

Course Title :-

Electronic Circuit Design

Module :-

4th Semester

Instructor :-

Mujtaba Ahsan

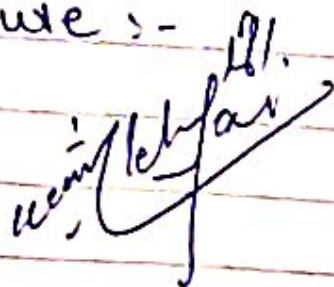
Name :-

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Signature :-

A handwritten signature in black ink, appearing to read 'Darvish Kayani', written in a cursive style with a large flourish at the end.

①

Question 1

(A) part.

Discuss the darlington connection for multistage amplifiers.

Answer:-

The main feature is that the ^{two} component transistors acts as a single unit with a current gain that is the product of the current gains of the individual transistors.

→ Provides high current gain than a single BJT

→ The connection is made using two separate transistors having current gains of β_1 and β_2 .

So, the current gain.

$$\beta_D = \beta_1 \beta_2$$

$$\text{If } \beta_1 = \beta_2 = \beta \quad \Rightarrow \beta_D = \beta^2$$

②

Question No 1
Part (b)

Solution:-

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

$$= 1.377\%$$

Eff

$$\text{Line Reg} = \frac{\frac{0.62}{40}}{4.5} \times 100\%$$

$$= 0.034\%$$

(2)

Question 2:-

Explain Colpitts and Hartley oscillators.

Answer:-

Colpitts Oscillators:-

The Colpitts oscillator is a type of oscillator that uses an LC circuit in the Feed-back loop.

→ The feed back network is made up of a pair of tapped capacitors (C_1 and C_2) and an inductor L to produce a feed back necessary for oscillations.

→ The output voltage is developed across C_1 .

→ The feed back voltage is developed across C_2 .

(4)
Hartley Oscillator:-
The Hartley oscillator is almost identical to the Colpitts oscillator.

→ The primary difference is that the feedback network of Hartley oscillator uses tapped inductors (L_1 and L_2) and a single capacitor C .

Question No 3:-

(a)

Describe the idea behind class B amplifiers?

Answer:-

When the amplifier is in its quiescent state, (it has no input signal) both transistors are biased at cut off.

→ when the input is positive, Q_1 is biased above cut off. transistor conducts, producing a replica of positive input at the output.

(5)

- > remains in cutoff.
- when the input is negative,
- > above cutoff, and the transistor conducts, producing a replica of the negative input at the output.

Question No 4 :-

Explain of Flash ADC working?

Answer:-

Working of Flash ADC:-

: Analog to Digital Converter:

Works:-

As the analog input voltage exceeds the reference voltage at each comparator, the comparator outputs will sequentially saturate to a high state.

Question 5 part (b)

Difference b/w active
and passive filters.

Answer :-

Active & Passive filter :-

- Due to presence of active components, active filters are expensive. However the low cost of passive filters is the result of the presence of passive components in it.
- The circuit orientation of active filters is quite complex while comparatively passive filters have a less complex circuit.
- Active filters possess a high value of quality factor as compared to passive filter.

(7)

Question 3
part (b)

Explain types of voltage regulators, and their purpose.

Answer:-

There are two types of voltage regulators:

- ① Linear voltage regulators.
- ② Switching voltage regulators.

① Linear or step regulators:-

Step regulators are those types of regulators in which switches regulate the current supply.

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

• Advantages & Disadvantages

- Simplest in terms of operational theory.
- most efficient in terms of speed very fast.
- limited only in terms of comparator and gate propagation delays.

Disadvantages:-

- Lower resolution.
- Expensive.
- For each additional output bit, the number of comparators is doubled.
- i.e. for 8 bits 256 comparators needed.

(8)
② Switching of induction regulators:-

Induction regulators which an induction motor supplies a secondary, continually adjusted voltage to even out current variations in the feeder line.

: Purpose of voltage regulators:-

→ it acts as a buffer for protecting components from damage. A voltage regulator is a device with a simple top-to-feed-forward design and it uses negative feedback control loops.

(7)

Question 5:-

Difference b/w

Low Pass Filter &
High Pass Filter?

Answer:-

Low Pass Filter:-

- LPF circuit allows the frequency underneath cut-off frequency for flowing through it.
- It can be built with a resistor which is followed by a capacitor.
- It is important in eliminating the aliasing effect.
- It is lesser than the cut-off frequency.
- LPF is used as an anti-aliasing filter in communication circuit.

: High Pass Filter :-

- HPF circuits allows the frequency for flowing through.
- It can be built with a capacitor which is followed by a resistor.
- It is important whenever the distortion occurs because of low-frequency signal like noise is to be detached.
- It is higher than the cut-off frequency.
- The HPF can be used in amplifiers like Low noise, audio etc.