

IV-1 要請機材リスト H.E.J.化学研究所研究機材整備計画

Item	Quantity
1. High Resolution Mass Spectrometer resolution, 100,000 with E.I., C.I., F.I., F.D., FAB, -ve FAB sources, GC/MS, and a computer with two terminals and library search software, mass worker, UV recorder linked scan unit, peak matching unit and chiller. MS-MS facility with one spare source of each type, spare probes of each type, two spare pumps of each type (rotary & diffusion), spare slits (main and collector sets - one each).	1
2. Amino Acid Sequencer (Gas phase) with online HPLC system	1
3. Highresolution FT NMR system comprising 500MHz multinuclear instrument with 5 mm $^1\text{H}/^{13}\text{C}$ Dual Probe, variable temperature system, keyboard, Printer, Multitasking and Large capacity Disk.	1
4. High Pressure Liquid Chromatography with data station variable wavelength U.V., detector R.I. detector gradient programmer, recorder, column holder, column oven, chromatopac C-RIB, with 6 column of each type, 100 rolls of paper for recorder, 12 pens for recorder, spare lamps for UV and I.R. detector. Cold Rooms	7
4. a U.V. Spectrophotometric Detector for HPLC system.	2
5. Refractive Index Detector.	7
6. Fluorescence HPLC Monitor for HPLC system.	6
7. Sample Injector.	1
8.	6

Item	Quantity
9. Stainless Steel Tubes	100 m
10. Guard column	12
11. Frits	100
12. Pumps for flow rate 20-26 ml/min Empty columns (stainless steel) (2.5 cm I.D x 1 m) for HPLC system	20
13. HPLC columns for HPLC Zorbax CN	6
ODS	12
C ₈	12
PC ₈	12
PCH	6
PNH ₂ x1	6
Permaphase ODS	1
Chromatography Gel PSG-100	6
Sil	12
AS1	12
Chromatography Gel HSG 15(5)	6
10(5)	6
Zipax	12
SAX	12
SCX	12
WAX	12

Item	Quantity
Chromatography-Gel PSG/SCR	6
PSG-100	6
SCR-101H	6
Chromatography LC column PNH ₂ -10/S2504	12
Chromatography Gel HSG-columns HSG-30	6
15. Column coupling device	10
16. Packing material as in Shimadzu	
228-0065910	12
228-00655-10	12
228-00658-10	12
228-00658-10	12
228-00657-10	12
228-06988-10	12
228-00415-91	12
227-00415-91	12
227-00415-92	12
228-000623-35	12
228-00624-25	12
228-00629-25	12
228-00630-25	12

Item	Quantity
17. Column oven	4
18. Detector Florometric FLDI Accessories for HPLC (LC-4A system)	4
19. Degasing unit	4
20. Automatic sampler	4
21. CRT display	4
22. Data processor CR2A	4
23. Column oven CTO 2AS	4
24. UV detector SPD	4
25. SIL-LA	4
26. Recorder	10
27. Laminar floor fume hood	2
28. Septum injector	4
29. Gway valve	4
30. Microliter syringe	20
31. Sample filter	100
32. Word Processor EX 56+CS 1000 with FD unit	2
33. OV-VIS recording spectrophotometer (UV-240)	2
34. Graphic Printer	6
35. Flash chromatographs with spare columns	20

Quantity

Item

品名	数量	単位	備考
36. Climbing film evaporator complete with spares, seals, elements and flask	2		

品名	数量	単位	備考
37. Reaction and Distillation unit complete with vacuum pumps, chillers etc. ready to use	2		

品名	数量	単位	備考
38. Fractional distillation apparatus theoretical plate numbers: 50 Hold-up 3~4 ml Throughput max at 760mm Hg: 350ml/h Charge: 20 ~ 100ml Vacuum at top condenser: ~ 1mm Hg Temperature range: ~ 200°C Pressure drop at 760mm Hg: 15mm H ₂ O max Reflux ratio: 0 ~ 999 Flasks: 100ml ~ 2 Column type Ø12x1,200mm Dimensions mm: 640x550x2,000	2		

品名	数量	単位	備考
39. Distillation unit complete with packing material for column, vacuum pump, heating system 220V, 9KW	8		

品名	数量	単位	備考
40. Solid-liquid extractor	2		

Item	Quantity
41. Single Crystal X-Ray Diffractometer system* consisting of 4 circle goniometer with Micro Vax Computer including	1 set
a) X-ray Generator system	"
b) Measuring Head Section	"
c) Electronic Circuit Panel	"
d) X-ray device controller and pulse motor driver unit	"
e) Microvax Computer	"
Thermal printer Floppy disk	"
Magnetic disk unit	"
Digital plotter unit	"
f) Cabinet for Computer	"
g) Software for automatic data collection	"
h) Software for Automatic Structure Analysis	"

*OR

Model R3m/E crystallographic system complete with X-ray generator Nova 4/C 32 KW, Eclipse S/140 64 KW 12-5 M byte computer, hard copy terminal (2), magnetic tape drives (2), plotter, complete software, 25M byte disk option, 128KW memory option, video display terminal 4105 colour graphic terminal.

Item	Quantity
42. Bus (Diesel) 26 seater	2
43. Toyota cars	4
44. Photocopying machine each with 8 spare drums and 10 kits	4
45. High vacuum pumps W-500	20
46. Laboratory Vacuum pumps W-50	50
47. Medium Pressure Pumps suitable for Lobar columns (preparative HPLC)	30
48. Vacuum Pump (oil free with stainless steel diaphragm)	50
49. U.V. Detectors (variable wavelength)	20
50. Droplet counter current Chromatograph 200 extra glass columns	3
51. Fraction Collectors	30
52. Recorder	8
53. Fire extinguishers (medium size for laboratory use)	40
54. Exhaust fans (Large size)	10
55. Shaker	6
56. Permenter	3

Item

1

57. Centrifugal Preparative Liquid Chromatograph CLC-5

CENTRIFUGAL UNIT

Separation Discs Motor:

Control of
Rotation Speed:
Dimensions:

Stainless steel and tempered glass. Direct drive type electronically controlled induction motor. Continuously variable from zero to 1,000 rpm, with electric break. 360(W) x 370(D) x 450(H) mm. Main Unit 290(W) x 370(D) x 220(H) mm. Control Unit

UV-MONITOR

Wavelength:
Flow Cell:
Mode:
Detector
Lamp:

UV—254 nm
5 mm optical path
Double beam
Double detectors (combination of transducers and Cds)

Linear Response Range:

Range Steps:

Output Signal:

Dimensions:

Low pressure mercury bulb (Type G4S11)
Absorbance 0.001—3.2 A
0.1, 0.2, 0.4, 0.8, 1.6 and 3.2 absorbance
Full scale 10mV
85(W) x 330(D) x 190(H) mm—UV Monitor

FRACTION COLLECTOR:

Modes:

Manual Fraction:

Time-Base Fraction:

Signal-Base Fraction:

Collection Trigger

Level:

Marker:

Manual, time-base, signal-base, automatic
Push button
Continuously adjustable from 0.1 to 30 minutes
Input signal: 10mV full scale
Continuously adjustable from 5 to 90% of full scale
Fraction collection point is indicated by a recorder pulse
24 tubes, 70 ml volume each
320(W) x 370(D) x 270(H) mm
Main Unit
85(W) x 330(D) x 190(H) mm
Control Unit

Standard Configurations

☐ Main unit with automatic eluent supplier
☐ Control unit
☐ Funnel for slurry introduction
☐ Standard test samples and silica gel
☐ Instruction manual

Optional Accessories

☐ Spacers—2, 3, 5 and 10mm
☐ Large volume separation disc
☐ Solvent saver

58. Centrifugal Counter Current Chromatograph (CCCC), (manufactured by Sanki Engineering Ltd.)

1

Item	Quantity
59. ORD/CD With necessary spares, cells etc.	1
60. Infra-red spectrophotometer complete with (a) Data Station (b) Cells (c) KBr press, with spare detector and bulbs	1
61. UV/Vis spectrophotometer complete with spare cells, detector, lamps etc.	1
62. Laboratory Washer	3
63. Refrigerated Centrifuge	2
64. Centrifuges	2
65. Dry Ice Maker	2

1 回の製造量	約600g
1 回の製造時間	2 ~ 3 分
付属シリンダー	600 g 用 300 g 用各 1 個付
フロックの大きさ	直径86×110mm 600 g 用
本体の寸法 mm	300×170×150
重 量 kg	10

Item

Quantity

66. Autoclave

4

有効内容量	312
常用圧力	1.0kg/cmG
最高使用圧力	1.6kg/cmG
常用温度	120°C
最高温度	128°C
温度設定	電子式温度セレクター 例) 105°C, 110°C, 115°C, 121°C, 多段階
ヒータコントロール方式	電力比例式 (停電復帰回路内蔵)
電源	AC100V 15A
内部機構	多段階温度速度セレクター 自動空気排出装置 電子式自動圧力・温度コントロール 圧力安全装置 停電復帰回路 空焚き報・防止装置 自在キャスター付
外形寸法	mm φ300×435 (有効寸法)
寸法	mm 630×550×840
重量	kg 50
付属品	アース線 全あり (φ270×200mm) ステンレス製フレキシブルパイプ

67. Sterilizer

4

寸法mm	内径 150× 深さ 380
圧力	1kg/cm 121°C ~ 2kg/cm 132°C
処理時間	1kg/cm 25分 2kg/cm 15分以上
電源	AC100V 7A
重量kg	9.8 (カスト全)

Quantity

Item

68. Heating Mantles	25
for 100 ~ 300 ml flasks	25
" ~ 500 flasks	25
" ~ 2,000 flasks	30
" ~ 3,000 flasks	30
" ~ 5,000 flasks	30
" ~ 10,000 flasks	

69. Dry Ice making plant
(capacity 20-50 Kg per hour approx.)

1

70. Micropumps

20

71. Rotary Evaporators with water baths

RE 120 A-QW	1 lit. capacity	30
RE 120 C-QW	"	30
RE 10 E - 100	10 lit.	10
RE 20 E	20 "	4
RE 50 E	50 "	2

Item	Quantity
72. High vacuum rotary pumps	12
73. Microtubing pump	4
74. Basket Centrifuge	2
75. Fraction distillation apparatus spinning band column	2
76. Melting point apparatus	6
77. Multipurpose chemical reactor with restux arrangement (Pilot plant size)	2
78. Solvent distillation plant (Pilot Plant size)	2
79. Lathe machine + accessories General purpose 14"	2
80. Glass working lathe. General purpose	1
81. Universal glass cutting machine	1
82. Slide projector	2
83. Ozone generator	2
84. High pressure hydrogenation apparatus	2
85. Ice making plant with crusher 1 ton/hr capacity ammonia compressor	1
86. U.V. lamps	15
87. Glass blowing equipment (complete with annealing furnace and tools)	1

Item	Quantity
88- 88- Filtration equipment (To filter alcoholic plant extracts)	1 set
89. Jaw crusher	1
90. Automatic Mortar Grinder Capacity: 50 kg of plant material/hr	1
91. Ball Mills (with full range of pots)	1
92. Centrifugal ball mills Capacity: 50 kg of plant material/hr.	1
100 kg of plant material/hr.	1
93. Sieving equipments Multipurpose Sieve Capacity: 50 Kg/hr. mesh sizes 2 mm-50 um.	1
94. Liquid - Liquid Extractors DN = 100 mm	1
DN = 150 mm	
DN = 225 mm	1
95. Solid-Liquid Extractors Static Extractors Size: 50 litres	1
100 "	1
96. Floating filter extractors Capacity: 150 litres	1
350 "	1

Item	Quantity
97. Extraction Units Capacity: 160 Kg plant material/hr.	1
98. <u>Evaporators</u>	
i) Primary evaporators continuous evaporators 100 litres of alcohol/hr.	2
ii) Secondary evaporators Capacity: 100 litres	2
200 "	2
300 "	2
99. Expellers for oil 10 Kg of seeds/hr.	1
100. Brown crushers	1
101. Pulverizers	1
102. Sieve shaker	1
103. Ice machines	12
104. Sterilizer unit	1
105. Vac. Gauges	12
106. Oscilloscope	1
107. Hand refractometer	1
108. Microscope	6
109. Camera	1

