INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

AERONAUTICAL ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**
Course Code	:	**AEEB04**
Program	:	**B.Tech**
Semester	:	**III**
Branch	:	**Aeronautical Engineering**
Section	:	**A & B**
Academic Year	:	**2019 - 2020**
Course Faculty	:	**Ms. B. Manogna, Assistant Professor** **Ms. B. Navothna, Assistant Professor**

COURSE OBJECTIVES:

The course should enable the students to:	
I	Understand Kirchhoff laws and their application in series and parallel circuits.
II	Discuss principle and operation of measuring instruments.
III	Analyze the characteristics of alternating quantities, electrical machines.
IV	Illustrate the V-I characteristics of various diodes and bi-polar junction transistor.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I						
1	Define Inductance.	The property of a conductor by which a change in current flowing through it induces a voltage in both the conductor itself (self-inductance) and in any nearby conductors (mutual inductance). Measured in Henry (H).	Remember	CO 1	CLO 1	AEEB04.01
2	Define Capacitance.	The ability of a body to store an electrical charge. Measured in Farads as the ratio of the electric charge of the object (Q, measured in Coulombs) to the voltage across the object (V, measured in Volts).	Remember	CO 1	CLO 1	AEEB04.01
3	Define Ampere-Hour (Ah).	A unit of measure for battery capacity. It is obtained by multiplying the current (in amperes) by the time (in hours) during which current flows.	Remember	CO 1	CLO 1	AEEB04.01
4	What is Conductor?	Any material where electric current can flow freely.	Remember	CO 1	CLO 1	AEEB04.01

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		Conductive materials, such as metals, have a relatively low resistance. Copper and aluminum wire are the most common conductors.				
5	What is a Wattmeter?	The wattmeter is an instrument for measuring the electric power in Watts of any given circuit.	Remember	CO 1	CLO 1	AEEB04.01
6	What is an Inductor?	A coil of wire wrapped around an iron core. The inductance is directly proportional to the number of turns in the coil.	Remember	CO 1	CLO 1	AEEB04.01
7	Define Electromotive Force (EMF)	A difference in potential that tends to give rise to an electric current. Measured in Volts.	Remember	CO 1	CLO 1	AEEB04.01
8	What is a measuring instrument?	Devices that are used for measuring, indicating, controlling, and recording can be considered as an instrument.	Remember	CO 1	CLO 4	AEEB04.04
9	What is working principle Moving-Iron (MI) Instruments?	These are generally used to measure alternating voltages and currents. In moving-iron instruments the movable system consists of one or more pieces of specially-shaped soft iron, which are so pivoted as to be acted upon by the magnetic field produced by the current in coil.	Remember	CO 1	CLO 4	AEEB04.04
10	What is working principle Moving-Coil(MC) Instruments?	When a current carrying conductor is placed in a magnetic field, it experiences a force and tends to move in the direction as per Fleming's left-hand rule.	Remember	CO 1	CLO 4	AEEB04.04
11	Explain Fleming's left-hand rule.	If the first and the second finger and the thumb of the left hand are held so that they are at right angle to each other, then the thumb shows the direction of the force on the conductor, the first finger points towards the direction of the magnetic field and the second finger shows the direction of the current in the wire.	Remember	CO 1	CLO 4	AEEB04.04
12	What are advantages & disadvantages of MC instruments?	Advantages: i) The MC consumes less power and has great accuracy. ii) It has efficient damping characteristics and is not affected by stray magnetic field. Disadvantages: i) Moving coil instrument can only be used on DC supply as the reversal of current produces a reversal of torque on the coil. ii) It's costly as compared to moving iron instruments.	Understand	CO 1	CLO 4	AEEB04.04

