

UNIT-2>>MULTISTAGE AMPLIFIERS

CLASS>>II_{ND} YEAR, IV SEM

SUBJECT-ANALOG CIRCUITS

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**TOPIC>>POWER EFFECIENCY OF CLASS A
Amplifier**

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POWER EFFECIENCY OF CLASS A

:-

The power conversion efficiency of an output stage is defined as

$$\eta = \text{Load power}(P_L)/\text{Supply power}(P_S)\dots\dots 1$$

Assuming that the output voltage is sinusoid

with the peak value V_0 , the average load power will be

$$P_L = (V_0 / \sqrt{2})^2 / R_L = 1/2 V_0^2 / R_L \dots\dots 2$$

Since the current in Q_2 is constant, the power drawn from the -ve supply is V_{CC} . The average current in Q_1 is equal to I , and thus the average power drawn from the +ve supply is V_{CC} . Thus the total average supply power is

$$P_S = 2V_{CC} \dots\dots 3$$

Eq 2 and 3 can be combined to yield

$$\eta = 1/4 V_0^2 / I R_L V_{CC}$$

Since $V_0 < V_{CC}$ and $V_0 < I R_L$, maximum efficiency can be obtained by

$$V_0 = V_{CC} = I R_L$$

The maximum efficiency attainable is 25%.