Item	Quantity
110. Ultra turrax as in Yamato	12
Shafts as in Yamato N-54-34	18
" " " N-54-35	18
Generators as in Yamato N-54-36	12
" " " N-54-37	12
" " " N-54-38	12
" " " N-54-39	12
" " " N-54-40	
111. Fume Hoods, Walk-in	4
112. Drawing Instrument	2
113. Microfiche/Microfilm preparing lab.	1
114. Photographic equipment (Camera with slide making accessories)	1
115. Microfich/Microfilm Reader Printers	2

Item	単位 数量	SPC	4	5	6	Quantity
116. Spectrophotometer						2
117. Gas chromatograph with data system, capillary and packed columns, TCD, FID, & ECD detectors, recorders						3
118. Laboratory Glassware (Flasks, Round Bottom)	50 100 500 1000 2000 10 25	105 118 160 200 235 70 93	24/40 " " " " 15 19			300 200 200 50 20 1000 1000
119. Laboratory Glassware (Flasks, Kjeldahl)	10 25 50 200 500 1000 2000	65 80 104 155 203 230 288	15/25 " 24/40 " " " "			300 300 200 100 50 50 20
120. Laboratory Glassware (Flasks, Pear shape, 2 neck)	50 100	54 66	92 106	15/25 15/25		10 10
121. Laboratory Glassware (Flasks, Pear shape, 3 neck)	25 50	42 54	97 117	19 19	15 15	10 10
122. Laboratory Glassware (Flasks, Erlenmeyer)	10 25 50 100 200 500	93 104 127 177 177	15 15 15 24 24 24			500 300 200 100 100 100
123. Laboratory Glassware (Funnels, cylindrical fitted Disc)	3G3 3G4	30 30	34 34	65 65	19/38 19/38	100 100

Item	1	2	3	4	5	6	Quantity
Laboratory Glassware							
124. (Funnels, Hirsch Type)							
	11G3	60	39	65	19/38		100
	11G4	60	39	65	19/38		100
	17G3	140	65	65	19/38		100
	17G4	140	65	65	19/38		100
	51G3	45	18	60	7		20
	51G4	45	18	60	7		20
	52G3	60	23	75	7		20
	52G4	60	23	75	7		20
	53G3	70	30	85	8		20
	53G4	70	30	85	8		20
Laboratory Glassware							
125. (Funnels, Micro)							
	12G3	2	10	30			200
	12G4	2	10	30			200
	30GA3	0.8	10	12			200
	30GA4	0.8	10	12			200
Laboratory Glassware							
126. (Funnels, Buchner)							
	70	48	10	45			50
	125	60	10	55			50
	200	73	18	70			50
	500	95	22	90			30
	1000	120	22	110			20
Laboratory Glassware							
127. (Stoppers)							
	15	870					100
	19	980					200
	24	1300					200
	29	1520					300
	34	2720					50
Laboratory Glassware							
128. (Funnels, Separating)							
	50	15/25	12/30				100
	100	15/25	12/30				100
	250	19/33	15/35				100
	500	24/40	19/38				100
	1000	29/42	K-22				50
Laboratory Glassware							
129. (Funnels, separatory)							
	2000	34/45	K-27				50
	3000	40/50	K-35				30

Quantity

Item	1	2	3	4	5	6	Quantity
Laboratory Glassware							
130. (Distilling Heads)	13	200	60/120°	15/25	15/25	15/25	30
	16	200	60/120	15/25	15/25	29/42	30
	13	200	75/105	15/35	19/38	24/40	30
Laboratory Glassware							
131. (Adapters side arm)	125x45	60°	15/25	15/25	15/25		50
	130x40	75°	15/35	19/38	19/38		50
Laboratory Glassware							
132. (Adapters, vacuum take-off)	70x80	120	15/25°	15/25			100
	70x80	105	19/38°	19/38			100
Laboratory Glassware							
133. (Distilling adapters)	135	40	15/25	15/25			100
	155	50	19/38	15/85			100
	195	65	19/38	15/35			100
Laboratory Glassware							
134. (Adapters joints)	67	15/25	19/38				200
	73	15/25	24/40				200
	77	15/25	29/42				200
	68	15/35	19/38				200
	73	15/35	24/40				200
	83	19/38	24/40				200
	90	19/38	34/45				200
	85	19/38	29/42				200
	92	24/40	34/45				50
	100	24/40	40/50				30
	102	29/42	45/50				10
Laboratory Glassware							
135. (Separating Funnel) cylindrical	10	SPC	13	SPC	15	0.2	50
	25	15	13	15	15	0.5	50
	50	15	13	19	19	1	50
	100	15	13	15	15	2	50
	100	19	13	19	19	2	50
	200	19	17	19	19	2	50
	300	19/33	15/35				50
	500	24/40	19/38				50

Item	1	2	3	4	5	6	Quantity
Laboratory Glassware							
142. (Capillary Tubes)		シミイント					
	225	15/25					200
	235	15/35					200
	240	19/38					200
	240	24/40					
Laboratory Glassware							
143. (Bulbs, Connecting)		ボース	ボース	75°, 105°	19/38	24/40	50
Laboratory Glassware							
143a. (Drying Tubes)		乾燥管	角 度	上	下		
	100	18	45°	19/38			200
Laboratory Glassware							
144. (Distilling receivers)							
	50	48x115	19/38				200
	100	63x135	"				200
Laboratory Glassware							
145. (Thermometers Borosilicate glass)							
	0-360	45	10/18				20
	"	76	15/25				20
	"	125	15/25				20
	"	125	15/35				20
Laboratory Glassware							
146. (Test Tubes)							
	12	120	41				2400
Laboratory Glassware							
147. (Beakers)							
	50	46	60				200
	100	55	70				200
	200	67	89				100
	500	90	120				100
	1000	110	150				50
Laboratory Glassware							
148. (Flasks, Erlenmeyer narrow mouth)							
	1000ml						100
	2000ml						100
	3000ml						50
	5000ml						50
Laboratory Glassware							
149. (Flasks, Filtering Duran)							
	500	34.5	185				100
	1000	45	230				100

Item	1	2	3	4	5	6	Quantity
150. Aspirator Bottles	5 litres						20
	10 "						20
	20 "						100
150a. Spatulas (Stainless steel) wide shape	Length (mm)	Blade width (mm)	Blade length (mm)				
	130	9	40				24
	150	9	45				24
	185	9	50				24
	300	16	75				24
Spatulas, Micro (Stainless steel)	100	2	30				24
	130	2	40				24
	150	2	40				24
	100	3	35				24
	150	3	40				24
	150	4	40				24
	100	5	40				24
	150	5	40				24
	150	6	40				24
Spatulas, double Chattaway English pattern (Stainless steel)	100		30				12
	125		40				12
	150		40				12
	180		50				12
	200		60				12
	230		70				12
Spatulas, double spoon shaped bent (Stainless steel)	130		5				12
	150		7				12
	200		7				12

Item	1	2	3	4	5	6	Quantity
Spatulas, Micro (stainless steel)	210 160		7 9				24 24
Spatulas, double (for mortars)	150 200 300	40 40 60	20 20 25				12 12 12
Spatulas (for Analysis)	150		7				12
Spatulas, double with flexible blade and wooden handle	165 230 275	75 130 165	14 20 27				12 12 12
Spatulas with spoon at one end	120	Spoon (20x30mm) " (26x40mm) " (40x55mm)					12 12 12
150b. Spoons	150 210 300						50 50 50
151. Cork/Rubber support rings	For flasks from 50-500ml " " 500-2000ml " " 2000-6000ml						24 24 24
152. Single Rubber Blowball	Ball size 52x88mm 57x105mm 45x69mm						36 36 36
153. Laboratory Glassware (Filtering flasks) (Quick fit)	50 100	15/25 19/38	100 135				50 50

Item	1	2	3	4	5	6	Quantity
Laboratory Glassware							
154. (Crystallizing Dishes, flat bottom, mini spout, Boro Glass)	40mm 50" 60" 70" 80" 95" 115" 140" 190" 230"	20ml 40" 60" 100" 150" 300" 500" 900" 2000" 3500"					60 60 60 60 60 48 48 24 24 12
155. Rubber tubing O.D. I.D. 0.8x0.6 cm							2000 cm
156. De-ionizer unit mono bed 1.3x1.1cm							1
157. Gas Cylinder Trolleys (To accomodate cy- linders of 220 cu fts)							2
158. Gas Cylinders with regulators							
Helium 220 cu ft.							100
Nitrogen 220 cu ft.							10
Hydrogen 220 cu ft.							14
Oxygen 220 cu ft.							10
Xenon 220 cu ft.							2
Argon 220 cu ft.							6
Isobutane 100 cu ft.							2
Ammonia 220 cu ft.							8

Item	1	2	3	4	5	6	Quantity
Chlorine 220 cu ft.							4
Carbon dioxide 220 cu ft.							3
Sulphur dioxide 220 cu ft.							2
Hydrogen chloride 220 cu ft.							4
Paper Chromatography Tanks							6
159. Muffle Furnace, Automatic maximum temperature 1600°C Inside Dimension 30x20x50 Cm							2
159a. Oven (Temp. range 50°C 200°C Inside dimension 60x 50x50 cm							6
160. Ozone Generators (Horizontal type) Double tube type, 300 mm in length							2
161. Air Conditioning plant 3x100 tons capacity with spare compressors and 3 years spare parts							1

Item	1	2	3	4	5	6	Quantity
162. Solid-Liquid Extractor (Pilot plant size)							1
Laboratory Glassware							
163. (Glass Tubing 16mm)							3600Kg
" " 18mm							3000Kg
" " 25mm							2000Kg
" " 32mm							2000Kg
" " 40mm							2000Kg
" " 65mm							2000Kg
Glass Rod 8mm							1000Kg
Glass Rod 12mm							1000Kg
164. Disposable culture tubes	16x125mm						5000
Laboratory Glassware							
165. (test tubes)(with screw caps)	16x125mm						5000
Laboratory Glassware							
166. (Micro sample tubes)	11x42mm, 1.5ml						15000
Laboratory Glassware							
167. (Microquantitative pipets)	5ul capacity						10
Laboratory Glassware							
168. (Microquantitative pipets)	1ul capacity						10
Laboratory Glassware							
169. (Flasks, pear-shaped)	300	90'	188	29			100
170. Dispenser							5
171. Test tube racks (Polypropylene)	13x16mm						100

Item

1

2

3

4

5

6

Quantity

172. High Vacuum Apparatus

2

高真空ポンプ	50g /mm	1台
油圧ポンプ	U-V型 (4456)	1台
電圧計	1X10 mmHg 0.133X10 kPa	1台
ガスラッパ	ネオンランプ付 (4441-1)	1式
トラップ	ガラス製	2コ
パイプ		1式
接続コネク		1コ
ゲージマウント	φ20mm用	2コ
サイズ mm	600X740X1,050	

173. Vacuum gauge, Bennet Type

22

品名	型	12
真空計	ベネット型	
材質	ガラス	

174. Vacuum Traps

10mm

10

175. Vacuum Traps

29/42 200mm

10

176. Vacuum Traps

34/45 200mm

20

177a High vacuum stopcocks
Offset side arms

10mm bore

20

177b Stopcocks, High vacuum Teflon
Needle valve

10mm bore

20

178. Photochemical reactor with
high pressure lamp
medium pressure lamp
low pressure lamp

3

3

3

Item	1	2	3	4	5	6	Quantity
187. Sealon Film							20 cases

188. Filter Holder							12
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189. pH meter, Digital pH-m V meter with built-in micro- computer with touch-keys panel							1
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190. pH electrodes							2
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191. " "							2
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192. Freez dryer with accessories							4
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Diameter 47mm, SPC joint,
Filter Base capacity 1000mm

品名コード 品名 単位 数量 単位 数量
7051-011 pH-m V 1 1 1

品名コード 品名 単位 数量 単位 数量
7051-012 pH-m V 1 1 1

Overall dimension of cabinet	(Top surface SUS 304)
Dimension of Pre-freeze bath	900W x 470L x 750H
Temp. of Pre-freeze bath	240W x 300L x 150H
Vacuum drum including con- densing coil	Cool to -50°C
Quick-sealed valve (unitrap)	200c x 330H, cool to -50°C
Condensate capacity	1/2" (21.7mm) x 9 ports
Compressor	3 liter/h
Vacuum pump	Sealed air cool
Vacuum gauge	AC.100V 400W 1/2HP
Power requirements	100 liter/min. 10 ⁻³ Torr
	Pirani Gauge
	220V, 50/60Hz

