



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad-500 043

CIVIL ENGINEERING

Course Name	:	BASIC ELECTRONICS ENGINEERING
Course Code	:	AECB01
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Section	:	A, B
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Course Faculty	:	Mr. P Sandeep Kumar, Assistant Professor Mr. B Santhosh Kumar, Assistant Professor

COURSE OBJECTIVES:

I	Introduce components such as diodes, BJTs and FETs.
II	Know the applications of components.
III	Understand common forms of number representation in logic circuits
IV	Be acquainted to principles and characteristics of op-amp and apply the techniques for the design of comparators, instrumentation amplifier, integrator, and differentiator.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

SNo	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I						
1	What is an intrinsic material?	Intrinsic materials are semiconductors that have a very low level of impurities.	Remember	CO 1	CLO 1	AECB01.01
2	What is an extrinsic material?	Extrinsic materials are semiconductors that have been exposed to a doping process.	Remember	CO 1	CLO 1	AECB01.01
3	Define n-type material.	An n -type material is formed by adding donor atoms that have five valence electrons to establish a high level of relatively free electrons.	Understand	CO 1	CLO 1	AECB01.01
4	What are carriers in n-type?	In an n -type material, the electron is the majority carrier and the hole is the minority carrier.	Understand	CO 1	CLO 1	AECB01.01
5	Define p-type material	A p -type material is formed by adding acceptor atoms with three valence electrons to	Understand	CO 1	CLO 1	AECB01.01

		establish a high level of holes in the material.				
6	What is majority carrier?	The most numerous charge carrier in a doped semiconductive material (either free electrons or holes).	Understand	CO 1	CLO 1	AECB01.01
7	Define a PN diode.	A two-element device containing an anode and a cathode, and providing unidirectional conduction.	Remember	CO 1	CLO 1	AECB01.01
8	Define depletion region.	The region near the junction of a diode that has very few carriers is called the depletion region.	Understand	CO 1	CLO 1	AECB01.01
9	When is current zero in a diode?	In the absence of any externally applied bias, the diode current is zero.	Understand	CO 1	CLO 2	AECB01.02
10	How current varies in forward bias?	In the forward-bias region the diode current increases exponentially with increase in voltage across the diode.	Understand	CO 1	CLO 2	AECB01.02
11	How current varies in reverse bias?	In the reverse-bias region the diode current is the very small reverse saturation current until breakdown is reached and current will flow in the opposite direction through the diode.	Understand	CO 1	CLO 2	AECB01.02
12	How reverse current increases in diode?	The reverse saturation current I_s will just about double in magnitude for every 10-fold increase in temperature.	Remember	CO 1	CLO 2	AECB01.02
13	What is dc resistance in diode?	The dc resistance of a diode is determined by the ratio of the diode voltage and current at the point of interest and is not sensitive to the shape of the curve.	Remember	CO 1	CLO 2	AECB01.02
14	What is ac resistance in diode?	The ac resistance of a diode is sensitive to the shape of the curve in the region of interest and decreases for higher levels of diode current or voltage.	Remember	CO 1	CLO 2	AECB01.02
15	What is cut-in voltage or threshold voltage in diode?	The forward-bias voltage at which diode starts conducting.	Remember	CO 1	CLO 2	AECB01.02
16	What is maximum power dissipation level of a diode?	The maximum power dissipation level of a diode is equal to the product of the diode voltage and current.	Remember	CO 1	CLO 2	AECB01.02
17	What is rectification?	Rectification is a process whereby an applied waveform of zero average value is changed to one	Remember	CO 1	CLO 3	AECB01.03

