സഹായി

SFI GEC PALAKKAD

D　　0000EST130121903　　Pages: 3

Reg No.:______________　　Name:__________________________

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech S1 (Special Improvement) Examination January 2021 (2019 scheme)

Course Code: EST130

Course Name: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING (2019-Scheme)

PART I: BASIC ELECTRICAL ENGINEERING

Max. Marks:50　　Duration: 90 min

PART A

Answer all questions, each carries 4 marks.

1 Derive the expression for rms value of a sinusoidal wave form.

2 Define self inductance of a coil and derive an expression for the same.

3 Derive an expression for energy stored in a capacitor.

4 Prove that in a purely inductive circuit, current lags behind the applied voltage by 90 degrees and the power consumed is zero.

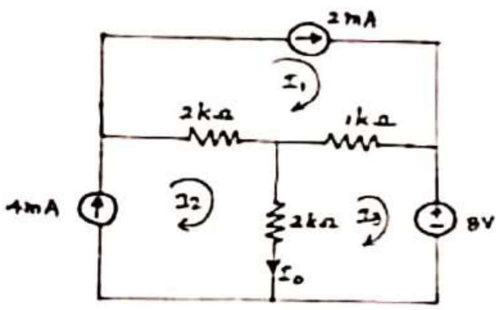
5 With the help of circuit diagram and phasor diagram, derive the relation between line and phase voltage in a three phase star connected system. (5x4=20)

PART B

Answer one full question from each module, each question carries 10 marks

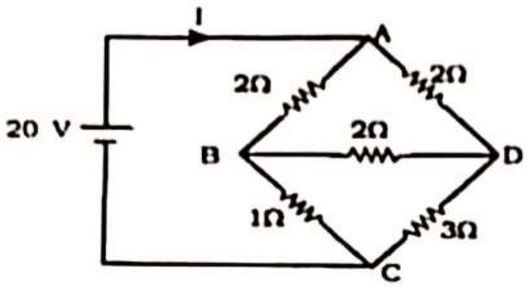
Module-I

6 Find I_o in the circuit using mesh current analysis. (10)



OR

7 Find the source current I in the figure using star-delta transformation. (10)



Module-II

8 a) An iron ring of mean diameter 10cm is uniformly wound with a coil of 2000 turns. When a current of 0.25A is passed through the coil a flux density of 0.4T is set up in the iron ring. Find i) the magnetizing force and ii) the relative permeability of iron. (4)

b) Define i) self-inductance of a coil ii) coefficient of coupling and iii) relative permeability (6)

OR

9 Two coils A and B have 12000 turns and 14000 turns respectively. 80% of the flux produced by coil A links with coil B. A current of 6A in coil A produces 0.05mwb in coil A while the same current in coil B produces 0.085mwb in coil B. Calculate i) Mutual inductance and ii) Coefficient of coupling. (10)

Module-III

10 Coil A having resistance of 20 Ω and inductance of 0.2 H is connected in series with another coil B having resistance of 15Ω and inductance of 0.1H. The two coils in series are fed from 220V, 50 Hz, single phase power supply. Determine (i) the voltage across each coil (ii) power dissipated in each coil (iii) power factor of the whole circuit. (10)

OR

11 Three similar coils connected in star draw a total power of 1.5kW at a power factor of 0.2 lagging from a 3 phase 400V, 50Hz power supply. Calculate the resistance and inductance of each coil (10)

****

PART II: BASIC ELECTRONICS ENGINEERING

Max. Marks: 50

Duration: 90 min

PART A

Answer all questions, each carries 4 marks.

12 What are the different types of capacitors? Find the value of the capacitor coded as 103.

13 Sketch the energy band diagram of conductors, insulator and semiconductors.

14 With a neat diagram explain the working of an instrumentation system.

15 What is biasing? List the advantages of potential divider biasing.

16 Discuss the need for modulation. (5x4=20)

PART B

Answer one full question from each module, each question carries 10 marks

Module-IV

17 a) Give the specifications of a resistor. The colour bands marked on a resistor are Green, Blue, Orange and Gold. What are the minimum and maximum resistance values expected from that resistance? (5)

b) Explain the working of a diode under forward and reverse biased condition. Draw its VI characteristics? (5)

OR

18 a) Differentiate between avalanche breakdown and zener breakdown. (4)

b) Narrate the working of an NPN transistor. (6)

Module-V

19 a) Explain the working of a bridge rectifier. (5)

b) Describe the block diagram of a public addressing system. (5)

OR

20 a) Define line regulation and load regulation. (4)

b) Draw the frequency response curve of a CE amplifier and explain. (6)

Module-VI

21 a) Describe the basic principles of a cellular communication system. (5)

b) Write the expression for an AM wave. Draw the frequency spectrum and find the associated bandwidth? (5)

OR

22 a) What are the advantages of GSM network? (4)

b) Explain the roles of BTS, BSC and MSC in a GSM network. (6)

****

BEE (special improvement)

1. The RMS value of an AC voltage is continually changing from zero up to the positive peak through zero to the negative peak and back to zero again. The RMS value is the effective value of varying voltage or current. It is the equivalent steady DC (const) value which gives the same effect.

