**ASK:** Amplitude shift keying(ASK) is a type of amplitude modulation that represents digital data. In this we transmit a carrier wave(RF) of high frequency when the binary digit is 1 and no signal when the binary signal is 0. But for practical purposes a very less amplitude signal is still transmitted for the distinguish for the 1 and 0 transmitted. Here the modulating signal is a digital signal that is varied in accordance with the amplitude of a carrier signal.

**FSK:** Frequency-shift keying is a frequency modulation scheme in which digital information is transmitted through discrete frequency changes of a carrier signal. FSK is the digital modulation technique in which the frequency of the carrier signal varies according to the digital signal changes. ... The output of a FSK modulated wave is high in frequency for a binary High input and is low in frequency for a binary Low input. Frequency-shift keying (FSK) is commonly used over telephone lines for Caller ID (displaying callers' numbers) and remote metering applications. There are several variations of this technology.

**PSK:** Phase-shift keying is a digital modulation process which conveys data by changing the phase of a constant frequency reference signal. The modulation is accomplished by varying the sine and cosine inputs at a precise time. It is widely used for wireless LANs, RFID and Bluetooth communication.

**AM:** In amplitude modulation, the modulating signal is a analog signal which is varied in accordance with amplitude of a carrier signal.

In this the message signal is multiplied with the carrier(RF) of high frequency. By doing this the amplitude of the carrier is changed according to the message signal voltage which is low frequency. So the carrier is being modulated in amplitude by the message signal.

**FM:** Frequency modulation (**FM**) is the encoding of information in a carrier wave by varying the instantaneous frequency of the wave.

In FM, the carrier amplitude remains constant and the carrier frequency is changed by the modulating signal. As the amplitude of the information signal varies, the carrier frequency shifts proportionately. As the modulating signal amplitude increases, the carrier frequency increases.

**PM:** Phase modulation (**PM**) is a modulation pattern for conditioning **communication** signals for transmission. It encodes a message signal as variations in the instantaneous phase of a carrier wave. ... The phase of a carrier signal is modulated to follow the changing signal level (amplitude) of the message signal.

**Differences between ASK, FSK and PSK:**

| **Parameters** | **ASK** | **FSK** | **PSK** |
| --- | --- | --- | --- |
| Variable characteristics | Amplitude | Frequency | Phase |
| Bandwidth | Is proportional to signal rate (B =(1+d)S),d is due to modulation & filtering ,lies between 0 & 1. | B=(1+d)×S+2Δf | B=(1+d)×S |
| Noise immunity | low | High | High |
| Complexity | Simple | Moderately complex | Very complex |
| Error probability | High | Low | Low |
| Performance in presence of noise | Poor | Better than ASK | Better than FSK |
| Bit rate | Suitable upto 100 bits/sec | Suitable upto about 1200 bits/sec | Suitable for high bit rates |

**Difference between AM, FM and PM modulation techniques.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **AM** | **FM** | **PM** |
| Function | amplitude of carrier wave varies as per amplitude or voltage of modulating signal input. | Frequency of carrier wave varies as per voltage of modulating signal input. | Phase of carrier wave varies as per voltage of modulating signal input. |
| Carrier parameter | frequency of carrier wave is kept constant | amplitude of carrier wave is kept constant | amplitude of carrier wave is kept constant |
| Types | AM types include DSB-SC, SSB, VSB etc. Refer [DSB-SC vs SSB-SC](https://www.rfwireless-world.com/Terminology/DSBSC-vs-SSBSC.html) and [SSB vs VSB modulation](https://www.rfwireless-world.com/Terminology/SSB-modulation-vs-VSB-modulation.html) | Digital FM types include FSK, GFSK, Offset FSK etc. Refer [MSK and GMSK modulation](https://www.rfwireless-world.com/Terminology/MSK-GMSK.html) | Digital PM types include BPSK, QPSK, QAM(combination of amplitude and phase modulation types) Refer [BPSK and QPSK](https://www.rfwireless-world.com/Terminology/BPSK-vs-QPSK.html), [QAM](https://www.rfwireless-world.com/Terminology/QAM.html) modulation types. |