Item	1	2	3	4	5	6	Quantity
192 i) T-shape manifold							4
ii) Chemical trap							4
iii) Adapters							4
iv) Vac.pump (extra)							4
193. Automatic water refiner with positive ion and negative ion exchange resin	Capacity 10 litre/hr						1
194. Test tube mixer							2
195. Dewar flask, cylindrical with steel case	Capacity 3000ml	Dimension (mm) 150x175x330					5
196. "	500ml	65x85x185					5
197. "	1000ml	85x105x220					5
198. "	2000ml	100x125x280					
199. Culture tubes, with rim	15x150x1.2mm dimension						5000
200. Test tubes with rim	13x90x1.2mm	"					2000
201. Test tube with rim	15x150x1.2	"					2000
202. Culture tubes, disposable without rim	16x150x0.8mm	"					5000

Item	1	2	3	4	5	6	Quantity
203. Culture tubes with screw cap provision	13x100mm						1000
204. Screw caps with leflon linear for above							1000
205. Culture tubes with screw cap provision	16x150mm						1000
206. Screw caps with teflon linear for above							1000
207. Pasteur pipette	7mm	146mm	40mm				300
208. Pasteur pipette	7mm	229m	115m				200
209. Centrifuge tubes,	10ml cap.	16.5x105mm dimension					500
	10ml cap.	16.5x105mm dimension					500
210. Centrifuge tubes conical, with rim, plain	10ml cap.	16.5x105mm dimension					500
211. Pipettes, Micro-litre, Lang-Levy	5ul						10
212. " " " "	10ul						10
213. " " " "	20ul						20
214. " " " "	50ul						10

Item	1	2	3	4	5	6	Quantity
215. Pipettes, Micro-litre, Lang-Levy	100ul						10
216. " "	200ul						10
217. Beakers	50ml	46x60mm dimension					144
218. Beakers	300ml	78x103mm "					144
219. Beakers	500ml	90x120mm "					144
220. Beakers	2000ml	135x200mm "					32
221. Pipettes, serological, large tip opening	1ml	0.01ml	+0.03ml	350mm			20
222. " "	2ml	0.02ml	+0.04ml	350mm			20
223. " "	5ml	0.05ml	+0.06ml	350mm			20
224. " "	10ml	0.1ml	+0.1ml	350mm			20
225. Bulb for pipettes, silicon rubber							20
226. " "	155						20
227. " "	190						20
228. " "	250						20

Item	1	2	3	4	5	6	Quantity
229. Bulb for pipettes, silicon rubber	335						20
230. "	63						20
231. "	95						20
232. "	125						20
233. "	190						20
234. "	275						20
235. Mixer, 220-230V 50/60Hz, 2, 850 rpm (14.5x9x14.5cm)							5
236. Mixer, same specification but dimension (17x11x15.5cm)							10
237. Conductance Bridge 0.1S to 1S, 220V, 50Hz							1
238. Conductivity cell for above							1
239. Hydrogen generator							1
240. Desiccant cartridges							6
241. Deionizer packs							6 packs

Item 1 2 3 4 5 Quantity

249. Still

●蒸留水採取能力	約 1.0 l/hr (冷却水量 10 l/hr 比圧 0.5 MPa)
●圧力	比圧 0.4 MPa (冷却水量 1 l/hr のとき)
●蒸気流量	0.6 m ³ /hr
●冷却水量	8 l/hr
●定格電力	100V, 910W, 50/60Hz
●ヒーター	VYCOR 電機 100V, 510W
●制御装置	安全スイッチ付、定水位検出装置
●大きさ、重量	Hg 0.1380, 0.730, 0.5 (連立時)

6

250. Still

●蒸留水採取能力	約 1.0 l/hr (冷却水量 10 l/hr 比圧 0.5 MPa)
●圧力	比圧 0.4 MPa (冷却水量 1 l/hr のとき)
●蒸気流量	0.6 m ³ /hr
●冷却水量	8 l/hr
●定格電力	100V, 910W, 50/60Hz
●ヒーター	VYCOR 電機 100V, 510W
●制御装置	安全スイッチ付、定水位検出装置
●大きさ、重量	Hg 0.1380, 0.730, 0.5 (連立時)

4

251. Distilling columns

カラムドの長さ	200	24	19/38	24/40	30
	300	24	19/38	24/40	30
	500	24	19/38	24/40	30
カラムドの長さ	200	10/18	15/20	15/20	50
	150	15	15	15	50

252. "

"

"

Item	1	2	3	4	5	6	Quantity
253. Vacuum Control Apparatus, range 1-220 mm Hg, Ac 220V, 50/60Hz							6
	370x250x630mm Approx.dimension						
254. Vacuum Controller 1-1000 inbar (1~200, 200 ~ 1000) AC 220V, 50/60Hz, 0.5A							6
	260x230x120mm Approx.dimension						
255. Vacuum gauge, tilting type, complete with bennet type gauge							10
256. Fitting Assortment, a box full of goodies, 76 pieces							20
257. Spring Tube Clamps, on/off tubing clamp, acetal copolymer, stainless steel							100
258. Gas Burners, Glass blowers liquified fuel gas							4

Item 1 2 3 4 5 6 Quantity

258A. Gas burner, Hand Torch

品名	単位	規格
ハンドバーナー 50型		器用カス用
		検出カス用

4

258B. Gas burner, bunsen

フンバーナー	2型	700ハンカス用
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4

259. Glass blowing kit with accessory

品名	規格	単位
ガラス吹き用セット		1セット

4

260. Air mixer for gas burner

品名	寸法	単位
エアミキサー	18X12	150

4

261. Laboratory jack

品名	荷重範囲	対応数値
150x150	52~250	15
80x80	45~120	5
100x100	45~140	10
300x300	90~495	25

60

20

20

20

262. Support, with set screw, diameter 65mm

500

Item	1	2	3	4	5	6	Quantity
263. Support Bases, H-type, Cast iron	220x190mm						25
264. Heavy duty test tube racks, polypropylene							20 each size
265. High vacuum stopcocks, off-set side arms	8mm bore						200
265A. As above, but with 90° side arms	8mm bore						200
266. Video recorders with TV set							2
267. Teflon tubings internal diameters, 2mm, 3mm, 4mm, 5mm							100 meter, each size
268. Drying racks for TLC plates	210x210x190mm dimension						50
269. Laboratory Glassware (TLC tanks)	200x200mm dimension						75

Item	1	2	3	4	5	6	Quantity										
278. High vacuum needle valves, teflon		<table><tr><td>型式</td><td>数量</td></tr><tr><td>D-25</td><td>9</td></tr><tr><td>D-40</td><td>10</td></tr><tr><td>D-60</td><td>11</td></tr><tr><td>D-100</td><td>18</td></tr></table>	型式	数量	D-25	9	D-40	10	D-60	11	D-100	18					100 100 100 100
型式	数量																
D-25	9																
D-40	10																
D-60	11																
D-100	18																
279. Gas washing bottles, quickfit, borosilicate glass	250ml	NS 34/32					200										
280. Desiccators, scheibler, borosilicate glass, screw cap.		<table><tr><td>数量</td><td>数量</td><td>数量</td><td>数量</td></tr><tr><td>6500</td><td>340</td><td>120</td><td>250</td></tr></table>	数量	数量	数量	数量	6500	340	120	250				100			
数量	数量	数量	数量														
6500	340	120	250														
281. Cocks with caps for above desiccator							100										

Item 1 2 3 4 5 6 Quantity

282. Laboratory Glassware
Assembly set kit (for
25ml capacity)

SPC 24

12

Laboratory Glassware
283. (Ground glass joints)

NS

500

Length

Outer
diameter

10/30

500

120mm

8mm

15/25

500

120mm

13mm

19/38

1000

120mm

16mm

24/40

1000

120mm

20mm

29/42

1000

120mm

26mm

284. Thermomagnetic stirrer
AC 220V, 50/60Hz
Diameter 160x105mm
~ 1.8kg

50

285. Clamp Holders, grip rods
upto 12mm

500

286. Clamp Holders, type S, grip rods
upto 15mm, at angle 90° to each
other

300

Item	1	2	3	4	5	6	Quantity
287. Rings, support, open	50mm diam.						100
	72mm diam.						200
	115mm diam.						200
288. Clamps, versatile, semi-micro							200
288A. Clamps, versatile, vinylized jaws, 3-prong grips, grip rods upto 50mm							200
288B. Same as above but grip rods upto 100mm							200
288C. Clamps versatile, grip rods upto 45mm							200
289. Clamps, steel band type grip upto 100mm							50

Item	1	2	3	4	5	6	Quantity
290. Clamps for Ball and Socket joints, pinch							
For 12mm grip							100
For 18mm grip							100
For 22mm grip							100
For 28mm grip							50
291. Clamps, for quick fit joints	NS 15/25						300
	" 15/35						200
	" 19/38						300
	" 24/40						300
	" 29/42						300
	" 34/45						50
291A. Color clamps for quickfit joints	" 14						400
292. Support rods, diameter 12 mm, length 450mm stainless steel							500
292a. Same as above but length 1000mm							100

Item	1	2	3	4	5	6	Quantity
293. Support Connector, straight, set screws for 12mm diameter rods							500
293A. Support Connector, 3-way set screws for 12mm diameter rods							500
294. Digital pH meter, 5-digits, resolution of 0.001 pH, range 0.00 -- 14.00pH accuracy ± 0.002 pH, temp. Compensation OC to about 100°C (manual or automatic) 220V, 50/60Hz							2
294A. Digital pH meter, with simultaneous indication of temperature and pH/mV indicator. Temperature measurement 0 - 50°C, B.C.D. output.							2
295. Conductivity meters, digital, conductivity 0.1 μ S/cm-1000 μ S/cm, Digital setting of temp. Compensation with range 0 - 59.9°C. Digital setting of cell constant compensation. Two kinds of measuring frequency to increase the accuracy. Provision of conductivity and temp. outputs. 220V, 50/60Hz.							6

Item	1	2	3	4	5	6	Quantity
296. Timers (With alarm). Time counter (stopwatch) 1/10 Sec. integrating. Start-Stop-reset-start are operatable							4
297. Rotary Test Tube Washer, hydraulic type, for 200 test tubes of 18mm diam. Washing basket made of stainless steel in 3 pieces							2
298. Ultrasonic Cleaner. Tank Capacity 6 lit. 220V, 50/60Hz							2
299. Pipette washer and dryer for washing 18 pipettes by connecting to a water pluck. Contains one suction adapter, one water aspirator, one glass chamber and one rubber tube							2
300. Electronic Precision balance weighing capacity 200/209; minimum indication 0.1/0.02g, standard deviation +0.5d fare weight subtraction range. To full weighing capacity measuring time 0.5 ~ 1.5 sec. Scan pan size: 100x100mm.							1

Item	1	2	3	4	5	6	Quantity
301. Densitometer with standard accessories							1

Specifications MEASUREMENT BLOCK Measured object

Photoelectric cell : Cellulose acetate film, polyacrylamide gel, agar-agar, starch gel, TLC plate and filter paper
 Light source : Photomultiplier
 Slit : Tungsten lamp, 12V, 10W, 0.2x2, 0.3x3, 0.5x5, 0.5x7, 1.0x3mm
 Filter : Metal interference filter, 440-620nm, 4 pcs.
 Sample feed speed : 2-step switching
 50/100mm/min (50Hz)
 50/120mm/min (60Hz)

LG CONVERTER DEVICE BLOCK

Log converter : Log module
 Optical density range : 0-0.5, 1.0, 1.5, 2.0, 3.0, 4.0
 Zero adjustment : Automatic
 Peak area separation : Automatic or Manual
 Measurable number of peaks per sample : 1-99
 Integral value : Max. 99,999 counts
 Sample index number : 0-99

RECORDER BLOCK (Optical Density Curve Recording Block)

System : Auto-balance servo system
 Effective recording width : 90mm
 Chart paper feed speed : 100mm/min (50Hz)
 120mm/min (60Hz)
 Chart paper for recording : Overall approx. 16m
 Recording pen : Hot pen
 Sampling marker : Optical density curve weight system