		that has a dc level.				
18	What is half wave rectifier?	A rectifier that delivers a half-cycle of direct-current(dc) output for every other half-cycle of alternating current(ac) applied voltage.	Remember	CO 1	CLO 3	AECB01.03
19	What is full wave rectifier?	A rectifier that delivers a half-cycle of pulsating direct-current (dc) output voltage for each half-cycle of applied alternating-current (ac) voltage.	Remember	CO 1	CLO 3	AECB01.03
20	What is ripple factor?	The ratio of the RIPPLE AMPLITUDE to the direct-current voltage output of a rectifier.	Remember	CO 1	CLO 3	AECB01.03
21	What is Peak Inverse Voltage of half wave rectifier?	It is the maximum voltage that the rectifying diodes has to withstand, when it reversed-biased.	Remember	CO 1	CLO 3	AECB01.03
22	What are examples of n-type dopants?	The examples of donors are Phosphorous(P), Arsenic(As), Antimony(Sb).	Remember	CO 1	CLO 1	AECB01.01
23	What are examples of p-type dopants?	The examples of acceptors are Boron(B), Gallium(Ga), Indium(In).	Remember	CO 1	CLO 1	AECB01.01
24	What is doping?	The process of adding impurities to intrinsic semiconductor is called doping.	Remember	CO 1	CLO 1	AECB01.01
25	What are elemental semiconductors?	Silicon(Si) and Germanium(Ge) are called elemental semiconductors.	Remember	CO 1	CLO 1	AECB01.01
26	What are compound semiconductors?	Galium Arsenide(GaAs) and Silicon Carbide(SiC) are compound semiconductors.	Remember	CO 1	CLO 1	AECB01.01
27	What is diffusion current?	Current resulting from the diffusion of carriers within a substance.	Remember	CO 1	CLO 1	AECB01.01
28	What is diffusion?	The random velocity and movement of current carriers in a semiconductor, resulting from a high-density gradient.	Remember	CO 1	CLO 1	AECB01.01
29	What is drift current?	In a semiconductor, the current resulting from a flow of charge carriers in the presence of an electric field.	Remember	CO 1	CLO 1	AECB01.01
30	What is conventional current?	Electron flow is opposite to conventional current flow; positively charged particles, such as holes, move in the same direction as the conventional current.	Understand	CO 1	CLO 1	AECB01.01
31	What is zener diode?	A Zener diode is a special type of rectifying diode that can handle breakdown due to reverse breakdown voltage without failing completely.	Remember	CO 1	CLO 4	AECB01.04

32	What is avalanche breakdown?	Avalanche breakdown usually occurs when we apply a high reverse voltage across a moderately doped diode.	Remember	CO 1	CLO 4	AECB01.04
33	What are other names of depletion region?	The other names of depletion region are barrier potential and space charge region.	Remember	CO 1	CLO 2	AECB01.02
34	What are diode terminals?	Anode and cathode are diode terminals.	Remember	CO 1	CLO 1	AECB01.01
35	What is PIV for full wave rectifier?	The PIV for each diode in a center-tapped, full-wave rectifier is twice the output voltage.	Remember	CO 1	CLO 3	AECB01.03
36	What filters are used in rectifiers?	Capacitor(C) filter, LC filter, and CLC filter.	Remember	CO 1	CLO 3	AECB01.03
37	What type of transformer is used in full-wave rectifier?	Step down transformer with centre tap is used in full-wave rectifier.	Remember	CO 1	CLO 3	AECB01.03
38	What is ripple voltage?	Ripple voltage is caused by the charging and discharging of the filter capacitor.	Remember	CO 1	CLO 3	AECB01.03
39	What is a hole?	The absence of an electron in the valence band of an atom.	Remember	CO 1	CLO 1	AECB01.01
40	What is minority carrier?	The most numerous charge carrier in a doped semiconductive material (either free electrons or holes).	Understand	CO 1	CLO 1	AECB01.01

MODULE-II

1	What is a transistor?	An active (commonly three-terminal) semiconductor device capable of amplification, oscillation, and switching action. The name is a contraction of transfer resistor.	Remember	CO 2	CLO 5	AECB01.05
2	What is BJT?	A bipolar junction transistor (BJT) consists of three regions: emitter, base, and collector. A terminal is connected to each of the three regions.	Remember	CO 2	CLO 6	AECB01.06
3	What is bipolar?	The term bipolar refers to two types of current: electron current and hole current.	Remember	CO 2	CLO 6	AECB01.06
4	What is amplification?	The process of producing a larger voltage, current, or power using a smaller input signal as a pattern.	Remember	CO 2	CLO 6	AECB01.06
5	Define common collector configuration.	A BJT amplifier configuration in which the collector is the common (grounded) terminal.	Remember	CO 2	CLO 6	AECB01.06
6	Define common emitter configuration.	A BJT amplifier configuration in which the emitter is the common (grounded) terminal.	Remember	CO 2	CLO 6	AECB01.06

