

hence no frictional error is involved.

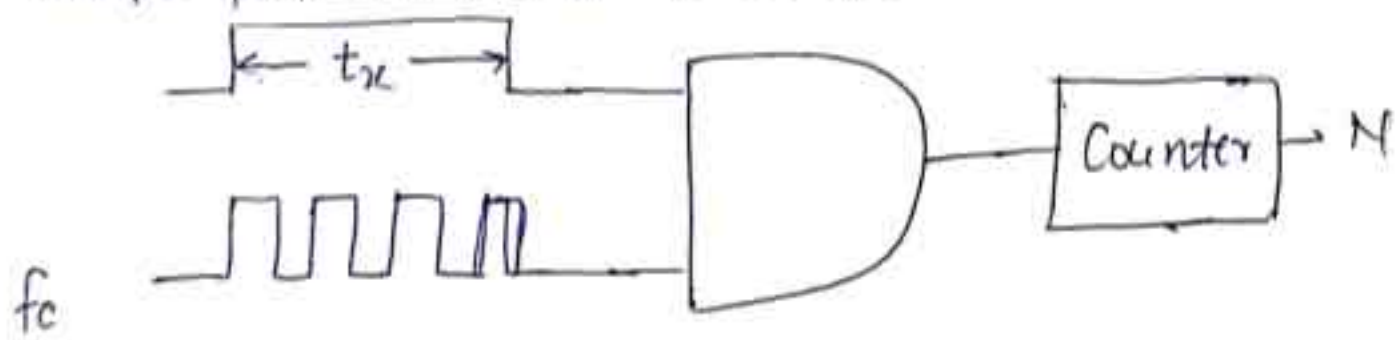
- No delicate (नाज़ुक) construction is required.
- No controlling & damping torque needed.
- Microprocessor or digital computer can be used.
- digital output can be stored.
- Variation in the component value due to temperature, humidity, vibration, and variations, and variations in supply voltage and noise level etc do not affect the accuracy.

### Disadvantage

- it is much more complex than the analog ones.
- it is costlier than analog ones.

[The main element in a S/H circuit, which holds the voltage, is a capacitor that allow to charge to the desired voltage and then disconnected to hold the voltage for desired length of time.

Thus the number of clock pulse counted and this is proportional to time  $t_x$



$$N = f_c \cdot t_x$$

$$\therefore N \propto t_x$$

$$\therefore \boxed{N \propto x}$$

Digital measurement of  $x$  is done in term of number of clock pulse. therefore the accuracy of measurement is primarily dependent upon the stability and the accuracy of the clock.

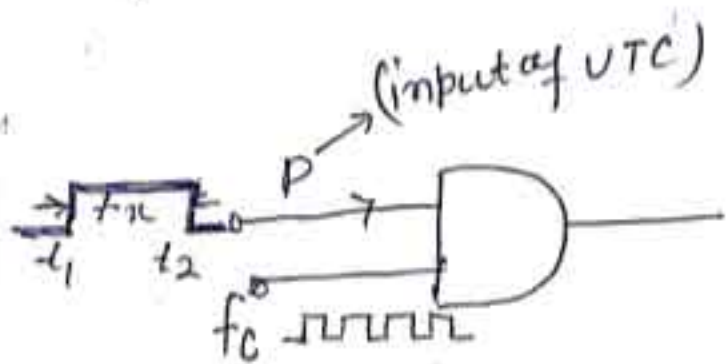
### ★ Advantage of Digital Measurement ★

- The error due to parallax is totally eliminated.
- Resolution can be improved almost without a limit by increasing the number of digit in the display.
- Ex - the resolution of 8 bit digit display is in  $10^8$ .
- Such digital instrument are absolutely free from any mechanical movement

A latch is used to have the facility of transferring the contents of the counter to the subsequent circuit at time  $t_2$ .

When the counting of pulses during interval  $t_x$  is just over, by a narrow pulse generated by the monostable multivibrator  $M_1$ .

At time  $t_3$  the counter is reset by narrow pulse generated by another monostable multivibrator ( $M_2$ )



the pulse of highly accurate and stable frequency  $f_c$  are allowed to pass through an electronic gate which is opened for the time duration  $t_x$  and closed for all other times

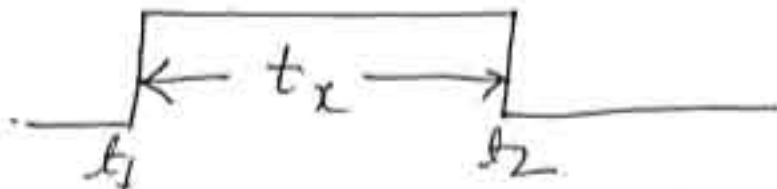
Let  $N =$  total number of pulse passed through the gate during  $t_x$

Then 
$$N = f_c t_x$$

→ 'V' is converted into a single pulse or periodic pulse of width  $t_x$  proportional to V.

it means

$$t_x \propto V$$



the circuit used for this purpose (voltage equivalent time)

is called VTC (voltage to time converter)

also it is known as voltage to pulse width converter.

→ Time interval ' $t_x$ ' is converted into Binary number. through the gate counter [a counter is a

device which stores (and sometimes display) the number of times a particular event or process has occurred. off often in relationship to a clock. the value on output lines represent a number in the binary or BCD number system.]

→ Binary coded information is converted into decimal through decoder and converted information is displayed in the form of illuminated numbers through driver.