Let a sinusoidal, $i = I_m \sin\theta$

$$I_{rms} = \sqrt{\int_0^{\pi} i^2 dt} = \sqrt{\frac{\int_0^{\pi} (I_m \sin\theta)^2 d\theta}{\pi}}$$

$$= \sqrt{\frac{I_m^2}{\pi} \int_0^{\pi} \sin^2\theta \, d\theta}$$

$$= \sqrt{\frac{I_m^2}{\pi} \times \frac{\pi}{2}} = \frac{I_m}{\sqrt{2}} = 0.707 I_m$$

$$\text{RMS value} = \frac{\text{maximum value}}{\sqrt{2}}$$

2. The property of the coil, which opposes any change of current current or flux through it, is called its self inductance and is denoted by letter L

Expression of self inductance of a coil.

consider a coil of N turns carrying a current I ampere. when a current in the coil changes, the flux linking with the coil also changes. The emf induced in the coil is given by

Scanned with CamScanner

$$e = -N\frac{d\phi}{dt} \quad \text{—— (1)}$$

$$= -\frac{d}{dt}(N\phi)$$

$$= -L\frac{dI}{dt} \quad \text{—— (2)}$$

where L is a constant called self Inductance of the coil or coefficient of self inductance.

$$L = \frac{-e}{(dI/dt)} \quad \text{—— (3)}$$

comparing (1) and (2)

$$N\frac{d\phi}{dt} = L\frac{dI}{dt}$$

$$N\,d\phi = L\,dI$$

on Integrating we get

$$N\phi = LI$$

$$L = \frac{N\phi}{I}$$

3)

capacitance, $C = \frac{Q}{V}$ or $C = \frac{q}{V}$

above equation interms of current

$$i = C\frac{dv}{dt} \qquad \left(i = \frac{dq}{dt}\right)$$

where V is the voltage across the capacitor and i is the current through it.

$$dv = \frac{1}{C}\,i\,dt$$

Scanned with CamScanner

Integrating both sides, we have

$$\int_0^t dv = \frac{1}{C}\int_0^t i\,dt$$

$$V(t) - V(0) = \frac{1}{C}\int_0^t i\,dt$$

$$V(t) = \frac{1}{C}\int_0^t i\,dt + V(0)$$

V(0) indicates the initial voltage across the capacitor.

The power absorbed by the capacitor is given by

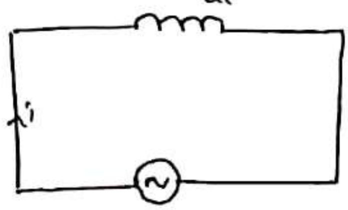
$$P = Vi = Vc\frac{dv}{dt}$$

The energy stored in capacitor is

$$W = \int_0^t P\,dt = \int_0^t Vc\frac{dv}{dt}$$

$$\boxed{W = \frac{1}{2}CV^2}$$

4)



At any instant t, self induced emf is,

$$e = -L\frac{di}{dt}$$

But $V = V_m \sin\omega t$ and $(v+e)$ must be equal to zero

Scanned with CamScanner

Hence, $V_m \sin \omega t = L \frac{di}{dt}$

$$di = \left(\frac{V_m}{L}\right) \sin \omega t \, dt$$

on Integrating both side

$$i = \frac{V_m}{L} \int \sin \omega t \, dt$$

$$= \frac{V_m}{L} \times \frac{-\cos \omega t}{\omega}$$

$$= \frac{-V_m}{\omega L} \cos \omega t$$

$$= \frac{V_m}{\omega L} \sin(\omega t - \pi/2).$$

when $\sin(\omega t - \pi/2)$ is unity, current is max. and denoted by I_m

$$I_m = \frac{V_m}{\omega L} = \frac{V_m}{X_L}$$

$$i = I_m \sin(\omega t - \pi/2)$$

From the above equation it's clear that 'I' lags behind the applied voltage V by 90°

Power consumed

$$P = V \times i = V_m \sin \omega t \; I_m \sin(\omega t - \pi/2)$$

$$= -V_m I_m \sin \omega t \cos \omega t$$

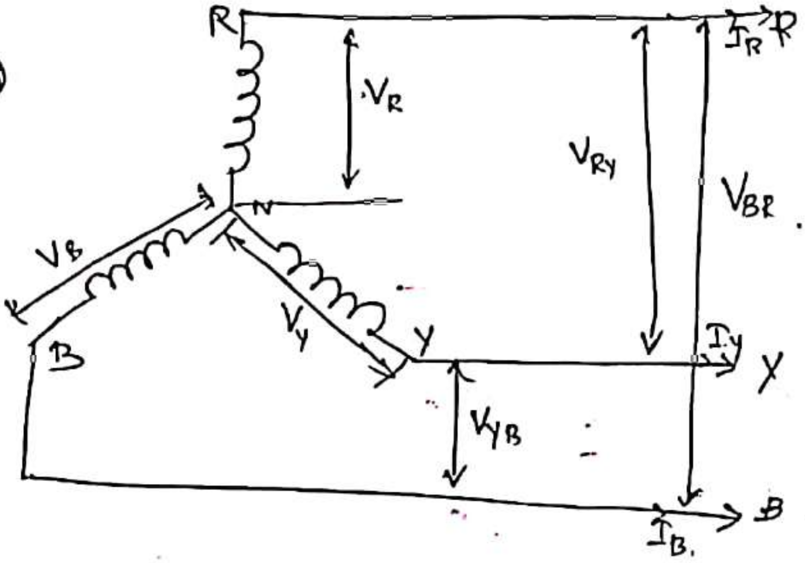
$$= -\frac{1}{2} V_m I_m \sin 2\omega t$$

average power of one complete cycle

$$P = \frac{-V_m I_m}{2} \times \text{average of } (\sin(2\omega t)) = 0$$

Scanned with CamScanner

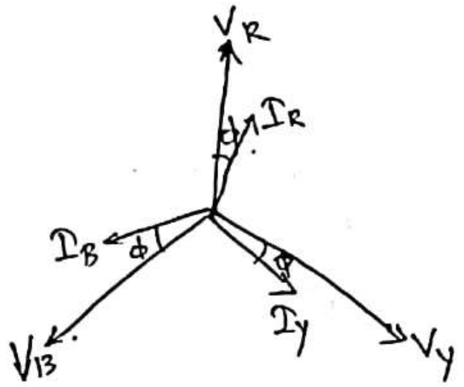
5)



line currents are I_R, I_B and I_Y.

Voltage available b/w any pair of line is line voltage.

Thus $V_{RY} \to$ line voltage b/w R and Y.



$V_R = V_Y = V_B =$ phase voltage V_P.

line voltage V_{RY} is vector difference of V_R and V_Y.