7	Define common base configuration.	A BJT amplifier configuration in which the base is the common (grounded) terminal	Remember	CO 2	CLO 6	AECB01.06
8	What are junctions in BJT?	Emitter-base junction or emitter junction and collector-base junction or collector junction.	Remember	CO 2	CLO 6	AECB01.06
8	What bias is used in BJT junctions for active region?	Emitter junction is forward-biased and collector junction is reverse-biased.	Remember	CO 2	CLO 6	AECB01.06
9	What bias is used in BJT junctions for saturation region?	Emitter junction is reverse-biased and collector junction is forward-biased.	Remember	CO 2	CLO 6	AECB01.06
10	What bias is used in BJT junctions for cut-off region?	Both junctions are reverse-biased.	Remember	CO 2	CLO 6	AECB01.06
11	What is I_{CO} ?	It is the reverse saturation current of collector junction.	Remember	CO 2	CLO 6	AECB01.06
12	What is I_{CBO} ?	The collector current when emitter current is zero.	Remember	CO 2	CLO 6	AECB01.06
13	What is I_{CEO} ?	I_{CEO} is the collector current with collector junction reverse biased and base open-circuited.	Remember	CO 2	CLO 6	AECB01.06
14	What is Early effect?	The modulation of effective base width by the collector voltage is known as Early effect.	Remember	CO 2	CLO 6	AECB01.06
15	Define reach through or punch through.	The condition where the collector junction width increases such that base region vanishes from BJT is called reach through or punch through.	Understand	CO 2	CLO 6	AECB01.06
16	What is dc beta?	The dc beta is defined by a simple ratio of dc current I_C to dc current I_B at an operating point.	Remember	CO 2	CLO 7	AECB01.07
17	What is biasing?	The proper flow of zero signal collector current and the maintenance of proper collector emitter voltage during the passage of signal is known as Transistor Biasing.	Remember	CO 2	CLO 7	AECB01.07
18	What is Q-point?	The dc operating (bias) point of an amplifier.	Remember	CO 2	CLO 7	AECB01.07
19	What is cutoff?	The nonconducting state of a transistor.	Remember	CO 2	CLO 7	AECB01.07
20	What is saturation?	The state of a transistor in which the output current is maximum and further increases of the input variable have no effect on the output.	Remember	CO 2	CLO 7	AECB01.07
21	What is voltage gain?	The ratio of output voltage to input voltage.	Remember	CO 2	CLO 7	AECB01.07

22	What is current gain?	The ratio of output current to input current.	Remember	CO 2	CLO 7	AECB01.07
23	Define voltage controlled device.	A voltage-controlled device is one in which a particular voltage defines the operating conditions.	Understand	CO 2	CLO 8	AECB01.08
24	Define current controlled device.	A current-controlled device is one in which a current defines the operating conditions of the device.	Understand	CO 2	CLO 8	AECB01.08
25	Define stability factor.	The extent to which a biasing circuit is successful in maintaining this is measured by Stability factor.	Remember	CO 2	CLO 7	AECB01.07
26	Define stabilization.	The process of making the operating point independent of temperature changes or variations in transistor parameters is known as Stabilization.	Remember	CO 2	CLO 7	AECB01.07
27	What is Field Effect Transistor?	A monolithic semiconductor amplifying device in which a high-impedance GATE electrode controls the flow of current carriers through a thin bar of silicon called the CHANNEL.	Remember	CO 2	CLO 8	AECB01.08
28	What are the terminals in JFET?	The terminals of the JFET are gate, source and drain.	Remember	CO 2	CLO 8	AECB01.08
29	What is pinch-off voltage?	The voltage at which the current flow between the source and drain is blocked because the channel between the electrodes is completely depleted.	Understand	CO 2	CLO 8	AECB01.08
30	What is I_{DSS} ?	I_{DSS} (referred to as the drain current for zero bias) is the maximum current that flows through a FET transistor, which is when the gate voltage, V_G , supplied to the FET is 0V.	Understand	CO 2	CLO 8	AECB01.08
31	What is enhancement mode in MOSFET ?	The condition of a MOSFET when the channel has an abundance of majority carriers.	Understand	CO 2	CLO 9	AECB01.09
32	What is CMOS?	The combination of n-channel and p-channel MOSFET in same device is called CMOS.	Remember	CO 2	CLO 10	AECB01.10
33	What are types of BJT?	Two types of BJT are n-p-n and p-n-p transistors.	Remember	CO 2	CLO 6	AECB01.06
34	What is CD amplifier?	A FET amplifier configuration in which the drain is the common terminal.	Remember	CO 2	CLO 8	AECB01.08
35	What is CS amplifier?	A FET amplifier configuration in which the source is the common terminal.	Remember	CO 2	CLO 8	AECB01.08