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13	What are advantages & disadvantages of MC instruments?	Advantages: i) The MC consumes less power and has great accuracy. ii) It has efficient damping characteristics and is not affected by stray magnetic field. Disadvantages: i) Moving coil instrument can only be used on DC supply as the reversal of current produces a reversal of torque on the coil. ii) It's costly as compared to moving iron instruments.	Remember	CO 1	CLO 4	AEEB04.04
14	What are advantages & disadvantages of MI instruments?	Advantages: i)The moving iron instruments are cheap, robust and simple in construction. ii) These instruments can be used on both AC and DC. Disadvantages: i) The moving iron instruments have non-uniform scale; crowded at the beginning, therefore, accurate readings are not possible at this end. ii) These instruments are not very sensitive.	Remember	CO 1	CLO 4	AEEB04.04
15	Define electric current.	Electrical current is the flow of electrons from higher electric potential towards the lower electric potential.	Remember	CO 1	CLO 1	AEEB04.01
16	Define voltage.	The potential difference between two points in an electric circuit called voltage.	Remember	CO 1	CLO 1	AEEB04.01
17	Define power.	The rate of doing work by electrical energy per unit time is called the power.	Remember	CO 1	CLO 1	AEEB04.01
18	Define resistance.	Resistance is the property of a substance, which opposes the flow of electric current.	Remember	CO 1	CLO 1	AEEB04.01
19	State Kirchhoff's laws.	Kirchhoff's current law: The sum of currents flowing towards the junction is equal to the sum of the currents flowing away from it. Kirchhoff's voltage law: In a closed circuit, the sum of the potential drops is equal to the sum of the potential rises.	Understand	CO 1	CLO 1	AEEB04.01
20	Explain about the series and parallel circuits.	When the resistors connected in a circuit such that the current flowing through them is same is called as series circuit. When resistors are connected across one another so that same voltage applied to each, then they are said to be in parallel the circuit is called as parallel circuit.	Understand	CO 1	CLO 2	AEEB04.02

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
21	State Ohm's law.	When temperature remains constant, current flowing through a circuit is directly proportional to potential deference across the conductor. V= I*R (Volts)	Understand	CO 1	CLO 1	AEEB04.01
22	Explain the Faraday's first law of electromagnetic induction.	Faraday's first Law of electromagnetic Induction state that whenever a conductor are placed in a varying magnetic field electromotive force(emf) are induced which is called induced electromotive force(emf), if the conductor circuit are closed current are also induced which is called induced current.	Understand	CO 1	CLO 4	AEEB04.04
23	Explain the Faraday's second law of electromagnetic induction.	Faraday's second law of electromagnetic induction states that, the magnitude of induced electromotive force is equal to the rate of change of flux linkages with the coil. The flux linkages is the product of number of turns and the flux associated with the coil.	Understand	CO 1	CLO 4	AEEB04.04
24	Explain about measuring instruments.	A measuring instrument is a device for measuring a physical quantity. In the physical sciences, quality assurance, and engineering, measurement is the activity of obtaining and comparing physical quantities of real-world objects and events	Understand	CO 1	CLO 4	AEEB04.04
25	Mention the basic requirements of measurement.	The basic requirements of measurement are the standard used for comparison purpose must be accurately defined and should be commonly accepted. The apparatus used and the method adopted must be provable.	Understand	CO 1	CLO 4	AEEB04.04
26	Define calibration.	Calibration is defined as the process by which comparing the instrument with a standard to correct the accuracy.	Remember	CO 1	CLO 4	AEEB04.04
27	Why calibration of instrument is important?	The calibration of all instruments is important since it affords the opportunity to check the instrument against a known standard and subsequently to errors in accuracy.	Understand	CO 1	CLO 4	AEEB04.04
28	List the functional elements of the measurement systems.	The three main functional elements of the measurement systems are: Primary sensing element Variable conversion element Data presentation element	Remember	CO 1	CLO 4	AEEB04.04
29	Mention the functions	The functions performed by the measurement system are Indicating function	Understand	CO 1	CLO 4	AEEB04.04

