**SECTION 1**

1. Electromagnetic waves are grouped according to frequency. Visible light has a narrow band of frequencies that are perceptible by the human eye. The visible spectrum ranges approximately from 400 nanometers to 700 nanometers.

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| **COLOR** | **WAVELENGTH (in nm)** |
| Violet | 380-450 |
| Blue | 450-495 |
| Green | 495-570 |
| Yellow | 570-590 |
| Orange | 590-620 |
| Red | 620-750 |

Optical sensor can be used to capture the light in visible range.

2. ***Image processing techniques:***

**Image enhancement** is the process of digitally manipulating a stored image using software to make it suitable for display. ***Eg:*** Removing noise, sharpening, or brightening an image.

**Image segmentation** is partitioning an image into distinct regions containing each pixels with similar attributes which are meaningful and useful for image analysis and interpretation.

**Edge detection** is used for finding the boundaries of objects within images. It works by detecting discontinuities in brightness.

4. ***Sensitivity:***

The sensitivity is defined as the change of output signal to the change in input signal. In other words it defines how large the response of the sensor is to a small change in input.

***Example:***

The temperature sensor measures the varying temperatures and the output will be in the form of voltage i.e., for the smaller changes in the temperature will cause changes in the voltmeter.

***Selectivity:***

Selectivity of sensor is defined as the sensors ability to filter out the unwanted signals other than the true signals. The sensor selectivity discriminates the response from the input end of the sensor.

***Example:***

The gas sensor which is designed for methane and selectivity is how well it responds to methane in the presence of other gases.

5. ***Calibration of sensors:***

Sensors are calibrated by giving constant input to get the same output and also monitor the small changes in the measured unit.