



CRITERION 4

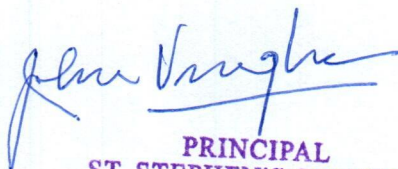
Infrastructure and Learning Resources

SUPPORTING DOCUMENT

4.1.1 Infrastructure and Physical Facilities for Teaching-Learning: Laboratories



S. No.	Content
1	List of the Laboratories
2	Geotagged photographs of Laboratories
3	Lab Stock Record: Physics Department
4	Lab Stock Record: Chemistry Department
5	Rules, Notices, and Instructions for Chemistry Lab
6	Rules and Instructions for Physics Lab
7	Rules and instructions for Computer Science Lab

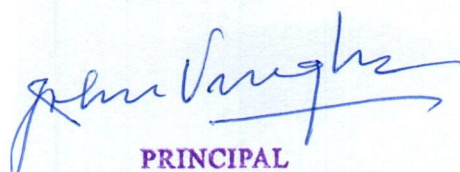

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1. List of the Laboratories

S. No.	Laboratory Name	ICT facility
1	Old physics lab (OPL)	Wireless internet networks, LMS, Two dark room
2	New physics lab (NPL)	Wireless internet networks, Projector, Remote, HDMI connector, Inbuild sound system, LMS
3	Dark room 1	Wireless internet networks, LMS
4	Dark room 2	Wireless internet networks, LMS
5	Dark room 3	Wireless internet networks, LMS
6	Old chemistry lab (OCL)	Wireless internet networks, LMS
7	New chemistry lab (NCL)	Wireless internet networks, LMS
8	Side lab chemistry	Wireless internet networks, LMS
9	Instrumentation lab	Wireless internet networks, LMS
10	Computer science lab	Wireless internet networks, Projector, Remote, HDMI connector, Inbuild sound system, LMS
11	Center for experimental physics	Wireless internet networks, Projector, Remote, HDMI connector, Inbuild sound system, LMS
12	Chemistry teacher research room (CTR)	Wireless internet networks, Projector, Remote, HDMI connector, Inbuild sound system, LMS
13	Chemistry balance room 1	Wireless internet networks, LMS
14	Chemistry balance room 2	Wireless internet networks, LMS
15	Chemistry Research Lab facility 1	Wireless internet networks, LMS
16	Chemistry Research Lab facility 2	Wireless internet networks, LMS
17	Chemistry Research Lab facility 3	Wireless internet networks, LMS


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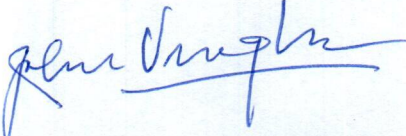


2. Geotagged photographs of Laboratories

1. OLD PHYSICS LAB (OPL)



🕒 Date: Wed 27th of April 2022
🏠 Address: Delhi University (North Campus), G
C Narang Marg, Delhi ...
📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 13.89" N, 77° 12' 40.62" E


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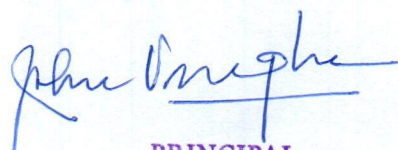




2. NEW PHYSICS LAB (NPL)



🕒 Date: Thu 21st of April 2022
🏠 Address: Delhi University (North Campus), G
C Narang Marg, Delhi ...
📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 14.91" N, 77° 12' 38.62" E


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3. DARK ROOM 1



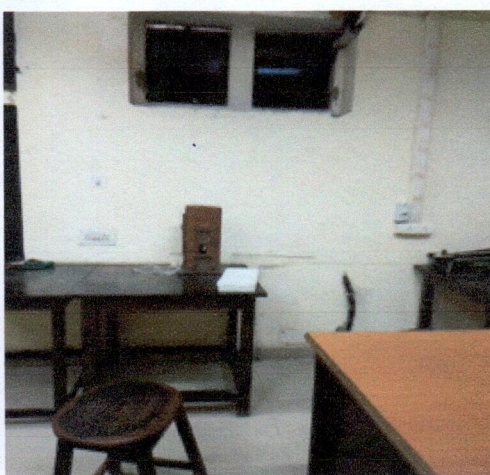
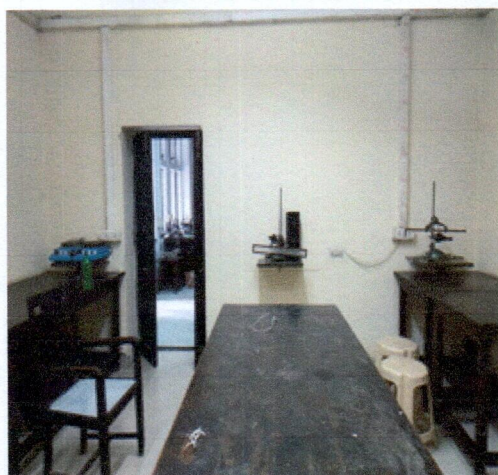
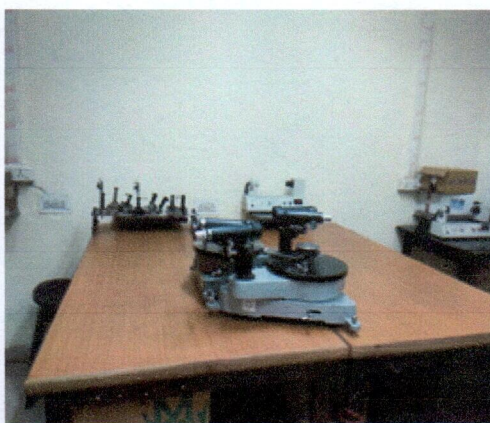
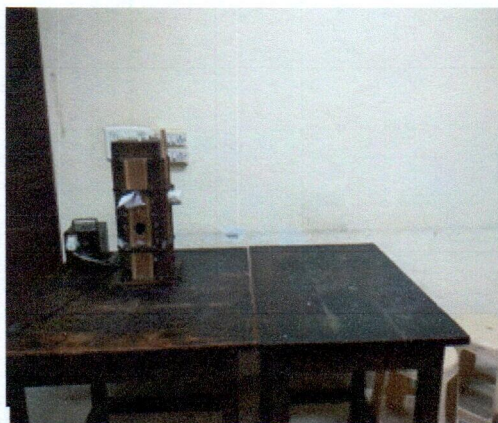
🕒 Date: Wed 27th of April 2022
🏠 Address: Delhi University (North Campus), G
C Narang Marg, Delhi ...
📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 14.77" N, 77° 12' 40.80" E

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4. DARK ROOM 2



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📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 14.77" N, 77° 12' 40.80" E

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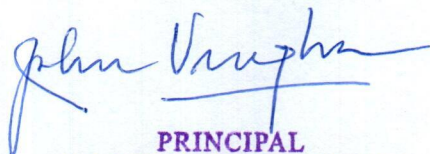


5. DARK ROOM 3



Shot on OnePlus
Central Delhi, Delhi 2022.07.04 11:29
Powered by Triple Camera

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Vishwavidyalaya Road, D...
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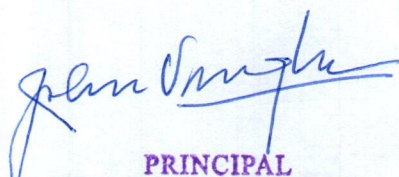




6. OLD CHEMISTRY LAB (OCL)



🕒 Date: Thu 21st of April 2022
🏠 Address: Delhi University (North Campus), G
C Narang Marg, Delhi ...
📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 14.23" N, 77° 12' 33.98" E


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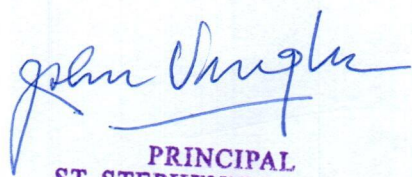




7. NEW CHEMISTRY LAB (NCL)



🕒 Date: Wed 27th of April 2022
🏠 Address: Delhi University (North Campus), G
C Narang Marg, Delhi ...
🏙 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 15.37" N, 77° 12' 38.92" E


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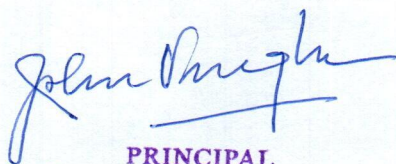




8: SIDE LAB CHEMISTRY



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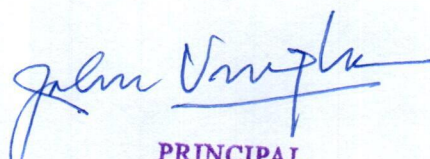


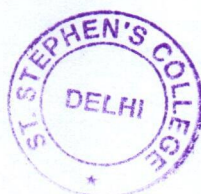


9. INSTRUMENTATION LAB



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Vishwavidyalaya Road, D...
📍 **City:** Delhi
🌐 **Country:** India
📍 **Location:** 28° 41' 15.23" N, 77° 12' 39.11" E


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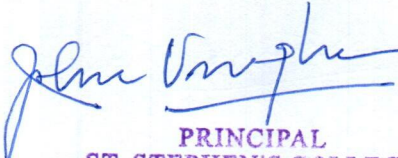




10. COMPUTER SCIENCE LAB (CSL)



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🏠 Address: Delhi University (North Campus), G
C Narang Marg, Delhi ...
📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 15.38" N, 77° 12' 38.88" E


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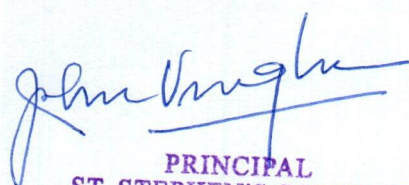




11. CENTER FOR EXPERIMENTAL PHYSICS



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🏠 Address: Delhi University (North Campus),
Vishwavidyalaya Road, D...
📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 15.30" N, 77° 12' 38.92" E


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12. CHEMISTRY TEACHER RESEARCH ROOM
(CTR)



🕒 Date: Thu 21st of April 2022
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Vishwavidyalaya Road, D...
👤 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 15.23" N, 77° 12' 39.11" E

John Singh

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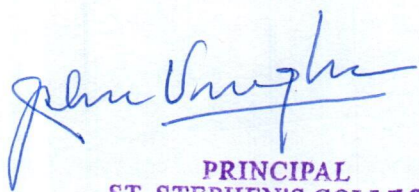




