, i.e. all the free charge from the channel get removed. At Pinch-off voltage V_P the drain current becomes constant.	Remember	CO2	CLO 6	AECB02.06
6	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	CO2	CLO 6	AECB02.06
7	Define drain resistance.	Drain resistance (r_d) is defined as the ratio of small change in drain to source voltage (ΔV_{ds}) to the corresponding change in drain current (ΔI_d) at constant gate to source voltage (V_{gs}).	Remember	CO2	CLO 6	AECB02.06
8	What is an amplification factor?	Amplification factor (μ) is the negative of rate of change of drain voltage v_{DS} with gate voltage V_{GS} with keeping I_D constant. Thus, $\mu \equiv \Delta v_{DS} / \Delta v_{GS}$	Remember	CO2	CLO 7	AECB02.07
8	What are the regions of operation of a MOSFET?	1.Ohmic region 2.Pinch-off region 3.Breakdown region	Remember	CO2	CLO 7	AECB02.07
9	Define Ohmic region.	The Ohmic Region is the only region on a FET Characteristics curve where there is a linear response in current from changes in the voltage. It is called the ohmic region or linear region because the JFET behaves like a voltage-controlled resistor.	Remember	CO2	CLO 6	AECB02.06
10	What is P-channel MOSFET?	In P-channel MOSFET majority carriers are holes.	Remember	CO2	CLO 6	AECB02.06
11	What is N-channel MOSFET?	In N-channel MOSFET majority carriers are electrons.	Remember	CO2	CLO 6	AECB02.06
12	What is an amplifier?	An amplifier is a device that increases the amplitude of input signal without changing its frequency.	Remember	CO2	CLO 6	AECB02.06

13	What is JFET?	A field effect (FET) is a three terminal device in which current conduction takes place by only one type of carriers (either holes or electron) and is controlled by an electric field.	Remember	CO2	CLO 6	AECB02.06
14	What are the terminals of JFET?	The three terminals of JFET are Source, Drain and Gate.	Remember	CO2	CLO 6	AECB02.06
15	What are the types of JFET?	There are two types of MOSFETs. 1. N-channel. 2. P-channel.	Understand	CO2	CLO 6	AECB02.06
16	Why do you call FET as field effect transistor?	The name “field effect” is derived from the fact that the current is controlled by an electric field set up in the device by an external voltage, applied across gate and source terminals, which reverse bias the junctions.	Remember	CO2	CLO 6	AECB02.06
17	Why FET is called an unipolar device?	The operation of FET depends upon the flow of majority carriers only (either holes or electrons) so the FET is said to be an unipolar device.	Remember	CO2	CLO 6	AECB02.06
18	Define small signal amplifier.	Small signal amplifiers are designed to amplify very small signal voltage levels of only a few micro-volts (μV) from sensors	Remember	CO2	CLO 7	AECB02.07
19	Mention the applications of FET.	FET is used as a buffer in measuring instruments, receivers since it has high i/p impedance and low o/p impedance. FETS are used in RF amplifiers in FM tuners and communication equipment for the low noise level.	Remember	CO2	CLO 6	AECB02.06
20	Why the input impedance of FET is more than that of a BJT?	The input impedance of FET is more than that of a BJT because the input circuit of FET is reverse biased whereas the input circuit of BJT is forward biased.	Remember	CO2	CLO 6	AECB02.06
21	What is meant by gate source threshold voltage of a FET?	The voltage at which the channel is completely cut off and the drain current becomes zero is called as gate source threshold voltage.	Remember	CO2	CLO 6	AECB02.06
22	Why N channel FET's are preferred over P channel FET's?	In N channel FET the charge carriers are the electrons which have a mobility of about $1300 \text{ cm}^2/\text{VS}$, whereas in P channel FET's the charge carriers are the holes which have a mobility of about $500 \text{ cm}^2/\text{VS}$.	Remember	CO2	CLO 6	AECB02.06
23	What are the types of MOSFETs?	There are two types of MOSFETs. 1. Depletion type. 2. Enhancement type.	Understand	CO2	CLO 6	AECB02.06
24	What are the types of enhancement mode MOSFETs?	There are two types of enhancement mode MOSFETs. 1. N-channel. 2. P-channel.	Understand	CO2	CLO 6	AECB02.06
25	What are the types of depletion mode MOSFETs?	There are two types of depletion mode MOSFETs. 1. N-channel. 2. P-channel.	Remember	CO2	CLO 6	AECB02.06