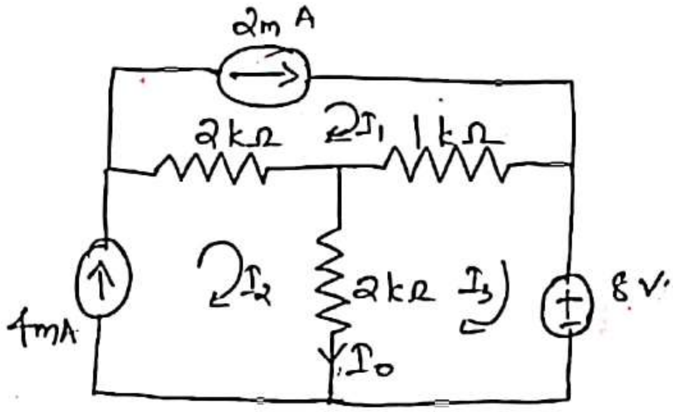
$V_{RY} = V_{YB} = V_{BR} =$ line voltage $= V_L$

Line voltage $V_{RY} = V_R - V_Y = 2V_R \cos 30°$

$= 2V_p \frac{\sqrt{3}}{2} = \sqrt{3} V_p$.

Line voltage $= \sqrt{3} \times$ phase voltage.

6.



As $I_1 = 2mA$

$I_2 = 4mA$.

By applying KVL at loop3.

$-1k(I_3 - I_1) - 8 - 2k(I_3 - I_2) = 0$

$-10^3(I_3 - 2\times10^{-3}) - 8 - 2\times10^{-3}(I_3 - 4\times10^{-3}) = 0$

$-10^3 I_3 + 2 - \cancel{8} - 2\times10^{-3} I_3 + \cancel{8} = 0$

Scanned with CamScanner

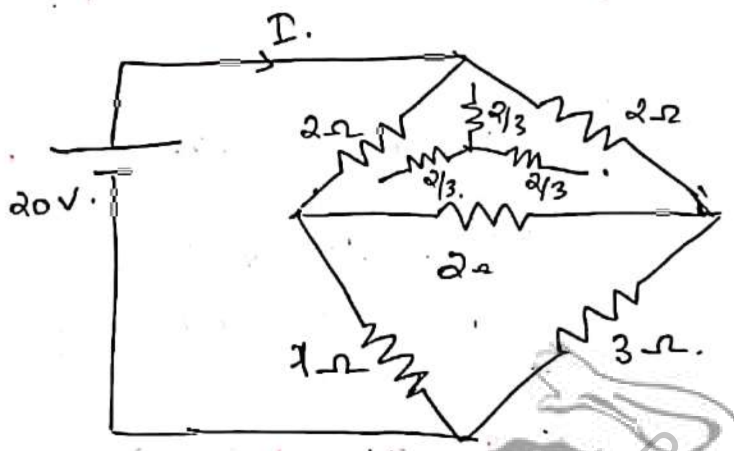
$2 = 3 \times 10^3 I_3$.

$I_3 = \underline{\underline{0.667\,mA}}$.

As $I_0 = I_2 - I_3$.

$= 4\,mA - 0.667\,mA = \underline{\underline{3.33\,mA}}$.

7)



$\left(\frac{2}{3}+3\right) \parallel \left(\frac{2}{3}+1\right)$

$\frac{5}{3} \parallel \frac{11}{3}$

$= \dfrac{\frac{5}{3} \times \frac{11}{3}}{\frac{16}{3}} = \frac{55}{\cancel{9}3} \times \frac{\cancel{3}}{16}$

$= \frac{55}{48}$

$\frac{55}{48} + \frac{2 \times 16}{3 \times 16} = \underline{\underline{\frac{87}{48}\,\Omega}}$

$R_{eq} = \frac{87}{48}\,\Omega$.

$I = \dfrac{20}{87/48} = \underline{\underline{11.034\,A}}$.

8) $d = 10\,cm$, $r = 5\,cm$

$N = 2000$ $\quad I = 0.25\,A$.

$B = 0.4\,T$ $\quad H?$ $\quad \mu_r = ?$

$H = \dfrac{NI}{l} = \dfrac{2000 \times 0.25}{2\pi(5 \times 10^{-2})} = \underline{\underline{1591.54\ AT/m}}$

Scanned with CamScanner

$B = \mu H$.

$\mu = \frac{B}{H} = 2.513 \times 10^{-4}$

$\mu_0 \mu_r = \mu$.

$\mu_r = \frac{\mu}{\mu_0} = 199.97$

9)

$\frac{A}{12000}$ $\frac{B}{14000}$

$I_1 = 6A \Rightarrow \phi_1 = 0.05wb$

$I_2 = 6A \rightarrow \phi_2 = 0.085$.

flux linking with coil B when 6A flows in A.

80% of $\phi_1 = 0.04wb$.

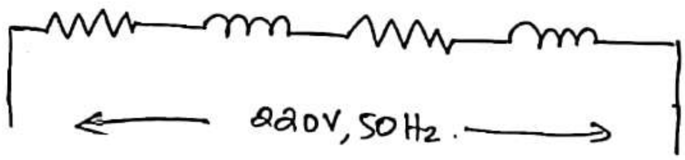
$M = \frac{N_2 \phi_{12}}{I_1} = \frac{14000 \times 0.04}{6} = 93.33H$.

$L_1 = \frac{N_1 \phi_1}{I_1} = 100$

$L_2 = 198.33$

$K = 0.66 \left(\frac{M}{\sqrt{L_1 L_2}} \right)$

10)



$Z_1 = 20 + 62.83j$

$Z_2 = 15 + 31.41j$

$Z = 35.94.24j$

Scanned with CamScanner

$I = \frac{V}{Z} = \underline{2.188 \angle -69.625}\ A$

$V_{coil1} = I(R_1 + jX_1) = \underline{144.296 \angle 2.717\ V}$

$V_{coil2} = I(R_2 + jX_2) = \underline{76.159 \angle -5.152}\ V$

$P_{coil1} = I^2 R_1 = 95.746\,W$

$P_{coil2} = I^2 R_2 = 71.810\,W$

$p.f = \frac{R}{Z} = 0.348$

Scanned with CamScanner

12) Capacitors are dived into

→ Fixed capacitors - value can't be varied

→ Variable capacitors - value can be varied.

