

# Centre for Automation and Instrumentation, NITW

## 1. 400 MHz Bruker NMR Spectrometer



Multinuclear Nuclear Magnetic Resonance Spectrometer  
Make: Bruker, USA  
Cost: 300 lakhs

### Applications:

#### 1D-NMR:

- A. <sup>1</sup>H, <sup>13</sup>C, <sup>31</sup>P, <sup>19</sup>F
- B. DEPT-135, DEPT-90, DEPT-45
- C. 1D-NOESY
- D. Water suppression
- E. VT Temperature

#### 2D-NMR:

- A. HOMO
- i. NOESY
- ii. COSY
- iii. TOCSY
- B. HETERO
- i. HSQC
- ii. HMBC

Molecular Structure Determination in Pharmaceuticals and Drugs.  
Structure and atomic arrangement in molecules and crystals can be investigated.

## 2. X-Band ESR Spectrometer



Electrochemical Cell for ESR Spectrometer.  
Make: JEOL, JAPAN  
Cost: 100 lakhs

### Applications:

1. Electron Spin Resonance (ESR) spectrometer used for the measurement of species that contain unpaired electrons (Free radicals, transition metal complexes, Molecular structure, Valence electron wave functions, Electron transport, Crystal &

ligand field splitting, Relaxation properties, Molecular motion, Reaction mechanisms and Reaction kinetics, odd-electron molecules, rare earth ions etc.)

## 3. Inductively Coupled Plasma Optical Emission Spectrophotometer (ICP-OES)



Make: Agilent USA  
Cost: 45 lakhs

### Applications:

This technique is used for quantitative and qualitative determination of the metals and metalloids in the following sample.

Biological	Geological
Environmental	Pharmaceutical
Industrial	Aqueous and Organic

## 4. HPLC- Mass Spectrometer (LC-MS)



Make: Agilent Tech.  
Q-TOF 6230, USA  
Cost: 125 lakhs.

### Applications:

Molecular structure of petroleum components, industrial products, pharmaceuticals, bio molecules can be judged. Purity of the finished chemical industrial products be established

## 5. UV-VIS-NIR Spectrometer



Make: Agilent Tech.  
Cary 5000 USA  
Cost: 40 lakhs

### Applications:

The electronic transitions and band-gaps of semiconductors, thin-films, etc can be determined. Electronic structures of polymers, complexes, bio molecules, materials, pharmaceuticals and other products can be evaluated.

## 6. Fluorescence Work station

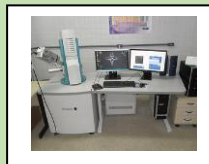


Make: Horiba Fluorolog-3-21, USA  
Cost: 75 lakhs

### Applications:

Molecular and solid state Fluorescence emission can be monitored and quantum lifetime measurements can be evaluated. Materials in all states and biological samples can be investigated.

## 7. Scanning Electron Microscope (SEM)



Make: Tescan, Vega 3 LMU  
Cost: 100 lakhs

### Applications:

Surface Studies, Nano Particle Imaging, Phase Transitions, Corrosion Products, All kinds of solid material studies.

## 8. Circular Dichroism-Optical Rotatory Dispersion (CD-ORD) Spectrometer



Make: BioLogic Czech  
Cost: 55 lakhs

### Applications:

Non-linear Optical materials, enantiomeric compounds, biochemicals express themselves in Optical Rotatory Dispersion and Circular Dichroism. Any subtle change in their structural or molecular profile would be reflected in their CD Spectra. Advanced research can be thought.

## 9. Universal Testing Machine (UTM)



Make: Blue star WDW-100 S  
Cost: 105 lakhs

### Applications:

It can perform many standard tensile and compression tests on materials, components, and structures. Physical and mechanical attributes of metals, alloys, finished solid products, etc can be studied; Phase transitions under stressed and normal conditions are investigated.