36	What is the best biasing circuit?	Voltage divider bias is the best biasing network as it gives best stability of Q-point.	Understand	CO 2	CLO 7	AECB01.07
37	What is feedback?	The process of returning a portion of a circuit's output signal to the input in such a way as to create certain specified operating conditions.	Understand	CO 2	CLO 7	AECB01.07
38	What is fixed bias circuit?	It is an amplifier circuit with dc supply and input terminal connected via a resistance.	Remember	CO 2	CLO 7	AECB01.07
39	Define coupling capacitor?	A coupling capacitor is one which is used to couple or link together only the AC signal from one circuit element to another. This capacitor blocks the DC signal.	Understand	CO 2	CLO 7	AECB01.07
40	Define 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	CO 2	CLO 7	AECB01.07

MODULE – III

1	Define an operational amplifier.	It is a voltage amplifying device designed to be used with external feedback components such as resistors and capacitors between its output and input terminals.	Remember	CO 3	CLO 11	AECB01.11
2	What is a differential amplifier?	A differential amplifier is one in which difference between two input signals is amplified.	Remember	CO 3	CLO 11	AECB01.11
3	What is input offset voltage?	Input offset voltage is defined as the voltage that must be applied between the two input terminals of an OPAMP to null or zero the output.	Understand	CO 3	CLO 12	AECB01.12
4	What is input offset current?	The input offset current is the difference between the currents into inverting and non-inverting terminals of a balanced amplifier.	Understand	CO 3	CLO 12	AECB01.12
5	Define bias current of a differential amplifier.	The input bias current is the average of the current entering the input terminals of a balanced amplifier	Understand	CO 3	CLO 12	AECB01.12
6	What is input resistance R_i .	R_i is the equivalent resistance that can be measured at either the inverting or non-inverting input terminal with the other terminal grounded.	Understand	CO 3	CLO 12	AECB01.12
7	What is input capacitance C_i .	C_i is the equivalent capacitance that can be measured at either the	Understand	CO 3	CLO 12	AECB01.12

		inverting and noninverting terminal with the other terminal connected to ground.				
8	What is input voltage range?	Input voltage range is the range of a common mode input signal for which a differential amplifier remains linear.	Understand	CO 3	CLO 12	AECB01.12
9	Define Common Mode Rejection Ratio(CMRR).	It is defined as the ratio of the differential voltage gain A_d to the common mode voltage gain A_{CM} .	Understand	CO 3	CLO 12	AECB01.12
10	Define Power Supply Rejection Ratio(PSRR).	The ratio of the change in the input offset voltage to the corresponding change in power supply voltages..	Understand	CO 3	CLO 12	AECB01.12
11	What is output resistance?	R_O is the equivalent resistance that can be measured between the output terminal of the OPAMP and the ground.	Understand	CO 3	CLO 12	AECB01.12
12	What is Gain Bandwidth Product?	The gain bandwidth product is the bandwidth of the OPAMP when the open loop voltage gain is reduced to 1.	Understand	CO 3	CLO 12	AECB01.12
13	Define Slew Rate.	The maximum rate of change of output voltage per unit of time under large signal conditions and is expressed in volts /msecs.	Understand	CO 3	CLO 12	AECB01.12
14	Define inverting amplifier.	If the input is applied to only inverting terminal and non-inverting terminal is grounded then it is called inverting amplifier.	Remember	CO 3	CLO 13	AECB01.13
15	Define non-inverting amplifier.	If the input voltage is applied to non-inverting terminals and inverting terminal is ground then it is called non-inverting amplifier.	Remember	CO 3	CLO 13	AECB01.13
16	What is a voltage follower?	A voltage follower(also called a unity-gain amplifier, a buffer amplifier, and an isolation amplifier) is an op-amp circuit which has a voltage gain of 1.	Understand	CO 3	CLO 15	AECB01.15
17	What is an inverter circuit?	If $R_f/R = K$ (a constant) in an inverting amplifier, then the circuit is called inverter or scale changer.	Understand	CO 3	CLO 14	AECB01.14
18	What is a summing amplifier?	Summing amplifier is basically an op amp circuit that can combine numbers of input signal to a single output that is the weighted sum of the applied inputs.	Understand	CO 3	CLO 14	AECB01.14
19	What is an integrator?	A circuit in which the output voltage waveform is the integral of the input voltage waveform is called integrator.	Understand	CO 3	CLO 15	AECB01.15
20	What is a differentiator?	A circuit in which the output	Understand	CO 3	CLO 15	AECB01.15