26	Give the drain current equation of JFET.	$I_D = I_{DSS} \left(1 - \frac{V_{GS}}{V_P}\right)^2$ <p>where V_P is the pinch-off voltage and I_{DSS} is the saturation drain current for $V_{GS} = 0$ (i.e. gate shorted to source).</p>	Remember	CO2	CLO 8	AECB02.08
27.	What are the special features of FET?	<ol style="list-style-type: none"> 1. Its operation depends upon the flow of majority carriers only. It is therefore a unipolar (one type of carrier) device. 2. It is simpler to fabricate and occupies less space in integrated form. 	Remember	CO2	CLO 8	AECB02.08
28.	List the advantages of FET.	<ol style="list-style-type: none"> 1. Input impedance is very high. 2. This allows high degree of isolation between the input & output circuit. 3. It has a smaller size, longer life high efficiency. 	Remember	CO2	CLO 9	AECB02.09
29.	What are the main drawbacks of FET?	The main disadvantage of the FET is its relatively small gain band width product in comparison with that which can be obtained with a conventional transistor.	Understand	CO2	CLO 9	AECB02.09
30.	List various types of analysis associated with an amplifier?	(i) DC analysis (ii) Small Signal Analysis (Mid Band Analysis) (iii) AC Analysis.	Understand	CO2	CLO 9	AECB02.09
31.	What are the parameters of JFET?	<ol style="list-style-type: none"> 1. ac drain resistance (r_d) 2. transconductance (g_m) 3. Amplification factor (μ) 	Remember	CO2	CLO 9	AECB02.09
32.	Why the input impedance in FET is very high in comparison with BJT?	JFET have very high input impedance because of the reverse biased Gate-Source pn-junction.	Remember	CO2	CLO 9	AECB02.09
33.	Why is FET preferred as a Buffer Amplifier?	FET is used as a buffer in measuring instruments, receivers since it has high input impedance and low output impedance.	Remember	CO2	CLO 9	AECB02.09
34.	What is I_{DSS} ?	I_{DSS} is the saturation drain current for $V_{GS} = 0$ (i.e. gate shorted to source).	Remember	CO2	CLO 10	AECB02.10
35.	Write the relationship between various FET parameters?	Amplification factor = drain resistance * Transconductance. $\mu = r_d * g_m$	Remember	CO2	CLO 10	AECB02.10
36.	What is meant by cascade connection?	In a multistage amplifier circuit, the output of one stage is connected to the input of the next stage. Mostly similar type of stages are cascaded.	Understand	CO2	CLO 10	AECB02.10
37.	What are the application of MOSFETs?	<ol style="list-style-type: none"> 1. It is used as an inverter. 2. It can be used in digital circuit. 3. It can be used as a high frequency amplifier. 	Remember	CO2	CLO 10	AECB02.10
38.	What is input resistance?	Input resistance of a circuit is defined as the ratio of input voltage to input current.	Remember	CO2	CLO 10	AECB02.10

39.	What is output resistance?	Output resistance of a circuit is defined as the ratio of output voltage to output current.	Remember	CO2	CLO 10	AECB02.10
40.	Define current gain	Current gain of an amplifier is defined as the ratio of output current to input current	Remember	CO2	CLO 10	AECB02.10
MODULE-III						
1	What is coupling?	In electronic circuits, coupling is the process of making a connection between two stages.	Remember	CO3	CLO 11	AECB02.11
2	List various coupling schemes.	1.RC coupling. 2.LC coupling. 3.Direct coupling.	Remember	CO3	CLO 11	AECB02.11
3	Define frequency response.	Frequency response describes the behavior of the system (Amplifier) at various frequencies of input signal.	Remember	CO3	CLO 11	AECB02.11
4	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.	Remember	CO3	CLO 11	AECB02.11
5	Define lower cutoff frequency?	The low frequency of the signal at which gain of the system (Amplifier) drops by 3dB from its maximum value.	Remember	CO3	CLO 11	AECB02.11
6	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.	Understand	CO3	CLO 11	AECB02.11
7	Define bandwidth of an amplifier?	Bandwidth is defined as the range of frequencies allowed by an amplifier to produce undistorted amplified output.	Remember	CO3	CLO 11	AECB02.11
8	What is Gain bandwidth product?	It is figure of merit of an amplifier and it is the multiplication of gain and bandwidth.	Remember	CO3	CLO 11	AECB02.11
9	What is multi stage amplifier?	An amplifier consisting of more than one internal amplifying stages is called multi-stage amplifier.	Remember	CO3	CLO 11	AECB02.11
10	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.	Remember	CO3	CLO 12	AECB02.12
11	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.	Remember	CO3	CLO 12	AECB02.12
12	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.	Remember	CO3	CLO 12	AECB02.12
13	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.	Remember	CO3	CLO 12	AECB02.12
14	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.	Remember	CO3	CLO 12	AECB02.12

