

## List of Equipment

Annx-A

Sr.No.	Description of Item	Qty.	Unit
1	Closet/cabinet for storing six gas cylinders (each 47/48 L Capacity) Made up of galvanized iron steel (epoxy coated), dimensions 6x1.5/2x7/8 ft (LxDxH), With 6 cylinder holding brackets, provision for 5 gas pipe outlets at the top of the closet. The closet will be mounted outside of the lab and the gas lines will enter the lab through the wall.	1	nos
2	Dual or two-stage pressure regulators of make Aptech for gas cylinders Body with stainless steel SS-316L, Pressure gauge at primary and secondary side for N <sub>2</sub> , CO <sub>2</sub> , and N <sub>2</sub> :CO <sub>2</sub> mixture (80:20) gas lines supplied with dust frit at inlet bull-eye connector. Primary gauge: 0-280 kg/cm <sup>2</sup> , secondary gauge: 0-12 kg/cm <sup>2</sup>	3	nos
3	Piping/tubing (Length ~9-10 m for each gas line) with <b>color coded sleeving</b> for different gas lines SS316L grade, 1/4" diameter, should be electro-polished and provided with appropriate fittings. All gas lines must be anchored to a wall. All feed-through holes must be sealed properly. Proposed schematic of the gas lines are given in the scheme.	50.00	mtr
4	One-stage pressure regulator Body with SS-316L, Pressure regulator for N <sub>2</sub> (#2), CO <sub>2</sub> (1), N <sub>2</sub> :CO <sub>2</sub> mixture (80:20) (#2) and N <sub>2</sub> :CO <sub>2</sub> :H <sub>2</sub> mixture (#1) gas lines with appropriate end fittings, Gauge: 0-12 kg/cm <sup>2</sup> For N <sub>2</sub> and N <sub>2</sub> :CO <sub>2</sub> regulators, additional outlet with on/off valve Make: AES, Spectron, Air Liquide, Tescom, Aptech	6.00	nos
5	Mass flow controllers Digital/Analog for N <sub>2</sub> , CO <sub>2</sub> , and N <sub>2</sub> :CO <sub>2</sub> (80:20) gases, flow rate: 0 – 250 slpm, Accuracy: Set value ± 0.5%, Make: Fujikin, Brunkrst, Horiba, Alicat	3.00	nos
6	Manifold gassing/degassing platform Body with SS-316L, 3/16" thick plate, Dimensions: 3x2 ft	1.00	nos
7	SS316L tubing for manifold gassing/degassing station 1" diameter, supplied with appropriate fittings. This should be fixed on the manifold platform Make: Dockweiler, Valex, Cardinal, Sandvik	3.00	mtr
8	Pressure gauge Body with SS-316L, Gauge: 0-12 kg/cm <sup>2</sup> Make: AES, Tescom, Spectron	1.00	nos
9	Vacuum pump For degassing manifold (5-10 L volume) Number of stages: 2; Pumping Speed @ 50/60Hz: 77/97 L/min Vacuum: 2x10 <sup>-3</sup> mbar Max. allowed intake/exhaust pressure: 1 bar IN / EX hose connector: DN 16 Motor: 200-240V, 50/60 Hz Supplied with all accessories Make: Fischer Scientific, Zeny	1.00	nos
10	Toggle valves (on/off) Material SS-316L; Supplied with tube adapter hose barb	12.00	nos
11	Solenoid valves (#2) Make: Spectron, Swagelok, Aptech, Parker	2.00	nos
12	Control panel (for gassing-degassing OR overpressure-vacuum cycles)Gassing - degassing for 20-25 cycles Max. overpressure 0.5-1 bar	1.00	nos
13	Hardware & Fittings	1	job