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	performed by the measurement system.	Recording function Controlling function				
		MODULE-II				
1	What is a Generator?	A device which converts mechanical energy into electrical energy.	Remember	CO 2	CLO 5	AEEB04.05
2	Explain working principle of a DC generator	According to Farady's laws of electromagnetic induction, whenever a moving conductor is placed in a magnetic field, an EMF (electromotive force) gets induced in the conductor.	Understand	CO 2	CLO 5	AEEB04.05
3	What are the main parts of a D.C machine?	Main Parts of DC machine: i) Armature, consists of conductors ii) Field Circuit, provides magnetic field.	Remember	CO 2	CLO 6	AEEB04.06
4	What are types of D.C generator?	Types: i) Separately excited DC generator and ii) Self-excited DC generator.	Remember	CO 2	CLO 7	AEEB04.07
5	What is meant by EMF of a DC machine?	As the armature rotates, a voltage is generated in its coils. In the case of a generator, the EMF of rotation is called the Generated EMF or Armature EMF and is denoted as $E_r = E_g$. In the case of a motor, the EMF of rotation is known as Back EMF or Counter EMF and represented as $E_r = E_b$.	Remember	CO 2	CLO 8	AEEB04.08
6	What is motor and what is the working principle of a DC motor?	A motor is an electrical machine which converts electrical energy into mechanical energy. The principle of working of a DC motor is that "whenever a current carrying conductor is placed in a magnetic field, it experiences a mechanical force".	Remember	CO 2	CLO 5	AEEB04.05
7	Explain about torque equation of a DC motor.	The torque equation of DC motor varies with only flux φ and armature current I_a.	Understand	CO 2	CLO 9	AEEB04.09
8	Mention about the classification of DC machines.	Each DC machine can act as a generator or a motor. Hence, this classification is valid for both: DC generators and DC motors. DC machines are usually classified on the basis of their field excitation method. This makes two broad categories of dc machines; i) Separately excited and ii) Self-excited.	Remember	CO 2	CLO 7	AEEB04.07
9	What are the applications of DC motors?	Direct Current (DC) motors are very commonly used as variable speed drives and in	Remember	CO 2	CLO 5	AEEB04.05

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		applications where severe torque variations occur.				
10	Why do we need starter to start a DC motor?	Starters are used to protect DC motors from damage that can be caused by very high current and torque during startup. They do this by providing external resistance to the motor, which is connected in series to the motor's armature winding and restricts the current to an acceptable level.	Understand	CO 2	CLO 6	AEEB04.06
11	What is the main difference between an AC generator and DC generator?	In an AC generator the field is rotating and the armature is stationary whereas in DC generator the field is stationary and the armature is rotating.	Understand	CO 2	CLO 6	AEEB04.06
12	Define electric motor.	An electrical machine, which converts electrical energy into mechanical energy, is called as electric motor.	Remember	CO 2	CLO 5	AEEB04.05
13	What is meant by armature reaction?	It is the effect of armature magnetic field on the distribution of flux under main poles of a generator. The armature magnetic field has two effects 1. It demagnetizes or weakens the main flux 2. It cross-magnetizes or distorts it.	Understand	CO 2	CLO 6	AEEB04.06
14	What is the use of commutator?	A device is used in a DC generator to convert the alternating electromotive force(emf) into unidirectional electromotive force(emf) is called commutator.	Understand	CO 2	CLO 6	AEEB04.06
15	State that the Fleming's left hand rule.	The rules states that outstretch the three fingers of the left hand namely the first finger, middle finger and thumb such that they are mutually perpendicular to each other. Now point the first finger in the direction of magnetic field and the middle finger in the direction of the current then the thumb gives the direction of the force experienced by the conductor	Understand	CO 2	CLO 5	AEEB04.05
16	Define Lenz's law.	Lenz's law states the direction of induced emf is always so as to oppose the cause producing it	Remember	CO 2	CLO 5	AEEB04.05
17	Explain the necessity of starter.	To restrict high starting armature current, a variable resistance is connected in series with the e armature at start. This resistance is called starter	Understand	CO 2	CLO 6	AEEB04.06
18	What is meant by Swinburne's test?	Without actually loading the motor the losses and hence	Understand	CO 2	CLO 7	AEEB04.07