Fixed capacitors

① Mica capacitor

→ ~~Med~~. Uses aluminium foils seperated by sheets of Mica.

→ Plates are connected to two electrodes

→ Capacitance range from 5-10000 pF.

→ advantage → used in resonance ~~and~~ circuit and high frequency filters.
Leak current is small

→ disadvantage → It is expensive.

② Ceramic capacitor

→ Constructed using titanium as dielectric.

→ The ceramic disc is coated with metal such as copper / silver. These coating act as plates.

→ Availfable values are 3 PF → 2 μF and rated at 500 V

→ It can be used in DC and AC circuits
very versatile.

③ Paper capacitor

→ ~~It~~ Consist of metal foils seperated by paper strips.

- The paper is impregnated with dielectric like oil, wax or plastic.
- It ~~is no~~ have no polarity used in AC & DC circuit
- Available range 0.0005 μF → several μF. rated 100V to several thousand volts.

④ Electrolytic capacitor.

- consists of an aluminium foil with oxide at one side.
- The foil act as electrode and oxide as dielectric.
- The oxide is in contact with a paper saturated with electrolyte. It also act as a plate.
- available range 1 μF – several thousand μF
- Rating 1V – 500V
- ~~use~~ Filtering of ripples in power supply circuits.

eg: Tantalum capacitor :- It is more superior to aluminium in temperature and frequency type but expensive.

Variable capacitors.

① Air gang capacitor

- Dielectric is air.
- It is a rotor – stator type capacitor.
- A large no. of capacitor is ganged together.
- By rotating the shaft and by adjusting the common area ~~it can~~ capacitance can be varied

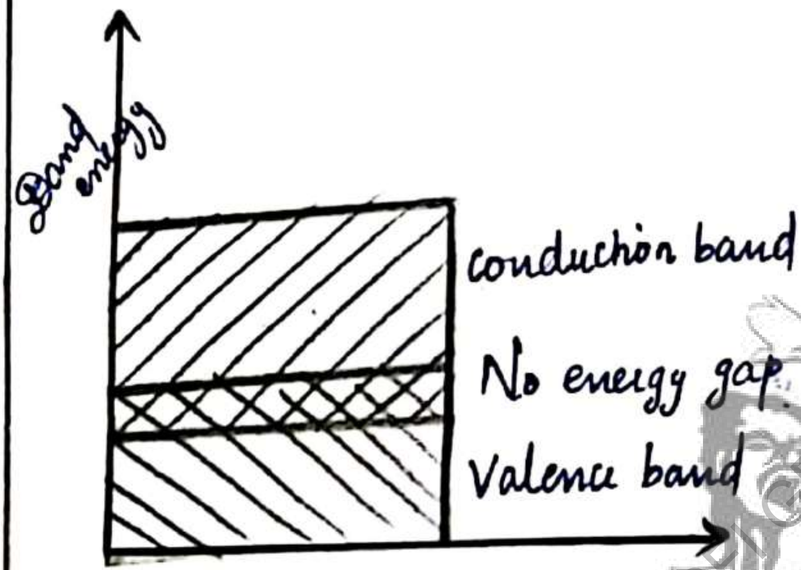
② Trimmer

- Variable capacitor which can't be varied frequently
- Once it is varied it should be undisturbed
- Used in TV, radio and other broadcast services.
- Mica and ceramic used as dielectric

③ Padder

- High value of capacitance with air as dielectric
- It is made of two aluminium cups and by turning the screw the capacitance value can be varied
- $5pF \rightarrow 600pF$ range.

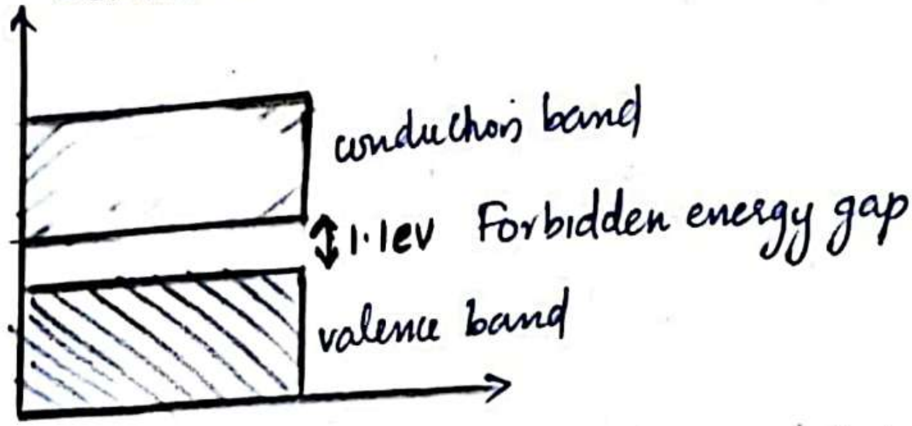
13) conductor.



→ Conductors conduct electricity easily through them. The valence band and the conduction band are overlapped and there is no energy gap between them.

→ The valence electrons easily move into the conduction band.

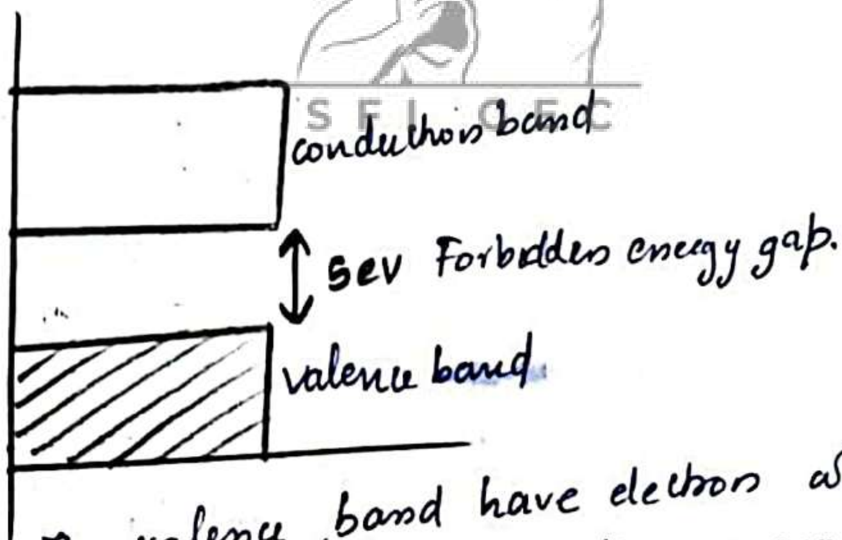
Semiconductor



Semiconductor have conductivity in between conductors and insulators.

