UNIT-4 >>CURRENT MIRROR AND OP-AMP DESIGN

CLASS>>II$_{ND}$ YEAR, IV SEM

SUBJECT-ANALOG CIRCUITS

PAPER-CODE>>BT-402

LECTURE-NO>>2.11

TOPIC>>CLASS(A,B,AB,C)Linearity issues

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Linearity issues of class C amplifier:-

1. The schematic diagram of a class C amplifier is shown in Fig. 2.15.1.
2. The input and the waveforms at the collector terminal are shown in Fig. 2.15.2.

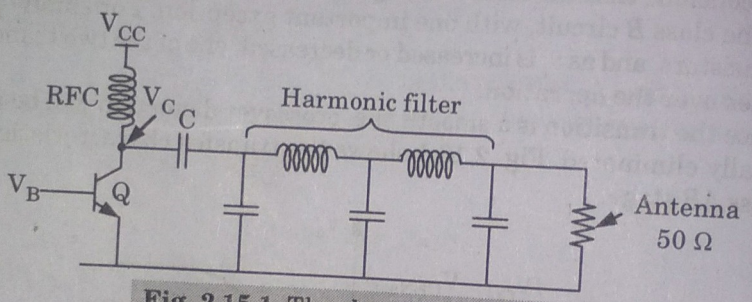
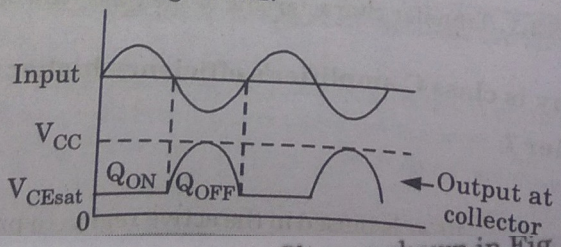


Fig. 2.15.1. The class C output stage.

3. When the input signal is positive and above the cut-in voltage of the transistor, the transistor operates in the saturation region.
4. During this period, the output voltage is equal to the saturation voltage of the transistor and remains constant as long as the input signal is above the cut-in voltage.
5. When the input voltage is less than the cut-in voltage, the transistor remains off, while the induced emf in the inductor provides the collector voltage as shown in Fig. 2.15.2.



6. This output voltage is fed to the low-pass filter as shown in Fig. 2.15.1. The low-pass filter suppresses the high-frequency harmonics present at the collector and produces output similar to the input signal.

Efficiency :

The efficiency of the class C amplifier is given by

$$h = \frac{P_{AC}}{P_{DC}} = \frac{(V_{CC} - V_{CEsat})\, I_{DC}}{V_{CC} I_{DC}} = \left(1 - \frac{V_{CEsat}}{V_{CC}}\right)$$

As V_{CEsat} is very small as compared to V_{CC}, the efficiency of the class C amplifier is very high; it can achieve above 90 % efficiency