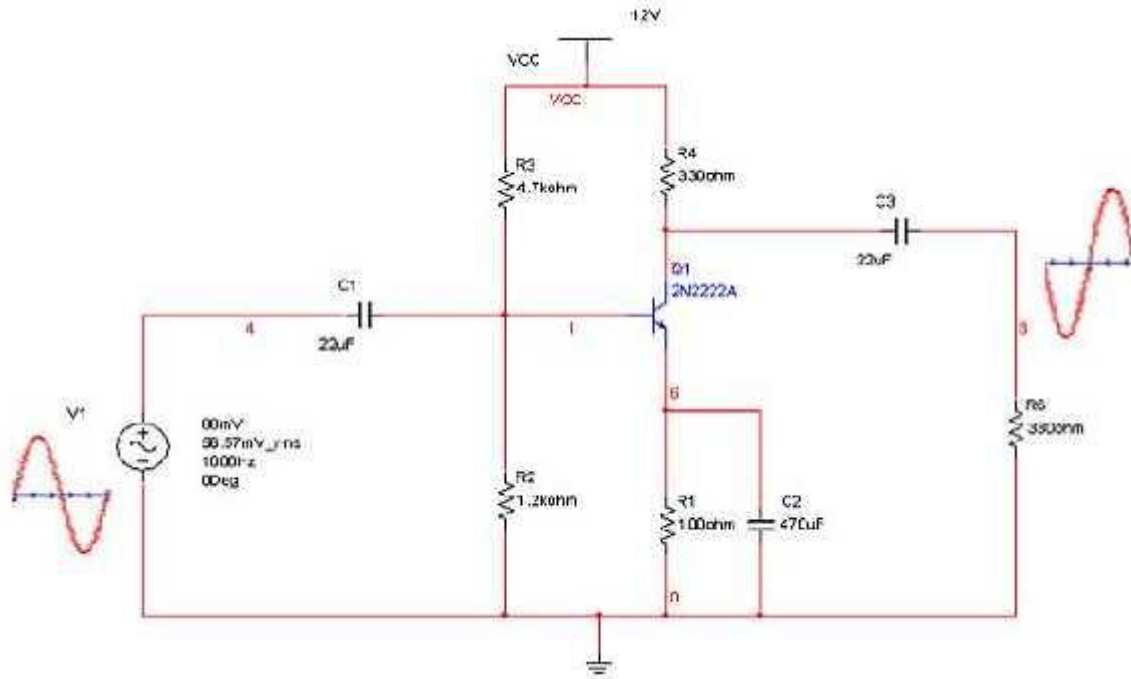# EXP- 07 CLASS A POWER AMPLIFIER

OBJECTIVE : To determine efficiency of class A power amplifier.

APPARATUS REQUIRED: MULTISIM 2007

CIRCUIT DIAGRAM:

THEORY:

The function of power amplifier is to raise the power level of input signal. Class A power amplifier is one in which the output current flows during the entire cycle of input signal. Thus the operating point is selected in such a way that the transistor operates only over the linear region of its load line. So this amplifier can amplify input signal of small amplitude. As the transistor operates over the linear portion of load line the output wave form is exactly similar to the input wave form. Hence this amplifier is used where freedom from distortion is the prime aim.

PROCEDURE:

1. Select different components and place them in the grid.
2. Apply the input ac signal voltage of 160mV (p-p) and simulate the circuit.

3. Observe the output wave form on CRO and measure the output voltage V_0.
4. Now connect the ammeter at collector terminal of transistor.
5. Disconnect the ac signal from input and measure the collector current Ic in ammeter.
6. calculate the efficiency by using practical calculations compare it with theoretically calculated efficiency

OBSERVATION :