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		efficiency at different loads can be found out.				
19	What is meant by residual magnetism?	Practically though the generator is not working, without any current through field winding, the field poles posses some magnetic flux. This is called as residual magnetism.	Understand	CO 2	CLO 5	AEEB04.05
20	Explain the back emf or counter emf.	When the armature of a DC motor rotates under the influence of the driving torque, the armature conductors move through the magnetic field and hence e.m.f. is induced in them as in a generator. The induced e.m.f. acts in opposite direction to the applied voltage V (Lenz's law) and in known as back or counter emf (E_b). It is always less than the applied voltage V, although this difference is small when the motor is running under normal conditions.	Understand	CO 2	CLO 8	AEEB04.08
21	Why series motor cannot be started on no-load?	Series motor cannot be started without load because of high starting torque. Series motor are used in Trains, Crane etc.	Remember	CO 2	CLO 6	AEEB04.06
22	Which type of motor is used in trains?	DC series motor is used in the trains to get high starting torque while starting of the trains.	Remember	CO 2	CLO 6	AEEB04.06
23	How can you reverse the direction of rotation of a DC Motor?	We can reverse the direction of rotation of a DC motor by either reversing the field current or armature current. If both the currents are reversed the motor will run in original direction.	Remember	CO 2	CLO 5	AEEB04.05
24	Explain the different tests conducted on DC Machines.	. Brake test Swinburne's test or No-load test Regeneration test or Hopkinson's test Retardation or Running down test	Understand	CO 2	CLO 7	AEEB04.07
25	Mention the methods for starting an induction motor?	Star delta starter Auto transformer starter Resistance starter Series reactor starter Direct online starter (DOL)	Remember	CO 2	CLO 13	AEEB04.13
MODULE-III						
1	What is an Alternating Current (AC)?	An electric current that reverses its direction many times a second at regular intervals.	Remember	CO 3	CLO 10	AEEB04.10
2	Define Power Factor.	The ratio of the actual electrical power dissipated by an AC circuit to the product of the r.m.s. values of current and voltage.	Remember	CO 3	CLO 10	AEEB04.10

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
3	Define Average value of an AC signal.	The average value is defined as "the average of all instantaneous values during one alternation". That is, the ratio of the sum of all considered instantaneous values to the number of instantaneous values in one alternation period. Whereas the average value for the entire cycle of alternating quantity is zero.	Remember	CO 3	CLO 10	AEEB04.10
4	Define RMS value of an AC signal.	The Root Mean Square (RMS) value is "the square root of the sum of squares of means of an alternating quantity". It can also express as "the effect that produced by a certain input of AC quantity which is equivalent to an effect produced by the equal input of D.C quantity".	Remember	CO 3	CLO 10	AEEB04.10
5	Define a Transformer.	A transformer consists of two electrically isolated coils and operates on Faraday's principal of "electromagnetic mutual induction", in which an EMF is induced in the transformers secondary coil by the magnetic flux generated by the voltages and currents flowing in the primary coil winding.	Remember	CO 3	CLO 14	AEEB04.14
6	How an EMF is induced in a transformer?	Actually in electrical power transformer, one alternating electrical source is applied to the primary winding and due to this, magnetizing current flowing through the primary winding which produces alternating flux in the core of transformer. This flux links with both primary and secondary windings. As this flux is alternating in nature, there must be a rate of change of flux. According to Faraday's law of electromagnetic induction if any coil or conductor links with any changing flux, there must be an induced EMF in it.	Remember	CO 3	CLO 14	AEEB04.14
7	What are the losses in a transformer?	In any electrical machine, 'loss' can be defined as the difference between input power and output power. An electrical transformer is a static device, hence mechanical losses (like windage or friction losses) are absent in it. A transformer only consists of electrical losses (iron losses and copper losses).	Remember	CO 3	CLO 14	AEEB04.014
8	Explain about working principle of	In a D.C motor, supply is needed to be given for the stator winding as well as the rotor winding. But	Understand	CO 3	CLO 13	AEEB04.013

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	three-phase Induction motor.	in an induction motor only the stator winding is fed with an AC supply. Alternating flux is produced around the stator winding due to AC supply. This alternating flux revolves with synchronous speed. The revolving flux is called as "Rotating Magnetic Field" (RMF). The relative speed between stator RMF and rotor conductors causes an induced EMF in the rotor conductors, according to the Faraday's law of electromagnetic induction. The rotor conductors are short circuited, and hence rotor current is produced due to induced EMF. That is why such motors are called as induction motors. (This action is same as that occurs in transformers, hence induction motors can be called as rotating transformers.)				
9	What are the applications of three-phase AC induction motor?	Three-phase A.C induction motors are widely used in industrial and commercial applications. These are of two types, squirrel cage and slip ring motors. Squirrel cage motors are widely used due to their rugged construction and simple design. Slip ring motors require external resistors to have high starting torque.	Remember	CO 3	CLO 13	AEEB04.13
10	What is working principle of Alternator?	The machine which produces 3 phase power from mechanical power is called an alternator or synchronous generator. The working of an alternator is based on the principle that when the flux linking a conductor changes, an emf is induced in the conductor.	Remember	CO 3	CLO 12	AEEB04.12
11	What do you understand by ω?	Each cycle of a sinusoidal wave spans 2π radians. Hence, if this quantity is divided by the time period, angular velocity of the sinusoidal wave is obtained. It is denoted by ω and is expressed in radians per second	Understand	CO 3	CLO 10	AEEB04.010
12	Why the RMS value of an alternating current or voltage is used to denote its amplitude?	RMS value of an alternating current or voltage is used to denote its amplitude because it is related to the power developed in a resistance by the alternating current or voltage.	Understand	CO 3	CLO 10	AEEB04.010