		voltage waveform is the differentiation of input voltage is called differentiator.				
21	Define a comparator.	A comparator is a device that compares two voltages or currents and outputs a digital signal indicating which is larger.	Understand	CO 3	CLO 15	AECB01.15
22	What is virtual ground?	The term virtual ground means that the voltage at that particular node is almost equal to ground voltage (0V). It is not physically connected to ground.	Remember	CO 3	CLO 13	AECB01.13
23	What is Dual In Line Package?	In microelectronics, a dual in-line package is an electronic device package with a rectangular housing and two parallel rows of electrical connecting pins.	Remember	CO 3	CLO 11	AECB01.11
24	What is an averaging amplifier?	An amplifier with several inputs that produces an output voltage that is the negative value of the mathematical average of the input voltages.	Understand	CO 3	CLO 14	AECB01.14
25	What is a scaling adder?	A special type of summing amplifier with weighted inputs.	Understand	CO 3	CLO 14	AECB01.14
26	What is an ideal integrator?	An ideal integrator has a capacitor in series with the input and a resistor in the feedback path.	Remember	CO 3	CLO 15	AECB01.15
27	What is bandwidth of an ideal op-amp?	An ideal operational amplifier has an infinite frequency response and can amplify any frequency signal from DC to infinite frequencies, so infinite bandwidth.	Remember	CO 3	CLO 12	AECB01.12
28	What is input resistance of an ideal op-amp?	The input resistance of an ideal op-amp is infinite.	Remember	CO 3	CLO 12	AECB01.12
29	What is the voltage gain of an ideal op-amp?	The voltage gain of an ideal op-amp is infinite.	Remember	CO 3	CLO 12	AECB01.12
30	What is the output resistance of an ideal op-amp?	The output resistance of an ideal op-amp is zero.	Remember	CO 3	CLO 12	AECB01.12
31	What are the blocks of an op-amp?	The input stage, intermediate stage (gain stage), level shifting stage and output stage.	Remember	CO 3	CLO 11	AECB01.11
32	Define input stage of op-amp.	The input stage is a dual input balanced output differential amplifier.	Remember	CO 3	CLO 11	AECB01.11
33	Define intermediate stage of op-amp.	The intermediate stage of OPAMP is another differential amplifier which is driven by the output of the first stage. This is usually dual input unbalanced output.	Remember	CO 3	CLO 11	AECB01.11
34	What is level shifter in	It shifts the dc level back to zero	Remember	CO 3	CLO 11	AECB01.11

	op-amp?	generally an emitter follower circuit.				
35	What is output stage of an op-amp?	It is complementary push pull amplifier circuit having large output voltage swing with low input resistance.	Remember	CO 3	CLO 11	AECB01.11
36	What is an IC?	The IC means an integrated circuit where all the active and passive components are fabricated on a single chip.	Remember	CO 3	CLO 11	AECB01.11
37	What is a monolithic IC?	The IC in which all active and passive components along with inter-connections are integrated in a single crystal.	Remember	CO 3	CLO 11	AECB01.11
38	What is the formula for voltage gain of op-amp inverting amplifier?	The formula for gain of inverting amplifier is $A_V = \frac{-R_F}{R_1}$	Remember	CO 3	CLO 13	AECB01.13
39	What is the formula for voltage gain of op-amp non-inverting amplifier?	The formula for gain of inverting amplifier is $A_V = 1 + \frac{R_F}{R_1}$	Remember	CO 3	CLO 13	AECB01.13
40	What is the formula for slew rate calculation?	The formula for slew rate is $SR = \left(\frac{dV_O}{dt} \right)_{max} V\mu s$	Remember	CO 3	CLO 12	AECB01.12

MODULE-IV

1	What is a timer?	An Electronic circuit or device for automatically timing a process or observed event.	Understand	CO 4	CLO 15	AECB01.15
2.	What is IC 555 is Timer?	The timer got its name from the three 5 kilo-ohm resistor in series employed in the internal circuit of the IC.	Understand	CO 4	CLO 15	AECB01.15
3	What is Astable multivibrator?	An Astable Multivibrator or a Free Running Multivibrator is the multi vibrator which has no stable states.	Understand	CO 4	CLO 16	AECB01.16
4	What is the need of astable multivibrator?	The improvement in the waveform is achieved by using a diode pair in each collector branch of the transistors.	Understand	CO 4	CLO 17	AECB01.17
5	What is Monostable multivibrator?	It have only ONE stable state in response to a single triggering input.	Understand	CO 4	CLO 17	AECB01.17
6	What is the use of Monostable ?	Monostable will generate only one pulse.	Understand	CO 4	CLO 17	AECB01.17
7	What is data converters?	In general terms a data converter is a device that converts analog signals to digital data or vice versa.	Remember	CO 4	CLO 18	AECB01.18
8	What is the principle of monostable	The Monostable triggers on a negative-going pulse applied to pin 2 and this trigger pulse must be	Understand	CO 4	CLO17	AECB01.17

