ELECTRONIC MEASUREMENT & INSTRUMENTATION (BEC-29)

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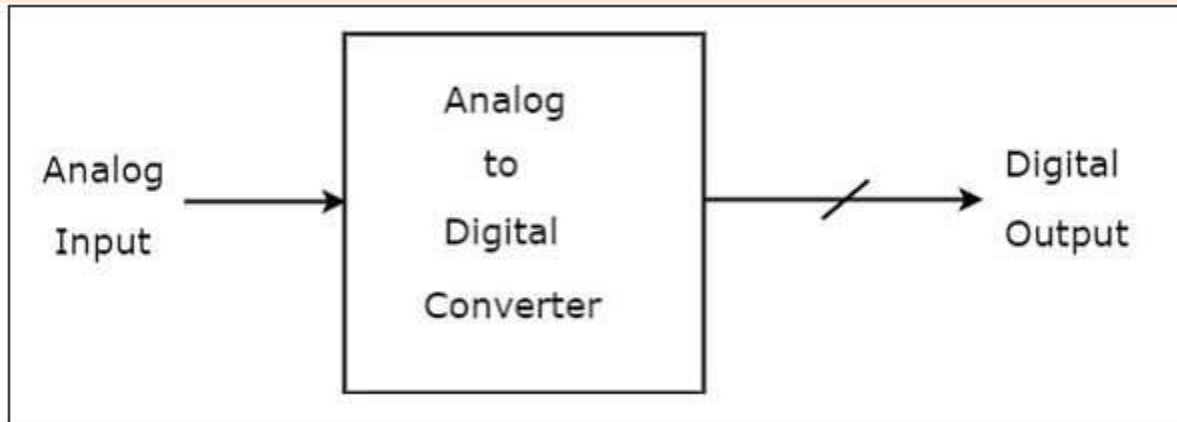
UNIT-3

Analog to Digital converter (ADC)

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- Introduction

- Types of ADC

- Counter type ADC

- Successive Approximation type ADC

- Flash type ADC

Analog to Digital converter

An Analog to Digital Converter **(ADC)** converts an analog signal into a digital signal. The digital signal is represented with a binary code, which is a form of bination of bits 0 and 1

Types of ADC

There are **two types** of ADC: Direct type ADC and Indirect type ADC

Direct type ADC:

If the ADC performs the analog to digital conversion directly by utilizing the internally generated equivalent digital (binary) code for comparing with the analog input, then it is called as Direct type ADC.

Indirect type ADC:

If an ADC performs the analog to digital conversion by an indirect method, then it is called an Indirect type ADC. In general, first it converts the analog input into a linear function of time (or frequency) and then it will produce the digital (binary) output.
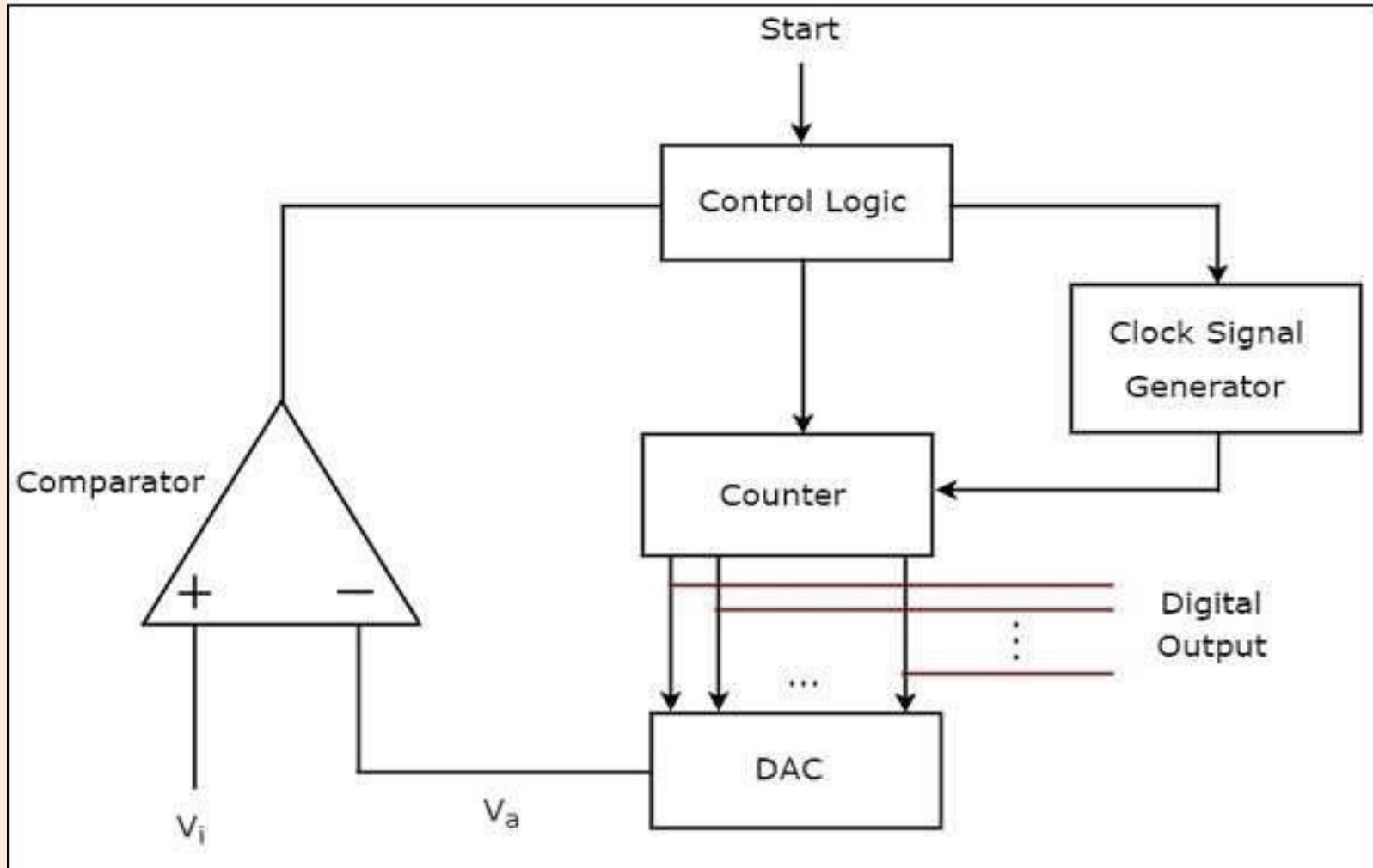
The following are the **examples** of Direct type ADCs −