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
13	Define effective value of an sinusoidal wave.	The effective value of an alternating current is given by that steady current which when flows through a given resistance for a given time produces the same amount of heat as when the alternating current is flowing through the same resistance for the same time duration.	Remember	CO 3	CLO 10	AEEB04.010
14	Explain the significance of form factor.	Form factor is a mean of relating the mean value with the effective value of alternating quantity and it is useful in determination of effective values of the alternating quantities whose mean or average values over half a period can be determined conveniently.	Understand	CO 3	CLO 10	AEEB04.010
15	Explain the significance of peak factor.	Peak factor of an alternating voltage is very essential in connection with determining the dielectric strength since the dielectric stress developed in an insulting material is proportional to the peak value of the voltage applied to it.	Understand	CO 3	CLO 11	AEEB04.011
16	Define phase and phase difference.	The phase of an alternating quantity (voltage or current) at any instant is defined as the fractional part of a cycle through which the quantity has advanced while the phase difference may be defined as the angular displacement between the maximum positive values of the two phasor's representation the two quantities having the same frequency.	Remember	CO 3	CLO 10	AEEB04.10
17	Why are transformers rated in KVA?	Copper losses (I^2R) depend on current which passing through transformer winding while Iron losses or core losses or Insulation losses depend on Voltage. That's why the transformer rating may be expressed in VA or kVA, not in W or kW.	Understand	CO 2	CLO 14	AEEB04.14
18	Explain if DC supply is applied to the transformer.	If DC supply is given to the primary of Transformer then DC current flows through primary winding which is constant(time invariant).For production of emf in any winding the current flowing through that must be sinusoidal since e=L*(dI/dt).So in the given case ie, for DC input, no emf produced in primary	Understand	CO 3	CLO 14	AEEB04.14

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		winding.				
19	Why an induction motor sometimes called rotating transformer?	An induction motor is sometimes called a rotating transformer because the stator (stationary part) is essentially the primary side of the transformer and the rotor (rotating part) is the secondary side.	Understand	CO 3	CLO 13	AEEB04.13
20	Define slip.	This difference between the speed of the rotor and speed of the rotating magnetic field in the stator is called slip. It is unit less and is the ratio between the relative speed of the magnetic field as seen by the rotor to the speed of the rotating field. Due to this an induction motor is sometimes referred to as an asynchronous machine.	Remember	CO 3	CLO 11	AEEB04.11
21	What is a cogging torque?	Cogging torque of electrical motors is the torque due to the interaction between the permanent magnets of the rotor and the stator slots of a Permanent Magnet (PM) machine. Also termed as detent or 'no-current' torque, it is an undesirable component for the operation of such a motor. It is especially prominent at lower speeds, with the symptom of jerkiness.	Understand	CO 3	CLO 12	AEEB04.12
22	Explain the advantages of providing damper winding.	The damper winding is useful in preventing the hunting (momentary speed fluctuations) in generators. The damper winding also used to maintain balanced 3 phase voltage under unbalanced load conditions.	Understand	CO 3	CLO 12	AEEB04.12
23	Define turbo alternators.	High speed alternators are called as Turbo alternators. As it runs at very high speed, salient pole rotors are not used. Smooth cylindrical type rotor is suitable for turbo alternators.	Remember	CO 3	CLO 12	AEEB04.12
24	How is a direct-connected exciter arranged in an alternator ?	The armature of the exciter is mounted on the shaft of the alternator close to the spider hub. In some cases, it is mounted at a distance sufficient to permit a pedestal and bearing to be placed between the exciter and the hub	Understand	CO 3	CLO 14	AEEB04.14
MODULE-IV						
1	What is a diode?	A semiconductor device with two terminals, typically	Remember	CO 4	CLO 15	AEEB04.15