		much shorter than the output pulse width.				
9	What is Analog-to-Digital (ADC)?	Analog information is transmitted and amplifying a signal's strength or varying its frequency to add or take away data.	Understand	CO 4	CLO 19	AECB01.19
10	What is the need of A/D?	To manipulate the data. According to the sampling precision.	Understand	CO 4	CLO 19	AECB01.19
11	What is the use of A/D?	It converts the output data into a series of digital values by approximates the signal with fixed precision	Understand	CO 4	CLO 19	AECB01.19
12	What do we need DAC?	To remove the noise and to synchronize the signal and we need to have an amplifier to drive them.	Understand	CO 4	CLO 20	AECB01.20
13	What are the applications of ADC	The key spectral-performance parameters include SNR and SFDR	Understand	CO 4	CLO 19	AECB01.19
14	What are the types in DAC?	R-2R Ladder. This is the simplest type of DAC and needs only two resistor values arranged in a ladder	Remember	CO 4	CLO 20	AECB01.20
15	What is Flash ADC?	To compare the input voltage to successive reference voltages	Understand	CO 4	CLO 19	AECB01.19
16	What is the use of Flash converter?	It is the fastest way to convert an analog signal to a digital signal.	Understand	CO 4	CLO 19	AECB01.19
17	What is 16 comparator Flash?	It is the flash methodology quickly shows its weakness.	Understand	CO 4	CLO20	AECB01.20
18	What is 12 bit resolution means?	A 12-bit ADC with a maximum input of $10 V_{DC}$ can resolve the measurement into $10 V_{DC}/4096 = 0.00244 V_{DC} = 2.44 \text{ mV}$.	Remember	CO 4	CLO2 0	AECB01.20
19	What is the principle of ADC?	which converts varying analog signals into digital signals so that they can easily be read by the digital devices	Understand	CO 4	CLO 19	AECB01.19
20	What is the purpose of ADC?	It is a device for converting an analog signal (current, voltage etc.) to a digital code, usually binary.	Understand	CO 4	CLO 19	AECB01.19
21	What is synchronous counter?	when all clock inputs of the all the flip flops are driven by the same clock.	Understand	CO 4	CLO 20	AECB01.20
22	What is asynchronous counter?	Only the first flip-flop is clocked by an external clock. All subsequent flip-flops are clocked by the output of the preceding flip-flop.	Understand	CO 4	CLO20	AECB01.20
23	What is ramp type counter?	It uses a binary counter as the register and allows the clock to increment the counter one step at a time.	Understand	CO 4	CLO 20	AECB01.20

24	What is Successive approximation ADC?	It is a type of ADC, that converts a continuous analog waveform into a discrete digital binary code.	Understand	CO 4	CLO 19	AECB01.19
25	What is the use of Successive approximation ADC?	To “shaping” the waveforms as approximations. And gets closer and closer to the desired behavior.	Remember	CO 4	CLO 19	AECB01.19
26	What techniques are used in Successive approximation ADC?	Shaping is a conditioning paradigm used primarily in the experimental analysis of behavior.	Understand	CO 4	CLO 19	AECB01.19
27	What is the reinforcement of the successive approximation	in the process of shaping, to strengthen through reinforcement, it is extinguished.closer approximation then occurs and is reinforced	Understand	CO 4	CLO 19	AECB01.19
28	What are the successive approximations?	It is a series of rewards that provide positive reinforcement for behavior changes that are successive steps towards the final desired behavior.	Understand	CO 4	CLO 19	AECB01.19
29	What is resistor ladder?	Resistors connected between two reference voltages is a resistor string ladder network to use an R–2R ladder network	Understand	CO 4	CLO 20	AECB01.20
30	What are the advantages of resistor ladder?	The actual value used for R is relatively less important as long as extremely large values, R-2R ladder network are available in monolithic chips.	Remember	CO 4	CLO 20	AECB01.20
31	What is the use of R to 2R ladder?	It works by the principle of superposition where switching on binary inputs adds more voltage at the output.	Understand	CO 4	CLO 20	AECB01.20
32	What is Ladder network?	A ladder is a simple and inexpensive way to perform digital-to-analog conversion.	Understand	CO 4	CLO 20	AECB01.20
33	What are the ADC and DAC Specifications?	This is a measurement of the difference between the largest and smallest signals .	Understand	CO 4	CLO 20	AECB01.20
34	What are the ADC Specifications	Analog input voltage range, Input impedance, Accuracy, Quantization error, Resolution, Conversion time, Format of digital output, Temperature stability.	Understand	CO 4	CLO 19	AECB01.19
35	What is accuracy of ADC?	The amount of uncertainty in a measurement with respect to an absolute standard.	Understand	CO 4	CLO 19	AECB01.19
36	What is ADC resolution?	ADC resolution is 3 bits with voltage resolution, $Q = 1 \text{ V} / 8 = 0.125 \text{ V}$.	Remember	CO 4	CLO 19	AECB01.19
37	What is the working principle of Astable multivibrator?	The two transistors are cross-coupled in such a way that the circuit switches back and forth	Understand	CO 4	CLO 16	AECB01.16