Forbidden energy gap 1.1 ev – Si
0.72 ev – Ge.

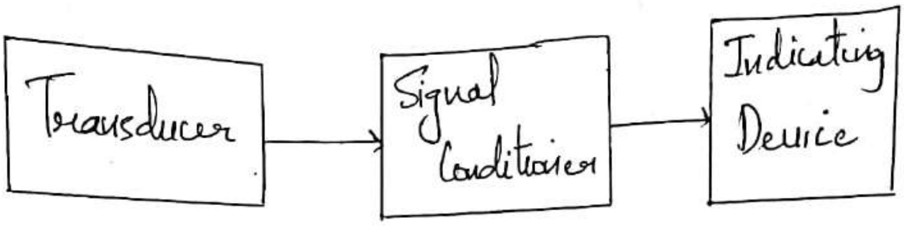
The valence band have electron while conduction band is empty at 0°c. As temperature increases the valence e^-s gain energy and move into the conduction band and causes conductivity. As temperature increases conductivity increases.



The valence band have electron while conduction band is empty. The forbidden energy gab is 5 eV.
So these will not conduct electricity

As temperature increases ~~resistance~~ the resistance decreases.

14.



Transducer converts input signal into an electrical signal. Signal conditioner converts this electrical signal into a suitable signal for the indicating device. Indicating device indicates the value of quantity being measured.

15. Biasing is the setting of initial operating conditions of an active device in an amplifier. Many electronic devices such as diodes, transistors and vacuum tubes whose function is processing time varying signals also require a steady current to operate correctly.

Advantages of potential divider biasing is:

i) It offers excellent stabilisation and hence Q point does not shift.

ii) When used in amplifiers, it provides better amplification.

16. <u>Need for Modulation</u>

1. Modulation allows to reduce the size of antenna
2. Modulation allows several broadcasting stations to transmit simantaneously at different carrier frequencies
3. It permits multiplexing, i.e several signals can be transmitted through the same channel without any mixing
4. Modulation reduces noise and ~~et~~ interference effects
5. Modulation improves signal-to noise ration.

17.

17 a) There are three important parameters that specify a resistor.

1) Value : The value that the resistor denotes

2) Tolerance : Error acceptable from the value specified

3) Power rating.

Green Blue Orange Gold : $56 k\Omega \pm 5\%$

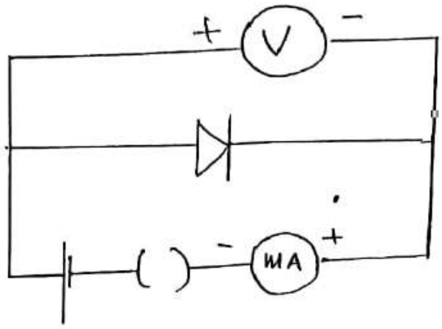
Maximum resistance value accepted $= 56000 + \frac{5}{100} \times 56000$

$= \underline{\underline{58800\,\Omega}}$

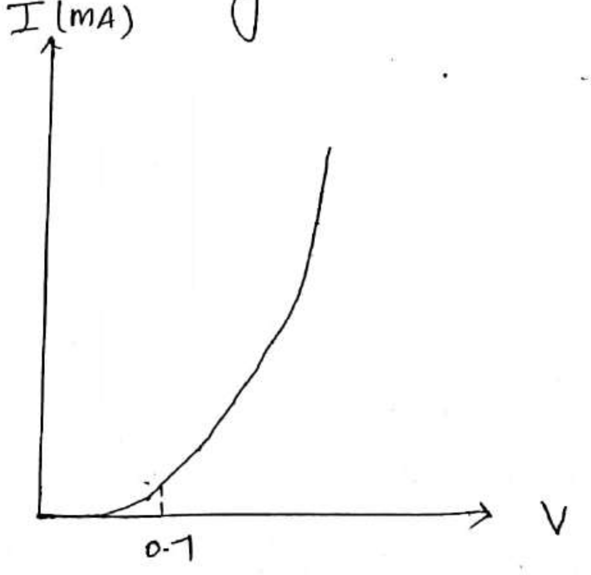
Minimum resistance value accepted $= 56000 - \frac{5}{100} \times 56000$

$= \underline{\underline{53200\,\Omega}}$

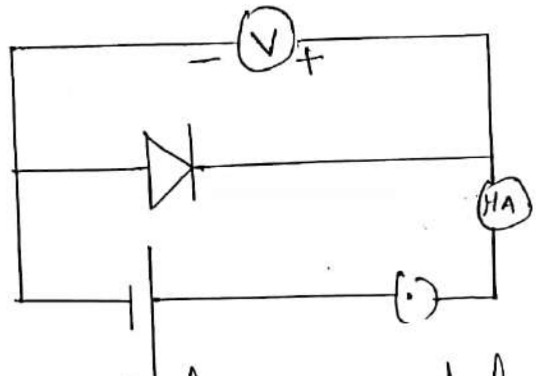
17.b. PN Junction Under Forward Bias.