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		allowing the flow of current in one direction only. Diodes allow current to flow when the anode is positive in relation to the cathode.				
2	What is meant by semiconductor	A solid substance that has conductivity between that of an insulator and that of most metals. Devices made of semiconductors, notably silicon, are essential components of most electronic circuits.	Remember	CO 4	CLO 15	AEEB04.15
3	What is a Rectifier?	An electrical device that converts an alternating current into a direct one by allowing a current to flow through it in one direction only.	Remember	CO 4	CLO 16	AEEB04.16
4	What is half-wave rectifier?	The half wave rectifier is a type of rectifier which converts half of the AC input signal (positive half cycle) into pulsating DC output signal and the remaining half signal (negative half cycle) is blocked or lost. In half wave rectifier circuit, we use only a single diode.	Remember	CO 4	CLO 16	AEEB04.16
5	What is full - wave rectifier?	The full wave rectifier is a type of rectifier which converts the full AC input signal (positive half cycle and negative half cycle) to pulsating DC output signal. Unlike the half wave rectifier, the input signal is not wasted in full wave rectifier. The efficiency of full wave rectifier is high as compared to the half wave rectifier.	Remember	CO 4	CLO 16	AEEB04.16
6	What is full-wave Bridge rectifier?	Another, more popular full-wave rectifier design exists, and it is built around a four-diode bridge configuration. For obvious reasons, this design is called a 'full-wave bridge'.	Remember	CO 4	CLO 16	AEEB04.16
7	What is ripple voltage?	The amount of AC voltage mixed with the rectifier's DC output is called 'ripple voltage'. In most cases, since "pure" DC is the desired goal, ripple voltage is undesirable.	Remember	CO 4	CLO 16	AEEB04.16
8	Define Filter.	A filter is a circuit capable of passing (or amplifying) certain frequencies while attenuating other frequencies. Thus, a filter can extract important frequencies from signals that also contain undesirable or irrelevant frequencies.	Remember	CO 4	CLO 17	AEEB04.17

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
9	Define Waveform.	A graphical representation of electrical cycles which shows the amount of variation in amplitude over some period of time.	Remember	CO 4	CLO 15	AEEB04.15
10	Explain about Diode as a Switch.	Diode is a two terminal p-n junction that can be used in various applications. One of such applications is an electrical switch. The p-n junction, when forward biased acts as close circuited and when reverse biased acts as open circuited. Hence the change of forward and reverse biased states makes the diode work as a switch, the forward being ON and the reverse being OFF state.	Understand	CO 4	CLO 17	AEEB04.17
11	What is a zener diode?	A zener diode is a special type of device designed to operate in the zener breakdown region. Zener diodes acts like normal p-n junction diodes under forward biased condition. When forward biased voltage is applied to the zener diode it allows large amount of electric current and blocks only a small amount of electric current.	Remember	CO 4	CLO 15	AEEB04.15
12	Explain about zener diode as a voltage regulator.	Zener diode is a silicon semiconductor with a p-n junction diode which operates under reverse biased condition. It is used as a voltage regulator in DC circuit. The primary objective of the zener diode as a voltage regulator is to maintain a constant voltage.	Understand	CO 4	CLO 15	AEEB04.15
13	Define what a p-n junction.	The contact surface between the layers of p-type and n-type semiconductor pieces	Remember	CO 4	CLO 15	AEEB04.15
14	Explain space region called the depletion region.	The region around the junction is completely ionized on formation of p-n junction. As a result, there are neither free electrons on the n-side nor the holes on the p-side. Since the region around the junction is depleted of mobile charges, it is called the depletion region	Understand	CO 4	CLO 15	AEEB04.15
15	Define cut-in voltage of a p-n junction diode.	The forward voltage, at which the current through the p-n junction starts increasing rapidly, is called the cut-in voltage	Remember	CO 4	CLO 15	AEEB04.15
16	Define peak inverse voltage.	Peak inverse voltage is the maximum voltage that can be applied to the p-n	Remember	CO 4	CLO 15	AEEB04.15

