ABBE-3L REFRACTOMETER

I. Turn refractometer ON *
   A. 3-Position power/lamp selector (toggle) switch on left side of refractometer
      1. Up position
         a. OFF
      2. Middle position *
         a. ON (sample illuminator lamp ON for adjusting total reflection borderline)
      3. Depressed and held down position
         a. ON (for reading numerical index scale)
         b. Must be held down in depressed position

II. Preset numerical readout
   A. Use CRC Handbook of Chemistry and Physics to determine theoretical refractive index of compound under study
   B. Depress and hold toggle switch on left side of refractometer to down position
      1. Light source will extinguish
      2. Toggle switch must be held down
   C. Rotate handwheel (knob) on right side of refractometer until theoretical refractive index value of compound under study (upper scale) is centered on total reticle (vertical line of crosshairs)

III. Sample application to crystal
   A. Lower lamp forward, away from prisms
   B. Open upper prism case
      1. Lift upper prism case by grasping metal tabs (located on right side of upper prism case) and swing upper prism case in upward, counterclockwise motion until it is leaning to the left
      2. DO NOT TOUCH PRISM SURFACES WITH FINGERS
   C. Use pipette to add several drops of sample to horizontal flat section of lower measurement prism
      1. DO NOT ALLOW PIPETTE TO CONTACT PRISM SURFACE!!
         a. Keep pipet tip at least 1 inch above prism surface!!
   D. Close upper prism case
      1. Using metal tabs on upper prism case, lift and rotate upper prism case clockwise and press down firmly, yet carefully
      2. Volatile samples may evaporate if upper prism case is left open for an extended period of time

IV. Determining refractive index
   A. Ensure that hinged lightshield (silver-colored metal tab attached front of lower prism case) is in the upright position covering measuring prism
   B. Lift lamp to the upmost position and rotate illuminator (clear, colorless end of lamp) such that light shines upon flat surface on front of prism cases producing the best contrast in the reflection borderline (dividing line between an upper light and a lower dark sector)
   C. While viewing through eye-piece
      1. Move eye-piece in or out, as necessary, to sharpen focus
      2. Rotate handwheel (knob) on right side of refractometer to center the horizontal line of the total reflection borderline onto cross-hairs of the dual reticle
         a. If horizontal line of total reflection borderline is not a sharp line
            (1) Remove plastic cover from compensating prism adjust drum
            (2) Slowly turn compensating prism adjust drum until horizontal line of total reflection borderline is a sharp line
            (3) Replace plastic cover over compensating prism adjust drum
         b. Continue rotation of handwheel (knob) on right side of refractometer to center the horizontal line of the total reflection borderline onto cross-hairs of the dual reticle
      3. Depress and hold toggle switch on left side of refractometer to down position
         a. Light source will extinguish
         b. Toggle switch must be held down
         c. Read refractive index scale (upper digital display) to the 4^{th} decimal place

V. Cleaning sample from prisms
   A. Turn lamp OFF
      1. Flip toggle switch on left side of refractometer to upper position
   B. Lower lamp forward, away from prisms
   C. Open upper prism case
      1. Use lintless tissue (ChemWipe) to wipe sample from both upper and lower prism surfaces
      2. If sample is nonvolatile
         a. Clean both upper and lower prism surfaces with lintless tissue (ChemWipe) soaked with ethanol
         b. Use dry lintless tissue (ChemWipe) to wipe ethanol from both upper and lower prism surfaces
   D. Lift lamp to the upmost position near crystal

VI. Turn refractometer OFF
   A. Flip toggle switch on left side of refractometer to upper position

VII. Compare the experimental refractive index to the theoretical value found in the CRC Handbook of Chemistry and Physics