13. CHEMISTRY BALANCE ROOM 1



🕒 Date: Thu 21st of April 2022
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C Narang Marg, Delhi ...
📍 City: Delhi
🌐 Country: India
📍 Location: 28° 41' 14.23" N, 77° 12' 33.98" E


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14. CHEMISTRY BALANCE ROOM 2



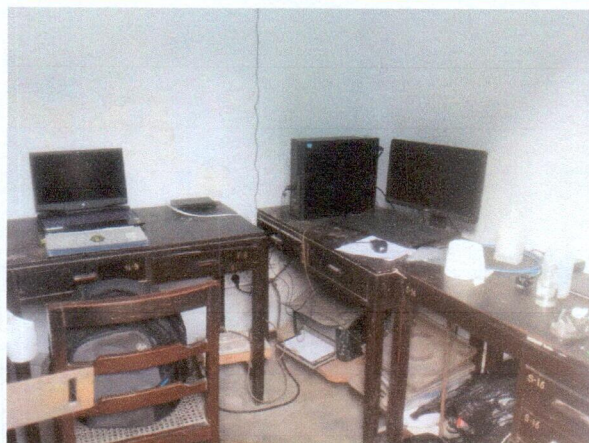
🕒 Date: Wed 27th of April 2022
🏠 Address: Delhi University (North Campus), G
C Narang Marg, Delhi ...
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📍 Location: 28° 41' 15.37" N, 77° 12' 38.92" E

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15, 16, 17. Personal research Labs for
chemistry faculties 1/2/3



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📍 Location: 28° 41' 14.77" N, 77° 12' 40.80" E

John Hughes

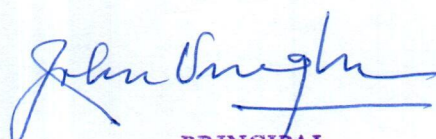
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3. Lab Stock Record: Physics Department

Physics Department Stock Record as on MAY,2019							
S. No.	Sr.Page No.	Name of Apparatus	New Lab	Old Lab	Store	Total	Remarks
1	1	Ammeter DC Analog	2	0	6	8	1 Extra in Store
2	5	Ammeter AC Analog	4	5	3	12	1 Extra in Store
3	9	Milliammeter AC & DC Analog	22	12	7	41	
4	11	Milliammeter AC & DC Digital	15	9	0	24	2 extra in NL
5	13	Microammeter AC & DC Analog	8	5	6	19	
6	15	Microammeter AC & DC Digital	0	3	0	3	
7	17	Voltmeter DC Analog	20	12	12	44	9 extras in store
8	19	Voltmeter AC Analog	7	5	6	18	
9	21	Millivoltmeter Analog	10	3	3	16	
11	25	Millivoltmeter/ Microammeter	10	0	1	11	1 Extra in Store and 1 extra in NL
12	27,28	Multimeter	25	15	25	65	20 to be disposed
14	31	RC Amplifier	8	0	0	8	1 extra in NL(tube based)
16	35	Battery Charger	1	1	0	2	
17	37	Cell Acid Accumulator	20	3	0	23	
19	41	calendar & Barnes	0	3	0	3	
20	43	Counter Digital	0	0	1	1	
21	45	Dimmer Stat	3	0	0	3	1 extra in NPL
22	49	e/m Apparatus, Bar/ Focusing	0	11	0	11	
23	51	Galvanometer	10	4	5	19	1extra in store


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24	53	Tangent Galvanometer	0	0	11	11	1 each with HKY, GS and SK from store
25	55,44 4	Galvanometer Mirror Type (BG)	9	11	16	36	
26	57	Spot Galvanometer	0	5	0	5	1 untraceable from store
27	59	Hysteresis coil	0	0	1	1	
28	61	Jockey	13	2	13	28	1 extra came with setup
29	63	One way key	14	6	0	20	1 extra in NL
30	65	Two Way Key	8	5	1	14	
31	67	Reversing key	2	0	8	10	
32	69	Charge discharge key	7	3	12	22	1 Extra
33	71	Four-way Key	1	4	1	6	1 Extra
34	73	Tapping Key	25	23	0	48	
35	75	Rayleigh's Key	2	6	6	14	
36	77	Kohlrausch Conductivity Bridge	0	0	1	1	
37	79	Lamp & Scale	5	6	2	13	1 complete set and 1 lamp only in Store
38	83	Meter Bridge	7	0	4	11	1 less/missing
39	85	Millikan's App.	0	0	1	1	
40	87	CRO	30	5	0	35	
41	93	Oscillator	25	6	18	49	18 to be disposed
43	105	Frequency Counter	2	0	0	2	
44	107	PO Box	0	1	12	13	
45	109	Potentiometer (10 Wire)	1	2	6	9	2 extra
47	113	Potentiometer (Direct Reading)	0	0	2	2	

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48	115	Power Supply	53	18	1	72	including 1 high volt P.S(3.5kV) each with store and NL
49	120	Platinum Resistance Thermometer	1	5	0	6	1 damaged in OL
51	123	Resistance Box	64	68	16	148	
52	125	Resistance Coil Inductance coil	55	38	35	128	
53	130	IC Tester	2	1	0	3	
54	131	Solenoid	0	0	2	2	
55	132	Rheostat	11	19	5	35	
56	135	Transformer (Na Lamp)	4	6	0	10	
57	137	Transformer Step Down	10	5	7	22	4 extra
61	144	Voltage Double & Tripler	0	0	1	1	
63	147	Gauss Meter	9	0	1	10	including 2 osaw + 1
64	148	LCR Meter	2	1	1	4	1 to be discarded from store
65	150	Discrete Component Trainer	1	0	0	1	
66	152	FET Characteristics	1	0	0	1	
67	153	Hall Probe	18	0	0	18	
68	154	Hall Effect Setup	3	0	0	3	
69	155	Adjustable Table	1	2	0	3	
70	156	Steel Almirah	14	12	3	29	
71	157	Boiler	2	9	1	12	5 Extra
72	158	Balance	3	3	0	6	1+1 Rough Balance each(OL+NL)
73	159	Pendulum Brackets	5	11	12	28	11 Extra came with Bar&Kater's
75	161	Bar For Koenig's apparatus	1	2	0	3	

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77	163	Clamps	8	11	0	19	
79	165	Drawing Board	63	0	0	63	31 board cut out from big board in college
80	166	Electric Heater	1	4	1	6	
81	167	Triangular File	0	0	0	0	1 missing
82	168, 211	Water Bath	0	1	0	1	
83	169	Fire Extinguisher	1	2	0	3	
84	170	Kater's Pendulum	0	11	5	16	
85	172	Bar Pendulum	0	9	12	21	1 Extra
86	174	Melde's Exp.	0	2	2	4	
87	176	Film Projector	1	0	1	2	
88	177	Screen	0	0	0	0	
89	178	Tripod Stand(sextant)	0	3	0	3	1 came with instrument
90	179	Head Phone	5	17	0	22	5 Extra
91	180	Hanger /anchor(Iron)	9	11	3	23	5 Extra
92	181	Bread Board	43	39	63	145	
93	182	Pateela	0	1	0	1	
94	183	Knife Edge	1	4	0	5	1 Extra
95	184	Locks	6	6	1	13	
96	185	Mugs	1	11	2	14	
97	186	Measuring Tape	1	4	0	5	
98	187, 320	Pliers	3	3	0	6	
99	188	Plumb Lines	5	2	7	14	5 taken from old balances
100	189	Plano meter	0	0	1	1	





101	190	Slit for Magnifying Power	0	15	0	15	1 missing
102	191	Stop Watch	12	27	6	45	
103	193	Sprit Level	10	15	0	25	
104	194	Coupled Pendulum	0	1	3	4	
106	196	Slotted Weights Iron	60	23	0	83	
107	197	Wire Cutter	67	27	3	97	
108	198	Slotted Weights Brass (including hanger)	20	35	0	55	including hangers 8 NL + 7 OL
109	199	Scale for Telescope	0	2	0	2	
110	200	Spherometer	1	12	0	13	
111	201	Scissor	2	2	0	4	
112	202	Stand	13	13	0	26	3 came with instrument
113	203	Boss Head	20	12	5	37	
114	204	Stand Case Wooden For Na/Hg Lamp	2	7	3	12	
115	205	Hand Lamp Wooden	4	12	0	16	
116	206	Stock Register	1	1	2	4	1 main + 1 contingency
117	208	Tray for putting the Pressure Coefficient App.	0	0	1	1	
118	209	Tray for General Use	4	0	9	13	
121	213	Wall Clock	2	1	0	3	
122	214	Weight Box	5	3	3	11	
123	215	Brass Pan	0	7	6	13	
124	216	Transparent Models	26	0	0	26	
125	219	Computer Printer	2	2	0	4	
126	220	Barometer Navy Type	0	0	1	1	

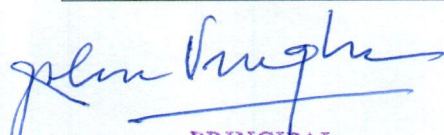


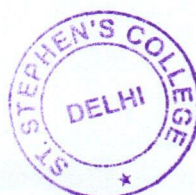
127	221	Barometer Fortins	0	1	0	1	
128	222, 396	Elastic Constant App. (searls)	0	6	1	7	1 to be discarded from store
129	223	Fly Wheel	3	3	0	6	
130	224	Vacuum Pump (rotary)	0	0	1	1	
131	225	Micrometer/Screw Gauge	3	11	6	20	
132	226	Maxwell Needle	5	2	1	8	
133	227	Pendulum Bobs	0	10	2	12	
134	228	Torsion App. (bartons App)	0	0	2	2	
135	229	Vernier Calipers	4	14	0	18	
137	231	Lee's App.	0	6	2	8	
139	233	Thermal Conductivity App.	0	5	1	6	1 to be discarded from store
140	234	Dioptrimeter	0	0	1	1	
141	235	Grating	5	11	2	18	
142	236,373	Fresnel's Rhomb's	0	3	0	3	
143	237	Glass Slabs	1	3	6	10	
144	238	Gaussian Eyepiece	0	3	8	11	
145	239	Mercury Lamp Choke	1	3	0	4	5 lamps and 4 chokes
146	240	Mercury Lamp	1	3	1	5	
147	241,403	Microscope (travelling)	4	13	3	20	
149	243	Michelson Interferometer	0	1	1	2	
151	245	Optical Bench	0	7	1	8	
152	246	Optical Lever	2	1	1	4	
155	250	Polarimeter setup	0	7	1	8	