•Counter type ADC

•Successive Approximation ADC

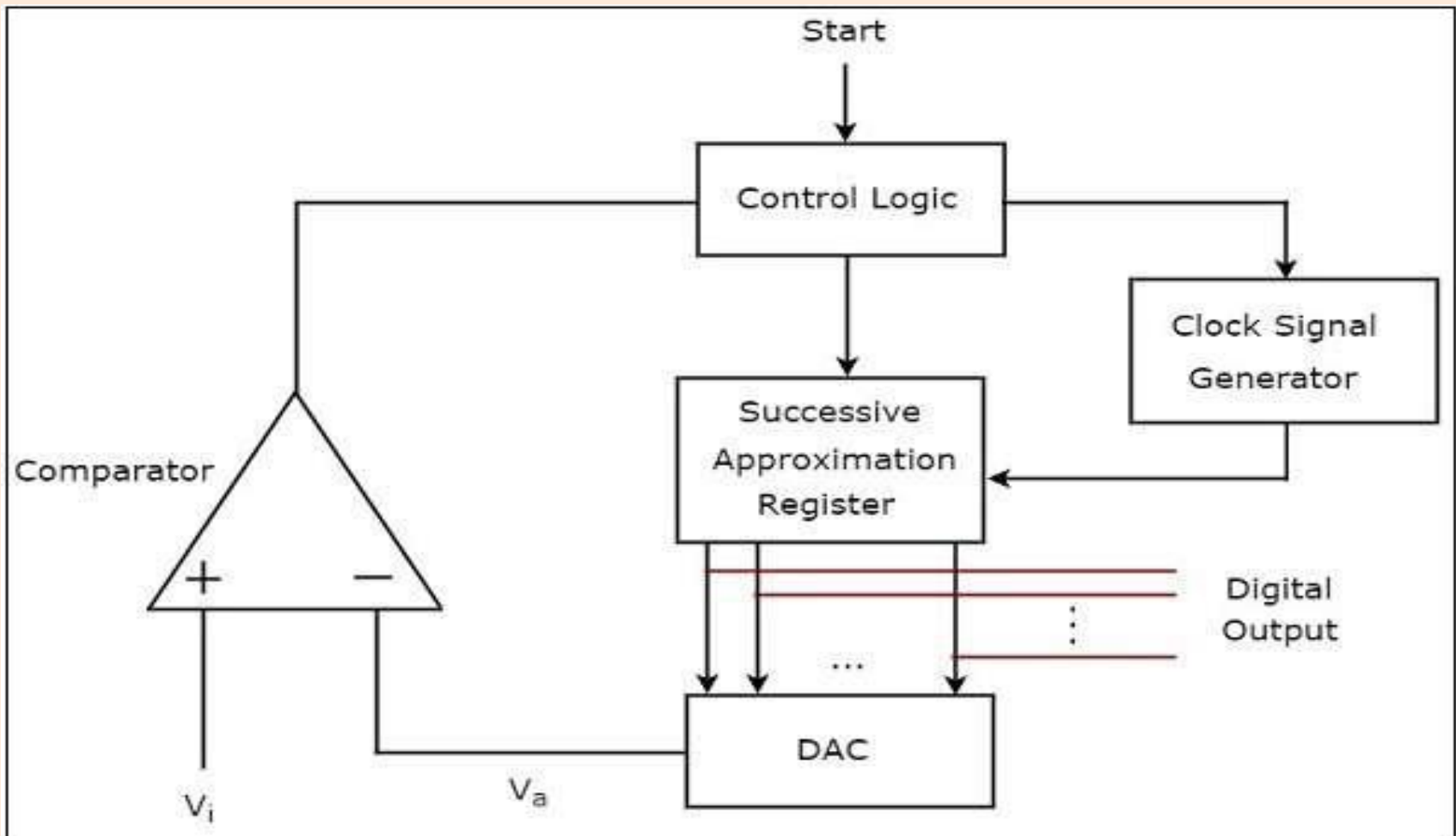•Flash type ADC

Counter type ADC

•A counter type ADC produces a digital output, which is approximately equal to the analog input by using counter operation internally.

Block Diagram of counter type ADC

Block Diagram of **Successive Approximation ADC**

A successive approximation type ADC produces a digital output, which is approximately equal to the analog input by using successive approximation technique internally.