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		junction without damaging the junction. If the reverse voltage across the junction exceeds its peak inverse voltage (PIV), the junction may get destroyed owing to excessive heat.				
17	Define breakdown voltage.	Breakdown voltage is defined as the reverse voltage at which p-n junction breaks down with sudden rise with reverse current	Remember	CO 4	CLO 15	AEEB04.15
18	Explain about the constant voltage regulator.	Constant voltage regulator is a p-n junction diode specially designed for operation in the breakdown region in reverse bias condition.	Understand	CO 4	CLO 15	AEEB04.15
19	What is the working principle of zener diode?	Principle behind zener diode working. As stated above the basic principle behind the working of a zener diode lies in the cause of breakdown for a diode in reverse biased condition. Normally there are two types of breakdown- zener and avalanche. This type of breakdown occurs for a reverse bias voltage between 2 to 8v.	Understand	CO 4	CLO 15	AEEB04.15
20	Explain how zener diode maintains constant voltage across the load.	Zener diode has the property of behaving like a dc battery in 'on' state. If the zener diode is shunted across the load RL and the voltage across zener diode is more than the zener voltage VZ then zener diode is on 'on' state , and any variation in voltage across the zener diode due to variations either in supply voltage or in load resistance is not able to change the output voltage. Thus zener diode maintains voltage constant across the load	Understand	CO 4	CLO 15	AEEB04.15
21	Define AC to DC power converter.	A rectifier is a device which converts alternating current (or) voltage into unidirectional current (or) voltage.	Remember	CO 4	CLO 17	AEEB04.17
22	Define why half-wave rectifiers are generally not used in dc power supply.	The type of supply available from half-wave rectifier is not satisfactory for general power supply. That is defining why it is generally not used in dc power supply.	Remember	CO 4	CLO 16	AEEB04.16
23	What is transformer utilization factor?	Transformer utilization factor is defined as the ratio of power delivered to the load and ac rating of secondary of supply	Understand	CO 4	CLO 16	AEEB04.16

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		power transformer.				
24	Which device used to remove the harmonics of DC signal?	Filter is a device that converts pulsating output of rectifier into a steady dc level.	Understand	CO 4	CLO 16	AEEB04.16
25	Why capacitor input filter is preferred to choke input filter?	In capacitor input filter, the dc output is much larger and ripples are less in comparison to those in choke input filter. So, capacitor input filter is preferred to choke input filter.	Understand	CO 4	CLO 16	AEEB04.16
26	Explain π-filters are not suitable for varying loads.	Voltage regulation in case of π-filters is very poor and, therefore, π-filters are not suitable for varying loads.	Understand	CO 4	CLO 16	AEEB04.16
27	Why series inductor and l-section filters cannot be used with half- wave rectifiers?	Series inductor and L-section filters cannot be used with half-wave rectifiers because operation of series inductor depends upon the current through it and needs a minimum current to flow at all times.	Understand	CO 4	CLO 16	AEEB04.16
MODULE-V						
1	Define Bipolar Junction Transistor (BJT).	A semiconductor device with three connections, capable of amplification in addition to rectification. The fusion of two diodes produces a three layer, two junctions, three terminal device forming the basis of a Bipolar Junction Transistor, or BJT for short.	Remember	CO 5	CLO 20	AEEB04.020
2	What is Solid State Circuit?	Electronic (integrated) circuits which utilize semiconductor devices such as transistors, diodes and silicon controlled rectifiers.	Remember	CO 5	CLO 20	AEEB04.20
3	Explain shortly about operation of BJT?	Bipolar transistors have the ability to operate within three different regions: Active Region – the transistor operates as an amplifier and $I_c = \beta * I_b$ Saturation – the transistor is "Fully-ON" operating as a switch and I_c = I(saturation) Cut-off – the transistor is "Fully-OFF" operating as a switch and $I_c = 0$	Understand	CO 5	CLO 20	AEEB04.020
4	What is Common Base (CB) configuration?	In the Common Base or grounded base configuration, the base connection is common to both the input signal and the output signal. The input signal is applied between the transistors base and the emitter terminals, while the	Remember	CO 5	CLO 20	AEEB04.020