PRINTER BLOCK

Printing speed : Approx. 3 lines/sec.
 Digit number : 9 digits (Sample number, 2, Peak number, 2, Integrate, 5)
 Chart paper : Overall approx. 45m, foldable type
 Power source : AC 90-110V, or AC 220-240V, 50/60Hz
 Power consumption : 90VA max.
 Dimensions : Approx. 650(W)x410(D)x350(H) mm
 Weight : Approx. 37kg

STANDARD ACCESSORIES

Chart paper for recorder : 5 Standard sample film, F-type : 1
 Chart paper for printer : 3 Optical density pattern list : 1
 Filter : 4 Forceps : 1
 Slit : 5 Lamp : 1
 Cell holder : 2 Earth wire : 1
 Sample cell with lid : 1 Fuse, 2A : 2
 Cellulose acetate press-plate : 1 Ink tape : 2
 Glass rod : 3 Operating manual : 1
 Glass plate : 3 Data (Experiment) list : 1

Item 1 2 3 4 5 6 Quantity

302. Digital Thermometers

Sample rate	Approx. 2.5 times/s.
Time information	0 to 999 display
Type of display	3-digit LCD
Power source	Single 9V battery
	OSK 484G
	CA probe select-
	able from 5 types
	(optional)
Temperature sensor	
Temperature range	-50 to 150°C
Resolution	500°C or 600°C
Accuracy	1°C
	0 to 600°C
	+10.5% of fs.
	+1 digit
	-50 to 0°C
	: 15°C + 1 digit

303. Deep freezer -15°C to -25°C
Capacity 620 lit.
outside dimensions
(HxWxD) approx.
No frost-type
Shelf : 4
Approx. weight 153 Kg
1,790x820x870 mm

12

304. Freeze Dryers (complete with free-
zing bath in every one + accessories and
attachments
as in Eyela FD-550

6

" " " FD-520

6

305. Aspirators with vacuum gauge
and regulator (No need fetch water)

50

Teflon aspirators with Metal sucker

50

Metal suckers

20

Item	Quantity
306. Airconditioners (18000 BTU) Spare Compressors for above	50 20
307. Balances	
as in Shimadzu	
ED 2000-20	6
L-160-DTP	3
EB-2800 M 11/21	4
EB-500-21	8

Item	Quantity
308. Colony Counter Automatic with electronic prob and digital counter	2
309. Marking pen for the above Wolffheugel plate clear black saline plate	2
310. Antibiotic zone reader 0-35.0 mm inhibition zone reader	2
311. Accessories for above For counting drops, strokes etc.	1000 boxes 6
312. Conductivity Meter Conductivity from 0-1,000	2
313. Freezer Upright model upto-85 93x88x184	2
314. Same as above 14x185x81	2
315. Freezer -18 ~-23OC 61x61x87	24
7-Day recorder for above freezers	4
Replacement alarm system for above	4

Item	Quantity
316. Multiple dialyzer For concentrating proteins such as enzymes with 5 litre glass tank with numbered holding notches glass marbles and dialysis tubes	1
317. Same for micro samples	1
318. Microwave ovens	2
319. Glassware washer and dryer supplied with distilled water system along with necessary accessories	2
320. Phase contrast microscope	1
321. Inverted microscope	1
322. Dual viewing microscope	1
323. Fluorescent microscopes	1
35 mm camera for the above microscopes	2
324. Complete photographic equipment with camera, light source, trans illuminator, etc for taking pictures and DNA gels	2

Item	Quantity
325. Evaluation Kit This kit provides sufficient equipment for evaluation of the fundamental principles of microtitration.	1
326. Microtitration Plates Disposable microtitration plates with 96 wells The rigid polystyrene plates Non-sterile Sterile Processed for use with treated RBC's Tissue culture treated to permit cell attachment and growth thus making the plate suitable for tissue culture Ushape 0.25 ml V-shape 0.25 ml FB-shape 0.35 ml	50 Boxes
327. Microtitration Plates IS-FB-96 Sterile (GN-7), FB-shaped wells, individually wrapped with cover IS-MRC-96 Sterile (MR-7), U-shaped wells, individually wrapped with cover IS-MVC-96 Sterile (MV-7), V-shaped " " " IS-FB-96 Clear, FB-shaped wells IS-MRC-96 Clear, U-shaped " IS-MVC-96 Clear, V-shaped " IS-FB-96 Processed (FB-P), FB-shaped wells, packed in 5's IS-MRC-96 Processed (MR-P), U-shaped wells, packed in 5's IS-MVC-96 Processed (MV-P), V " " " IS-FB-96-TC (GN-3), FB-shaped wells, with cover, individually wrapped	10 box " " " " " " " " " " "

Item	Quantity
328. Microtitration Plate Sealers/Covers	
Titertek Plate Sealer non-toxic	10 box
329. Numbered Plate Sealers	" "
330. Plate Sealing Equipment	
Plate Sealing Apparatus	
Titertek Plate Sealing Apparatus	1
Spare Blade for Plate Sealing Apparatus	10 "
331. Plate Sealing Tape	
Titertek Plate Sealing Tape-non-toxic	60 m roll
332. Plate Sealing Roller	1
333. Plate Reading Equipment	
The plate reading mirror is made of strong anodized metal and facilitates the observation of test patterns at bench level	
Titertek Plate Reading Mirror	1
" Mirror, spare for 77-440-00	1
334. Report Stamp	
Titertek report stamp	1
Titertek " " pad	1
335. Reusable Pipettes	
Titertek Pipette, Reusable 0.025 ml	5 box
Titertek " " 0.050 ml	5 "

Item	Quantity
343. Template Blotter Titertek Template Blotter	10 box
344. Stands and Racks Pipette/Diluter Stand Titertek Stand to hold 36 Diluters and 6 pipettes	1
345. Pipette/Diluter Rack Titertek rack to hold 8 diluters or 8 pipettes	1
346. Universal Stand	1
347. Plate Shakers Titertek Plate Shaker Variable Speed plus Timer	4
348. Ultrasonic Cleaners Flowsonic Cleaner, capacity 4.50 litre	1
349. Hand Multidiluter Titertek Hand Multidiluter (supplied without diluters)	1
350. Diluters Titertek Diluter, 0.025 ml short-form " " 0.050 ml "	12 box 12 box

Item	Quantity
351. Multidiluter	1
Titertek Motorized Multidiluter (supplied without diluters)	1
Instruction manual	1
Multidiluter carriage	1
Manual conversion unit	1
Motorized conversion unit	1
Plate Tray, 12-way	1
Plate Tray, 8-way	1
Dust cover	1
Tool kit	1
352. Medimixer	1
Accessories for Medimixer: Cassette to take upto 12 diluters	1
" " With 8-0.025 ml "	1
" " 12-0.025ml "	1
" " 8-0.050 ml "	1
" " 12-0.050 ml "	1
Vial Carrier to hold wash solution	1
" Holder to store upto 36 vials	1
353. Microdrop Dispenser	1
The Microdrop Dispenser is a medium or reagent dispenser.	
It comes complete with an autoclavable, 8-channel dispensing head.	
354. Multipipetter	1
355. Multiskan	1
Titertek Multiskan, 110V/50 or 60Hz	1
Titertek Multiskan Filter, 405 nm, 450, 492 nm	1

Item	Quantity
356. Multiwash The Titertek Multiwash has been developed for use in the Enzyme Immunoassay (E.I.A.) technique. It will wash all 96-wells of a microtitration plate simultaneously in 45 seconds.	1
357. Lunu - Aggregometer for measuring simultaneously both platelet aggregation and the release of ATP from the same sample of platelet rich plasma. Aggregation is measured using a turbidometric approach and release of ATP is detected by the luminescence. An infra-red light source is simultaneously passed through both the PRP and PPP (platelet rich and platelet poor plasma) and the light transmission through each is detected.	1
358. Dual Channel Chart Recorder for recording simultaneously the platelet aggregation and ATP release. Accessories: 1. Cuvettes 2. Teflon coated magnetic stir bars for the cuvettes 3. Chart paper for dual channel recorder, 100ft. roll 4. Pens for the recorder - green and red Reagents: 1. Luciferin - Luciferase kit 2. Chrono-Par ADP kit 3. Chrono-Par collagen kit	1 100 24 6 rolls 6 each 2 2 2

Item	Quantity
359. Power Cable 3½ core 600/100V (Four core with reduced neutral conductor) 150 Amp. Suitable for underground installation.	1500m
360. Emergency Diesel Generator 250 KVA, Three phase 220V/380V 50 Hz, with control panel.	1
361. Uninterruptible Power Supply 150 KVA - 220/380V 50 Hz. Three phase with sealed lead acid batteries. Battery back-up time 15 minutes.	1
362. Personal Computers with recorders.	2
363. Upgrading of Mass Spectrometer-311 " " "12 " " "12	

To increase mass range. Reinhardt West Germany) are quoting price of 200,000 D.M. per mass spectrometer system).

S.NO.	I T E M S	MODEL/CAT.NO.	QUANTITY	S U P P L I E R
364.	Harvard analgesia meter	56-4674	2	Harvard Apparatus Ltd., Fircraft Way, Edenbridge, Kent, TN86 HE England
365.	Harvard Decapitators	55-0012	2	"
366.	Harvard Anaesthetizing boxes	50-0108	2	"
367.	Harvard dual syringe infusion and withdrawal pumps	55-1184 Model 915	2	"
368.	Cannulae (arterial) 1 mm	819-70050-0	6	Bioscience Harbour Estate, Sheerness, Kent, ME121RZ, England
369.	" " 2 mm	819-70060-0	6	"
370.	" " 3 mm	819-70070-0	6	"
371.	Venous Cannula 1 mm	819-70090-0	6	"
372.	" " 2 mm	819-70100-0	6	"
373.	" " 3 mm	819-701100-0	6	"
374.	Rate Cannula 1 mm	819-70330	6	"
375.	Mammalian heart Cannula " " Clip	819-70340-0	2	"
376.	Frog's heart clip (pack of 10)	816-61450-0	6	"
377.	Ball Jointed arms and Clamp, Large	816-60790-0	6	"
378.	Ball and Socket electrode Clamp	816-60750-0	6	Bioscience
379.	Muscle grip	816-60620-0	6	"

380.	"V" Clamp	816-60660-0	6	Bioscience
381.	Oxford Clamp	816-60670-0	6	"
382.	Thermometer Clamp	816-60680-0	6	"
383.	Clamping upright rod	816-40070-0	6	"
384.	Detachable Stand	816-40050-0	6	"
385.	Swivel Mount Pulley	816-20540-0	6	"
386.	Brass rod. 6.4 mm diameter	816-30490-0	6	"
387.	Boss head adjustable	816-20350-0	6	"
388.	" " small (pack of 5)	816-20200-0	6	"
389.	" " open sided (pack of 5)	816-20220-0	6	"
390.	Frog myograph Board	816-51120-0	6	"
391.	Animal Operating Table	816-50330-0	2	"
392.	Nerve/Muscle chamber	815-71210-0	2	"
393.	Muscle Lever	815-71211-0	6	"
394.	Starling's Heart Lever Assembly	815-71212-0	6	"
395.	Complete Isolated Organ Bath 230V	815-61100-1	2	"
396.	Metal Oxygen tube	815-62145-0	1	"
397.	Mammalian Heart Perfusion Assembly. 230V	815-61220-1	2	"
398.	Tracheal Cannula Set Large	816-60670-0	6	"
399.	Miniature Ideal Pump Assembly 230V	815-51190-1	2	"
400.	Nerve Chamber Bipolar electrodes	814-81520-0	6	"
401.	Brodie Universal Lever	811-50600-0	6	"
402.	Nickle Silver Spring (pack of 10)	811-50601-0	1	"