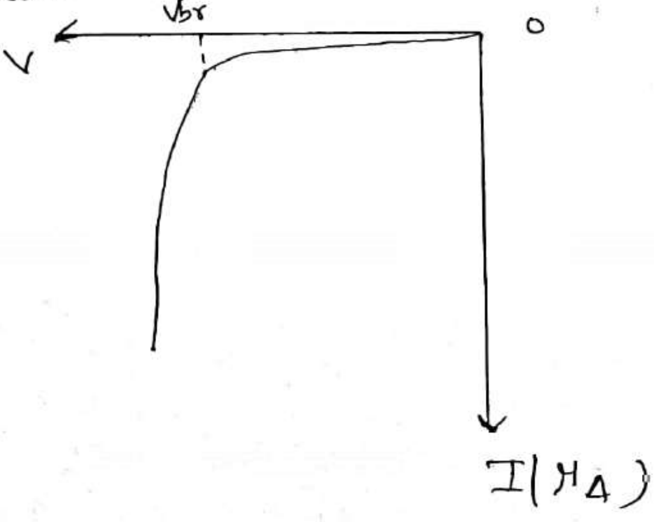
A P-N junction diode is said to be forward biased when the positive terminal of a cell or battery is connected to the p-side of the junction & the (−) terminal ~~x~~ to the n side. When diode is forward biased the depletion region narrows and consequently the potential barrier is lowered. This causes the majority charge carriers of each region to cross into other regions. The electrons travel from the n side to p side and go to the positive terminal of the battery. The holes from the p side to the n side combine with the electrons injected into the n region from the (−) terminal of the battery. This way the diode conducts when it is forward biased.



PN Junction under Reverse bias

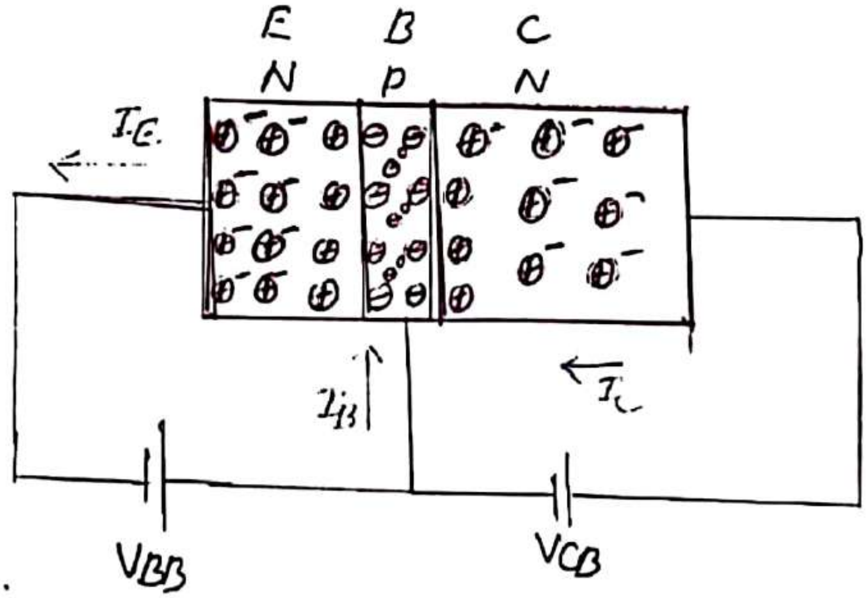


A PN Junction diode is said to be reverse biased when (+) terminal of the cell is connected to the n side and the (−) terminal to the p side. When reverse biased the depletion region widens and the potential barrier is increased. The polarity of the battery extracts the majority charge carriers of the each region. The holes in the p region from the electrons injected into the p-region from the negative terminal of the battery. The electrons in the n-region go to the positive terminal of the battery. This way the majority charge carriers concentration in each region decreases against the equilibrium values across the junction becomes zero. Thus the diode does not conduct.



18. Zener Breakdown.	Avalanche Breakdown.
1) The process in which the electrons move across the barrier from the valence band of p type material to the conduction band of n type material is called Zener Breakdown	The process of applying high voltage and increasing the free electrons or electric current in semiconductors and insulating materials is called an avalanche breakdown
2). The valence electrons are pulled into conduction due to the high electric field in the narrow depletion region.	The valence electrons are pushed to conduction due to the energy imparted by accelarated electrons.
3) The VI characteristics of a Zener breakdown has a sharp curve	The VI characteristics of the avalance breakdown is not as sharp as the zener breakdown.
4) It occurs in diodes that are highly doped.	It occurs in diodes that are lightly doped.

Normal operation of NPN Transistor :-



→ Emitter-Base Junction is Forward biased

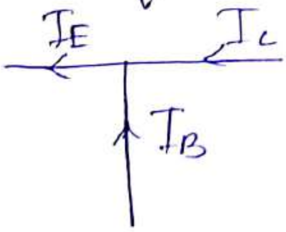
→ Collector-Base Junction is Reverse biased

→ The Forward bias results in the emission of electrons From the emitter - Emitter current, I_E

→ The emitted electrons enters the base region and undergo recombination resulting in base current I_B.

→ The remaining $\bar{e}$'s which donot undergo recombination, gets repelled towards the collector terminal by the -ve terminal of Vcc. (or) attracted towards the collector by the positive terminal of Vcc.

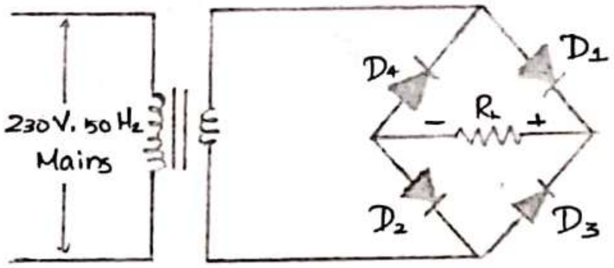
Hence the electron flows from emitter to collector or current flows from collector to emitter



$$[I_E = I_B + I_C]$$

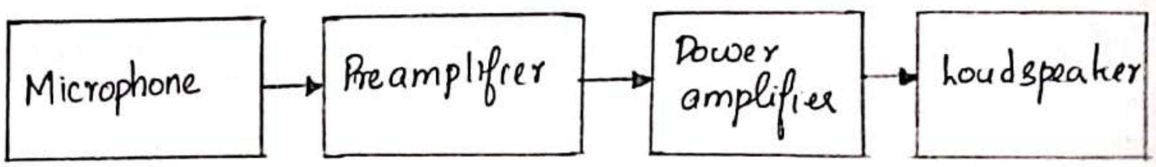
19] a Explain the working of bridge rectifier.

