. Photosynthesis: History of photosynthesis, Nature and unit of light, Determination of oxygenic and an oxygenic photosynthesis. Ultrastructure of thylakoid vesicle, various pigments and photosynthetic activity, Ultrastructure and composition of composition of photosynthesis I-II. Absorption and action spectra of different pigments, Mechanism of photosynthesis- light absorption charge separation. Electron and proton transport through thylakoid protein, pigment complexes. Photophosphorylation and its mechanism, CO2 reduction. C3 pathway and photorespiration Regulation of C3 and C4 pathway and its different forms. C3-C4 intermediates, CAM pathway, Methods of measurement of photosynthesis. Respiration: synthesis of hexose sugar from reserve carbohydrates, Mechanism of respiration- Glycolysis, Difference between cytosolic and chloroplast glycolysis, Oxidative decarboxylation, Krebs cycle. Regulation of glycolysis and Krebs cycle, Electron transport and oxidative phosphorylation. Aerobic and anaerobic respiration, energetics of respiration. Pentose phosphate pathway Glyoxlate cycle, Cyanide resistant respiration. Translocation of food: Pathway of translocation, source and sink interaction, Materials translocated. Mechanism of phloem transport, loading and unloading, Leaves and atmosphere: Gaseous exchange, Mechanism of stomatal regulation, Assimilation of nitrogen, Sulphur and phosphorus: Nitrogen cycle, Nitrogen fixation. Pathway of assimilation of nitrate and ammonium ions, Assimilation of Sulphur and Phosphorus.

**Practical:**

Preparation of standard solution. Determination of the volume of CO2 evolved during respiration by plant material. Determination of the amount of O2 used by respiring water by Wrinkle method. Separation of chloroplast pigments on column chromatogram and their quantification by spectrophotometer. Extraction and separation of anthocyanin and other phenolic pigments from plant material. Categorization of C3 and C4 plants through their anatomical and physiological character. Regulation of stomatal opening by light of different colors and PtL.