157	253	Spectrometer	0	24	10	34	
158	254	Sextant	0	8	4	12	one each with GS, HKY and SK
159	255	Sodium Lamp	2	4	8	14	entry in consumable reg.
160	256	Telescope	2	3	3	8	
161	258	Compass Box	6	0	2	8	
162	260	Electromagnets	3	0	0	3	
163	261, 338	Magnet pairs (Bar)	1	8.5	0	9.5	1 magnet missed from OL
164	263	Short Wave Demonstration App.	0	0	1	1	
165	264	Tuning Forks	0	0	45	45	
167	266	Physics Linear IC Equivalent (Book)	2	0	0	2	
168	267	Digital IC Equivalent (Book)	1	0	0	1	
169	268	Integrated Circuits (Book)	1	0	0	1	
170	269	Small Signal Devices (Book)	1	0	0	1	
171	270	Introduction to system Designing (Book)	1	0	0	1	
172	271	Power Devices (Book)	1	0	0	1	
173	272	Semi-Conductor Data Book	1	2	0	3	
174	273	Every Day Electronic Data Book	1	0	0	1	
175	274	Thyristor Theory & App. (Book)	1	0	0	1	
176	275	Practicals-Worsnop Flint (Book)	3	3	0	6	
177	276	Practicals- Indu Prakash (Book)	4	8	0	12	1 missing from Store
178	277	Nelkon's Practical Book	0	0	0	0	2 missing
179	278	Table of Physical Constant	2	1	0	3	


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181	281	Harnam Sing Practical (Book)	8	4	0	12	
183	283	Electronics Fundamental (Book)	1	0	0	1	
184	284	Op-Amp Liner Integrated Circuit (Book)	1	0	0	1	
187	287	Reading Lens (non-LED)	9	14	14	37	
189	289	Jug (Steel + Aluminium)	1	6	2	9	
190	291	Screwdriver	10 solo+1 Set	3 Sol o+ 1 Set	0	13 Sol o+ 2 Set	
192	292	De Soldering Pump	1	0	0	1	
193	294, 38	Computer (CPU, Monitor, Keyboard and Mouse)	2	4	0	6	1 workstation in staff room
194	295	UPS	2	3	10	15	10 scrapped but not taken
195	296	Bench Vice	0	0	2	2	
196	297	Die Box	1	0	0	1	1 in exp. Centre
197	298	Cabinet Rasp File	4	0	0	4	4 in exp. Centre
198	299	Chisel	3	0	0	3	3 in exp. Centre
199	300	Centre Punch	2	0	0	2	2 in exp. Centre
202	303	Die	0	0	5	5	
203	304	Drills beats	0	8	0	8	
204	305	Farmer Chisel	0	0	2	2	1 missing
205	306	Smooth File	1	0	0	1	1 in exp. Centre
207	308	Drill Machine	0	1	3	4	
208	309, 293	Hammers	0	1	3	4	1 missing from OPL
209	310	Carpenter Saw	0	0	2	2	

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210	311	Electric motor	0	0	2	2	
211	312	Bastard File Half Round	1	0	0	1	1 in exp. Centre
212	313	Smooth File Half Round	6	0	0	6	6 in exp. Centre
213	314	Flat File Bastard	0	0	2	2	
214	315	Smooth File Flat	5	0	0	5	5 in exp. Centre
215	316	Round Bastard File	6	0	0	6	6 in exp. Centre
216	317	Knife File Bastard	0	0	1	1	
217	318	File Round Smooth	5	0	0	5	5 in exp. Centre
218	319	Needle File Set	1	0	0	1	1 in exp. Centre
219	321	Right Angle	0	0	3	3	
221	323	Spanner Set	1 Set	1 Set	6 solo	6 solo + 2set	1 Set in exp. Centre
224	326	Spring Callipers	2	0	0	2	2 in exp. Centre
225	327	Triangular File 5*6"	7	0	0	7	7 in exp. Centre
226	328	Taps	2	2	1	5	
227	329	Wood Working Vice	1	0	0	1	1 in exp. Centre
228	330	Chowrsi	0	0	2	2	
229	331	Tin Cutter Scissor	1	1	0	2	
230	332	Invertor With Battery	1	1	0	2	
231	333	Laser Kit	0	1	0	1	
232	334, 356	Viscosity setup	0	4	0	4	
233	335, 368	C.L. Arora Book	4	3	0	7	1 missing
234	336	Hot Case & Hot Plate	2	13	0	15	1 came with instrument





235	207, 337	Extension Boards	9	15	1	25	
236	339	Photo Diode App.	4	0	0	4	
237	340	Photo Voltaic Cell	1	0	0	1	
238	341	Mono-Stable & Free Running Multivibrator	3	0	0	3	
239	342	Solar Cell Characteristic App.	3	0	0	3	
240	343	Light Dependant Resistance Characteristics App.	1	0	0	1	
241	344	V-I Characteristics of Diode and Bulb	2	0	0	2	
242	#### ###	Integrating RC Circuit with Square Wave Gen.	9	0	0	9	1 donation
243	346	Transistor Characteristics App.	2	0	0	2	
244	347	Common Emitter Amplifier Set up (Board)	5	0	0	5	
245	348	Study of Operational Amplifier micrometer- 741 , With P.S.	1	0	0	1	
246	349	Study of op amp mathematical ops(Adder, Sub. Diff. int.)	1	0	0	1	
247	350	Op-Amp Microammeter 741 + Diff. Amplifier	1	0	0	1	
248	351	Microprocessor Training Kit	26	0	0	26	2 Donation
249	352	Microprocessor Power Supply	7	0	0	7	
250	353	Upto Date TTL 7400 Book	1	1	0	2	
251	354	Micro processing Data Book	1	1	0	2	
252	355, 387	Asprkati bottles	2	9	2	13	7 came with Apparatus
253	357	Stephan's Constant App.	0	7	0	7	
254	358	Lens Holder Parallel bar Type + LED reading lens	2	11	0	13	1 missing





255	359	Multi range voltmeter (ac/dc)	17	7	0	24	
256	360	Resolving Power Slit	0	8	0	8	
258	362	Colour Code Book	1	0	0	1	
261	365	UJT Characteristics App.	0	1	0	1	
263	367	Malus Law	0	1	0	1	
264	369	Fiber optic Kit with Bread Board	0	1	0	1	
267	372,4 24	Double Slit Micro meter Control	0	3	0	3	
268	373	Elliptically Polarised Set Up	0	3	0	3	
269	374	Four Probe Method App.	5	0	0	5	
271	377	Computer chair	4	0	0	4	
272	378	Computer Table	3	0	0	3	
273	379	He-Ne laser with power supply	0	1	0	1	
274	380	Free Fall App.	0	2	0	2	
275	381	Single Slit Set-up With Optical Bench	0	1	0	1	
277	385	Magnetic Stirrer with Hot Plate	3	1	0	4	2 came with lee's apparatus
278	386,4 49	Planks Constant by photo Cell/Photo Electric Setup	0	6	0	6	
279	389,4 47	Hydrogen Spectrum Setup	0	2	2	4	2 to be disposed from store
280	390	Iodine Set up for Rotational Spectra	0	1	0	1	
281	391, 421, 436	Quartz Iodine Tube	0	2	5	7	2 BROKEN & DISCARDED
282	392,4 01,40 2	Ultrasonic Grating Set up	0	2	0	2	392, 401 and 402 make one set up
283	393	UJT & PUT oscillator trainer kit	0	4	0	4	

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284	394	FET, UJT & PUT characteristics trainer kit	1	3	0	4	
285	395	Phonix Kit	3	2	0	5	1 untraceable from NL
287	406	Eye Piece	0	15	0	15	
288	407	Source Measure Unit (SMU)		0	0	0	1 in exp. Centre
289	408	Digital multi meter (DMM)	1	0	0	1	1 in exp. Centre
290	409, 41	single slit micrometer control	1	5	0	6	
291	410	PE Hysteresis Loop tracer	0	0	0	0	
292	411	DSBSC AM kit	1	0	0	1	
293	412	BH loop tracer for magnetic parameter measurement	1	0	0	1	
294	413	Electron Spin Resonance (ESR) setup	1	0	0	1	
295	414	Transformer coil winding machine	1	0	0	1	
296	415	Amplitude modulator demodulator	1	0	0	1	
297	416	PLL setup	1	0	0	1	
298	417	ASK and FSK modulator kit	1	0	0	1	
299	418	PSK modulator and demodulator	1	0	0	1	
300	419	Polarization of light setup	1	1	0	2	
302	423	PZT crystal with holder	0	0	0	0	
303	424	Slit for optical bench (single and double) + Slit on Slide	4	2+ 3	0	5	
304	425	Wollastone Air Film	0	2	0	2	
305	426	Microcontroller kit and Burner	0	0	0	5	

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		Diode Laser with Power Supply	5	3L ase r Di od e+ 3P S	2Dio de+1 PS	5Di ode +1P S	
306	427						Extra might have come with supply
307	428	Digital Lux Meter	0	3	0	3	
308	429	Hologram With Holder	0	1	0	1	
310	431	Photo Detector With Laser	0	2	0	2	
311	432,4 56	Power Meter For Laser	0	4	2	6	1 OSAW came with instrument&3 new complete setup on P.No.456
312	433	Reflection /Refraction Of Microwave Setup	0	0	1	1	
313	434	Polarization & Double Slit Interference in Microwave	0	0	1	1	
314	435,4 59	Ionisation Potential of Mercury	0	2	0	2	
315	437	Setup to measure variation of field Strength	1	0	0	1	
316	440	Bending Device for Fibre Glass	1	1	0	1	
317	442	Double Helix & Helix on glass with holder	0	4	0	4	
318	445	Dielectric Constant Setup	0	0	0	3	
319	446	SPR Experiment	3	0	0	2	
320	448	Tunnel Diode	2	3	0	3	
321	451	Tools Kit(Taparia Make in New)	0	0	2	2	
322	452	Optical Post and Holder	0	0	5	5	

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323	453	Mirror Mount	0	0	4	4
324	454	Broadband Dielectric Mirror	0	0	4	4
325	455	Arduino Kit	0	0	0	20
326	457	Thickness monitor with crystal Oscillator	20	0	0	1
327	458	Dipole Antenna Radiation angle Study Setup	1	0	1	1
328	461	Optical Breadboard	0	1	0	1
329	462	Sonicator	0	0	0	1
330	463	Water Chiller	1	0	0	1
331	465	Fourier Optics Kit For Basic Experiment	1	1	0	1
332	466	Germanium Wafer	0	0	0	1
333	467	UV Spectrophotometer Dual Beam	1	0	0	1
334	468	Semi-Conductor Laser Diode	1	0	1	1