Ans) Bridge Rectifier.



A Bridge Rectifier is an Alternating current (AC) to Direct Current (DC) converter that rectifies mains AC input to DC output. It has four diodes of which two conduct during one half cycle and the other two during next half cycle. of applied voltage. During positive half cycle of the input, diodes D_1 and D_2 conduct and diodes D_3 and D_4 do not conduct. Therefore the current flows through secondary winding. During negative half cycle, diodes D_3 and D_4 conduct while D_1 and D_2 do not. In both the cases current through the loads is in same direction. As a result, a full wave rectified voltage is developed across the load resistor R_L.

b. Describe the block diagram of Public Address System



Public Address System is an electronic sound amplification and distribution system with a microphone, amplifiers and loudspeakers used in many applications.

Microphone

It is a transducer which senses sound signals & converts them into corresponding electrical signals that can be processed by rest of the system. Microphone should be able to produce a reproduction of sound wave as an electrical signal without any distortion.

Preamplifier.

This is used to increase the amplitude of signal coming from microphone.

Power amplifier.

It takes amplified signal from pre-amplifier and boosts the current so that it is strong enough to drive the loud-speaker.

Loudspeaker.

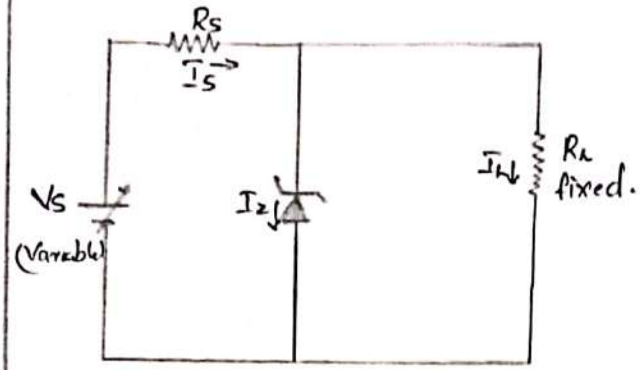
This is the final part of the system, that converts electrical signal back to sound wave. Without any functionality errors, emerging sound will be an undistorted but amplified version of original sound.

20] a Define line regulation and load regulation.

Line Regulation

This determines the amount the load voltage changes (ΔV_o) when the source voltage changes (ΔV_s)

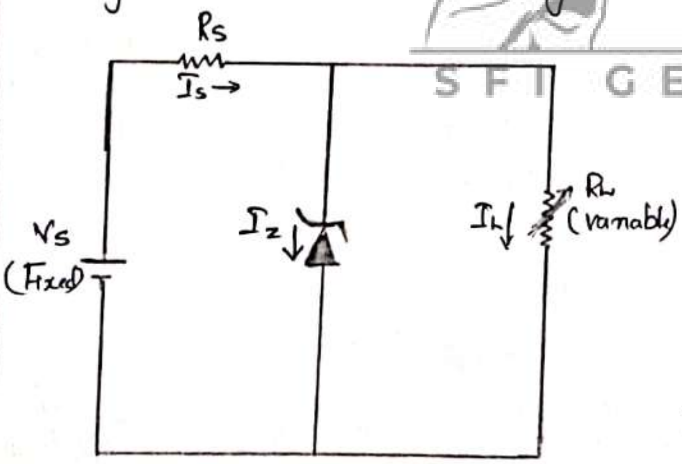
It is the ability of a power supply to maintain a constant output voltage despite changes to the input voltage, with the output current drawn from the power supply remaining constant.



As the input voltage Vs is varied / increased, the input current Is also increases. The increase in input current increase voltage drop across the Rs thereby keeping output voltage Vo, const.

Load Regulation.

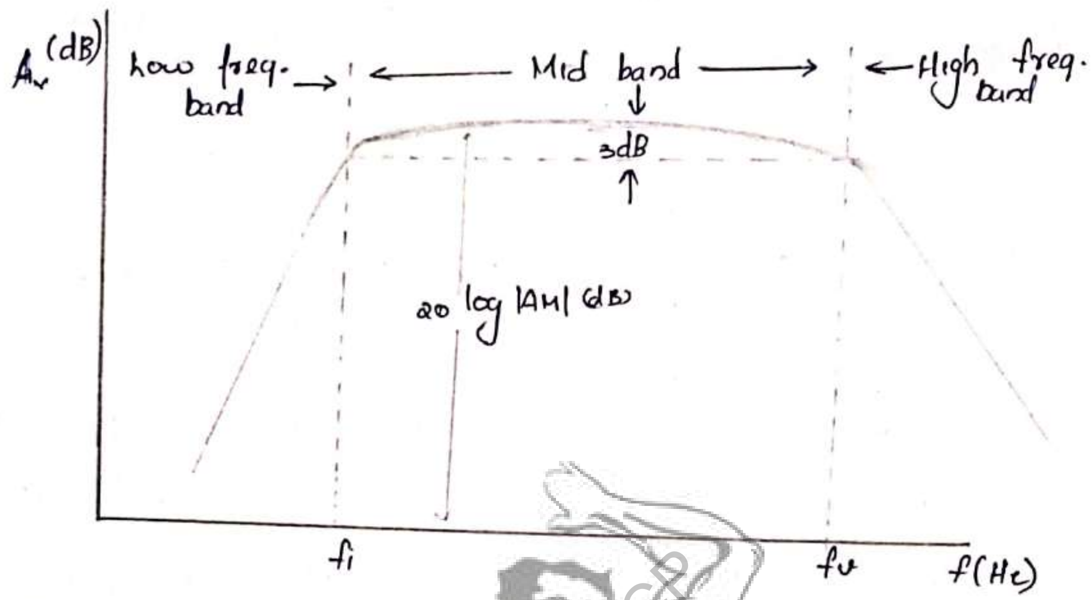
It is the capability to maintain a constant voltage level on the output channel of power supply despite changes in supply load (such as changes in resistive value connected accross supply output). It determines the change in output voltage when load current changes.



