(*ii*) *Emitter follower.* It is also a negative current feedback circuit. Its most important characteristic is that it has high input impedance and low output impedance. This makes it an ideal circuit for impedance matching. Fig. 14·10 shows the circuit of an emitter follower. It differs from the circuitry of conventional amplifiers by the absence of collector load and emitter by-pass capacitor. The emitter resistance R_E itself acts as the load and the a.c. output voltage e_o is taken across it. The biasing is generally provided by base resistor method. When signal e_s is applied, the resulting a.c. emitter current i_e produces an output voltage $i_e R_E$ across emitter resistance. This voltage opposes the signal voltage, thus providing negative feedback. Obviously, it is a current feedback circuit since the voltage feedback is proportional to the emitter current i.e. output current. It is called emitter follower because voltage variations across base-emitter junction follow the emitter.

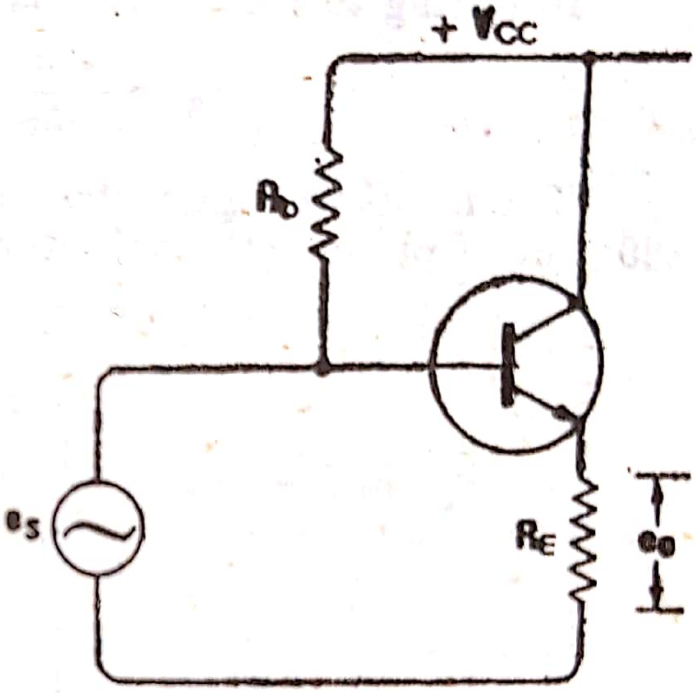
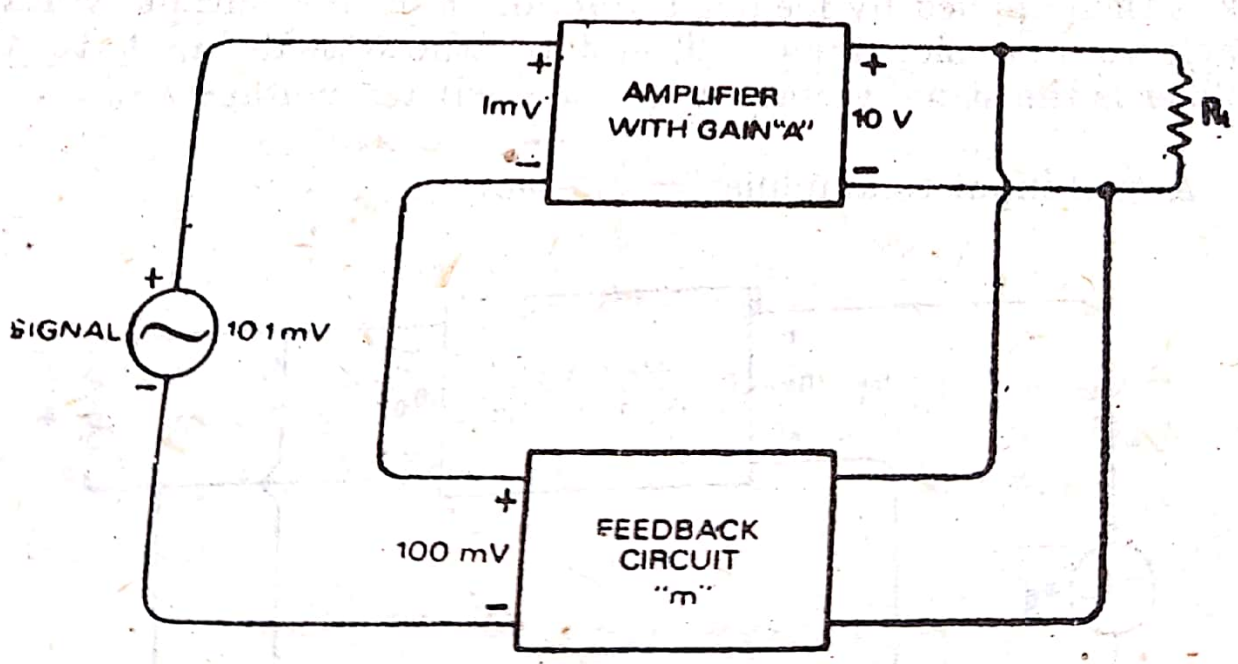


Fig. 14·11

Ans. Principles of negative feedback in amplifiers

A feedback amplifier has two parts *viz* an amplifier and a feedback circuit. The feedback circuit usually consists of resistors and returns a fraction of output energy back to the input. *Fig. 14·1 shows the principles of negative feedback in an amplifier. Typical values have been assumed to make the treatment more illustrative. The output of the amplifier is 10V. The fraction m of this output *i.e.* 100 mV is fedback to the input where it is applied in series with the input signal of 101 mV. As the feedback is negative, therefore, only 1mV appears at the input terminals of the amplifier. Referring to Fig. 14·1,



Ans. Feedback

The process of injecting a fraction of output energy of some device back to the input is known as **feedback.**

The principle of feedback is probably as old as the invention of first machine but it is only some 30 years ago that feedback has come into use in connection with electronic circuits. It has been found very useful in reducing noise in amplifiers and making amplifier operation stable. Depending upon whether the feedback energy aids or opposes the input signal, there are two basic types of feedback in amplifiers *viz positive feedback* and *negative feedback.*

(*i*) **Positive feedback.** When the feedback energy (voltage or current) is in phase with the input signal and thus aids it, it is called *positive feedback.* Positive feedback increases the gain of amplifier. However, it has the disadvantage of increased distortion and instability. Therefore, positive feedback is seldom employed in amplifiers. One important use of positive feedback is in *oscillators.* As we shall see in the next chapter, if positive feedback is sufficiently large, it leads to oscillations.

(*ii*) **Negative feedback.** When the feedback energy (voltage or current) is out of phase with the input signal and thus opposes it, it is called *negative feedback.* Negative feedback reduces the gain of amplifier. However, the advantages of negative feedback are : reduction in distortion, stability in gain, increased bandwidth and improved input and output impedances. It is due to these advantages that negative feedback is frequently employed in amplifiers.