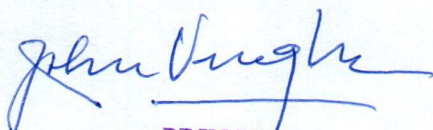
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4. Lab Stock Record: Chemistry Department

S. No.	Name of the Instrument / Equipment	Total No.
1	Analatical Balance Digital (0.1g) Wensar	1
2	Balance Analytical	1
3	Balance Chainomatic	1
4	Balance Single Pan (Dhona, Sico, Verbal, Keroy)	6
5	Balance Toploading	1
6	Centrifuge Machine (electrical)	4
7	Centrifuge Machine (R-8-C) Remi	3
8	Colorimeter (Std. glass tube)	29
9	Colorimeter 5 filter (EI)	1
10	Colorimeter 8 filter digital	48
11	Conductometer Digital	37
12	Digital Balance 4 Digit	6
13	Digital Photo Fluorimeter	4
14	Digital Pororimeter	1
15	Electric Bunsen (Toshiwal)	10
16	Flame photometer digital	3
17	Heating Mental 1 Litre	1
18	Heating Mental 3 Litre	1
19	Heating Mental 500 MI ER	2
20	Hot Plate Round 20.5cm 1kw	1
21	Inverter	2
22	Magnetic Stirrer with hot plate	40
23	Magnetic Stirrer without hot plate	4
24	Meiting Point Apparatus Electric	20
25	Melting Point Apparatus Digital	12
26	Oven (Local, Memert type, Toshiba)	2
27	Over Head Projector (Photophone)	1
28	pH Meter (Hand Operated)	2
29	pH Meter analog (Elico)	34
30	pH Meter Equip-tronics- 610	3
31	Polarimeter	7


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32	Potentiometer	33
33	Printer & Scanner (HP)	1
34	Refractometer Abc	1
35	Refrizerator LG(Doble Door)	2
36	Screen Projector With Stand	2
37	Slide Projector	1
38	Spectro photometer Digital EI	2
39	Vaccum Pump 100cc	5
40	Vaccum Pump 50cc	2
41	Vaccume Pump Rotary	1
42	Water Bath Electric (12 Hols)	3
43	Weih. Balance Digital (0.01g)	10
44	Weih. Balance Digital (0.1g)	2

S..No.	Name	Total	Working	Not Working	Service
1	Centrifuge Machine electrical	13	5	8	service
2	Centrifuge machine(Remi)	2	2		service
3	Colorimeter(5 litre)	1		1	service
4	Colorimeter(8 litre)	6	1	5	
5	Lamp Halogen	2	2		
6	Magnetic Stirrer (with hot plate)	2	2		
7	Magnetic Stirrer (without hot plate)	2	2		
8	Oven(Tempo, Toshiba)	4	3	1	service
9	Over Head Projector	2	1	1	service
10	PH meter (Equip tronic)	3	3		service
11	PH meter (toshiniwal)	2	2		
12	Polarimeter	7	6	1	service
13	Potentiometer	13	13		
14	Stop Watch (electronic)	24		24	service
15	Inverter	2		2	service
16	Vacuum Pump 100 cc	1	1		
17	Vacuum Pump 50 cc	2		2	





18	Magnetic Stirrer with hot plate Model no KI 137	5			
19	Muffle Furnace	1			
20	Oven(KI 181)	1			
21	PH meter(CI54)	6			
22	PH meter (TM 90)	5			
23	Platinum Electrode (M13)	10			
24	Spectrophotometer scanning (Elico sl 177)	2			
25	U V vis Spectrophotometer (uv 2100)	1			
26	Vacuum Pump (KI 108)	3			
27	Water bath (KI 161)	2			
28	PH Electrode	15			

List of Organic Chemical

Sr. No.	Page No.	Chemicals
1	355	Acetaldehyde
2	356	Acetamide
3	357	Acetanilide
4	22	Acetic acid
5	360	Acetone
6	361	Acetophenone
7	580	Acetyl Actone
8	362	Acetyl chloride
9	364	Adipic Acid
10	365	Alanine
11	366	Alizarin red s
12	563	Alizarin GR
13	367	Allyl alcohol





14	368	Aluminone
15	369	Amino acid kit
16	370	Amino acetic acid (glycine)
17	371	Amino benzoic acid-o
18	372	Amino benzoic acid-m
19	373	Amino benzoic acid-p
20	374	Aminophenol-o
21	375	Aminophenol-p
22	376	Amyl acetate
23	377	Amyl alcohol-iso
24	378	Aniline
25	379	Aniline hydrochloride
26	380	Aniline sulphate
27	381	Anisaldehyde
28	382	Anisidine-o
29	383	Anisidine-p
30	384	Anthracene
31	385	Anthranilic acid
32	386	Anthraquinone
33	387	Arginine hydro chloride-L
34	570	L-Amylas (Diastase)
35	392	Benzanilide
36	583	S- Benzyl Thiuronium Chl.
37	388	Benzaldehyde
38	389	Benzamide
39	601	Benzil
40	390	Benzene
41	391	Benzoic acid
42	572	Benzophenone





43	393	Benzoquinone-p
44	394	Benzoyl chloride
45	395	Benzyl alcohol
46	396	Benzyl benzoate
47	397	Benzyl chloride
48	398	Boric acid
49	399	Bromine
50	400	Bromobenzene
51	401	Bromothymol blue
52	402	Butyl acetate-n
53	403	Butyl alcohol-n
54	404	Butyl alcohol-iso
55	405	Butyl alcohol-tert
56	406	Butyl amine-n
57	407	Butyl methyl ketone
58	408	Carbon di sulphide
59	409	Carbon tetra chloride
60	410	Charcoal activated
61	412	Chloroaniline-o
62	413	Chloroaniline-p
63	414	Chlorobenzene
64	415	Chlorobenzoic acid-o
65	416	Chloroform
66	417	Chloronitrobenzene 1-2
67	418	Chlorophenol-o
68	419	Chlorophenol-p
69	420	Chlorotouene-o
70	421	Chlorotduene-p
71	422	Cinnamaldehyde





72	423	Cinnamic acid
73	424	Citric acid
74	425	Cresol-o
75	426	Cresol-m
76	427	Cresol-p
77	428	Cresol red
78	429	Cyclohexane
79	430	Cyclohexanone
80	431	Diacetone alcohol
81	432	Diethylamine
82	433	Diethylaniline
83	434	Diethylaniline-nn
84	435	Diehtylene glycol
85	566	N-N Dimethyl formamide
86	436	Dimethylaniline-nn
87	437	Dimethyl glyoxmie
88	438	m-Dinitrobenzene
89	439	3:5 Dinitrobenzoic acid
90	440	dimethyl Sulphate
91	441	Dinitro phenyl hydrazine 2,4
92	568	3:5 Dintro Salicylic Acid
93	442	Dioxan 1:4
94	443	Diphenyl
95	581	E.A.Solution
96	445	Ether petroliem
97	446	Ether solvent
98	447	Ethyl acetate
99	448	ethyl benzene
100	449	ethyl benzoate





101	451	Ethylene glycol
102	582	Ethylene Di-Amine
103	452	Fluorescein
104	453	Fomaldehyde
105	454	Fomic acid
106	455	Fructose-d
107	456	Fuchsin(megenta)
108	579	Folin & Ciocateus
109	457	Gallic acid
110	458	Glucose-d (Dextrose)
111	459	Haptane-n
112	460	Hexane
113	461	L-Hisyidine monhydrochloride
114	462	Hydrochloric acid GR
115	464	Hydrochloride CP/LR
116	465	Hydroxylamine HCL
117	561	Hydroxyquonoline-8(oxine)
118	467	Hydroquiomone
119	468	Iodoform
120	595	Labdet
121	469	Lactic acid
122	470	Lactose
123	472	Leishman's staining solution
124	473	Lysine monohydrochloride
125	474	Magneson II
126	475	Malic acid
127	604	Maleic Acid
128	564	Maleic Anhydride
129	476	Maltose





130	477	Manitol
131	478	Mannose-d
132	479	Methoxy ethanol-2
133	480	Methoxy phenol(o-guaiacol)
134	481	Methyl acetate
135	8	Methyl Benzoat
136	482	Methyl orange
137	483	Methyl red
138	485	Methyl salicylate
139	484	Methyl violet
140	486	Morine
141	487	Naphthalene
142	488	Naphthol-alpha
143	489	Naphthol-beta
144	490	Naphthylamine-alpha
145	491	Nicotinamide
146	492	Ninhydrine
147	493	Nitric acid CP/LR
148	495	Nitric acid GR
149	496	Nitro aniline-o
150	497	Nitro aniline meta
151	498	Nitro aniline-para
152	499	Nitrobenzaldehyde-o
153	500	Nitrobenzene
154	502	Nitrobenzoic acid-meta
155	501	Nitrobenzoic acid-ortho
156	503	Nitrobenzoic acid-para
157	504	Nitrophenol-ortho
158	505	Nitrophenol-para





159	506	Nitroso beta naphthol
160	507	Nitrotoluene-ortho
161	508	Nitrotoluene-para
162	587	P-Nitrobenzoyl Chloride
163	567	Paraffin heavy Liq.
164	510	Parreldehyde
165	511	Phenol
166	512	Phenol phthalein
167	513	Phenol red
168	514	Phenyl anthanilc acid-n
169	515	Phenyl hydrazine HCL
170	516	Ortho-Phosphoric acid
171	517	Phosphorous penta chloride
172	518	Phthalic acid
173	519	Phthalic anhydride
174	520	Picric acid
175	521	Polyvinyl alcohol
176	522	Polyvinyl pyrrolidone
177	523	Polyethaline glycol
178	605	Propionaldehyde
179	607	Propionic acid
180	525	Propyl alcohol-iso
181	526	Propyl alcohol-n
182	527	Pyridine
183	528	Pyrogallc acid
184	529	Pyogallol
185	575	1-10 Phenathrolin HCL
186	530	Resorcinol
187	531	Salicyldehyde

