Course Details

Course Title — E-C-D

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Module — 4th

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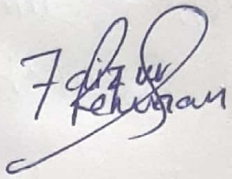
S.Sign — 

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Q1 (A) Discuss the darlington connection for multistage amplifiers.

MULTISTAGE AMPLIFIERS:-

Multistage amplifier are amplifier circuit cascaded to increased gain. we can express gain in (dB) decibels. Two or more amplifier can be connected to increase the gain of ac signal. The overall gain can be calculated by simply multiplying each gain together.

$$A_v' = A_{v1} A_{v2} A_{v3} A_{v4} \text{ - - - - - -}$$

DIAGRAM:

DARLINGTON CONNECTION FOR MULTISTAGE AMPLIFIER

A very popular connection of two bipolar junction transistors

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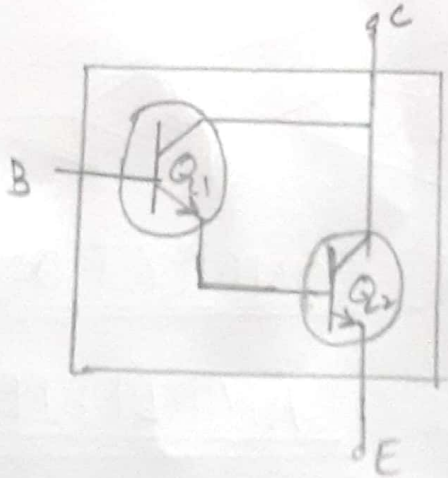
for operation as one "superbeta" transistor is the Darlington connection. The main feature of darlington connection is that the composite transistor act as single unit with a current gain that is product of the current gains of the individual transistors. if the connection is made using two ~~step~~ separate transistor having current gains of β_1 & β_2 the darlington connection provide a current gain of $\beta_0 = \beta_1\beta_2$

DIAGRAM:



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Q1 (b) The input of a certain regulator ---- 40v. Evaluate the line regulation in both % & in %/V

SOLUTION:

$$\text{Line Reg} = \frac{0.062}{4.5} \times 100\%$$

$$= 1.377\ \%$$

And

$$\text{Line Reg} = \frac{\frac{0.062}{40}}{4.5} \times 100\ \%$$

$$= 0.0344\ \%/V$$

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Q12 Explain colpitts and Hartely Oscillator.

COLPITTS OSCILLATOR

* The colpitts oscillator is a type of oscillator that uses an LC circuit in the feed-back loop.
* The output voltage is developed across C_1
* The feedback voltage is ~~voltage~~ developed across C_2
* The feedback network is made up of a pair of tapped capacitor (C_1 and C_2) and an inductor L to produce a feedback necessary for oscillations.

DIAGRAM:

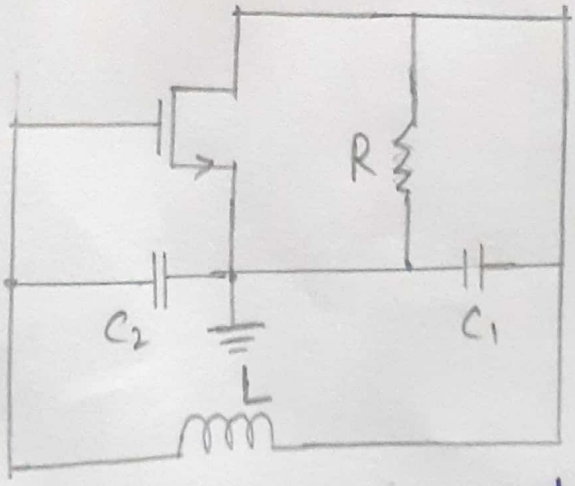

Diagram of colpitts oscillator.

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HARTLEY OSCILLATOR

* Hartley oscillator is almost indentical to the colpitts oscillator.
* The frequency of oscillation as:

$$\omega_o = \frac{1}{\sqrt{(L_1+L_2)C}}$$

* The analysis of hartley oscillator is identical to that ~~of~~ colpitts oscillators.
* The primary difference is that the feedback network of Hartley oscillator uses tapped inductor (L_1 and L_2) and a single capacitor C.