15	What is Darlington amplifier?	A Darlington pair is two transistors that act as a single transistor but with a much higher current gain. This means that a tiny amount of current from a sensor, micro-controller or similar can be used to drive a larger load.	Understand	CO3	CLO 12	AECB02.12
16	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.	Remember	CO3	CLO 12	AECB02.12
17	Define Push-Pull configuration?	The Class A amplifier by using a combinational transistor pair called as Push-Pull configuration.	Remember	CO3	CLO 12	AECB02.12
18	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.	Remember	CO3	CLO 13	AECB02.13
19	Define power gain.	It is the ratio of the output power to the input power.	Remember	CO3	CLO 13	AECB02.13
20	Define class A power amplifier?	A power amplifier that conducts the collector current for full cycle of the input signal.	Remember	CO3	CLO 13	AECB02.13
21	Define class B power amplifier?	A power amplifier that conducts the collector current for half cycle of the input signal.	Remember	CO3	CLO 13	AECB02.13
22	Define class AB power amplifier?	A power amplifier that conducts the collector current for more than half cycle of the input signal.	Remember	CO3	CLO 13	AECB02.13
23	Define class C power amplifier?	A power amplifier that conducts the collector current for less than half cycle of the input signal.	Understand	CO3	CLO 13	AECB02.13
24	Define Efficiency of power amplifier?	It is defined as the capability of the power amplifier in converting DC power to AC power.	Understand	CO3	CLO 13	AECB02.13
25	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.	Understand	CO3	CLO 13	AECB02.13
26	What is the application of power amplifier?	Power amplifier finds its application in public audio system	Remember	CO3	CLO 13	AECB02.13
27.	List various distortions in power amplifiers?	Distortions in power amplifiers are i) Non linear distortion. ii) Frequency distortion.	Remember	CO3	CLO 14	AECB02.14
28.	Define gain bandwidth product of an amplifier?	The gain bandwidth (GBW) product is a figure of merit defined in terms of mid band gain and upper 3-dB frequency f_h .	Remember	CO3	CLO 14	AECB02.14
29.	Define ac input.	The ac input to a circuit is defined as sinusoidal signal with certain amplitude and frequency.	Remember	CO3	CLO 14	AECB02.14
30.	Define DC input.	The DC input to a circuit is defined as biasing voltage to the transistor amplifier.	Remember	CO3	CLO 14	AECB02.14
31.	What is a Power transistor?	A transistor that is manufactured to suit the purpose of power amplification is called as a Power transistor.	Remember	CO3	CLO 14	AECB02.14

32.	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 $A_v = \beta(R_c/R_{in})$.	Remember	CO3	CLO 14	AECB02.14
33.	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	CO3	CLO 15	AECB02.15
34.	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.	Remember	CO3	CLO 15	AECB02.15
35.	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	CO3	CLO 15	AECB02.15
36.	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	CO3	CLO 15	AECB02.15
37.	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	CO3	CLO 15	AECB02.15
38.	Define frequency f_T	The frequency at which the magnitude short ckt. current gain of CE amplifier reduces to unity is defined as frequency f_T .	Remember	CO3	CLO 15	AECB02.15
39.	What is DC supply?	The term DC is used to refer to power systems that use only one polarity of voltage or current, and to refer to the constant, zero-frequency.	Understand	CO3	CLO 15	AECB02.15
40.	What is AC supply?	Alternating current (AC) is an electric current which periodically reverses direction, in contrast to direct current (DC) which flows only in one direction.	Remember	CO3	CLO 15	AECB02.15