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188	532	Salicylaldehyde oxime
189	533	Salicylic acid
190	534	Semicarbazide HCL
191	535	Soda lime
192	536	Stearic acid
193	537	Succine acid
194	538	Sucrose
195	539	Sulpanilamide
196	540	Sulphanilic acid
197	542	Sulphuric acid CP/LR
198	543	Sulphuric acid GR
199	547	Thionyl chloride
200	548	Thiourea
201	565	Thiamile hydrochloride
202	549	Thymol blue
203	571	Thymolphthalene GR
204	574	Trichloro- Acetic Acid
205	550	Toluene
206	588	m- Toluidine
207	552	Toluidine
208	553	Toludine-para
209	554	Triethanolamine
210	555	Triethylamine
211	597	Transstelsene
212	556	Urea
213	562	Vacuum Grease
214	569	Vanillin
215	608	Xylenol Orange AR
216	557	Xylene





217	558	Xylene-ortho
218	559	xylene-meta
219	560	xylene-para

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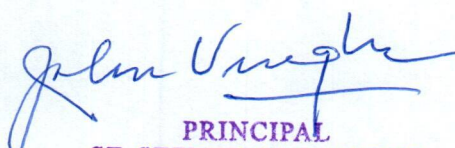
5. Rules, Notices and instructions for Chemistry Lab

Chemistry Lab

The Lab has instruments and equipment such as Potentiometer, Conductometers, pH meter, Calorimeter, Polarimeter, Colorimeter, UV-Vis spectrophotometers, Flame photometer; UV lamp chamber, Electrical melting point apparatus, Electrical water bath, Ovens, Centrifugation machines, Muffle furnace, Rotary evaporator, BOD incubator and Drill machine etc.

Use:

1. Bonafide regular students of B Sc (Hons) Chemistry; B. Sc. Programme with Chemistry; and students of other department of the college who take up GE in Chemistry, Chemistry teachers, and research students in our college can use the Chemistry labs.
2. Chemistry Students use it during their lab classes and other science students, research students, teachers from Physics/ Maths Department could use it with prior intimation/ permission from HoD and the concerned teachers.
3. Guidelines for proper use are typed in bold and pasted next to certain lab apparatus, chemicals and reagents, equipment and instruments for easy access and compliance by students, teachers, and lab staff.
4. There are safety measures in place in case of an accident in lab. For e.g., functional fume hoods, exhaust fans, first-aid box in lab, sanitizers, continuous supply of tap, open spaces behind labs for carrying out organic reactions, water, eye wash station, sand, fireextinguishers, on campus nurse etc
5. All students are required to be acquainted with the Chemistry Lab Safety Manual before they work in the lab. The Safety Manual can be read by clicking.


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Maintenance:

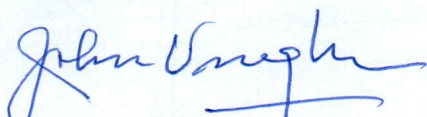
1. The maintenance of lab chemicals, apparatus, equipment cleanliness of lab, issuing and stock-taking of chemicals, apparatus and equipment is usually done by the lab staff and overseen by the Chemistry Department teachers.
2. The lab apparatus, equipment and instruments undergo periodic maintenance by lab staff and professional technicians regularly.
3. The proper day-to-day maintenance of every apparatus, equipment and instrument is regularly demonstrated to students by teachers during lab classes and lab staff.
- 4.

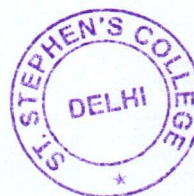
Safety Manual and Designation of Duties for Laboratory Work in Chemistry

Students should read the given information very seriously and follow all the instructions before they began the lab work. We can avoid many accidents by simply using good judgement and common sense. We must realize chemistry labs are places full of potentially hazardous chemicals. It is expected that students behave responsibly and seek the advice of the teacher concerned in case of any doubt. If you don't understand something, ask your teachers, never guess!!

We must always remember a few basic important points listed below:

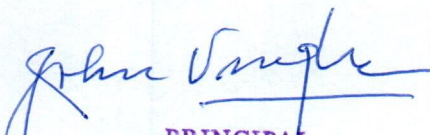
1. Always wear gloves and glasses.
2. Always wear proper clothing and shoes.


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3. Never work in the lab without your lab coat.
4. Long hair must be tied back to avoid catching fire.
5. Eating is strictly prohibited in the chemistry laboratory.
6. Do not try to perform unauthorized experiments in the lab.
7. All chemicals must be treated as hazardous substances.
8. When you prepare something label your compound. Write the name of the compound and date of synthesis.
9. When you use any chemical and are left with some extra amounts do not transfer it back to the container or reagent bottle. It might contaminate the pure sample.
10. Use volatile, inflammable compounds only in the fume hood.
11. Never taste or ingest chemicals or materials in the lab.
12. No compound or solvent should come in contact with your skin. Wear gloves recommended for the chemical you are handling. Neoprene, vinyl plastic, rubber latex, nitrile, synthetic and natural latex gloves are available. The MSDS tells you the gloves most appropriate for handling a chemical.
13. Keep your working place neat and clean. Also make sure the sink is not blocked.
14. Always read the reagent bottle labels twice before you use the reagent. Be certain the chemical you use is the correct one.
15. Never leave your bench when a reaction is under progress.
16. Never leave a Bunsen burner on when not in use.
17. Report all accidents i.e. spills, burns etc. however minor to your teacher.


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18. In case of any breakage, do not clean it yourself. Inform the teachers.
19. Return all lab materials and equipment to their proper places after use as instructed.
20. Clean all spills immediately as per protocol necessary for the compound.
21. Never pipette a liquid using your mouth. Use a manual or electric pipette sucker.
22. Keep your working place neat and clean. Also make sure the sink is not blocked.
23. Do not light burners with filter papers. Use a match stick. Do not throw the burnt matchstick in the sink.
24. Dispose of all waste as per standard protocol.
25. Learn the location and proper usage of the fire extinguisher in the lab.
26. Check the flash point of each organic solvent you use. Solvent flash points that are below room temperature can form an invisible vapour cloud that can be ignited by any spark and cause a fire or explosion.
27. Conduct yourself in a responsible manner at all times. You must assume responsibility for your safety and that of your neighbours. The lab is a community where students must watch out for each other's safety as well as for themselves.

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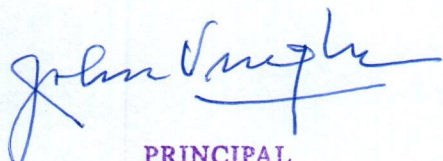




What are hazardous substances and how do we protect ourselves from them?

Hazardous substances

- A hazardous substance produces adverse effects on humans and the environment. We need to assess the toxicity of the compound and how we are exposed to it.
- Before using any chemical, it is important to understand what the potential exposure hazards may be and how to use the chemical safely.
 - Inhalation is the most common route of chemical exposure. Many chemicals have distinct odours. When we are exposed to an odour for long at low concentrations or if we are exposed to high concentrations of that particular substance, it may seem that the odour has diminished. The substance still remains a health hazard. *H₂S is a classic example. It can be smelled at low levels, but with continuous low-level exposure or at higher concentrations one loses the ability to smell the gas even though it is still present. At high concentrations the ability to smell the gas can be lost instantly. Relying on the sense of smell to detect H₂S is hazardous.*
 - Some chemicals may be absorbed by the skin and directly enter the blood stream. This is why wearing gloves and protective clothing like lab coats become important. If one accidentally comes in contact with the skin one should rinse the affected area with water repeatedly. Our eyes are very sensitive, chemicals coming in contact with eyes can lead to injuries and blindness. Eyes should be rinsed with water repeatedly if this happens.


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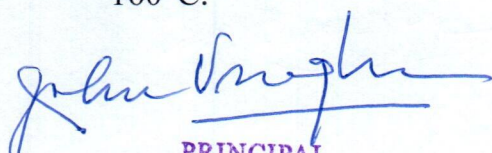


Wearing safety glasses is therefore imperative in the lab.

- Eating and drinking without washing hands thoroughly after working in a chemistry laboratory increases the risk of chemical exposure.
- *Flammable chemicals: Flammability* is the tendency of a chemical to burn. *Flammable* and *combustible* chemicals are solids, liquids or gases which vaporise readily. We usually encounter flammable liquids in our lab. The vapour easily ignites in the presence of an ignition source. Flammable chemicals will generate sufficient vapours at temperatures below 37.8 °C. Combustible materials generate sufficient vapours at or above 37.8 °C. Flash point, boiling point and ignition temperature are important parameters according to which flammable chemicals are classified.
- *Flash point* is the lowest temperature at which a flammable liquid gives off sufficient vapour to ignite.
- *Boiling point* is the temperature at which the vapour pressure of a liquid is equal to the atmospheric pressure.
- *Ignition* temperature is the lowest temperature at which a chemical will ignite and burn independently of its heat source. This means at the ignition temperature no external heat source is required

Common solvents in the lab

- In the lab we use many organic solvents. Solvents like ether, alcohols, toluene, etc are highly volatile and flammable. Ethanol has a flash point of +12°C, toluene +4 °C and acetone -19°C. Always use them in a fume hood. Their flash points are below room temperature therefore they are major fire hazards. Carbon disulphide has an autoignition temperature of 100°C and diethyl ether 160°C.


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- Flames of flammable chemicals like methanol and hydrogen are invisible and accumulation of vapour can result in a flashback.
- All chlorinated solvents like chloroform, carbon tetrachloride trichloroethylene (TCE), or methylene chloride are non-flammable but no less dangerous. They produce carbon monoxide, phosgene and other highly toxic gases on exposure to heat or flame. They can be absorbed through the skin and are suspected carcinogens.
- We should control the ignition source, vapour production source and the oxygen source to reduce the fire risk.
- Oxidizing substances need to be handled with care. Oxidizing chemicals are materials that spontaneously evolve oxygen at room temperature or with slight heating or promote combustion. Substance such as chlorate, permanganate, peroxides, nitrates, perchlorates yield oxygen readily and cause combustion of organic matter.

What should you do to keep yourself safe in the lab

How do we find out the type of hazard associated with a particular compound?

Hazard Warning - Words, pictures, symbols, or a combination appearing on a label convey the hazards of the chemical in the container and this is extremely important.

Before using any chemical always read its Material Safety Data Sheet (MSDS)

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Material Safety Data Sheet (MSDS) – A compilation of information required under the US OSHA Hazard Communication Standard on the identity of hazardous substances, health and physical hazards, exposure limits and precautions.