403.	Condon's rat BP Manometer	811-40340-0	2	Bioscience
404.	Respiratory flow transducer	810-54041-7	6	"
405.	PT 400 Blood Pressure Transducer	810-50030-7	7	"
406.	pulse Plethysmograph	810-28440-7	2	"
407.	D1-Isometric transducer (52 gms)	810-21601-7	2	"
408.	UFI isometric transducer (220 gms)	810-50020-7	2	"
409.	UFI Isometric transducer (55 gms)	810-5000-7	2	"
410.	T ₂ Isotonic transducer	810-25900-7	6	"
411.	P-23 Open beaded thermistor	810-90012-0	6	"
412.	F-23 beaded glass thermistor	810-1676	6	"
413.	Tendon Hammer	812-81762-0	2	"
414.	Student Stimulator (340 V)	813-13340-1	1	"
415.	Animal Cages Disposable plastic cage Econo-cage with lid with accessories	01-260-1 01-282-2 01-282-5 01-260-52A 01-260-58-A	4 dozens 6 6	Fisher Scientific 711 Forbes Ave. Pittsburgh P.A. 15219 "
416.	Metabolism Cage	81-287 81-287-5	2	"
417.	Adjustable Restraining Cages	01-282-10	2	"
418.	Restraining Cages	01-279 01-280 01-280-10	2 2 2	" " "
419.	Ear punch	01-337 B	1 pack	"
420.	Operating table	01-331-B	1	"

421.	ACD-18 automatic computing densitometer (230 V)	08-585-50	1	Fisher
422.	Chart paper for densitometer	08-585-52	2 rolls	"
423.	Vortex mixers Test tube mixer	12-812	2	"
424.	Scintillation vials (20ml borosilicate glass vials with caps)	03-337-15 03-337-5	500 vials 500 vials	"
425.	Borosilicate 7 ml glass vials	03-337-26	500 vials + caps	"
426.	Minotome IEC Microtome/Cryostat and accessories	IEC 3399/12-625-41 " 12-625-66 05-424-50 12-625-69 12-625-10 12-625-7	1 1 1 1 1 1	" " " " " "
427.	Microsample. Test tube rack	4834/1100	12	Sibata Scientific Technology Ltd., 1-25 Ikenohata 3-Chome, Taito-Ku, Tokyo 110, Japan
428.	Shaking incubator	HB SS	1	Evela, No.2 (Toei Bldg.), 4-Chome Murochi Nihombashi Chuo-Ku, Tokyo, Japan.
429.	Microfilters	B-20-A (IEC 3444) 6331-047022 047030 047045 047065 047080 047120 047300 047500	1 One pack each " " " " " " "	Fisher Sibata " " " " " " "
430.	Filter holders SPC Joint SUS 316-filter base	6163-2503	12	"
431.	Freeze dryer	FD-1,	1	"
432.	Refrigerated centrifuge with multiple sample head 1500G	10411/4 K-1	1	Sigma Chemical Company, Fancy Road, Poole, Dorset B.11177 NH.

433.	Roller tube culture apparatus	MPR-600	1	Technic House, Christopher Street, London EC2 P2ER, England. 68260.
434.	Anaerobic Jars	OSK 7255	1	OSK
435.	Erma dissecting microscope	14-148-0	1	Erma Optical Work Ltd., 2-4-5 Kajicho Chiyoda Tokyo, Japan.
436.	Large florescence microscope-III with epi. and camera attachment	III	1	Carl Zeiss, 7082 Oberkochen, W.Germany
437.	Tissue Culture fiber dish	61-201-99 61-202-99	(Box 700) (Box 540)	Flow Laboratories Ltd. P.O.Box 17, IInd Ave.,
438.	Culture tubes	61-230-99	(Box 350)	Industrial Estate Irvine, Ayrshire Scotland, KA12 8NB
439.	Liquid Nitrogen storage ampoules	61-250-06	(Box 200)	"
440.	Storage vials	60-360-99	(Box 250)	Flow Labs
441.	Medium size bottle/caps	6-330-99	(Box 68)	"
442.	Gould OS1400 Series 20MHz dual trace, Digital Storage Oscilloscope	OS1400 Series 20MHz	1	Gould Inst. Ltd., Roebuck Road Hainault Ilford, Essex IG6 3UE England
443.	Four channel Oscillograph Complete with remote event marker button with lead, 1 roll chart paper ink cartridge spare fuse spare ink tubing and plastic dust cover for 220/240 volts 50Hz	50-9307	2 sets	North Eastern Medical 46 Service Road Potters Bar, Hertfordshire England
<u>Accessories for above</u>				
444.	I.U. 100 Universal transducer interface unit	50-8861	2 sets	NEM
445.	Isotonic transducer	50-6360	2 sets	NEM
446.	Isometric transducer 100gms	50-7913	2 sets	NEM
447.	Isometric transducer 50gms	50-7905	2 sets	NEM

448.	Stethograph with transducer	50-8028	2 sets	NEM	
449.	ECG Electrode set 4 plates	50-9539	2 sets	NEM	
450.	Suction electrode	50-9604	2 sets	NEM	
451.	ECG Limb cable	50-9562	2 sets	NEM	
452.	Triple disc electrode set	50-5289	2 sets	NEM	
453.	Triple surface electrodes c/davis electrodes	50-9612	2 sets	NEM	
454.	Digital storage module	56-5135	2 sets	NEM	
455.	Fanfold curvilinear chart paper 2 ch	50-9067	48	NEM	
456.	Spare curvilinear pen	50-9091	12	NEM	
457.	Instruction manual	50-9117	1	NEM	
458.	Application manual	50-9125	1	NEM	
459.	Blue ink cartridges	50-9174	2	NEM	
460.	Red ink cartridges	50-9182	2	NEM	
461.	Washers and Jars	OSK 9232 Type ASJ	6	OSK	
462.	Liquid scintillation spectrometer (β Counter) with automatic sample changer + data printer	81000	1	LKB Produkter AB Box 305, S-161 26 Broma, Sweden	
463.	Cell Harvester (Complete)	78-144-00	1	Flow Lab PTE Ltd., 175 A Gold Hill Shopping Center Thomson Road Singapore 11	
464.	Fraction Collector	DC-180	1	Eyela No.2 (Toei Bldg.) 4-Chome, Murochi Nihombashi Chuo-ku Tokyo, Japan.	

465.	Tygon tubing of different diameters	R-3606 14-169-1A 14-169-1E 14-169-1H	100 meters 100 " 100 "	Fisher
466.	Laminar Flow cabinet	3050/ET (0838)	1	Gelman Inst., 600 South Vanger Road, Ann Arbor Michigan 48106
467.	Minishaker	SS-80	1	Eyela
468.	Microtitrate tray of SS 100	SS-100	1	"
469.	Constant low temp. and humidity temp.	OSK 6323 -30 to 80°C	1	Ogawa Seiki Co. Ltd., Oikawa Building 4-5 2-Chome Hayakunni-Cho Chanjuku-ku Tokyo, Japan
470.	Anaerobic Jars	OSK 7255	1	"
471.	Air conditioners	National	2	Japan
472.	FBE-immuno apparatus	19-7651-01	1	Pharmacia, Box 175 S-75104 Uppsala 1, Sweden.
473.	Pharmacia Gel electrophoresis GS-2 power supply EPS 500/400	19-4906-01 19-7900-01	1	"
474.	Pharmalites and calibration kits	1	1	"
475.	Flat bed IEF, electrophoresis system base unit kits of IEF of electrophoresis of preparative agarose			"
476.	Two channel strip chart recorder and accessories	19-8004-01	2	"
477.	Cell Culture Rotating Apparatus	CR-45	1	OSK
478.	Cell Rotator	CR-45	1	OSK

479.	Flame photometer	OSK-6562	1	OSK
480.	Fluoro-spectrophotometer	OSK-6561	1	OSK
481.	Low temp. incubator CO ₂ incubator	OSK 6320	1	OSK
482.	CO ₂ incubator	OSK 6319 type FC50	1	OSK
483.	Polypropylene holder for 30 ml tubes	03-337-13	12	Fisher
484.	Polypropylene support	03-213		"
485.	Support for RIA tubes	14-809-21	12	"
486.	Support for RIA tubes	14-809-10 14-809-12		
487.	Pipette tips (disposable)	21-341	Pack of 1000	"
488.	Electronic scientific calculator Casio		1	Japan
489.	Automatic Ice cuber	OSK-6343 Type C	1	OSK
490.	High-low temp. and humidity chamber	OSK 6333 (CHP-22F 5)	1	OSK
491.	Colony counter (Digital)	OSK 9191	1	OSK
492.	Refrigerators	10 c.f. (separate freezer)	2	National
493.	Drying Rack	100-5	4	OSK
494.	Separation chamber	100-7a	4	OSK
495.	Reagent sprayers	7265Q	2	OSK
496.	Rotary evaporators	Model N-1	2	Eyela
497.	Aspirators	A-25	2	"
498.	Cold water Circulators		2	Any Japanese manufacturer
499.	Paper chromatography tank		2	

500.	Drying Rack	100-5	4	OSK
501.	Separation chamber	100-7a	4	OSK
502.	Reagent sprayers	7265Q	2	OSK
503.	Gas liquid chromatography apparatus	Model N-1	2	Eyela
504.	Rotary evaporators	Model N-1	2	Eyela
505.	Aspirators	A-25	2	Eyela
506.	Cold water circulators		2	Any Japanese manufacturer
507.	Paper chromatography tank			
508.	Harvard indirect blood pressure silencers	56-4658	1	
509.	Dog Holders	50-6261 50-6279	2 2	Harvard "
510.	Cat Holders	50-6253	2	"
511.	Needle	56-5434 (7mm) 56-5424 (5mm)		" "
512.	Mini Blades	56-5507		"
513.	Columbus Instruments Animal activity meter Opto-Varimex-Minor (220)	56-6604	1	"
514.	Lab Animal Respiration Monitor	56-6620	1	"
515.	Rotamex-V-Rota-Rod Treadmills	56-6794	1	"
516.	Dog Jackets with swivel Tether System	56-7008 56-7024	1 1	" Bioscience
517.	Stop watch (alarm clock)	56-7032	1	

518.	Model 7-Polygraph with 4 channels	7-16p-40-25	2	Grass Instrument Co., P.O.Box 516 Quincy M.A. 02169 Grass Instrument
(a)	Power supplies and signal marker	RPS-7C-8	2	
(b)	Signal Marker and Timer	SMT 7	2	" "
(c)	Oscillographs	70 SC	8	" "
(d)	Driver Amplifiers	7DA	8	" "
(e)	Preamplifiers and plug-ins:			
	(i) Low level DC for DC potential and Transducers	7PI	2	" "
	(ii) Wide band AC and integrator (EEG, MG)	7P3	2	" "
	(iii) EEG-low-level, High grain AC, wide band	7P5	5	" "
	(iv) Rotameter blood flow adaptor	7P7	2	" "
	(v) EKG-Sphygmomanometer/Aneroid Manometer and pulse transducer	7P8	2	" "
	(vi) General purpose polygraph Differentiator	7P20	1	" "
(f)	(i) Driver and preamplifier combined (7DA + 7PS)-1.75" panel height	7P511	1	" "
	(ii) Driver and Preamplifier combined (7DA + 7P1)	7P122	1	" "
(g)	Adaptor panels:			
	(i) Blank preamplifier cover panel	7P00	2	" "
	(ii) Adaptor panel (output connector only)	7P01	2	" "
	(iii) Adaptor panel (input, output and attenuator controls with chassis	7P03	2	

(iv) Adaptor panel (input and output connectors) 7P02	7	Gross Instruments
(h) Accessory Units:		
Master Record Playback Panel, 8 channel for Model 7	2	"
(i) Pushbutton electrode selector panels and Electrode Boards: 8-Channel (with 23 electrodepositions)	2	"
(j) Transducer:		
(i) Pressure: Volumetric (+5 mm Hg, +5 mm ³)	2	"
(ii) Force Displacement: 4 range, 2mg to 2 kgm	2	"
(iii) Respiration: Pneumatic, with cable PRT	2	"
(iv) Gould, Arterial, Miniature size P23 1D	2	"
519. Stopwatches 0-30 min, metal case 14-647-23	2	Fisher
520. 60-min Spring-wound Timer plastic 5.7 Lx10Wx11 cm H 06-660	2	"
521. Test tubes without 21m	2 dozen	Sibata
522. Centrifuge Tubes		
Polypropylene-IEC		
(i) 10ml; 16.1x81.4mm	24	Fisher
(ii) 50ml; 28.4x106 mm	24	"
(iii) Micro centrifuge tubes with caps: 1.5ml cap.	500	"