Load current IL is varied by varying load resistance RL. In the absence of load resistance output voltage will be maximum, and when it is connected, voltage falls by small amount.

6. Draw the frequency response curve of a CE amplifier and explain.

The curve drawn between voltage gain and the signal frequeny of an amplifier is known as frequency response.



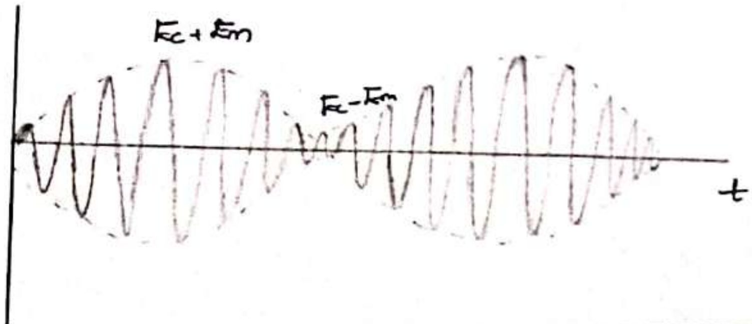
In ac coupled amplifiers, coupling capacitors or transform are used to pass the signal from one stage to another. The presence of these coupling capacitors reduces the gain at low frequencies. At low frequencies, capacitive impedance increases as it is inversely proportional to the frequency of the signal ($X_c = \frac{1}{2\pi fC}$). The gain is also reduced at high frequencies due to the presence of internal capacitances such as stray capacitance. These capacitances are parasitic capacitances internally formed at transistor junctions. The gain will be constant over a mid-frequency range. All coupling and by-pass capacitors are considered short-circuit at midband frequencies while all internal capacitive effectes are considered open circuit.

21] a. Describe the basic principles of a cellular communication system.

* The entire network coverage area is divided into cells.
* A cell is a basic geographic unit of a cellular system.
* It is the area around an antenna where a specific frequency range is used., represented as a hexagonal shape.
* A group of cells is called a cluster
* The cellular concept is a system level idea which makes the use of multiple low-power. transmitter each providing coverage to a small portion of the service area.
* An. area is divided into a number of cells, each one is served by a base station.
* Each base station is allocated a portion of total number of channels or frequencies available to entire system.

b. Write the expression for an AM wave. Draw the frequency spectrum and find associated bandwidth.

$e_{am} = (E_c + e_m) \sin \omega_c t$.



$$e_{am} = (E_c + e_m) \sin \omega_c t$$

$$e_{am} = (E_c + E_m \sin \omega_m t) \sin \omega_c t$$

$$= E_c \left(1 + \frac{E_m}{E_c} \sin \omega_m t\right) \sin \omega_c t$$

$$= E_c (1 + m \sin \omega_m t) \sin \omega_c t.$$

$m = \frac{E_m}{E_c} \Rightarrow$ modulation index.

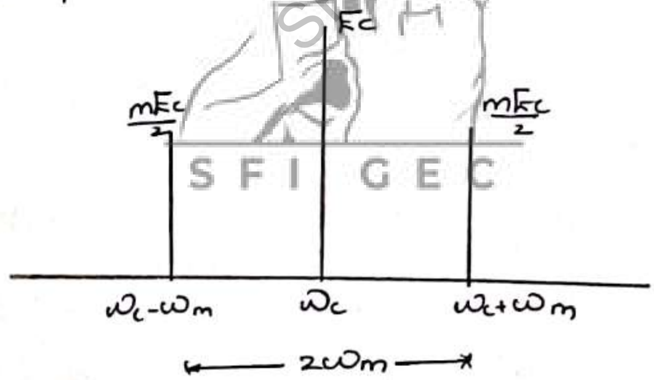
$$e_{am} = E_c \sin \omega_c t + m E_c \sin \omega_m t \sin \omega_c t$$

$$= E_c \sin \omega_c t + \frac{m E_c}{2} \left[\cos(\omega_c t - \omega_m t) - \cos(\omega_c t + \omega_m t)\right]$$

since $\sin A \sin B = \frac{1}{2}(\cos(A-B) - \cos(A+B))$

$$= E_c \sin \omega_c t + \frac{m E_c}{2} \cos(\omega_c t - \omega_m t) - \frac{m E_c}{2} \cos(\omega_c + \omega_m) t.$$

Frequency spectrum.



$$BW = (\omega_c + \omega_m) - (\omega_c - \omega_m) = 2\omega_m.$$

22] a. What are the advantages of GSM network?

GSM stands for Global System of Mobile communications.

* It provides very cost effective products and solutions.
* The GSM based networks are deployed across the world. This leverages cost benefits as well as provides seamless wireless connectivity.
* Advanced versions of GSM with higher number of antennas will provide high speed download and upload of data.
* It is easy to maintain GSM networks due to availability of large number of network engineers..
* Phone works based on SIM card and hence it is easy to change the different varieties.
* GSM signal does not have any deterioration inside office & home premises.

b. Explain the role of BTS, BSC and MSC in a GSM network.

A base transciever station (BTS) is a piece of equipment that facilitates wireless communication between user equipment and a network. UEs are devices like mobile phones, computers with wireless internet connectivity. BTS forms part of the base station subsystem (BSS) developments for system management. A BTS has several transcievers which allow it to serve several different frequencies and different sector of the cell.

The Base Station Controller (BSC) is in control of and supervises a number of Base Transceiver Station BTS. The BSC is responsible for the allocation of radio resoures to a mobile call and for the handovers that are made between base stations under his control.

The mobile switching center (MSC) is the primary service delivery node for GSM. responsible for routine voice calls and SMS as well as other services. It acts as a control center of a Network Switching Subsystem (NSS). MSC connects calls between subscribers by switching the digital voice packets between the network paths.