Since $\lambda_1 = \lambda_2$, the output resistances are

$$r_{o1} = r_{o2} = \frac{1}{\lambda I_{DQ}} = \frac{1}{(0.01)(0.2 \times 10^{-3})} = 500K\Omega$$

$$A_v = -g_{m1}(r_{o1} \| r_{o2}) = -1.265 \times 10^{-3}(500k\Omega \| 500k\Omega) = -316.25$$

TWO MARK QUESTIONS AND ANSWERS

1. Define current steering.

In integrated circuit designs biasing circuits use constant current sources.T he constant d.c current called reference current is generated at one location and then replicated at various other locations for biasing the various stages of amplifier present in the circuit. This process is known as current steering.

2. State the advantages of current steering.

1) The external components such as precision resistors required to generate a predictable and stable reference current, need not be repeated for every amplifier stage.

2) The bias currents of the various stages track each other when there is any change due to power supply voltage or temperature.

3. Define override voltage.

Override voltage is denoted as $V_{ov,}$

$$V_{ov} = V_{GS} - V_T$$

$$V_o \geq V_{ov}$$

4. What is meant by Wilson current mirror?

In MOSFET Wilson current source, the V_{DS} values of transistors are not equal. Since λ is not zero, the ratio I_O/I_{REF} is slightly different from aspect ratio. The modified Wilson current mirror solves this problem by including other transistor. The advantage of these circuits is increase in output resistance and hence increase the stability of output current.

5 .List the various types of active loads.

When MOSFET itself is used as a load device,it is referred to as active load.

Three types of load devices are:

1) n-channel enhancement mode device.

2) n-channel depletion mode device.

3) p-channel enhancement mode device.