DIAGRAM:

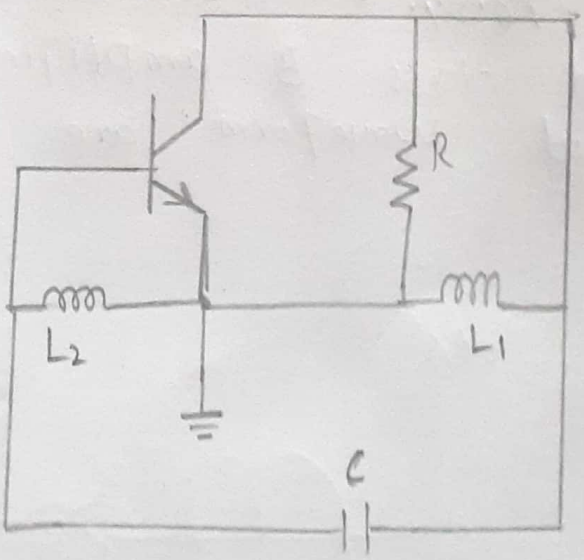

Diagram of Hartley oscillator.

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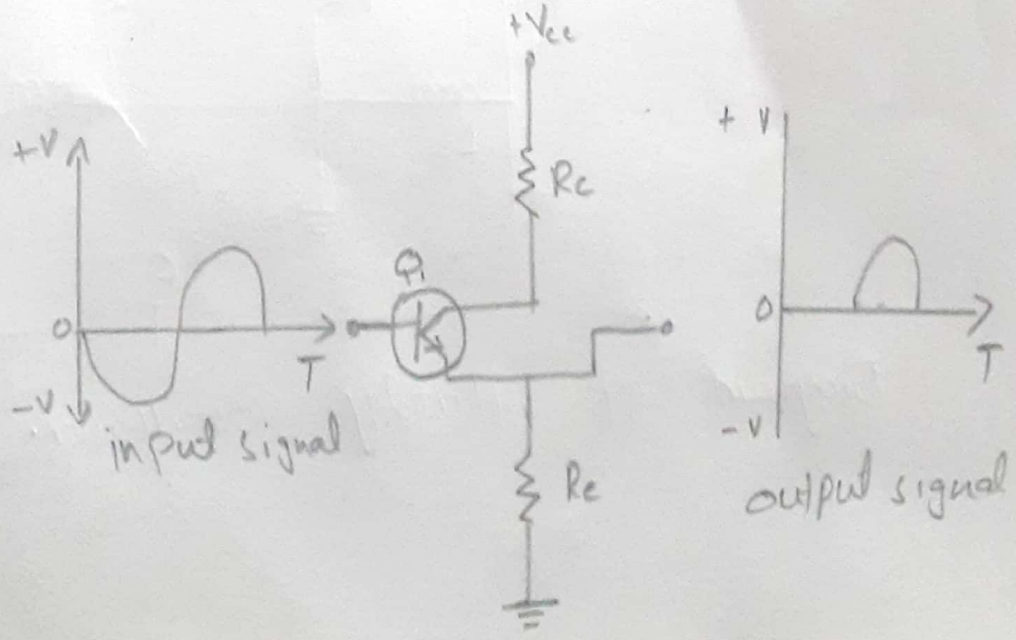
Q3 (a) Describe the idea behind class B amplifier. 6

CLASS B AMPLIFIER

Class B amplifier is a type of power amplifier where the active device (transistor) conducts only for one half cycle of the input signal. That means the conduction angle is 180° for a class B amplifier. Since the active device is switched off for half the input cycle. The active device ~~dis~~ dissipate less power and hence the efficiency is improved. Theoretically maximum efficiency of class B power amplifier is 78.5%. Schematic of a single ended class B amplifier and input output waveform are shown.



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Above circuit clear that the base of transistor Q_1 is not baised and the +ive half cycle of the input wave form is missing in the output. Even throug it improve the power efficiency. it create distortion. only half information present in input will be available in output and bad thing. single ended class B amplifier are not used in present day practical audio amplifier application and they can found only Some earlier gadgets. Another place where you can find RF Power Amplifier often used in RF Power Amp- application.

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Q3 (B) Explain the types of voltage regultor and their purpose.