Hazards: Set of inherent properties of a substance, mixture of substances, or a process involving substances that, under production, usage, or disposal conditions, make it capable of causing adverse effects to organisms or the environment, depending on the degree of exposure; in other words, it is a source of danger.

Adverse Effects: Change in biochemistry, morphology, physiology, growth, development, or lifespan of an organism which results in impairment of functional capacity or impairment of capacity to compensate for additional stress or increase in susceptibility to other environmental influences.

Exposure: Concentration, amount or intensity of a particular physical or chemical agent or environmental agent that reaches the target population, organism, organ, tissue, or cell, usually expressed in numerical terms of concentration, duration, and frequency (for chemical agents and micro-organisms) or intensity (for physical agents) and the process by which a substance becomes available for absorption by the target population, organism, organ, tissue or cell, by any route.

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***OSHA (Occupational Safety and Health Administration) U.S. Hazard
Pictograms***

The hazard pictograms alert us to the presence of a hazardous chemical. They help us to know the harm these chemicals may cause to people or the environment. One or more pictograms might appear on the labelling of a single chemical.



Explosive (Symbol: exploding bomb)



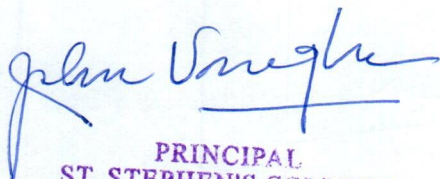
Flammable (Symbol: flame)



Oxidising (Symbol: flame over circle)



Corrosive (Symbol: Corrosion)


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Acute toxicity (Symbol: Skull and crossbones)



Hazardous to the environment (Symbol: Dead tree and fish)



Health hazard/Hazardous to the ozone layer (Symbol: Exclamation mark)



Serious health hazard (Symbol: health hazard)



Gas under pressure (Symbol: Gas cylinder)

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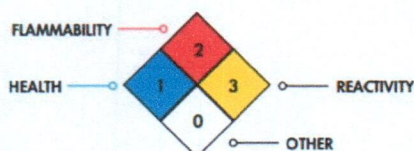




The **Hazardous Materials Identification System (HMIS)** is a numerical hazard rating that incorporates the use of labels with colour developed by the American Coatings Association as a compliance aid for the OSHA Hazard Communication Standard. The colour bar is not for emergencies and is used to convey broader health warning information.

The four bars are color-coded, blue indicating the level of health hazard, red for flammability, orange for a physical hazard, and white for Personal Protection. The number ratings range from 0-4.

The **National Fire Protection Association** system uses a diamond-shaped diagram of symbols and numbers to indicate the degree of hazard associated with a particular chemical or material. These diamond-shaped symbols are put on containers of chemicals to identify the degree of hazard associated with the chemical or material. The rating system utilizes a numeric system beginning with 0 as the least hazardous to 4, the most hazardous.



In 2003, the United Nations (UN) adopted the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The GHS includes criteria for the classification of health, physical and environmental hazards, as well as specifying what information should be included on labels of hazardous chemicals as well as safety data sheets.

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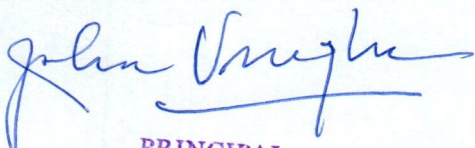
Division of Duties

Store In-charge:

- To prepare annual budget for the department.
- To make proposal for purchases, seek quotations, and place orders etc.
- Assignment of duties or work allocation under the knowledge of the Head.
- Supervision of the Laboratory staff and overall monitoring.
- Handling of stock register/ Stock taking work.
- To prepare brakeage charge list.
- To prepare / update apparatus, chemicals' name list etc.
- To keep track of safety measures and first-aid box etc. in the labs.
- To help during the conduct of the examination; overall monitoring of the staff and availability of all chemicals and instruments, to prepare list of requirements and budget for the examination, availability of answer scripts etc.

Lab Assistant:

- Making fresh solution for bench reagents and side shelf.
- Making distilled water.
- To be available to faculty during preparation for the next session and during conduct of practical classes.
- To be available to students during the conduct of classes.
- To help in issue of the apparatus (to be kept in students' lockers) once during the beginning of the session and daily issue of required apparatus as per the requirement during the beginning of every practical session.
- To monitor the return of the apparatus after each practical session and also


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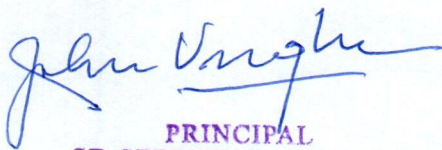


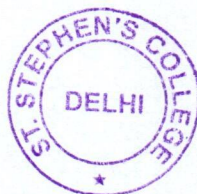
during the end of the final year.

- To keep track of daily breakage etc. and final l breakage at the end of the semester.
- To ensure safety of students during any breakage or spillage, or any other emergency.
- To check and servicing, repair / Maintenance of Instruments / Apparatus.
- To check and clean fume cupboards, digital balances, and Vacuum pumps on regular basis.
- To take care of gas maintenance with respect to regular supply, change of cylinders to check for any leakage etc.
- To help in operating fire extinguishers during any emergency.
- To help during the examination time with the preparation of the labs, solutions and other necessities.
- To help the store keeper with stock taking and other work.

To help in the computer work, writing of letters, and various lists etc.

- Daily cleaning of three labs, two balance rooms, two instrumentation rooms and two stores;
- Cleaning, storage, and maintenance of glassware and apparatus;
- To help senior assistants and store keeper with laboratory work, stock taking and other work.
- To help in the computer work, writing of letters, and various lists etc.
- Making distilled water.
- To be available to faculty during preparation for the next session and during conduct of practical classes.
- To be available to students during the conduct of classes.
- To help in issue of the apparatus (to be kept in students' lockers) once during


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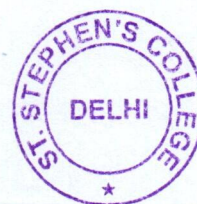




the beginning of the session and daily issue of required apparatus as per the requirement during the beginning of every practical session.

- To monitor the return of the apparatus after each practical session and also during the end of the final year.
- To keep track of daily breakage etc. and final breakage at the end of the semester.
- To ensure safety of students during any breakage or spillage, or any other emergency.
- To take care of gas maintenance with respect to regular supply, change of cylinders to check for any leakage etc.
- To help in operating fire extinguishers during any emergency.
- To help during the examination time with the preparation of the labs, solutions and other necessities.

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Chemistry department notices

CHEMISTRY DEPARTMENT ST. STEPHEN'S COLLEGE INORGANIC AND ORGANIC REAGENTS			
IMPORTANT: PLEASE DON'T REMOVE BOTTLE AND DROPPER FROM THEIR RESPECTIVE PLACE			
S. NO.	LIQUID	S. NO.	SOLID
1	ACTIC ACID (GLACIAL)	36	NICKEL AMMONIUM SULPHATE
2		37	α -NAPHTHOL
3	ISO- AMYL ALCOHOL	38	β -NAPHTHOL
4	AMMONIA LIQUOR	39	OXALIC ACID
5	ANILINE	40	PARA TOLUDINE
6	BENZENE	41	PHENYLDRAZINE HCL
7	CARBON TETRACHLORIDE	42	PHTHALIC ACID
8	CHLOROFORM	43	PHTHALIC ACID ANHYDRIDE
9	ETHYL ACETATE	44	PIRIC ACID IN WATER
10	NITROBENZENE	45	POTASSIUM CARBONATE
11	PRYDINE	46	POTASSIUM CHLORIDE
	<u>SOLID</u>	47	POTASSIUM DICHROMATE
12	AMMONIUM ACETATE	48	POTASSIUM NITRITE
13	AMMONIUM CARBONATE	49	POTASSIUM PERMANGANATE
14	AMMONIUM CERRIC NITRATE	50	PUMIC STONE
15	AMMONIUM CHLORIDE	51	RESORCINOL
16	AMMONIUM FERROUS SULPHATE	52	SEMICARBOZIDE HCL
17	AMMONIUM NITRATE	53	SALICYLIC ACID
18	BARIUM CHLORIDE	54	SAND (SILICON DI- OXIDE)
19	BORAX (SODIUM TETRA BORATE)	55	SODIUM ACETATE
20	CALCIUM FLOURIDE	56	SODIUM BISMUTHATE
21	CHARCOAL ACTIVATED	57	SODIUM BICARBONATE
22	COBALT CHLORIDE	58	SODIUM BISULPHITE
23	COPPER TURNING	59	SODIUM CACBONATE
24	COPPER ACETATE	60	SODIUM CHLORIDE
25	COPPER CARBONATE	61	SODIUM NITRATE
26	3:5 DINTRO BENZOIC ACID	62	SODIUM NITRITE
27	1:3 DINTRO BENZOIC ACID	63	SODIUM NITROPRUSIDE
28	DIPHENYLAMINE	64	SODIUM SULPHITE
29	FERROUS SULPHATE	65	SODIUM THIOSULPHATE
30	FUSION MIXTURE	66	SUCCINIC ACID
31	IRON FRLING	67	THIOUREA
32	LEAD OXIDE	68	TIN METAL
33	LEAD PEROXIDE	69	UREA
34	MANGANESE DIOXIDE	70	ZINK DUST
35	MANGNESIUM CHLORIDE		

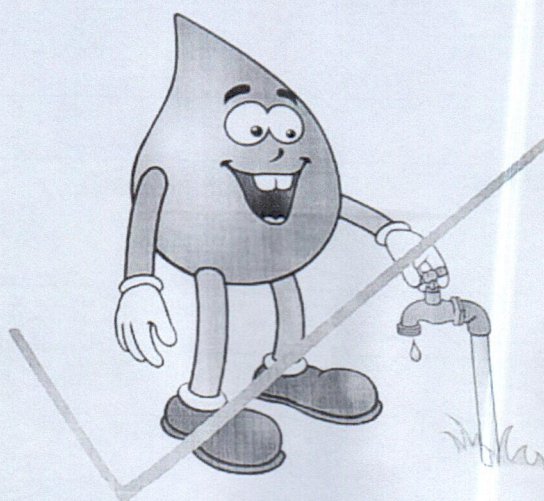
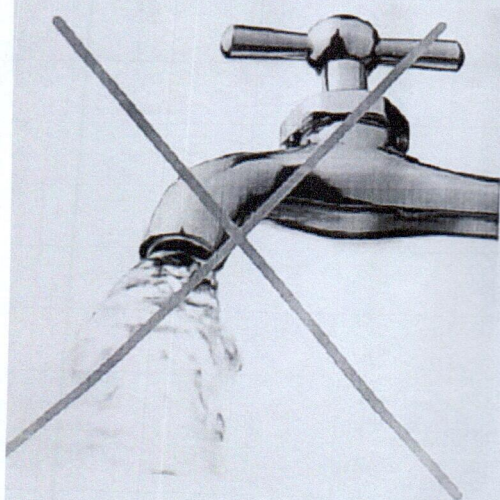
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CONSERVE WATER