		between two states.				
38	What is the Trigger?	It is a logic input type provides hysteresis or two different threshold voltage levels for rising and falling edge.	Understand	CO 4	CLO 16	AECB01.16
39	What is the principle of Schmitt trigger?	When the input lower chosen threshold the output is low, and when the input is between the two levels the output retains its value.	Understand	CO 4	CLO 16	AECB01.16
40	What is an Op-amp Multivibrator	It is an astable oscillator circuit that generates a rectangular output waveform using an RC timing network connected to the inverting input of the Op-Amp.	Understand	CO 4	CLO 17	AECB01.17
MODULE-V						
1	What is Binary Number Systems and Codes?	Binary number systems and codes are represented in 1's and 0's.	Understand	CO 5	CLO 21	AECB01.21
2.	What are the types in Binary Number Systems?	Binary, nibble, octal, BCD and hexadecimal.	Understand	CO 5	CLO 21	AECB01.21
3	What is BCD?	It is a type of method to convert a four-digit binary code to each digit 0 through 9 in a decimal (base-10) numeral.	Understand	CO 5	CLO 21	AECB01.21
4	What is 8421?	It is so called because each of the four bits is given a 'weighting' according to its column value in the binary system.	Understand	CO 5	CLO 21	AECB01.21
5	What is the Binary coded decimal?	In BCD we can use the binary number from 0000-1001 only, which are the decimal equivalent from 0-9 respectively.	Remember	CO 5	CLO 21	AECB01.21
6	What is the use of binary to BCD?	Where each digit of a decimal number is respected by its binary number	Understand	CO 5	CLO 21	AECB01.21
7	What is the technique to convert numbers in to BCD?	An easy method of converting decimal to binary number equivalents is to write down the decimal number and to continually divide-by-2 (two).	Understand	CO 5	CLO 21	AECB01.21
8	What is Logic Gate?	To perform the logic operations.	Understand	CO 5	CLO 22	AECB01.22
9	What are the basic logic Gates?	These gates are the AND, OR, NOT, NAND, NOR, EXOR and EXNOR gates.	Remember	CO 5	CLO 22	AECB01.22
10	What is the principle of Logic Gates?	The principle of operation is that the circuit operates on just two voltage levels, called logic 0 and logic 1	Remember	CO 5	CLO 22	AECB01.22
11	What is Logic Gate used?	To performs a logical operation on one or several logic inputs in order	Understand	CO 5	CLO 22	AECB01.22