VOLTAGE REGULTOR

Voltage regultor is device with a simple feed-forword design and it uses a negative feed back control loops. There are mainly two types of voltage regulators:

Linear Voltage regulators

Switching Voltage regulator

LINEAR REGULATOR

Linear regulator act as a voltage divider. In ohmic region it uses FET. Resistance of voltage regulator varies with load resulting in constant out put voltage.

ADVANTAGE

- Give a low output ripple votage
- Fast response time to load or line change

DISADVANTAGE.

- Efficiency is very low
- Voltage above the input cannot be increased.

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SWITCHING REGULATOR

Switching regulato rapidly a series device on & OFF. Switch duty cycle sets the amount of charged transfered to the load. This controlled by feedback mechanism similar that of linear regulator. switchig regulator are efficient bic the series. element either fully conducting switch off bic dissapates almost no power.

Non isolation
Dielectric isolation

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Q4 Explain the working of Flash ADC.

FLASH ADC

Series of comparators, each one compares input to unique reference voltage

Comparators outputs connect to priority encode circuit → produce binary output.

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HOW FLASH WORK

As the analog input voltage exceed the reference voltage at each ~~other~~ comparators, the comparator outputs will sequentially saturate to a high state.

The priority encoder generates a binary number based on the highest - order active input, ignoring all other active inputs.

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Q5 Difference between the following

(a) Low Pass & high Pass filters

LOW PASS FILTERS

A low Pass filter allow frequencies lower than its corner frequency to pass through it cleanly (ideally) while blocking high frequencies.

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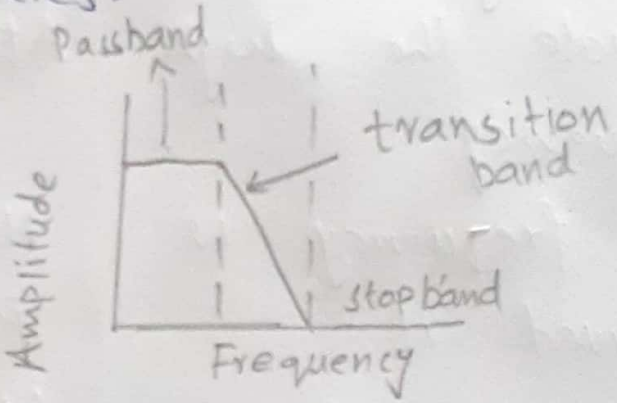

Low - Pass

HIGH PASS FILTER:

A high pass filters allows frequencies higher than its corner frequency to pass through it cleanly (ideally) while blocking low frequencies.

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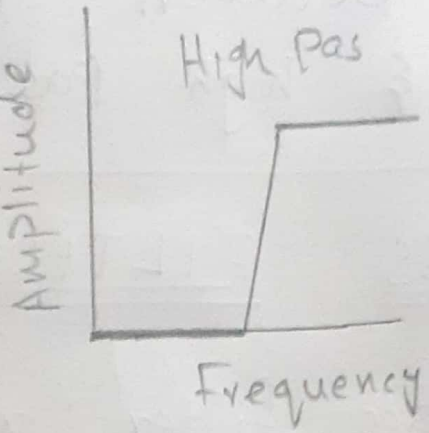
DIAGRAM:



High-pass

DIFFERENCE

LOW PASS	HIGH PASS
* Used for smoothing the image	Used for sharpening the image
* Attenuate the high frequency	Attenuat the low frequency
* Low frequency is Preserved it	High frequency is preserved it
* It consist of resistor that is followed by capacitor	it consist of capacitor that is followed by resistor.
* It help in removal of aliasing effect	It help in removal of noise
$G(u,v) = H(u,v) \cdot F(u,v)$	$H(u,v) = 1 - H'(u,v)$

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45 (b) Active and Passive Filters.

ACTIVE AND PASSIVE FILTER DIFFERENCE B/W:

- Active filter need outside source for their operation, while passive filter do not need any outside source for their operation.
- Due to involment of fewer elements Passive filter are less compler and easy to design as compared to the equivalent active filter.
- Passive filter are design using capacitor resistor and inductor while active filter do not use inductor in their design. This result in campact design of active filter as campared to passive filter.
- Active filter have the capability of amplifying filter output. while passive filter consume the power of the input signal and cannot amplify the output signal.

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