John Singh

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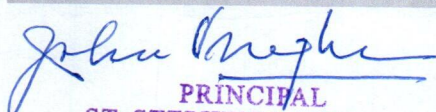




INSTRUCTIONS


OLD CHEMISTRY LABORATORY

- **BEFORE LEAVING THE LAB, CLEAN YOUR TABLE.**
- **AFTER USING THE VACUUM PUMP, OVEN OR ANY OTHER INSTRUMENT, KINDLY SWITCH IT OFF.**
- **DEPOSIT THE KEY OF YOUR LOCKER AT THE LAB COUNTER AFTER THE CLASS, WITHOUT FAIL.**
- **DISPOSE OFF THE WASTE PAPERS/USED FILTER PAPERS AND BROKEN GLASS IN THE DUSTBIN. PLEASE DO NOT THROW ANYTHING IN SINK.**
- **BRING YOUR OWN MATCHBOX OR LIGHTER.**
- **DO NOT WASTE DISTILLED WATER.**


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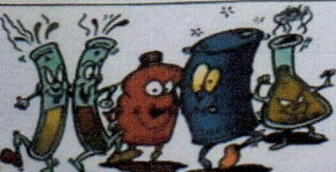
HAZARDOUS AND NON-HAZARDOUS CHEMICAL WASTE





**Warning
Chemical
waste**

- **Chemical waste** is a **waste** that is made from harmful **chemicals** (mostly produced by large factories)
- Liquid: Sanitary Sewer Disposables solutions of sugars, protein solutions, Used oil, Elemental Mercury
- Solids: Trash Disposal, Silica Gel, Mercury Containing Devices, Computers and Electronic Devices

- Hazardous waste: Waste is regulated as hazardous if it meets any of the following characteristics:
 - Ignitable-A flammable compressed gas, An oxidizer
 - Corrosive- liquids that corrode easily.
 - Reactive-unstable and readily undergoes violent change without detonating
 - Toxicity-metals, pesticides or selected organics above specified levels.








Non Hazardous Waste

Food items, water and drink containers → Garbage in black bag

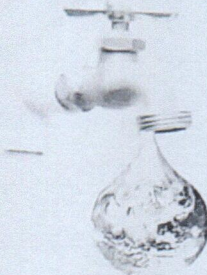
• Non-hazardous waste: waste that is less harmful to environment or human health



BY-GROUP1

ABHIRAM, ARIANA, AMAN, ANKIT, ANIRUL, ARJUN,
ASTHAN, AVINASH, BHAVESH

DO NOT LEAVE
THE TAPS OPEN



*Save water
Save Earth*

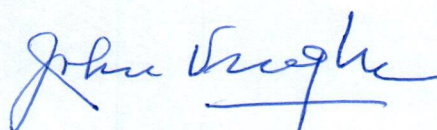
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INSTRUCTION FOR TOP LOADING BALANCE

- **DON'T USE THE BALANCE WITHOUT THE PERMISSION OF TEACHER OR LAB STAFF.**
- **AFTER SWITCHING ON THE BALANCE, FIRST PUT WEIGHING TUBE OR GLAZE PAPER SO THAT PARTICLES DON'T STICK ON THE PAN OF THE BALANCE.**
- **WEIGHING TUBE MUST BE CLEAN AND DRY BEFORE WEIGHING.**
- **USE TARE BUTTON TO NULLIFY THE WEIGHT OF GLAZE PAPER OR WEIGHING TUBE.**
- **DON'T WEIGH ABOVE 200 GRAMS ON THE BALANCE.**
- **DON'T WEIGH ANY ORGANIC COMPOUND OR WET SAMPLE.**
- **DON'T DISPLACE THE BALANCE.**
- **DON'T PRESS THE WEIGHING PAN TOO HARD.**
- **CLOSE THE WINDOWS/DOORS OF THE BALANCE DURING MEASUREMENT.**
- **AFTER USING THE BALANCE, DON'T FORGET TO SWITCH IT OFF.**


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LABORATORY SAFETY

LABORATORY DRESS

Splash Goggles
Gloves
Face Shield
Laboratory coat
Also wear shoes that are closed from all sides

HOUSEKEEPING

Keep the laboratory clean and organized.
A place for everything and everything in its place.

CHEMICAL SPILLS

- Wear shoes covered from all sides while cleaning chemical spills.
- Do not just sweep spilled chemicals with a broom.
- Spray agents that solidify chemical spills or neutralize them.
- Do not dump the cloth soaked in spilled chemical in a waste bin. That cloth then becomes hazardous.
- Ventilate the room.

TRANSFERRING LIQUIDS

Pour the liquid down a stirring rod to avoid splashing.
Always add acid to water.
Use funnel while pouring from a wide mouth container to a small mouth container.

LABELING CHEMICALS

CAUTION
CHEMICAL STORAGE ONLY
No open flames, no heat, no food, no drink.

Always store chemicals in a rack and place a caution sign.
Label chemicals clearly and permanently.
Do not use chemicals from unlabeled containers.

HEATING CHEMICALS

Wear safety glasses while heating in a laboratory.
Keep the direction of the mouth of the test tube away from yourself and others.
Heat gently to avoid splattering.
While boiling, leave the stirring rod in the beaker.

EYE WASH

Let water go directly into the eyes. Keep your hands free to hold your eyes open. Rinse eyeballs and interior of the eye gently for about 15 minutes.

WATER REACTIVE METALS

- Water reactive metals react violently with water.
- Handle them with extreme caution. Direct contact with them causes burns.
- Store Sodium, Lithium and Potassium under dry mineral oil or dry kerosene.
- Store metals in tight containers.
- Do not store Potassium for very long periods.

Potassium and dry mineral oil.
Metal cans provide durable storage, are fire resistant and break resistant for several hazardous chemical.

FIRE EXTINGUISHERS

CAUSE OF FIRE	TYPE OF FIRE EXTINGUISHER				
	HALON	DRY CHEMICAL	CARBON DIOXIDE	POWDER	SAND BUCKET
A. Liquid combustibles that produce a foam and flash	YES	YES	NO	YES	NO
B. Flammable liquids like alcohol	YES	YES	YES	NO	NO
C. Electrical equipments	YES	YES	YES	NO	NO
D. Water reactive chemicals	NO	NO	NO	YES	YES

HARMFUL VAPOURS

Ventilate the room. Open all doors and windows.
Use respirator.
Use fume hood.
Switch on the exhaust fan and open all windows to let the vapours out.

WASTE CONTAINERS

- Sort your laboratory waste.
- Dispose hazardous and non-hazardous waste in separate bins and bags.
- Maintain separate bins for chemicals, broken glasses, and general waste.
- Identify all bins by marking them or by different colours.

SAFETY RULES

- Do not perform unauthorized experiments.
- Never work alone in the laboratory.
- Report all accidents immediately to the teacher or the laboratory in-charge.
- If toxic vapours are generated, use fume hood.
- Wear a chemical splash goggles and resistant gloves.
- Wear a chemical resistant apron or coat.
- Tie back long hair.
- Do not wear loose sleeves.
- Do not wear shorts.
- Do not wear sandals.
- Do not wear contact lenses.
- No food or beverage inside the laboratory.
- Do not leave experiments unattended.
- Keep knowledge of the exits, safety showers, eye wash, fire blankets and extinguishers.
- Do not run around in the laboratory.
- Keep the working shelf and the laboratory clean.
- Extinguish burners when away from desk.

John Dwyer

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ON THE SHOULDERS OF GIANTS

An Account of the ongoing RESOLUTION REVOLUTION

Designed the first electron microscope: **Ernst Ruska**

Studied structure of haemoglobin using X-ray crystallography: **John Kendrew**, **Mike Perutz**

Developed cryo-electron microscopy: **Aaron Klug**

Developed cryo-electron microscopy: **Richard Henderson**, **Nigel Unwin**, **Rosalind Franklin**, **Margery Delmege**

How to capture images of biomolecules?

Negative Staining

Biomaterial is embedded in the amorphous film of heavy metal salt which generates a cast around that object. It provides low resolution information.

Electron Microscopy

X-ray Crystallography

It only works for small proteins

Miracles Do Happen!

Henderson's Faith and Perseverance does it!

Tries to visualize membrane protein

Could not crystalize

Removal from membrane turns it into a useless mass

Idea: use EM - uses Glucose solution to protect it from drying out and use low intensity electron beam.

CRYO EM: Journey from 35 Å to 3 Å

Frank's Image Processing Method

FRANK'S IMAGE ANALYSIS FOR 3D STRUCTURES

- Finds relative orientations between molecules
- Puts it all together

1. Randomly oriented particles are 2. The computer determines the relative orientations of the particles by comparing the images.

3. The computer combines the images to produce a 3D reconstruction of the molecule.

4. The computer produces a 3D reconstruction of the molecule.

Making Glass from Water

DUBOCHET'S VITRIFICATION METHOD

Challenge: Can't use glucose solution for H₂O soluble molecule

Let's freeze the sample

Ice crystals disrupt electron beam

Vitrify water

Cooling water rapidly so that it solidifies in liquid form to form a glass instead of crystals

It diffracts electron beam evenly

1. The sample is suspended in a thin layer of water and vitrified by rapid cooling.

2. The sample is frozen in liquid nitrogen.

3. The sample is thawed and imaged by electron microscopy.

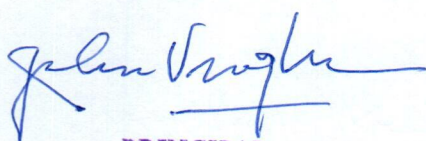


5. Rules and instructions for Physics Lab

Physics Lab

Use:

1. Primary User: Students enrolled in the course work under the Physics Department like B.Sc. (Physics Hons.) Physics, B.Sc. Programme (Physical Sciences), Generic Elective students.
2. Other Users include a. Students doing project work with any faculty member of the Physics Department, can use the laboratory under the supervision of the concerned teacher and b. Students working for the Physics and Electronics Societies of the college under the guidance of the staff advisors.
3. Students are not allowed to enter the lab early unless the instructor is present. If they have to stay back and finish their experiments, then they are required to take permission from the teacher conducting the lab.
4. The students should be thoroughly familiar with the apparatus and the procedure before they begin their experiments.
5. They should handle all the devices, equipment, chemicals and glassware with utmost care.
6. Students should not leave the laboratory without permission while performing any experiment.
7. As Mercury is extremely poisonous, the teacher overseeing the laboratory should be informed immediately if a mercury thermometer is broken. Care should be taken not to touch the spilt mercury with bare hands.