MODULE-IV

1	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	CO4	CLO 16	AECB02.16
2	What is Positive feedback?	The feedback in which the feedback energy i.e., either voltage or current is in phase with the input signal.	Remember	CO4	CLO 16	AECB02.16
3	What is Negative feedback?	The feedback in which the feedback energy i.e., either voltage or current is out of phase with the input.	Remember	CO4	CLO 16	AECB02.16
4	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 shunt-driven series-fed feedback.	Remember	CO4	CLO 16	AECB02.16
5	What is Voltage	A fraction of the output voltage is applied in	Remember	CO4	CLO 16	AECB02.16

	shunt feedback?	parallel with the input voltage through the feedback network. This is also known as shunt-driven shunt-fed feedback.				
6	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 series-driven series-fed feedback.	Remember	CO4	CLO 16	AECB02.16
7	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 series-driven shunt-fed feedback	Remember	CO4	CLO 17	AECB02.17
8	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.	Remember	CO4	CLO 17	AECB02.17
9	Define Sinusoidal Oscillator.	The oscillators that produce an output having a sine waveform are called sinusoidal or harmonic oscillators.	Remember	CO4	CLO 17	AECB02.17
10	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.	Remember	CO4	CLO 17	AECB02.17
11	Define Crystal Oscillators?	These oscillators use quartz crystals and are used to generate highly stabilized output signal with frequencies up to 10 MHz.	Remember	CO4	CLO 18	AECB02.18
12	Define Negative resistance 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	CO4	CLO 18	AECB02.18
13	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.	Remember	CO4	CLO 18	AECB02.18
14	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	CO4	CLO 18	AECB02.18
15	What is transfer gain?	It is the ratio of the output signal to the input signal. It is denoted by A. $A = X_o / X_i$	Understand	CO4	CLO 18	AECB02.18
16	Define the feedback factor β ?	It is the ratio between the feedback voltages to the output voltage of the amplifier. $\beta = V_f / V_o$.	Remember	CO4	CLO 18	AECB02.18
17	What is Barkhausen criterion?	The conditions for oscillator to produce oscillation are given by Barkhausen criterion. They are: (i). the total phase shift produced by the circuit should be 360° or 0° . (ii).The Magnitude of loop gain must be greater than or equal to 1.	Remember	CO4	CLO 18	AECB02.18
18	Define Desensitivity.	Desensitivity is defined as the reciprocal of sensitivity. It indicates the factor by which the	Remember	CO4	CLO 19	AECB02.19

		voltage gain has been reduced due to feedback network.				
19	What are linear oscillators?	The oscillators that generate sinusoidal signals are called linear oscillators.	Remember	CO4	CLO 19	AECB02.19
20	What are non linear oscillators?	The oscillators that generate non linear signals such as square wave, triangular wave, and rectangular wave are called non linear oscillators. They are also called as multivibrators.	Remember	CO4	CLO 19	AECB02.19
21	What is audio oscillator	An oscillator that generates a signal of audio frequency range are called audio frequency oscillator. Example: RC oscillators.	Remember	CO4	CLO 19	AECB02.19
22	What is radio oscillator?	An oscillator that generates a signal of radio frequency range are called audio frequency oscillator. Example: LC oscillators.	Remember	CO4	CLO 19	AECB02.19
23	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.	Understand	CO4	CLO 19	AECB02.19
24	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.	Understand	CO4	CLO 19	AECB02.19
25	What are the types of feedback amplifiers?	There are four types of feedback amplifiers. 1.Voltage series. 2.voltage shunt. 1.Current series. 2.Current shunt.	Remember	CO4	CLO 19	AECB02.19
26	What is the purpose of mixer network?	The mixer network is used to combine feedback signal and input at input of an amplifier.	Remember	CO4	CLO 20	AECB02.20
27.	What are the advantages of negative feedback?	1. Input resistance is very high. 2. Output resistance is low.	Remember	CO4	CLO 19	AECB02.19
28.	List the four basic feedback topologies.	1. Voltage amplifier with voltage series feedback. 2. Transconductance amplifier with current-series feedback. 3. Current amplifier with current-shunt feedback. 4. Transresistance amplifier with voltage shunt feedback	Remember	CO4	CLO 19	AECB02.19
29.	Give the different types of feedbacks used in amplifier circuits.	1.Positive feedback 2. Negative feedback.	Remember	CO4	CLO 19	AECB02.19
30.	Define feedback factor.	The ratio of the feedback voltage to output voltage is known as feedback factor or feedback ratio.	Remember	CO4	CLO 19	AECB02.19
31.	What is loop gain or return ratio?	A path of a signal from input terminals through basic amplifier, through the feedback network and back to the input terminals forms a loop. The gain of this loop is the product $-A\beta$.	Remember	CO4	CLO 19	AECB02.19

