

2.16 Two Marks Question and Answers

1. What is an oscillator?

An oscillator is a circuit which basically acts as a generator, generating the output signal which oscillates with constant amplitude and constant desired frequency.

2. State the Barkhausen criterion for an oscillator.

- a. The total phase shift around a loop, as the signal proceeds from input through amplifier, feedback network back to input again, completing a loop, is precisely 0° or 360° .
- b. The magnitude of the product of the open loop gain of the amplifier (A) and the feedback factor β is unity. i.e., $A\beta = 1$.

3. Explain the concept of positive feedback.

The feedback is a property which allows to feedback the part of the output, to the same circuit as its input. Such a feedback is said to be positive whenever the part of the output that is fed back to the amplifier as its input, is in phase with the original input signal applied to the amplifier.

4. Why in practice $A\beta$ is kept greater than unity.

To amplify small noise voltage present, so that oscillations can start, $A\beta$ is kept initially greater than unity.

5. Give the overall classification of oscillators?

- a. Waveform type (sinusoidal, square, triangular, etc.,)
- b. Circuit components (LC, RC, etc.,)
- c. Range of frequency – A.F (audio), R.F (radio)
- d. Type of feedback (RC phase shift, Wein bridge are feedback used, UJT relaxation oscillators uses no feedback)

6. What are the frequency sensitive arms?

The arms which decide the frequency of oscillations i.e., R1-C1 and R2-C2 are the frequency sensitive arms.

7. What is the gain requirement in the wein bridge oscillator?

The gain requirement for wein bridge oscillator is minimum 3.

8. How to obtain Hartley oscillator from the basic form of LC oscillator

Using X1 and X2 as inductors and X3 as capacitor, Hartley oscillator from basic form of LC oscillator is obtained.

9. How to obtained colpitt's oscillator form basic form of LC oscillator?

Using X1 and X2 as capacitors and X3 as inductors, colpitt's oscillator from basic form of LC oscillator is obtained.

10. Write down the advantages of RC phase shift oscillator.

- a. Simplicity of the circuit.
- b. Useful for frequencies in the audio range.
- c. A sine wave output can be obtained.

11. Write down disadvantages of RC phase shift oscillator.

- a. Poor frequency stability.

- b. It is difficult to get a variable frequency output, because to change the frequency, we need to vary all the resistors and capacitors simultaneously which is practically very difficult.
12. Write down the advantages, disadvantages and applications of Hartley oscillator.
- Advantages:
- It is easy to tune
 - It can operate over a wide frequency typically from few Hz and several MHz.
 - It is easy to change the frequency by means of a variable capacitor.
- Disadvantages:
- Poor frequency stability.
- Applications:
- It is used as local oscillator in radio and TV receivers.
 - In the function generator.
 - In RF sources
13. Write down the advantages, disadvantages and applications of colpitt's oscillator.
- Advantages:
- Simple construction.
 - It is possible to obtain oscillations at very high frequencies.
- Disadvantages:
- It is difficult to adjust the feedback as it demands change in capacitor values.
 - Poor frequency stability.
- Application:
- As a high frequency generator.
14. Write down the comparison between LC oscillators and crystals oscillators.

S.NO	Crystal oscillator	LC oscillator
1	Frequency of oscillations depends on the dimensions of crystal	Frequency of oscillations is dependent on values of L and C
2	Accuracy depends only on the fine cut of the crystal	Accuracy mainly depends on tolerances of L and C
3	is very high and it is stable	Q is less as compared to the crystal
4	Miller crystal oscillator, pierce crystal oscillator are the examples of crystal oscillator	Hartley, colpitt's and clap oscillators are the examples of LC oscillators.