Block Diagram of Flash type ADC

A flash type ADC produces an equivalent digital output for a corresponding analog input in no time. Hence, flash type ADC is the fastest ADC.
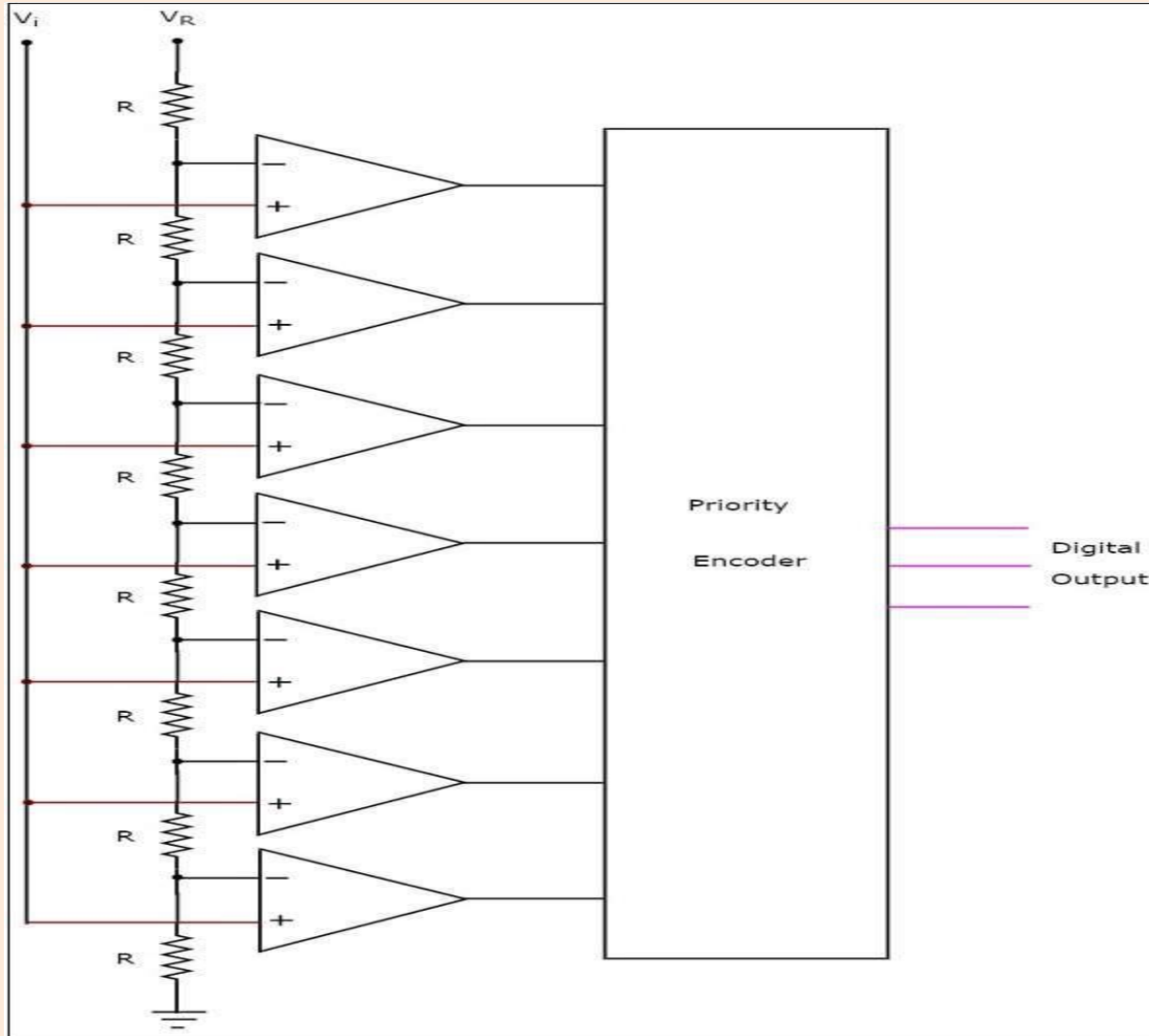
Assignment Questions

- Explain in brief the working of an analog to digital converter.

- What do you understand by multichannel DAS?

- Explain with a block diagram the operation of a multichannel analog multiplexed DAS.

- Explain with a block diagram the operation of a multichannel DAS with multiplexing the output of sample and hold (S/H) circuits.

- Explain with a block diagram the operation of a multichannel DAS using digital multiplexing.

Conceptual Questions

Find out the integrating type analog to digital converter?

a) Flash type converter

b) Tracking converter

c) Counter type converter

d) Dual slope ADC

Which type of ADC follow the conversion technique of changing the analog input signal to a linear function of frequency?

a) Direct type ADC

b) Integrating type ADC

c) Both integrating and direct type ADC

d) None of these

Contd..

Find out the integrating type analog to digital converter?

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Contd..

Which A/D converter is considered to be simplest, fastest and most expensive?

a) Servo converter

b) Counter type ADC

c) Flash type ADC

d) All of the mentioned

The flash type A/D converters are called as

a) Parallel non-inverting A/D converter

b) Parallel counter A/D converter

c) Parallel inverting A/D converter

d) Parallel comparator A/D converter

Contd..

What is the advantage of using flash type A/D converter?

a) High speed conversion

b) Low speed conversion

c) Nominal speed conversion

d) None of the mentioned

Drawback of counter type A/D converter

a) Counter clears automatically

b) More complex

c) High conversion time

d) Low speed

THANK YOU