32.	Write down the advantages of RC phase shift oscillator.	a)Simplicity of the circuit. b)Useful for frequencies in the audio range. c) A sine wave output can be obtained.	Remember	CO4	CLO 20	AECB02.20
33.	Write down disadvantages of RC phase shift oscillator.	a)Poor frequency stability. b) It is difficult to get a variable frequency output.	Remember	CO4	CLO 20	AECB02.20
34.	What are the applications of crystal oscillators?	a) As a crystal clock in microprocessors. b) In the frequency synthesizers. c) In the radio and TV transmitters.	Remember	CO4	CLO 20	AECB02.20
35.	Write down the general applications of oscillators.	a) As a local oscillator in radio receivers. b) In T.V receivers. c) In signal generators. d) AM and FM transmitters.	Remember	CO4	CLO 20	AECB02.20
36.	What are the types of RC oscillators?	There are two types of RC oscillators. 1.RC phase shift oscillator. 2.wein bridge oscillator.	Remember	CO4	CLO 20	AECB02.20
37.	What are the types of LC oscillators?	There are two types of LC oscillators. 1.Hartley oscillator. 2.Colpitts oscillator.	Remember	CO4	CLO 20	AECB02.20
38.	What are the applications of hartley oscillators?	a)It is used as local oscillator in radio and TV receivers. b) In the function generator.	Remember	CO4	CLO 20	AECB02.20
39.	What are the advantages of hartley oscillators?	a)It is easy to tune. b) It can operate over a wide frequency typically from few Hz and several MHz.	Remember	CO4	CLO 20	AECB02.20
40.	What are the advantages of crystal oscillators?	a)Very high frequency stability. b) The Q is very high.	Remember	CO4	CLO 20	AECB02.20

MODULE V

1	Define an operational amplifier.	An operational amplifier is a direct-coupled, high gain amplifier consisting of one or more differential amplifier.	Remember	CO5	CLO 21	AECB02.21
2	Mention the characteristics of an ideal op-amp.	* Open loop voltage gain is infinity. *Input impedance is infinity. *Output impedance is zero.	Remember	CO5	CLO 21	AECB02.21
3	What happens when the common terminal of V+ and V- sources is not grounded?	If the common point of the two supplies is not grounded, twice the supply voltage will get applied and it may damage the op-amp.	Remember	CO5	CLO 21	AECB02.21
4	Define input offset voltage.	A small voltage applied to the input terminals to make the output voltage as zero when the two input terminals are grounded is called input offset voltage.	Remember	CO5	CLO 21	AECB02.21
5	Define input offset current	The difference between the bias currents at the input terminals of the op-amp is called as input offset current.	Remember	CO5	CLO 21	AECB02.21
6	Define CMRR of	The relative sensitivity of an op-amp to a	Remember	CO5	CLO 21	AECB02.21

	an op-amp	difference signal as compared to a common mode signal is called the common –mode rejection ratio.				
7	What is the need for frequency compensation in practical op-amps?	Frequency compensation is needed when large bandwidth and lower closed loop gain is desired. Compensating networks are used to control the phase shift and hence to improve the stability.	Remember	CO5	CLO 21	AECB02.21
8	Define slew rate.	The slew rate is defined as the maximum rate of change of output voltage caused by a step input voltage.	Remember	CO5	CLO 22	AECB02.22
9	What causes slew rate?	There is a capacitor with-in or outside of an op-amp to prevent oscillation. It is this capacitor which prevents the output voltage from responding immediately to a fast changing input.	Remember	CO5	CLO 22	AECB02.22
10	Define an Integrated circuit.	An integrated circuit(IC) is a miniature, low cost electronic circuit consisting of active and passive components fabricated together on a single crystal of silicon.	Remember	CO5	CLO 22	AECB02.22
11	Mention the advantages of integrated circuits.	1. Miniaturisation and hence increased equipment density. 2. Cost reduction due to batch processing.	Remember	CO5	CLO 22	AECB02.22
12	Define Power supply rejection ratio?	It is defined as the ratio of the change in input offset voltage due to change in supply voltage producing it, keeping other power supply voltage constant.	Remember	CO5	CLO 23	AECB02.23
13	Define Inverting Amplifier.	Inverting Amplifier is a normal op-amp in which the output is given as feedback to the inverted terminal of input by means of a feedback resistor.	Remember	CO5	CLO 23	AECB02.23
14	What is Non-inverting amplifier?	Non-inverting amplifier is “the operational amplifier in which the output is in phase with input signal”.	Remember	CO5	CLO 23	AECB02.23
15	Define Amplification.	Amplification means a process to increase signal strength by means of amplitude.	Understand	CO5	CLO 23	AECB02.23
16	Define Summing Amplifier.	The Summing Amplifier is another type of operational amplifier circuit configuration that is used to combine the voltages present on two or more inputs into a single output voltage.	Remember	CO5	CLO 23	AECB02.23
17	Define Gain.	Amplifier gain is simply the ratio of the output signal divided-by the input signal.	Remember	CO5	CLO 23	AECB02.23
18	Define Accuracy.	Accuracy can be defined as the amount of uncertainty in a measurement with respect to an absolute standard.	Remember	CO5	CLO 24	AECB02.24
19	Define DC offset.	DC offset is the unwanted DC output voltage which appears at the output of the op-amp in addition to the desired signal.	Remember	CO5	CLO 24	AECB02.24
20	What is voltage follower?	A voltage follower is an electronic circuit, which produces an output that follows the input voltage.	Remember	CO5	CLO 24	AECB02.24