		to produce a single logic output.				
12	What are the universal gates?	A gate which can implement any Boolean function without need to use any other gate type. The NAND and NOR gates are universal gates.	Understand	CO 5	CLO 22	AECB01.22
13	What is don't care condition?	It is an input-sequence for which the function output does not matter.	Understand	CO 5	CLO 22	AECB01.22
14	What is Min. term and Max. term?	A maxterm is a Boolean expression resulting in a 0 for the output of a single cell expression, and 1s for all other cells in the Karnaugh map, or truth table.	Understand	CO 5	CLO 22	AECB01.22
15	What is SOP and POS?	SOP is a way of representing a Boolean expression using min terms and POS is a way of representing a Boolean expression using max terms or sum terms.	Understand	CO 5	CLO 22	AECB01.22
16	What is Boolean Algebra?	Boolean Algebra is used to analyze and simplify the digital (logic) circuits uses only the binary numbers i.e. 0 and 1	Remember	CO 5	CLO 21	AECB01.21
17	What is fundamental concept of Boolean algebra?	Boolean algebra is a logical algebra in which symbols are used to represent logic levels.	Understand	CO 5	CLO 21	AECB01.21
18	What are the basic operations in Boolean Algebra?	Boolean Algebra is used to analyze and simplify the digital circuits	Understand	CO 5	CLO 21	AECB01.21
19	What is Boolean logic?	Boolean logic is a form of algebra in which all values are reduced to either TRUE or FALSE.	Understand	CO 5	CLO 22	AECB01.22
20	What is De Morgan's theorem?	The complement of the product of two or more variables is equal to the sum of the complements of the variables.	Understand	CO 5	CLO 22	AECB01.22
21	What is De Morgan's first theorem?	The left hand side (LHS) of this theorem represents a NAND gate, the right hand side (RHS) of the theorem represents an OR gate..	Understand	CO 5	CLO 22	AECB01.22
22	What is the use of De Morgan's theorem?	To solve the various Boolean algebra expressions.	Understand	CO 5	CLO 21	AECB01.21
23	What is logic circuit?	It performs a logical operation on one or more binary inputs and produces a single binary output.	Understand	CO 5	CLO 21	AECB01.21
24	What are the logic circuits used for?	A logic gate often uses diodes or transistors that act like electronic switches	Understand	CO 5	CLO 21	AECB01.21
25	What is the principle of logic gates?	If 0 is called "false" and 1 is called "true," the gate acts in the same way.	Understand	CO 5	CLO 21	AECB01.21
26	What is Flip Flop?	A flip flop is an electronic circuit	Understand	CO 5	CLO 22	AECB01.22

		with two stable states that can be used to store binary data				
27	What are the types in Flip Flops?	SR flip-flop, D flip-flop, JK flip-flop... T flip-flop	Remember	CO 5	CLO 22	AECB01.22
28	What is the use of Flip Flops?	It is used to store binary data. The stored data can be changed by applying varying inputs.	Understand	CO 5	CLO 22	AECB01.22
29	What is SR Flip Flop?	A basic NAND gate SR flip-flop circuit provides feedback from both of its outputs back to its opposing inputs and.	Understand	CO 5	CLO 22	AECB01.22
30	What is JK Flip Flop?	The J-K flip-flop is the most versatile of the basic flip-flops. It has the input- following character of the clocked D flip-flop but has two inputs.	Understand	CO 5	CLO 22	AECB01.22
31	What is D Flip Flop?	The D flip-flop tracks the input, making transitions with match those of the input D. The D stands for "data"; this flip-flop stores the value that is on the data line.	Understand	CO 5	CLO 22	AECB01.22
32	What is T Flip Flop?	The T or "toggle" flip-flop changes its output on each clock edge.	Remember	CO 5	CLO 22	AECB01.22
33	What is Master-Slave Flip-Flop Flip Flop?	The inputs to a flip-flop often depend on the state of its output.	Understand	CO 5	CLO 22	AECB01.22
34	What is Counter?	The output of the counter includes a predefined state based on the clock pulse.	Understand	CO 5	CLO 22	AECB01.22
35	What are the Types of Counters?	Synchronous , Asynchronous or Ripple Counter, Up/Down Counter, Decade Counter, Ring counter, Cascaded counter, Johnson counter, Modulus counter.	Understand	CO 5	CLO 23	AECB01.23
36	What is Register?	A register is a form of memory that uses a series of flip-flops to store the individual bits of a binary word.	Understand	CO 5	CLO 23	AECB01.23
37	What are the Types of Registers?	Serial-in-Serial-out (SISO) Serial-in-Parallel-out (SIPO) Parallel-in-Serial-out (PISO) Parallel-in-Parallel-out (PIPO)	Remember	CO 5	CLO 23	AECB01.23
38	What are the applications of Shift registers?	It converts the parallel data into serial data., Serial to parallel converter,	Understand	CO 5	CLO 23	AECB01.23
39	What is Shift left and shift right register?	It will shift the bits to left are called "Shift left registers". Shift the bits to right are called "Shift right registers	Understand	CO 5	CLO 23	AECB01.23

40	What is the need of shift registers?	Shift registers can also function as delay circuits and digital pulse extenders.	Understand	CO 5	CLO 23	AECEB01.23
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