Inverting 741 IC Op-amp Comparator Circuit

An inverting 741 IC op-amp comparator circuit is shown in the figure below. It is called a inverting comparator circuit as the sinusoidal input signal $V_{in}$ is applied to the inverting terminal. The fixed reference voltage $V_{ref}$ is give to the non-inverting terminal (+) of the op-amp. A potentiometer is used as a voltage divider circuit to obtain the reference voltage in the non-inverting input terminal. Both ends of the POT are connected to the dc supply voltage $+V_{cc}$ and $-V_{ee}$. The wiper is connected to the non-inverting input terminal. When the wiper is rotated to a value near $+V_{cc}$, $V_{ref}$ becomes more positive, and when the wiper is rotated towards $-V_{ee}$, the value of $V_{ref}$ becomes more negative. The waveforms are shown below.
Comparator Characteristics

1. **Operation Speed** – According to change of conditions in the input, a comparator circuit switches at a good speed between the saturation levels and the response is instantaneous.

2. **Accuracy** – Accuracy of the comparator circuit causes the following characteristics:
   (a) **High Voltage Gain** – The comparator circuit is said to have a high voltage gain characteristic that results in the requirement of smaller hysteresis voltage. As a result the comparator output voltage switches between the upper and lower saturation levels.
   (b) **High Common Mode Rejection Ratio (CMRR)** – The common mode input voltage parameters such a noise is rejected with the help of a high CMRR.
   (c) **Very Small Input Offset Current and Input Offset Voltage** – A negligible amount of Input Offset Current and Input Offset Voltage causes a lesser amount of offset problems. To reduce further offset problems, offset voltage compensating networks and offset minimizing resistors can be used.

Source: [http://www.circuitstoday.com/op-amp-comparator](http://www.circuitstoday.com/op-amp-comparator)