(iv) Centrifuge tubes 50 ml; Pyrex 28x14 mm, Stopper size 16	05-538-20B	12	Fisher
(v) Centrifuge tubes; 40ml. Pyrex (coxing 8120)	05-536	12	"
(vi) Centrifuge tubes: 15ml Pyrex stopper No.13	05-538-20A	12	"
(vii) 15ml Corex (Corming 8060A)	05-505-5	30	"
(viii) Centrifuge tubes; conical bottom 15ml	05-500	5 dozen	"
523. Centrifuge tubes			
(i) 50ml: 35x110 mm with cap	1028-504A	24	Sibata
(ii) 10ml; 16x105 mm; 12110	1028-14106	24	"
(iii) 10ml; 16x105 mm	1028-104A	36	"
524. Surgical instruments (3 sets)		2	
525. Hydrogen generator	2-2898	One	SUPELCO S.A. Chemin du Lavasson 2 1196 Gland Switzerland
526. Desiccant cartridge	2-2962	6	"
527. Deionizer	2-2963	6 packs	"
528. Eppendorf pipettes	4700 10 µl	10	IKEDA
	50 "	10	"
	100 "	10	"
	500 "	10	"
	1000 "	10	"
	4720 "	10	"
	5 "	10	"

529.	Intraventricular Cannula	819-60900-0	6	Bioscience
530.	CEPTO Electrophysiological Teaching Unit	812-81760-1	1	"
531.	Metal Frontal Writing Point (Pack of 5)	811-51000-0	6	"
532.	With Lever	811-51100-0	6	"
533.	Weights and Carrier 100 gms	811-61300-0	1	"
534.	Isotonic Lever and Weights	811-50700-0	6	"
535.	Students Isometric Lever	811-50800-0	6	"
536.	Simple Lever Assembly	811-50000-0	6	"
537.	Water Monometer	811-40360-0	2	"
538.	Recording drums	811-11058-0	6	"
539.	Universal Kymograph Assembly	851-10050-5	1	"
540.	Universal Kymograph with Stimulator 230V	811-30070-0	2	"
		811-10550-5	2	"
541.	T ₂ Isotonic transducer	810-25900-7	6	"
542.	P-23 Open beaded thermistor	810-90012-0	6	"
543.	F-23 beaded glass thermistor	810-1670	6	"
544.	Tendon Hammer	812-81762-0	2	"
545.	Student stimulator (230V)	813-13340-1	1	"
546.	Animal Clippers	01-305-10	2	Fisher
		01-305-10A	2	"
547.	Operating board	01-330	2	"
548.	Fisher tissue preparation model 135. Flootation Bath	15-464-10	1	"
549.	Aluminium foil	01-213	2 rolls	"

550.	Wrapping film	13-374-16	2 rolls	Fisher
551.	GRO-BOX Plant growth Cabinets	PPL 205-010X	1	Gallenkamp P.O.Box 290 Technic House Christopher Street London EC2 P2ER England 68260
552.	Modular Roller apparatus	06-411-50	1	Fisher
553.	Photo irvertoscope	LM 35/1CM 405	1	Zeiss, West Germany
554.	Cold incubators	11-679-56	2	Carl Zeiss, 7082 Oberkochen, W.Germany
555.	Filtration assemblies of diff. mesh sizes	6131-013022 -013030 -0138 -013065 -013080 -013120 -013300 -013500	100 100 100 100 100 100 100 100	SIBATA " " " " " " " "
556.	Medium size bottle/caps	60-340-99	(Box 24)	Flow Labs.
557.	" " "	60-108-05	(Box 100)	" "
558.	Re-usable pipettes	77-000-01	(Box 5)	" "
559.	Re-usable pipettes	77-001-01	(Box 5)	" "
560.	Pipette filter	77-004-05	(Box 100)	" "
561.	Pipette bulb	76-739-01	(Box 5)	" "
562.	Filter holder	77-003-00	(each)	" "
563.	Pipette Tips	77-890-07	(Box 500)	" "
564.	Pipette rack	77-854-00	(each)	" "
565.	Vials for storage	76-717-07	(Box 500)	" "
566.	Vial Carrier	76-720-00	(each)	" "
567.	Wall clocks	TKL-210	2	Gallenkamp

<u>S.No.</u>	<u>Items</u>	<u>Code</u>	<u>Qty</u>	<u>Supplier</u>
568.	Drying Oven Model Power Ac 220V	SI-1002	One	Sibata
569.	Incubator with Freezer. Model CR-14 Power AC 220V	SI-021	One	=
570.	Incubator Oven, Model SI-300 Power AC 220V	SI-1011	One	=
571.	Block heaters, Model TAH-1 Power AC 220V	SI-1702	One	=
572.	Blocks:- (i) 13x36 (ii) 18x20 (iii) 24x16		One One One	=
573.	Auto clave, Model AS-230 Power AC 220V	SI-2301	One	=
574.	Shaker bath, Model 902, Power AC 220V	SI-3002	Two	=

575.	Test tube mixer Model S-50 Power Ac 220V	SL-3411	One	=
576.	Ultrasonic cell disruptor. Model USD-500 Power AC220V	SL-4321	One	=
577.	High speed Centrifuge with Refrigerator. Model H-2100M.	SL-5001	One	=
578.	Angle Rotors:- (i) Type A 10x12 (ii) Type B 50x6 (iii) Type K 200 x 6 (iv) Type M 500 x 4	SL-5012	One	=
		SL - 5023	One	=
579.	Centrifuge Table top., Power AC 220V	SL-5121	One	=
580.	Mini Filter Holders, polycarbonate, (i) for 13 mm Filter (ii) for 25 mm Filter	SL-5422 SL-5423	One case (10 Pis.,) Two case (10 Pis.,)	

581.	Dispensers: Burette with Amber bottle 1 - 10ml.	SI-6139	Four	=
582.	Dispensers: Digipet;			
	(i) Model DG-10	SI-6191	Two	=
	(ii) 2-10ml DG-100 10-100ml	SI-6192		
	(iii) DG-1000	SI-6194	Two	=
	(iv) Stand for Digipet.	SI-6198	Two	=
583.	Ultra sonic cleaner. Model 100-2u Power Ac 220V	SI-8002	One	=
584.	Water Distilling Apparatus Model D-2	S2-3021	One	=
585.	Precision balance Model JP-200	S3-1003	One	=
586.	Precision balance Model JP-2000	S3-1004	One	=

587.	Balance double beam; Model SB-2000.	S3-1103	One	=
588.	Colony counter, Model 102.	S3-4602	One	=
589.	pH meter Model 671	S3-6005.	One	=
590.	a. Glass pH combination electrodes, Standard. b. Lead wire lm & BNC connector.	S3-6101	Two	=
591.	Extremely low temperature freezer. Model RS-30Y Power Ac 220V.	S5-2213	One	=
592.	Clean Draft chambers: Model SCV-1600	S5-3313	One	=
593.	UV-spectrophotometer, double beam, latest model		One	Schmadzu
594.	Thermomagnetic Stirers		Two	=

595.	Universal middle speed centrifuge with Refrigerator.	UJK-6473 Rotor Model G&G1	One	OSK
596.	Laminar Flow cabinet.	3050/ET(0838)	Two	Gelman Inst.
597.	Minishkar	S5-80	One	Eyela
598.	Fluor ^o Spectrophotometer.	OSK-6561	One	OSK
599.	Automatic Incubator.	OSK-6343	One	OSK
600.	Reagent sprayers.	72650	Two	= =
601.	Stop watch 0-30 min, metal case.	14-647-23	Two	Fisher
602.	60-min spring-wound timer. Plastic.	06-660	Two	=
603.	Beakers:- (i) Type 50 A (ii) Type 100 A (iii) Type 300A	S4-2002 S4-2003 S4-2008	84 (one case) 120 (one case) 36 (one case)	 = = =

604.	Test tubes, borosilicate:- (i) 12x105; Type 1016 - 12105A (ii) Type 4616A 16.5x165	S4-2301 S4-2305	1000 One case 600 (one case)	=
605.	Centrifuge tubes Type 1015-101A	S4-2341	One case (100)	=
606.	Disposable culture tubes: 12x100 Type 12100A	S4-2353	One case (1000)	=
607.	Screw capped test tubes; 12x100 Type 12100R	S4- 2353	One case (1000)	=
608.	Screw capped Test tubes; borosilicate glass, Model 16125A	S4-2364	4 cases (50x4)	=
609.	Sample bottles:- (i) Type 1791-1535A (ii) Type 1840A (iii) Type 2755A	S4-2707 S4-2703 S4-2707	One case (100 pc) One case (100) One case (50)	= q= =
610.	Aspirator Bottle Type 06-01-02.	S4-2902	Two	=

611.	Polyethylene Aspirator Bottle with stopcock; Type 22-05-05	S4-6155	Two	=
612.	Pipet washer with basket Type 22-60-2	S4-6102	Two	=
613.	Racks for Test tubes:-			
	(i) Type 09B	S4-8459	Six	=
	(ii) Type 02B	S4-8452	Six	=
614.	Baskets for test tubes: Type ss.	S4-8538	Four	=
615.	Thermometers	S4-8601	Four	=
616.	Eppendorf tubes; polyethylene, capacity 1.5 ml.		100-500	Any make.
617.	Petri dishes Pyrex 100mmx15mm		500	Any make.
618.	Culture tubes for Capsenberg caps; straight rim		100	Any make.
619.	Caps, Capsenberg; Aluminum.		100	Any make.
620.	Culture tubes with plastic chrome caps (i) 12x100		100	=

621.	Clay Adams Hematology Analyzer accessories	02-714-11	1	Fisher
		02-714-5	1	"
		02-714-7	1	"
		02-714-14	1	"
		02-714-13	1	"
		02-714-15	1	"
		02-714-10	1	"
622.	Micro blood collecting tubes	02-668-10	2 packs	"
		02-668-15	2 packs	"
623.	Micro hematocrit capillary tubes	02-668-66	4 packs	"
		02-668-68	4 packs	"
624.	Hematocrit tube sealants	02-676-20	2 packs	"
625.	Hemat-O-Seal	02-678	2 packs	"
626.	Cold room 19'x12'x10' at 4°C 6'x12'x10' at 20°C		1	Foster
627.	Voltage stabilizers	OSK 3597-CVR-IX (IKVA)	6	OSK

IV-2 要請機材リスト クズダール工科大学教育機材整備計画

SHEETS INDEX
OF SPECIFICATION FOR
BALUCHISTAN ENGINEERING COLLEGE

SHOP AND LABORATORY EQUIPMENT

SPECIFICATIONS

DEPARTMENT / SECTION

I MECHANICAL ENGINEERING DEPARTMENT

- | | | |
|----|-----|---|
| 1. | MJA | HYDRAULIC LABORATORY SECTION |
| 2. | MMA | MATERIAL TESTING SECTION |
| 3. | MPA | PRECISION MEASURING SECTION |
| 4. | MWA | WORKSHOP SECTION |
| 5. | MEA | HEAT ENGINE SECTION |
| 6. | MAA | AIRCONDITIONING & REFRIGERATION SECTION |
| 7. | NTA | HEAT TREATMENT SECTION |
| 8. | MVA | AUTOMOTIVE WORKSHOP SECTION |
| 9. | MDA | DRAWING ROOM |

BALUCHISTAN ENGINEERING COLLEGE

KHUZDAR PAKISTAN

II ELECTRICAL ENGINEERING DEPARTMENT

- | | | |
|----|-----|---------------------------|
| 1. | ELA | ELECTRICITY SECTION |
| 2. | ERA | ELECTRONICS SECTION |
| 3. | ETA | TELECOMMUNICATION SECTION |
| 4. | EWA | WORKSHOP SECTION |
| 5. | EDA | DRAWING ROOM |

I MECHANICAL ENGINEERING DEPARTMENT

II ELECTRICAL ENGINEERING DEPARTMENT

III CIVIL ENGINEERING DEPARTMENT

IV COMMON EDUCATIONAL EQUIPMENTS

V OTHER FACILITIES

III CIVIL ENGINEERING DEPARTMENT

- | | | |
|----|-----|---------------------------------------|
| 1. | CCA | STRUCTURAL & CONCRETE SECTION SECTION |
| 2. | CSA | SOIL MECHANICS SECTION |
| 3. | CRA | ROAD & HIGHWAY SECTION |
| 4. | CIA | SANITARY & IRRIGATION SECTION |
| 5. | CJA | SURVEYING SECTION |
| 6. | CDA | DRAWING ROOM |

