

# Signal

## → INTRODUCTION :-

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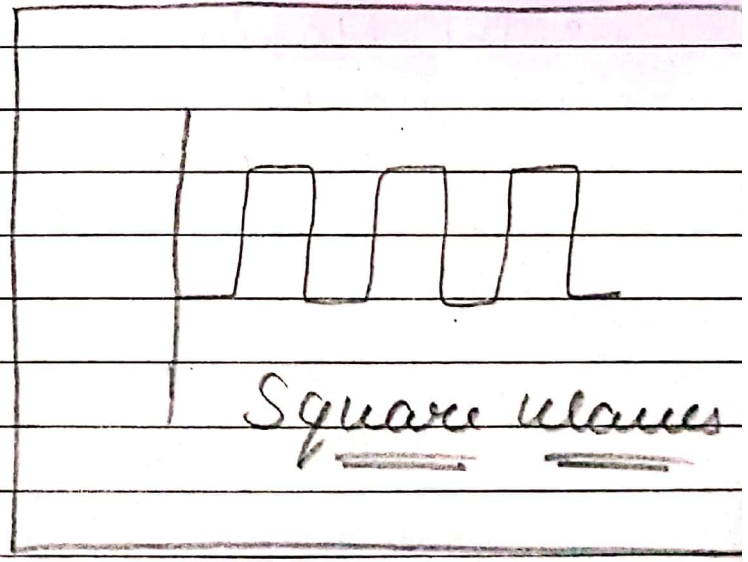
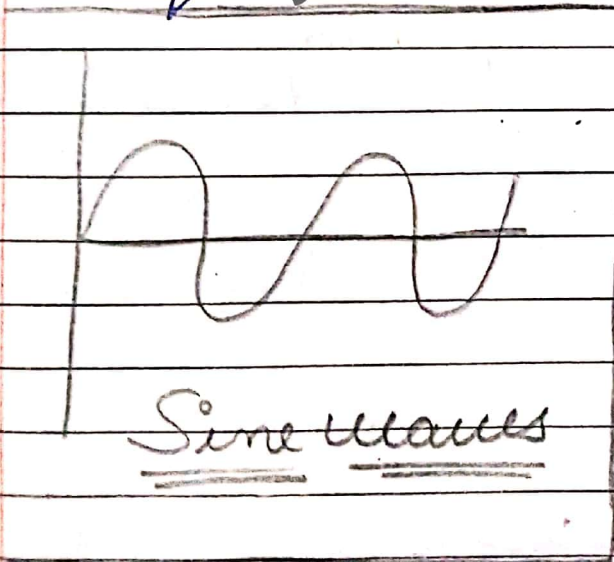
- Electrical signal is represented as a change in voltage over time.
- The change occurs when the voltage begins at zero and increases until it peaks.
- This signal can be in analog or digital form.

∴ There are two types of waveforms:-

⇔ Sine Waves

⇔ Square Waves

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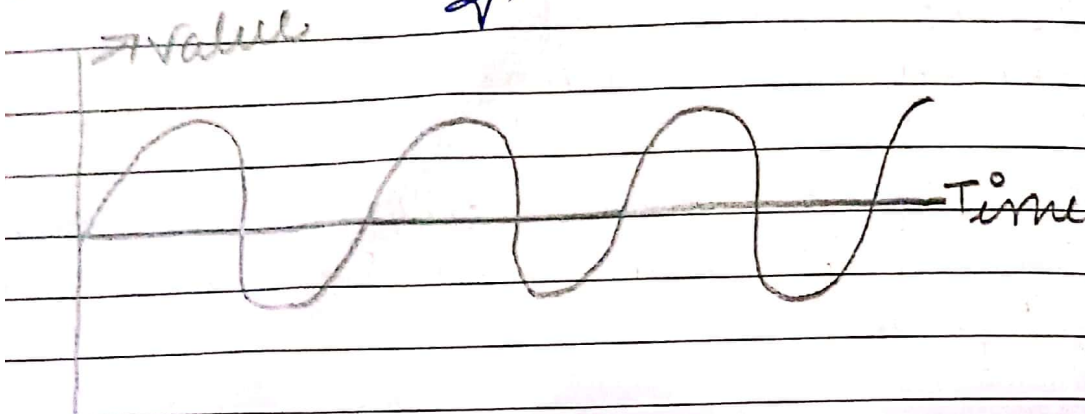


## → ANALOG SIGNAL :-

- Analog signal can have infinite no. of values (waves) and continuously

with time.

Analog signal is usually represented by sine waves.