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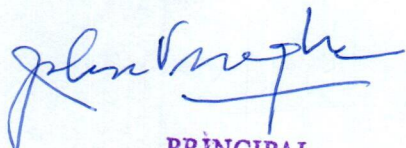




8. Eating is prohibited in the laboratories during the class.
9. The apparatus should be issued at the beginning of the laboratory class and should be returned after completion of their class.
10. The lights and fans should be switched off before leaving the laboratory
11. All students are required to be acquainted with the detailed Physics Lab Safety Manual before they work in the lab. The Safety Manual can be read by clicking [here](#).

Maintenance:

1. At the beginning of every semester, stock checking of all the laboratory apparatus is done by faculty members along with lab staff.
2. Every equipment is numbered for identification.
3. Every equipment is checked and tested for their proper working before the beginning of a semester
4. A stock register, an issuing register, faulty equipment register and a complaint register are maintained in the laboratories.
5. A written receipt is kept by the Lab Staff if any item is issued to any teacher with the signature of the teacher concerned.
6. Any item issued to a student should be based on a receipt signed by the student concerned and the teacher in charge of the class.
7. A Students from any other college may be issued an item if they are part of an experimental Physics/Theoretical Physics group of the college and the item concerned costs less than Rs.5000 provided the teacher concerned is a


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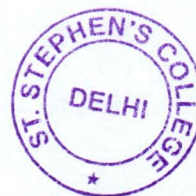
cosignatory.

8. In case of any breakage of an apparatus, the students should immediately inform the concerned teacher and the lab staff.
9. If a device or an equipment becomes faulty while performing an experiment, the student should immediately report and write the nature of fault along with its assigned number in the complaint register.
10. The faulty components should be put in a separate box kept at the issuing counter.

Safety Manual for Laboratory

General Rules:

1. Students are not allowed to enter the lab early unless the instructor is present. If they have to stay back and finish their experiments, then they are required to take permission from the teacher conducting the lab.
2. The students should be thoroughly familiar with the apparatus and the procedure before they begin their experiments.
3. They should handle all the devices, equipment, chemicals and glassware with utmost care.
4. Students should not leave the laboratory without permission while performing any experiment.
5. As Mercury is extremely poisonous, the teacher overseeing the laboratory should be informed immediately if a mercury thermometer is broken. Care should be taken not to touch the spilt mercury with bare hands.

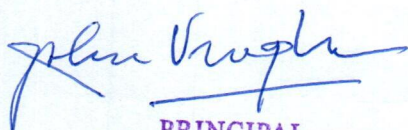




6. Eating is prohibited in the laboratories during the class.
7. The apparatus should be issued at the beginning of the laboratory class and should be returned after completion of their class.
8. The lights and fans should be switched off before leaving the laboratory.

Safety Precautions for Electrical Circuit Experiments:

1. The current and power ratings of every electrical device should be checked before usage.
2. The positions and operations of safety switches on electrical equipment should be noticed before using it in a circuit.
3. Students must get all electrical circuits, including ones using batteries, made by them checked by teachers overseeing the laboratory before switching them on.
4. It should be ensured that the circuits are connected through a key or a switch so that the current doesn't continuously flow through the circuits.
5. The electrical circuits should be disconnected or completely dismantled before leaving the laboratory.
6. The polarities of various components should be checked to avoid short circuits.
7. The electrical circuit experiments should be performed on insulated or wooden surfaces.
8. Special care should be taken while performing experiments involving high currents.


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Safety Precautions for Thermal Experiments:

1. The temperatures of heating devices especially Hot Plates should be monitored while performing thermal physics experiments.
2. Hot glassware should be handled carefully.
3. A very hot glassware should never be placed directly onto a cold surface.
4. Care should be taken to avoid spilling of hot water while boiling.
5. The equipment should be completely cooled down before stacking them in almirahs.

Safety Precautions for Darkroom Experiments:

1. The access to the darkroom should be limited.
2. Only students who have been allotted the darkroom experiments should be allowed to work in these rooms.
3. The dark room should be well ventilated.
4. Students should use covered hand lamps to perform their experiments and thus avoid disturbing other students with stray lights.
5. The darkroom should be clean and uncluttered to avoid tripping over objects.
6. The glass plates and lenses should always be with care to avoid breakage and getting hurt.
7. The Sodium and Mercury lamps should not be touched by hand when in use.
8. Students should never look directly into a laser light source.

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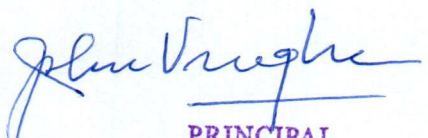


Safety precautions for Experiments Involving Chemicals:

1. Students should use Nitrile gloves while handling chemicals and salts.
2. All glassware should be cleaned thoroughly before and after use.
3. The glassware should be kept at their designated place after using them.
4. Chemical should never be touched directly with bare hands.
5. A clean spatula should always be used to take out chemicals from the bottles to avoid contamination.
6. Containers should be held away from the body when transferring a chemical or solution from one container to another.
7. Chemical containers/vials should always be labelled as to the contents, concentration, date, and initials.
8. Used chemicals should not be casually disposed of down the drain instead should be disposed of in specified tanks only.

Safety Precautions while depositing Thin Films:

1. A safe distance should be kept while operating the thermal evaporation system.
2. The top lid of the spin coater and centrifuge should be closed while using.
3. It should be ensured that the exhaust of the rotary pumps is venting the gases in the open and not inside the room.


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Regulations for the Computational Labs:

1. Students should receive laptops after doing proper entries in the issuing registers.
2. The laptops should be used with full care ensuring proper battery charging and hardware safety of the device.
3. Students are advised not to make any change in the root files/ directories of the operating system.
4. They are suggested not to save any personal data on lab laptops or take the backup of their data before returning it to the lab assistants.
5. The laptops must be properly shut down after the completion of their lab.
6. Students are advised not to use any virus affected external device on the lab computer systems.

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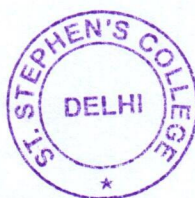
7. Rules and instructions for Computer Science Lab

Computer Science Lab

Use:

1. The lab is primarily used by students enrolled in B.Sc.(P) Computer Science and Students from Honours courses who have opted for Computer Science as their GE (General Elective) Paper.
2. It is also used by Students working for the Computer Science Society of the College under the guidance of the Staff Advisors.
3. Students are allowed to use the lab while the concerned teacher is present in the lab.
4. If any student wants to leave the lab in between for any exigency, then she/he is required to take permission from the concerned teacher taking the class.
5. If the lab is free and any student wants to use the lab to finish her/his practical or do practice, then she/he is required to take permission from the concerned teacher and inform the STA (Senior Technical Assistant)
6. All users of the lab are required to handle all the devices, equipment and furniture with utmost care.
7. All users of the Laboratory are required to maintain proper decorum and avoid misdemeanour.
8. The laboratory is to be kept neat and clean.

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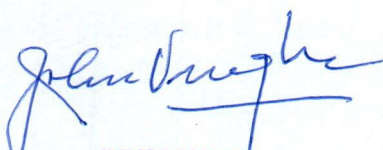




9. Drinks and eatables are not allowed in the lab.
10. Switch off the Air Conditioners, lights and fans are to be switched off when the laboratory is not in use.
11. All students are required to be acquainted with the detailed Computer Science Lab Safety Manual before they work in the lab. The Safety Manual can be read by clicking [here](#).

Maintenance:

1. Lab infrastructure such as furniture, air conditioner, fans, lights, fire extinguisher etc., are maintained by the Estate office of the college.
2. At the beginning of every semester or whenever required during semester, software installation in lab computers is done by STA, as per the requirement of the subjects being taught.
3. No one other than the STA is authorized to install/ remove any software.
4. Prior to the Practical Examinations, all unwanted data from the computers is deleted and the machines are prepared for the examinations by the STA.
5. Users should not attempt to repair, open, temper or interfere with any of the computers, printers, cables, Air Conditioners or other equipment.
6. In case of any breakage of the equipment, the same should immediately be informed to the STA.
7. The new machines in the lab are under warranty and are maintained by the Vendor. Remaining machines (which are out of warranty) are also maintained by vendor but on call basis as and when required under supervision of STA.


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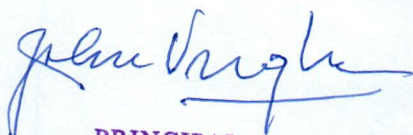
8. Do not remove anything from the computer lab without permission of the STA.
9. All users are required to follow the directions of the STA.

General Rules:

1. Students are allowed to use the lab while the concerned teacher is present in the lab.
2. If any student wants to leave the lab in between for any exigency then she/he is required to take permission from the concerned teacher taking the class.
3. If the lab is free and any student wants to use the lab to finish her/his practical or do practice, then she/he is required to take permission from the concerned teacher and inform the STA (Senior Technical Assistant)
4. Handle all the devices, equipment and furniture with utmost care.
5. Do not misbehave and maintain proper decorum.
6. Keep the lab neat and clean.
7. Tea, coffee, and eatables are not allowed in the lab.
8. Switch off the Air Conditioners, lights and fans before leaving the lab.

Safety Precautions while using computers in the Lab:

1. Use computers with full care ensuring hardware safety.
2. Do not make any change in the directories & files of the operating system.
3. Do not make any change in computer settings.
4. Save your work in your respective folders only.


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5. Shut down the computers after completion of work.
6. Do not use any external device without authorization of the STA.
7. Do not save any personal data in the lab computers.
8. If a device or an equipment becomes faulty while working, the same should be immediately reported to the STA.
9. In case of any fire or accident, the same should immediately be informed to the teacher/STA.
10. Users are advised not to touch any of the power sockets while the device is connected and switched on.

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