IV COMMON EDUCATIONAL EQUIPMENTS

- | | | |
|----|-----|---------------------------|
| 1. | PHA | APPLIED PHYSICS SECTION |
| 2. | CHA | APPLIED CHEMISTRY SECTION |
| 3. | ACA | AUDIO-VISUAL EQUIPMENTS |
| 4. | ECA | COMPUTER SECTION |

V OTHER FACILITIES

- | | | |
|----|-----|---------------------|
| 1. | HRA | HOSTEL & RESTAURANT |
|----|-----|---------------------|

I MECHANICAL ENGINEERING DEPARTMENT

1. MIA

HYDRAULIC LABORATORY SECTION

2. MYA

MATERIAL TESTING SECTION

3. MPA

PRECISION MEASURING SECTION

4. MWA

WORKSHOP SECTION

5. MEA

HEAT ENGINE SECTION

6. MAA

AIRCONDITIONING & REFRIGERATION SECTION

7. MTA

HEAT TREATMENT SECTION

8. MYA

AUTOMOTIVE WORKSHOP SECTION

9. MDA

DRAWING ROOM

HYDRAULIC LABORATORY SECTION (MHA)

No.	Description	Qty
MHA-1	Air Demonstration Apparatus	1
MHA-2	Raynolds number Experimental app.	1
MHA-3	Hydraulic Bench	1
MHA-4	Bernoulli Theorem Apparatus	1
MHA-5	Comparative Flow Measurement App.	1
MHA-6	Orifice Flow Experimental App.	1
MHA-7	Platform Scale	1
MHA-8	Viscous Meter	1
MHA-9	Air Compressor	1
MHA-10	Vacuum Pump	1
MHA-11	Air Meter	2
MHA-12	Vacuum Pressure Tester	1
MHA-13	Volt Meter	1
MHA-14	Ampere Meter	5
MHA-15	Hydrometer	5
MHA-16	Second Meter	2
MHA-17	Tachometer	5
MHA-18	Tools	3
MHA-19	Work Bench	1

MATERIAL TESTING SECTION (MMA)

No.	Description	Q'ty
MMA-1	Universal Testing Machine	1
MMA-2	Impact Testing Machine	1
MMA-3	Torsion Testing Machine	1
MMA-4	Dial Extensometer	2
MMA-5	Micro Vickers Hardness Tester	1
MMA-6	Rockwell Hardness Tester	2
MMA-7	Brinell Hardness Tester	1
MMA-8	Shore Hardness Tester	2
MMA-9	Dividing Machine for Test Bar	1
MMA-10	Erichson's Cupping Tester	1
MMA-11	Direct Reading Balance	1
MMA-12	General Tools	1
MMA-13	Work Bench	2

MMA-14 - 1000 standards

MMA-15 - 1000 surface roughness gauges

PRECISION MEASURING SECTION (MPA)

No.	Description	Q'ty
MPA-1	Tool Microscope	3
MPA-2	Surface Roughness Tester	1
MPA-3	Profile Projector	1
MPA-4	Height Master	1
MPA-5	Screw Thread Comparator	1
MPA-6	Gauge Block Set	2
MPA-7	Pocket comparator	3
MPA-8	Square Master	1
MPA-9	Combination Square Set	5
MPA-10	Steel Rule	5
	Steel Rule	5
	Steel Rule	5
MPA-11	Screw Pitch Gauge	5
	Screw Pitch Gauge	5
	Screw Pitch Gauge	5
	Screw Pitch Gauge	5
MPA-12	Morse Taper Gauge	1
MPA-13	Angle Gauge	5
MPA-14	Radius Gauge	5
	Radius Gauge	5
MPA-15	Thickness Gauge	5
MPA-16	Universal Bevel Protractor	3
MPA-17	Cylinder Bore Gauge	2
MPA-18	Dial Indicator	5
	Dial Indicator	2
	Dial Gauge Stand	6
MPA-19	Granite Plate with Stand	1
MPA-20	Precision Surface Plate	2
MPA-21	Vernier Height Gauge	2
MPA-22	Depth Gauge	3
MPA-23	Vernier Caliper	5
	Vernier Caliper	5
MPA-24	Optical Parallel	2
MPA-25	External Micrometer Set	5
MPA-26	Inside Micrometer Set	5
MPA-27	Caliper Type Inside Micrometer	3
MPA-28	Caliper Type Inside Micrometer	3
	Depth Micrometer	3

WORKSHOP SECTION (MWA)

No.	Description	Qty
MWA-29	Surface Thread Micrometer	3
MWA-30	Straight Edge	3
MWA-31	Straight Edge	2
MWA-32	Cylinder Square	10
MWA-33	Flat Type Square, Steel	5
MWA-34	Flat Type Square, Steel	3
MWA-35	Flat Type Square, Steel	3
MWA-36	V-block	3
MWA-37	V-block	3
MWA-38	Precision Square Level	2
MWA-39	Flat Type Precision Level	2
MWA-40	Sine Bar with Center	1
MWA-41	Surface Gauge	10
MWA-42	Tools	1
MWA-43	Mini Micro Scope	5
MWA-44	Mini Micro Scope	5
MWA-45	Micrometer Stand	2
MWA-46	Work Bench	3

Slip Gauge
Slide Snap Gauge
Steel Test Penetration
Slide micrometer
Universal Bevel Protractor
Precision Vernier Caliper

No.	Description	Qty
MWA-1	Engine Lathe with accessories	9
MWA-2	Engine Lathe w/accessories	1
MWA-3	Bench Drilling Machine	4
MWA-4	Upright Drilling Machine	2
MWA-5	Upright Drilling Machine	1
MWA-6	Radial Drilling Machine	1
MWA-7	Universal Milling Machine w/accessories	1
MWA-8	Horizontal Milling Machine w/accessories	2
MWA-9	Vertical Milling Machine	1
MWA-10	Shaping Machine	1
MWA-11	Slotting Machine	1
MWA-12	Surface Grinding Machine w/accessories	1
MWA-13	Block Gauge Set	1
MWA-14	Universal Tool Grinder w/accessories	1
MWA-15	Carbide Tool Bit Grinder	1
MWA-16	Drill Grinder	1
MWA-17	Double Head Grinder /Bench Type	2
MWA-18	Double Head Grinder with Floor Stand	2
MWA-19	Hack Sawing Machine	1
MWA-20	Metal Band Sawing Machine	1
MWA-21	Abrasive Cutting Machine	2
MWA-22	AC Arc Welder	2
MWA-23	DC Arc Welder	1
MWA-24	TIG Arc Welder (Argon Arc Helder)	1
MWA-25	Portable Spot Welder	2
MWA-26	Engine Welder w/ Wheel	1
MWA-27	Gas Holding Set	2
MWA-28	Holding Food & Fan	4
MWA-29	Welding Booth With Curtain	4
MWA-30	Holding Table & Chair	4
MWA-31	Hydraulic Press	1
MWA-32	Hydraulic Pipe Bender	1
MWA-33	Pipe Threading Machine	1
MWA-34	Shearing Machine	1
MWA-35	Lever Shear	1
MWA-36	3-Roll Bender	1
MWA-37	Air Compressor	1
MWA-38	Hood Circular Saw Bench	1
MWA-39	Hood Planer (Jointer)	1

HEAT ENGINE SECTION (HAE) *

No.	Description	Qty
MHA-39	Hollow Chisel	1
MHA-40	Jig Saw	1
MHA-41	Moulder	1
MHA-42	Belt Sander & Disc	1
MHA-43	Hand Band Saw	1
MHA-44	Portable Dust Collector	3
MHA-45	Profile Projector	1
MHA-46	Rockwell Hardness Tester	1
MHA-47	Brinell Hardness Tester	1
MHA-48	Block Gauge	1
MHA-49	Electric Tools	1
	1) Electric Drill	3
	Electric Drill	2
	Electric Drill	1
	2) Electric Hand Grinder	2
	Electric Hand Grinder	1
	3) Polisher	2
	4) Electric Hand Planer	3
	5) Portable Circular Saw	3
	6) Portable Router	1
	7) Portable Jig Saw	2
	8) Electric Hand Shear	1
MHA-50	Surface Plate	1
	1) For Measuring	2
	2) For Fitting	2
	For Fitting	1
	3) For Welding	1
MHA-51	Measuring Tools	1
MHA-52	Hand Tools	1
MHA-53	Cutting Tools	1
MHA-54	Wooden Tools	5
MHA-55	Work Bench	4
MHA-56	Foot Shearing Machine	1
MHA-57	Hydraulic Punch Set	1

No.	Description	Qty
MEA-1	Engine Research and Test Bed	1
MEA-2	Thermal Conductivity Measuring Apparatus	1
MEA-3	Gasoline Engine	2
	Gasoline Engine	1
	Gasoline Engine	1
MEA-4	Diesel Engine	1
	Diesel Engine	1
	Diesel Engine	1
MEA-5	Tachometer	2
MEA-6	Multimeter	3
MEA-7	Engine Generator	1
MEA-8	Work Bench	3
MEA-9	Tools	1

AIRCONDITIONING & REFRIGERATION (MAA)

No.	Description	Qty
MAA-1	Fan Coil Unit	2
MAA-2	Rotary Compressor	1
MAA-3	Air Cooled Split System Packaged Type Aircon.	1
MAA-4	Air Cooled Split System Airconditioner	2
MAA-5	Window Type Room Airconditioner	2
MAA-6	Bending Machine	1
MAA-7	Threading Machine	1
MAA-8	Portable Grinder	1
MAA-9	Electric Drilling Machine	2
MAA-10	Tools & Instrumentations	1
MAA-11	Work Bench	3

HEAT TREATMENT SECTION (MTA)

No.	Description	Qty
MTA-1	High Temperature Furnace	1
MTA-2	Oil Fired Furnace	1
MTA-3	Black-Smith Forge	1
MTA-4	Quenching Oil Tank	1
MTA-5	Optical Pyrometer	1
MTA-6	Surface Thermometer	2
MTA-7	Pocket Digital Thermometer	2
MTA-8	Digital Multi Thermometer	1
MTA-9	Recorder	1
MTA-10	Swaging Anvil	2
MTA-11	Swage Block	2
MTA-12	Forging & General Tools	1
MTA-13	Work Bench	2

• AUTOMOTIVE WORKSHOP SECTION (MVA) •

No.	Description	Qty
MVA-1	Garage Jack	3
MVA-2	Rigid Rack	2
MVA-3	Steam Cleaner	1
MVA-4	Parts Washing Stand	1
MVA-5	Air Compressor	1
MVA-6	Oil Buckel Pump	1
MVA-7	Valve Lifter & Compressor	1
MVA-8	Nozzle Tester	1
MVA-9	Battery Charger	1
MVA-10	Engine Stand	1
MVA-11	Tacho-dwell Tester	1
MVA-12	Battery Tester	1
MVA-13	Voltage Regulator Tester	1
MVA-14	Tire Service Tools Set	1
MVA-15	Body Fender Tool Set	1
MVA-16	Battery Hydrometer Set	1
MVA-17	Grease Gun	2
MVA-18	Mechanic Tool Kit Set	2
MVA-19	Gasket Punch Set	1
MVA-20	Nozzle Cleaning Kit	1
MVA-21	Sling Chain	2
MVA-22	Lubricating Vessel	1
MVA-23	Ambulance Car	1
MVA-24	Micro Bus	2
MVA-25	Jeep	2
MVA-26	Student Bus	2

• DRAWING ROOM (MDA) •

No.	Description	Qty
MDA-1	Drafting Table	42
MDA-2	Drafting Machine	42
MDA-3	Drawing Board, magnetic	42
MDA-4	Drafting Chair	42
MDA-5	Fluorescent Light	42
MDA-6	Tracing Table	5
MDA-7	Drafting Instrument	42
MDA-8	Drafting Cabinet w/Stand	4
MDA-9	Drafting Paper Suspender w/Stand	4
MDA-10	Blue Copying Machine	1
MDA-11	Scale & Rule	
	1" scale	42
	French Curve Scale	42
	Triangle Scale	42
	Triangle Rule	42
	Straight Rule	42
	Protractor	42
	Free Curve Rule	42
MDA-12	Small Instrument	
	Brush for Drawing	
	Paper Cutter	
	Magnet Plate	
	Error Plate	
	Pencil Shaper	
MDA-13	Template	42
MDA-14	Lettering Card	42
MDA-15	Lettering Pen Set	42
MDA-16	Pantograph	10