21	What is linear component?	Any component which will follow the ohm's law is a linear component otherwise non linear.	Remember	CO5	CLO 24	AECB02.24
22	What is non-linear?	Any component which will not follow the ohm's law is a non-linear component.	Remember	CO5	CLO 24	AECB02.24
23	Define integrator.	An integrator is an electronic circuit that produces an output that is the integration of the applied input.	Understand	CO5	CLO 24	AECB02.24
24	Define differentiator.	A differentiator is an electronic circuit that produces an output equal to the first derivative of its input.	Understand	CO5	CLO 24	AECB02.24
25	Define biasing.	Biasing is the process of application of external voltage in order to operate the device in a desired way.	Remember	CO5	CLO 24	AECB02.24
26	What is the input impedance of a non-inverting amplifier?	Input impedance of a non-inverting amplifier is extremely large ($= \infty$) as the op-amp draws negligible current from the signal source.	Remember	CO5	CLO 23	AECB02.23
27.	What is thermal drift?	Thermal drift is the changes in the normal operational behavior of a device due to changes in ambient temperature.	Remember	CO5	CLO 25	AECB02.25
28.	What are the advantages of IC over discrete components?	<ul style="list-style-type: none"> • Miniaturization • Cost reduction • Increased system reliability • Increased functional performance 	Understand	CO5	CLO 24	AECB02.24
29.	What are the different IC packages?	There are three different packages available. <ul style="list-style-type: none"> • Metal can package • Ceramic flat package • Dual-in-line package 	Remember	CO5	CLO 24	AECB02.24
30.	What are the ideal characteristics of Op-amp?	<ul style="list-style-type: none"> * Open loop voltage gain is infinity. * Input impedance is infinity. * Output impedance is zero. 	Remember	CO5	CLO 24	AECB02.24
31.	Define input offset current.	It is defined as the algebraic difference between the current entering the inverting and non-inverting terminal of an op-amp.	Understand	CO5	CLO 25	AECB02.25
32.	Define CMRR of an op-amp	The relative sensitivity of an op-amp to a difference signal as compared to a common mode signal is called the common –mode rejection ratio	Remember	CO5	CLO 25	AECB02.25
33.	Why IC 741 is not used for high frequency applications?	IC741 has a low slew rate because of the predominance of capacitance present in the circuit at higher frequencies. As frequency increases the output gets distorted due to limited slew rate.	Remember	CO5	CLO 25	AECB02.25
34.	Why Does An Op-amp have High CMRR	High CMRR ensures that the common mode signals such as noise are rejected successfully and the output voltage is proportional only to the differential input voltage.	Understand	CO5	CLO 25	AECB02.25
35.	What is the classification of ICs based on complexity level?	<ol style="list-style-type: none"> 1. Small Scale Integration 2. Medium Scale Integration 3. Large scale Integration 4. Very Large Scale Integration 	Remember	CO5	CLO 25	AECB02.25

36.	What is the classification of ICs based on fabrication process?	Depending on the fabrication process IC are classified as 1)Monolithic IC 2)Hybrid IC	Remember	CO5	CLO 25	AECB02.25
37.	What produces more offset voltage at the output?	Input bias current produces more offset voltage at the output.	Understand	CO5	CLO 24	AECB02.24
38.	What are the typical values for an IC741?	Input bias current:500nA Input offset current:200nA Input offset voltage:500mV	Remember	CO5	CLO 25	AECB02.25
39.	Define Power supply rejection ratio?	It is defined as the ratio of the change in input offset voltage due to change in supply voltage producing it , keeping other power supply voltage constant .	Remember	CO5	CLO 25	AECB02.25
40.	What are factors that changes op-amp parameters?	1)Temperature 2) Supply voltage change 3) Time.	Understand	CO5	CLO 25	AECB02.25

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