DATE: / /
PAGE NO.

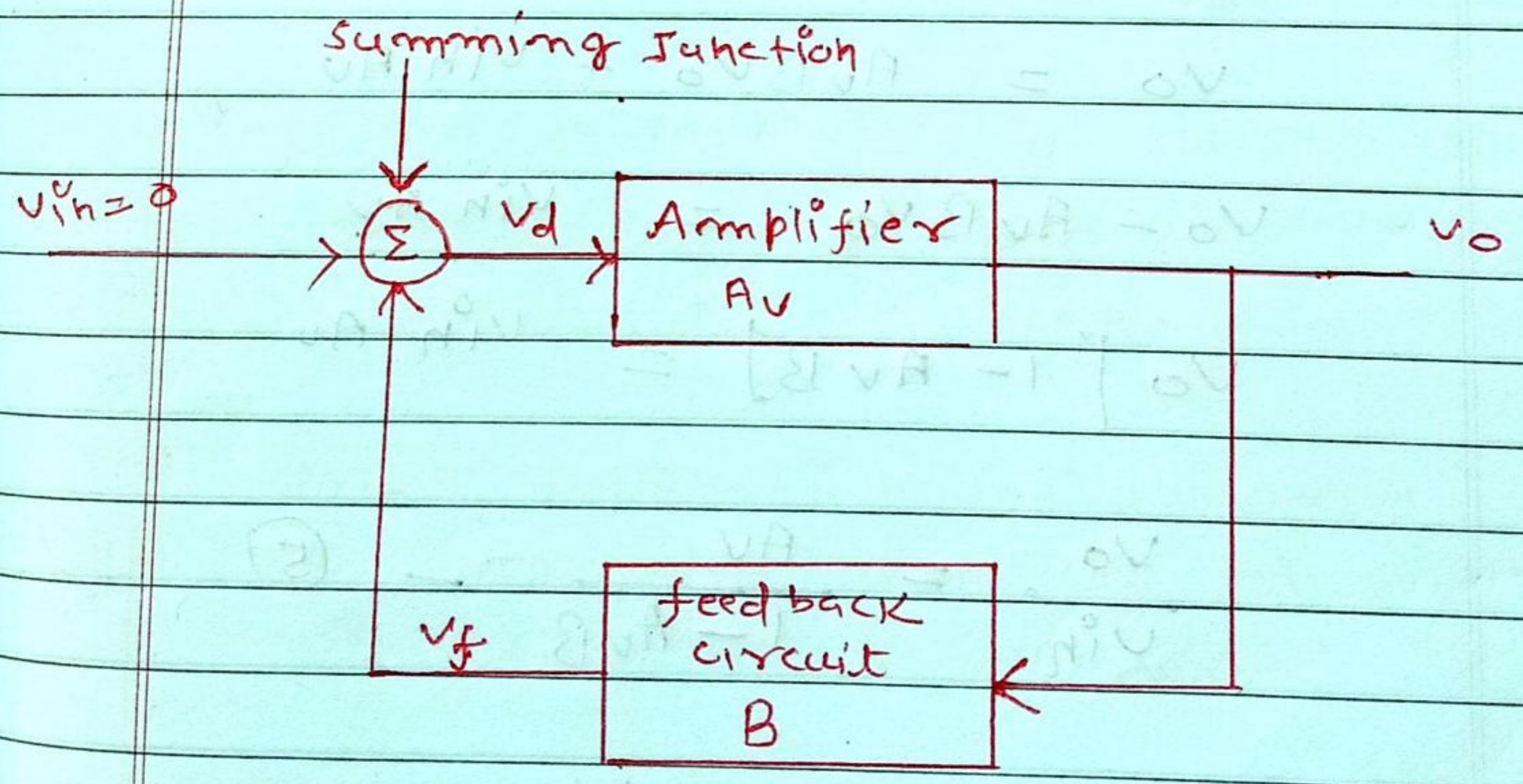
B+

OSCILLATORS

An oscillator is a circuit that generates a repetitive waveform of fixed amplitude and frequency with out any input (i.e $v_{in}=0$)

Principle of oscillation :-

An oscillator is a type of feedback amplifier in which part of the output is fed back to the input via a feed back ckt. If the signal fed back is of proper magnitude and phase, the circuit produces alternating output.



A_V — gain of the amplifier
B — " " feed back ckt.
v_f → feed back voltage.

from the fig it is clear that

$$v_d = v_f + v_{in} \quad \text{— (1)}$$

$$v_o = A_v \cdot v_d \quad \text{— (2)}$$

$$v_f = B v_o \quad \text{— (3)}$$

putting the value of $v_d = \frac{v_o}{A_v}$ from (2) into (1) we get

$$\frac{v_o}{A_v} = v_f + v_{in} \quad \text{— (4)}$$

putting the value of $v_f = Bv_o$ from (3) into (4) we get

$$\frac{v_o}{A_v} = Bv_o + v_{in}$$

$$v_o = A_v B v_o + v_{in} A_v$$

$$v_o - A_v B v_o = v_{in} A_v$$

$$v_o [1 - A_v B] = v_{in} A_v$$

$$\frac{v_o}{v_{in}} = \frac{A_v}{1 - A_v B} \quad \text{— (5)}$$

However v_{in} has to be

JOY

DATE: / /
PAGE NO. B+

zero ~~torch~~ and $v_o \neq 0$ implies that

$$A\upsilon B = 1 \quad -- (6)$$

eqn (6) is know as Barkhausen criterion for oscillich to take place.

According to Barkhausen criterion there are two requirements for oscillatich to take place..

i] $A\upsilon B$ should be at least 1

2] total Phas shift of the loop gain $A\upsilon B$ must be equal to 0° or 360°.