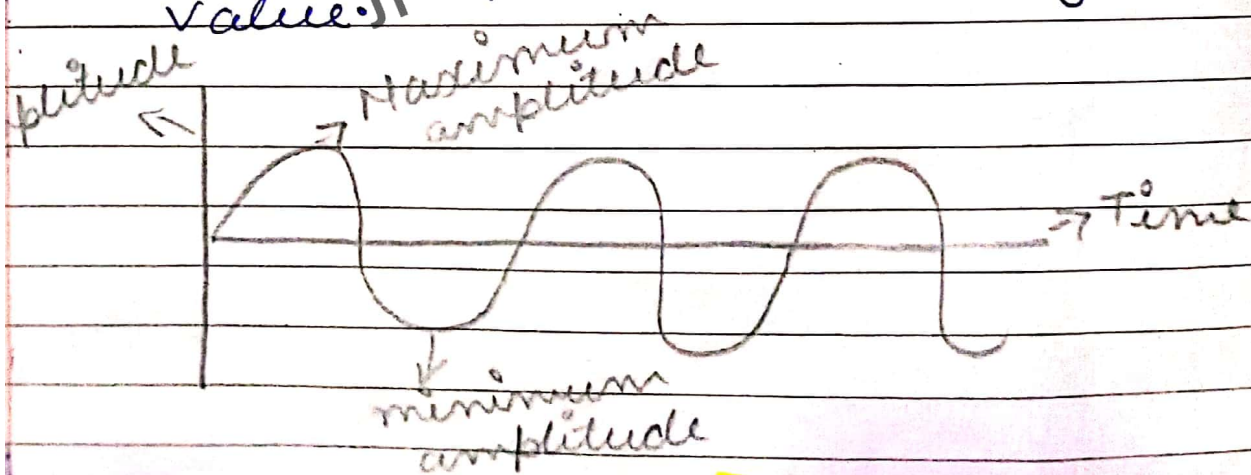
**Characteristics / features of analog signal :-**

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**AMPLITUDE :-**

Amplitude of a signal refers to the height of the signal.

The Maximum amplitude of a sine wave is equal to the highest value.



**PERIOD :-**

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Period refers to the amount of time in which signal

complete one cycle.

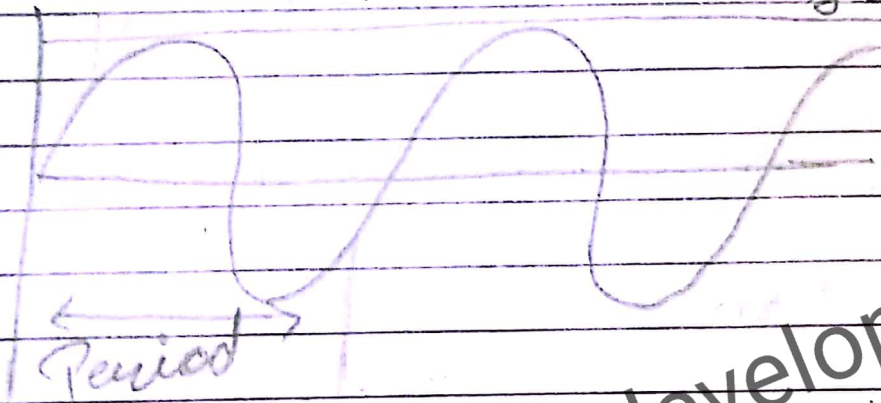
It is measured in seconds.

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Frequency :-

It refers to the number of waves pattern completed in a given period of time.

frequency measured in (HZ) Hertz frequency



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PHASE :-

Phase describes the position of the waveform relative to time zero.

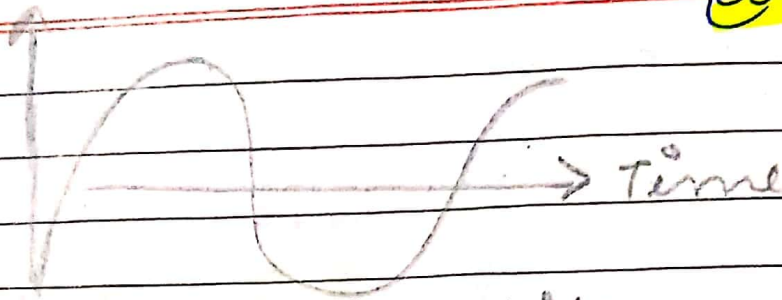
It indicates the <sup>status</sup> (position) of first cycle.

A Phase is measured in degree or radians.