THEORITICAL CALCULATIONS :

$$I_{CQ} = \frac{V_{CC}/R_L}{2}$$

$$I_{CQ} = \frac{I_C}{2}$$

$$P_{in}(dc) = \frac{V_{CC}*V_{CC}}{2R_L} = \frac{V_{CC}^2}{2R_L}$$

$$P_o(a.c) = \frac{(V_{max}-V_{min})*(I_{max}-I_{min})}{8}$$

$$(I_{max} - I_{min}) = \frac{V_{CC}}{R_L}$$

$$(V_{max} - V_{min}) = V_{CC}$$

$$\text{Po(a.c)} \quad = \quad \frac{V_{CC}}{8R_L} \quad = \frac{V_{cc}^2}{8R_L}$$

$$\text{\% of efficiency} = \frac{P_o(ac)}{P_{in}(dc)}*100 = \frac{V_{CC}^2/8R_L}{V_{CC}^2/2R_L} * 100 = 25\%$$

PRACTICAL CALCULATIONS :
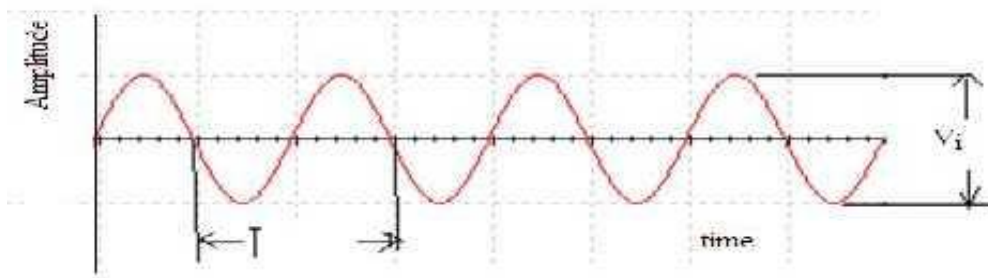
$$I_C =$$

$$\text{Pin(d.c)} = V_{CC}*I_{CQ} =$$

$$\text{Po(a.c)} \quad = \quad \frac{V_0^2}{8R_L} =$$

$$\text{\% of efficiency} = \frac{Po(ac)}{P_{in(dc)}} *100 =$$

OBSERVATIONS:

	OUTPUT VOLTAGE (V_0)	Gain = Vo/Vin	GAIN IN dB $A_v=20 \log_{10} (V_0/V_i)$

WAVEFORMS:

OUTPUT WAVEFORMS:
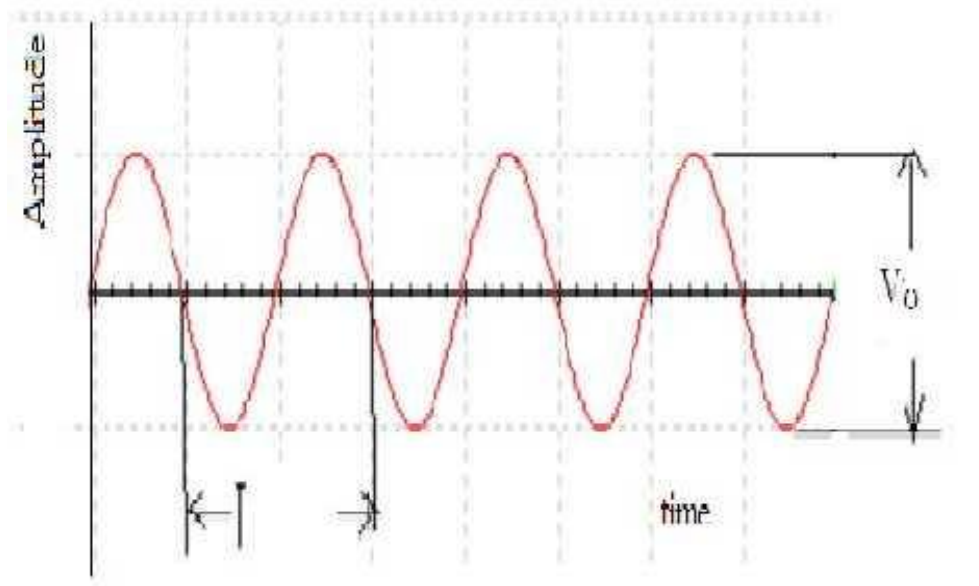
RESULT: The efficiency of class A Power amplifier is verified.