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		corresponding output signal is taken from between the base and the collector terminals				
5	What is the main feature of CB configuration?	CB bipolar transistor configuration has a high ratio of output to input resistance or more importantly "load" resistance (R_L) to "input" resistance (R_{in}) giving it a value of "Resistance Gain".	Remember	CO 5	CLO 20	AEEB04.020
6	What is Common Emitter (CE) configuration?	In the c**ommon emitter** or grounded emitter configuration, the input signal is applied between the base and the emitter, while the output is taken from between the collector and the emitter. This type of configuration is the most commonly used circuit for transistor based amplifiers and which represents the "normal" method of bipolar transistor connection.	Remember	CO 5	CLO 20	AEEB04.020
7	What is the main feature of CE configuration?	The CE amplifier configuration produces the highest current and power gain of all the three bipolar transistor configurations. This is mainly because the input impedance is low as it is connected to a forward biased PN-junction, while the output impedance is high as it is taken from a reverse biased PN-junction.	Remember	CO 5	CLO 20	AEEB04.020
8	What is Common Collector (CC) configuration?	In the c**ommon collector** or grounded collector configuration, the collector is now common through the supply. The input signal is connected directly to the base, while the output is taken from the emitter. This type of configuration is commonly known as	Remember	CO 5	CLO 20	AEEB04.020
9	What is the main feature of CC configuration?	The Common Collector or emitter follower configuration is very useful for impedance matching applications because of the very high input impedance, in the region of hundreds of thousands of Ohms while having relatively low output impedance.	Remember	CO 5	CLO 20	AEEB04.020
10	What is meant by the word transistor as an amplifier'?	The transistor raises the strength of a weak signal and hence acts an amplifier	Remember	CO 5	CLO 21	AEEB04.021

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
11	Why is transistor called current controlled device	The output voltage, current or power is controlled by the input current in a transistor. So it is called the current controlled device.	Remember	CO 5	CLO 21	AEEB04.021
12	Why silicon types are more used than germanium type transistor.	Silicon transistor has smaller cut-off current ICBO, small variations in ICBO due to variations in temperature and high operating temperature as compared to those in case of germanium type.	Remember	CO 5	CLO 20	AEEB04.020
13	Why collector is made larger that base and emitter?	Collector is made physically larger than emitter and base because collector is to dissipate much power.	Remember	CO 5	CLO 20	AEEB04.020
14	How α and β are related to each other	α and β are related as below: α= β/(1+ β) or β= α/(1- α) Q14. Define beta of a transistor. The β factor transistor is the common emitter current gain of that transistor and is defined as the ratio of collector current to the base current : B = IC/IB	Understand	CO 5	CLO 21	AEEB04.021
15	Why CE configuration more popular in amplifier circuits?	CE configuration is mainly used because its current, voltage and power gains are quite high and the ratio of output impedance and input impedance are quite moderate.	Understand	CO 5	CLO 21	AEEB04.021
16	What is collector reverse saturation?	When input current (IE in case of CB configuration and IB in case of CE configuration) is zero, collector current IC is not zero although it is very small. In fact this is the reverse leakage current or collector reverse saturation current (ICBO or simply ICO in CB configuration and ICEO in CE configuration).	Understand	CO 5	CLO 20	AEEB04.020
17	What is operating point?	Quiescent point is a point on the *dc* load line which represents VCE and IC in the absence of ac signal and variations in VCE and IC take place around this point when ac signal is applied.	Understand	CO 5	CLO 22	AEEB04.022
18	How is BJT used as amplifier	A transistor operates as an amplifier by transfer of the current from low impedance loop to high impedance loop.	Understand	CO 5	CLO 21	AEEB04.021
19	Why ICEO >> ICBO	The collector cut-off current denoted by ICBO is much larger than ICBO. ICEO is given as : ICEO = ICBO/(1-α) Because α is nearly equal to unity (slightly less than unity),	Understand	CO 5	CLO 22	AEEB04.022

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		ICEO >> ICBO				
20	Why is there a maximum limit of collector supply voltage to transistor	Although collector current is practically independent of collector supply voltage over the transistor operating range, but if VCB is increase beyond a certain vale collector current IC is eventually increases rapidly and possibly destroys the device.	Understand	CO 5	CLO 20	AEEB04.020
21	Why is ordinary junction transistor called bipolar?	Because the transistor operation is carried out by two types of charge carriers (majority and minority carriers), an ordinary transistor is called bipolar.	Understand	CO 5	CLO 23	AEEB04.023
22	Can a transistor be formed by connecting two diodes back to back?	No. Because in case of two discrete back-to-back connected diodes there are four doped regions instead of three and there is nothing that resembles a thin base region between an emitter and a collector.	Understand	CO 5	CLO 23	AEEB04.023

Signature of the Faculty **HOD, AE**