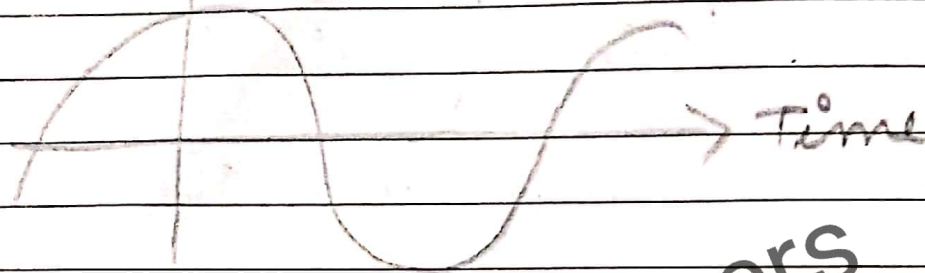
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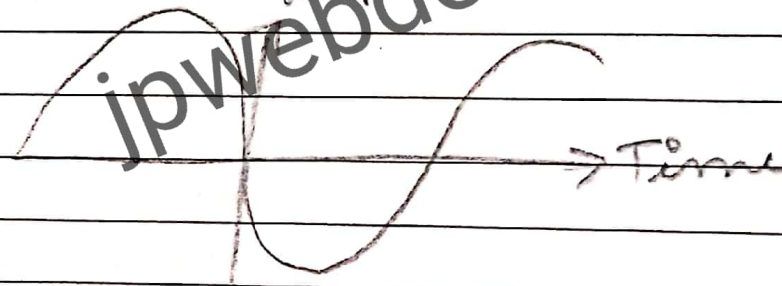
amplitude



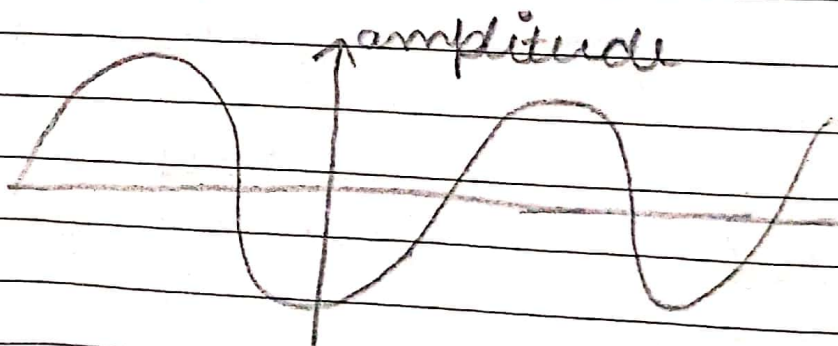
⇒ 0° phase shift  
↑ amplitude



⇒ 90° Phase shift  
↑ amplitude



⇒ 180° phase shift



⇒ 270° phase shift

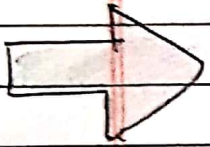
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## → ADVANTAGES:-

- Best suited for the transmission of audio & video.
- Consume less bandwidth than digital signal to carry the same information.
- Analog systems are gradually in place of around the world.

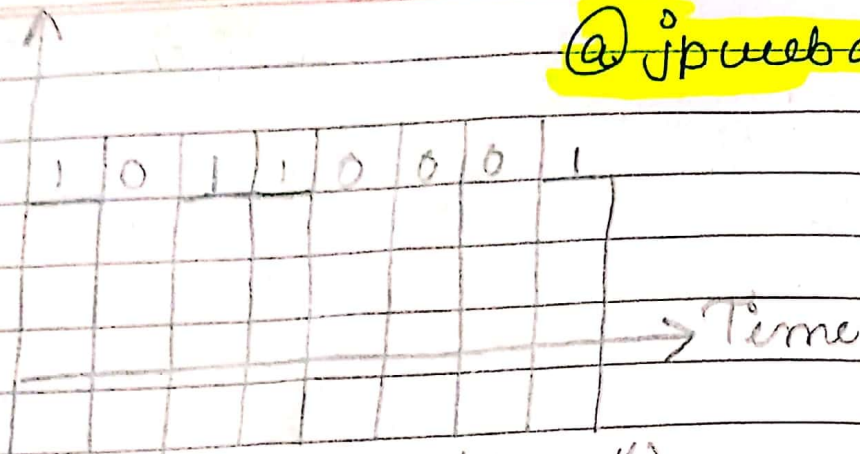


## DIGITAL SIGNAL

- A digital signal is a discrete form.
- It can have only one digital form (signal) from one value to another value.
- Digital signals are represented by square waves.
- In this signal 1 is represented by having a positive voltage and 0 is represented by having a negative voltage.

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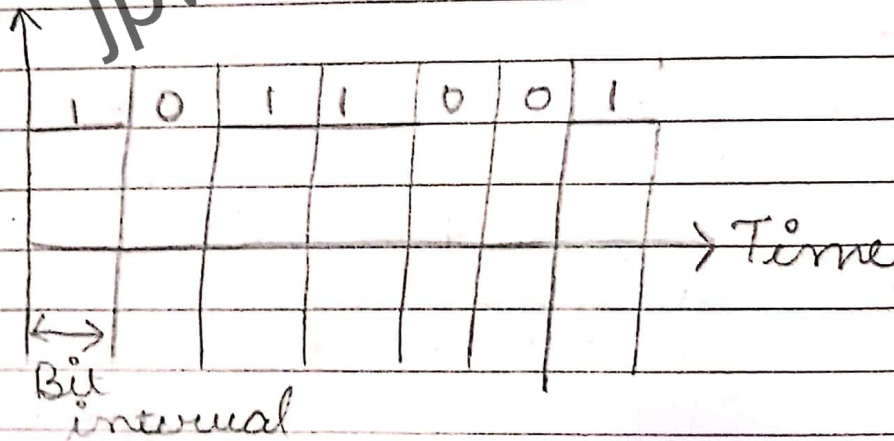


Digital Signal

⇒ Characteristics of Digital Signal:-

1. BIT INTERVAL:-

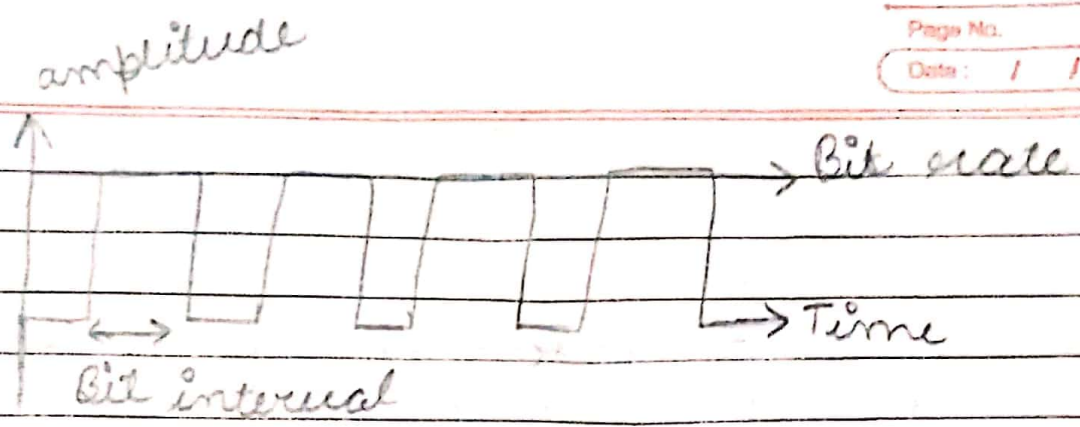
It is time required to set one single bit (waves)



2. BIT RATE:-

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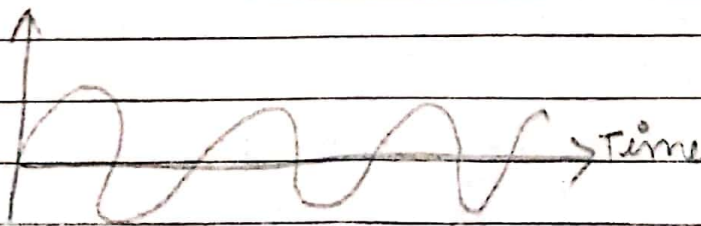
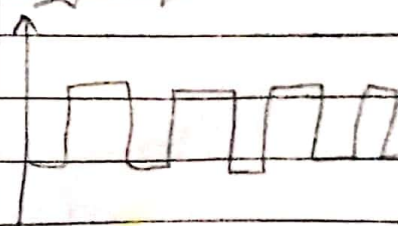
- It refers to the number of bit intervals in one (second) set.
- Therefore bit rate is the no. of bits send in one second.



➔ ADVANTAGES:- @jpwebdevelopers

- Bit suited for the transmission of digital data.
- Digital data can be easily compressed.
- Digital information can be encrypted.

➔ Comparison between analog and Digital signal:-

Sr. no	Factor	Analog Signal	Digital signal
1	Nature	continuous waveform that change smoothly with time	discrete form in which value changes
2	values	have infinite no. of values.	have limited value 0 & 1.
3	Representation	represented by sine waves.	represented by square waves.
4	diagram		
5	example	human voice in air	signal generated by computer or devices.