ELECTRICITY SECTION (ELA)

No.	Description	Qty
ELA-1	Resistance Experiment Unit	10
ELA-2	Capacity Test Unit	10
ELA-3	Wheatstone Bridge for Trainer	10
ELA-4	Induction and Magnetic Characteristic Testing Unit	20
ELA-5	Potentiometer for Trainer	10
ELA-6	Cut Motor Experiment Unit	8
ELA-7	Cut Motor	8
ELA-8	Cut Motor	8
ELA-9	Experimental Motor	2
ELA-10	Experimental Motor	2
ELA-11	Experimental Motor	2
ELA-12	Experimental Motor	2
ELA-13	Experimental Motor	2
ELA-14	Experimental Motor	2
ELA-15	Motor Generator for Experimental Machine	1
ELA-16	Motor Generator for Experimental Machine	1
ELA-17	Motor Generator for Experimental Machine	1
ELA-18	Motor Generator for Experimental Machine	1
ELA-19	Portable Standard DC Volt Meter	10
ELA-20	Portable Standard DC Volt Meter	10
ELA-21	Portable Standard DC Volt Meter	10
ELA-22	Portable Standard DC Ammeter	10
ELA-23	Portable Standard DC Ammeter	10
ELA-24	Portable Standard DC Ammeter	10
ELA-25	Portable Standard DC Ammeter	10
ELA-26	Portable Standard AC Voltmeter	5
ELA-27	Portable Standard AC Voltmeter	5
ELA-28	Portable Standard AC Voltmeter	5
ELA-29	Portable Standard AC Voltmeter	5
ELA-30	Portable Standard AC Voltmeter	5
ELA-31	Portable Standard AC Ammeter	5
ELA-32	Portable Standard AC Ammeter	5
ELA-33	Portable Standard AC Ammeter	5
ELA-34	Portable Standard AC Ammeter	5
ELA-35	Portable Standard AC Ammeter	5
ELA-36	Portable Standard AC Ammeter	5
ELA-37	Portable Single-phase Wattmeter	3

II ELECTRICAL ENGINEERING DEPARTMENT

1. ELA ELECTRICITY SECTION
2. ERA ELECTRONICS SECTION
3. ETA TELECOMMUNICATION SECTION
4. EWA WORKSHOP SECTION
5. EDA DRAWING ROOM

No.	Description	Q'ty
ELA-38	Portable Single-phase Wattmeter	3
ELA-39	Portable Single-phase Wattmeter	3
ELA-40	Portable Single-phase Wattmeter	3
ELA-41	Portable Single-phase Wattmeter	3
ELA-42	Portable Single-phase Wattmeter	3
ELA-43	Portable Three-phase Wattmeter	3
ELA-44	Portable Three-phase Wattmeter	3
ELA-45	Portable Three-phase Wattmeter	3
ELA-46	Clip-on AC Power Meter	4
ELA-47	Clip-on AC Power Meter	2
ELA-48	Electronic Galvanometer	3
ELA-49	Galvanometer	5
ELA-50	Portable Potentiometer	3
ELA-51	Portable Wheatstone Bridge	4
ELA-52	Portable Double Bridge	4
ELA-53	Decade Resistance Box	4
ELA-54	Decade Resistance Box	4
ELA-55	Slide Resistor	4
ELA-56	Slide Resistor	4
ELA-57	Slide Resistor	4
ELA-58	Slide Resistor	4
ELA-59	Slide Resistor	4
ELA-60	Standard Resistor	5
ELA-61	Standard Resistor	5
ELA-62	Standard Resistor	5
ELA-63	Standard Resistor	5
ELA-64	Standard Resistor	5
ELA-65	Standard Resistor	5
ELA-66	Standard Resistor	5
ELA-67	Standard Resistor	5
ELA-68	Standard Resistor	5
ELA-69	Standard Resistor	5
ELA-70	Electronic Fluxmeter	2
ELA-71	Insulation Tester	3
ELA-72	Insulation Tester	3
ELA-73	Insulation Tester	3
ELA-74	Insulation Tester	3
ELA-75	Earth Tester	4
ELA-76	Rectifier	1
ELA-77	Rectifier	1

No.	Description	Q'ty
ELA-78	Rectifier	1
ELA-79	Rectifier	1
ELA-80	Rectifier	1
ELA-81	Rectifier	1
ELA-82	Universal Load	2
ELA-83	Universal Load	2
ELA-84	Condenser	3
ELA-85	Inductor	4
ELA-86	Inductor	4
ELA-87	Inductor	4
ELA-88	Power Measuring Instrument	1
ELA-89	Universal Leakage Current Tester	8
ELA-90	Electrician's Tool Kit	42
ELA-91	Electrician's Tool Kit	3
ELA-92	Components for Circuit Board	1
ELA-93	Tools	1
ELA-94	Electric Tools	1
ELA-95	Samples	1
ELA-96	Work Bench	4
ELA-97	Regulated DC Power Supply	28

• TELECOMMUNICATIONS SECTION (ETA) •

No.	Description	Qty.
ETA-1	Digital Telephone Exchange	1

• ELECTRONICS SECTION (ERA) •

No.	Description	Qty.
ERA-1	Resistance Experimental Unit	20
ERA-2	Wheatstone Bridge Experimental Unit	10
ERA-3	Calibration Bridge for Trainer	10
ERA-4	Wheatstone Bridge	3
ERA-5	Galvanometer	10
ERA-6	Slide Resistor	3
	Slide Resistor	3
	Slide Resistor	3
	Slide Resistor	3
	Slide Resistor	3
ERA-7	Volt Slider	10
ERA-8	Volt Slider	10
ERA-9	Portable DC Ammeter	10
	Portable DC Ammeter	10
	Portable DC Ammeter	10
ERA-10	Portable DC Voltmeter	10
ERA-11	Portable AC Ammeter	5
	Portable AC Ammeter	5
ERA-12	Portable AC Voltmeter	5
	Portable AC Voltmeter	5
ERA-13	High Frequency Ammeter	4
	High Frequency Ammeter	4
ERA-14	Portable Frequency Counter	4
ERA-15	Electrician's Tool Kit	42
ERA-16	Electrician's Tool Kit	2
ERA-17	Work Bench	4

• WORKSHOP SECTION (EWA) •

No.	Description	Qty
EWA-1	DC Calibration Set	2
EWA-2	AC Calibration Set	2
EWA-3	Precision Digital Multimeter	2
EWA-4	Digital AC Meter	2
EWA-5	Universal Tachometer	8
EWA-6	Digital Multimeter	8
EWA-7	Portable Recorder	2
EWA-8	Insulation Tester	2
EWA-9	Insulation Tester	2
EWA-10	Earth Tester	4
EWA-11	Pocket Conductivity Meter	2
EWA-12	Circuit Tester	10
EWA-13	Digital Luxmeter	3
EWA-14	Digital Luxmeter	1
EWA-15	Electric Voltmeter	4
EWA-16	Home Appliance Tester	2
EWA-17	AC Stabilization Power Supply	1
EWA-18	AC Stabilization Power Supply	1
EWA-19	Distribution Board	1
EWA-20	Distribution Board	1
EWA-21	High Tension Switch Board for Training	1
EWA-22	Low Tension Switch Board for Training	2
EWA-23	Insulation Puncture Tester	1
EWA-24	Relay Tester	1
EWA-25	Oil Circuit Breaker	1
EWA-26	Induction Voltage Regulator	1
EWA-27	Miscellaneous	1
	Work bench	4

• DRAWING ROOM (EDA) •

No.	Description	Qty
EDA-1	Drafting Table	4
EDA-2	Drafting Machine	42
EDA-3	Drawing Board, magnetic	42
EDA-4	Drafting Chair	42
EDA-5	Fluorescent Light	42
EDA-6	Drafting Table	5
EDA-7	Drafting Instrument	42
EDA-8	Drafting Cabinet w/Stand	4
EDA-9	Drafting Paper Suspender w/Stand	4
EDA-10	Blue Copying Machine	1
EDA-11	Scale & Rule	1
	1" scale	42
	French Curve Scale	42
	Triangle Scale	42
	Triangle Rule	42
	Straight Rule	42
	Protractor	42
	French Curve Rule	42
EDA-12	Small Instrument	1
	Brush for Drawing	1
	Paper Cutter	1
	Magnet Plate	1
	Error Plate	1
	Pencil Sharpener	1
EDA-13	Template	1
EDA-14	Lettering Card	1
EDA-15	Lettering Pen Set	1
EDA-16	Pantograph	10

• STRUCTURAL & CONCRETE SECTION (CCA) •

Item No.	Description	Qty
CCA-1	Universal Testing Machine	1
CCA-2	Vicat Apparatus	4
CCA-3	Vicat Apparatus (BS standard)	1
CCA-4	Gillmore Needle	2
CCA-5	Motorized Mortar Flow Table	2
CCA-6	Electric Mortar Flexure Tester	1
CCA-7	Michaelis Type Mortar Flexure Tester	2
CCA-8	Praeger Needle for Mortar	2
CCA-9	Blaine Fineness Tester	4
CCA-10	Cement Calorimeter	1
CCA-11	Motorized Mortar Permeability Apparatus	1
CCA-12	Autoclave with Pressure Regulator	1
CCA-13	Mortar Length Comparator	1
CCA-14	Mortar Bleeding Apparatus	2
CCA-15	Slump Test Set	10
CCA-16	Poisson's Ratio Measuring Apparatus	1
CCA-17	Berry's Strain Gage	2
CCA-18	2" Cube Mold with Tamper	10
CCA-19	70.7mm Cube Mold with Tamper	2
CCA-20	Briquette Mold with Tamper	4
CCA-21	Briquette Mold	2
CCA-22	Mortar Prism Mold with Tamper	4
CCA-23	3 Gang Mold for Mortar Length Comparator w/Tamper	4
CCA-24	Concrete Cylindrical Mold	10
CCA-25	Concrete Cube Mold	4
CCA-26	Straight Edge	5
CCA-27	High Speed Finishing Machine of Concrete Specimen	1
CCA-28	Internal Vibrator	2
CCA-29	Mortar Vibrator	1
CCA-30	Concrete Beam Mold	8
CCA-31	Concrete Specimen Grips	4
CCA-32	Cutting Machine for Concrete Specimen	1
CCA-33	Rake Drum Type Concrete Mixer	1
CCA-34	Sample Splitter	2
CCA-35	Mechanical Convection Oven	1
CCA-36	Constant Temperature Electric Drying Oven	1
CCA-37	Thermostatic Constant Humidity Chamber	1
CCA-38	Electronic Balance	1
CCA-39	Electronic Balance	1

III CIVIL ENGINEERING DEPARTMENT

1. CCA STRUCTURAL & CONCRETE SECTION

2. CSA SOIL MECHANICS SECTION

3. CRA ROAD & HIGHWAY SECTION

4. CIA SANITARY & IRRIGATION SECTION

5. CUA SURVEYING SECTION

6. CDA DRAWING ROOM

• SOIL MECHANICS SECTION (CSA) •

New No.	Description	Q'ty
CCA-40	Trip Scale	1
CCA-41	Table Platform Scale	1
CCA-42	Platform Scale	1
CCA-43	Platform Scale	1
CCA-44	Los Angeles Abrasion Testing Machine	1
CCA-45	Ro-Tap Sieve Shaker	1
CCA-46	Test Sieve Set	4
CCA-47	Sand Absorption Cone with Rod	4
CCA-48	Le Chatelier Pycnometer	8
CCA-49	Unit Weight Measures	2
CCA-50	Gravel Specific Gravity Test Set	2
CCA-51	Stone Meter	42
CCA-52	Stone Hardness Tester	2
CCA-53	Aggregate Impact Testing Machine	1
CCA-54	Aggregate Crushing Test Set	1
CCA-55	Improved Washington Type Air Meter	2
CCA-56	Henzel Type Air Meter	2
CCA-57	Mortar Mixer	1
CCA-58	Table Vibrator	1
CCA-59	Concrete Permeability Apparatus	1
CCA-60	Concrete Flow Table	1
CCA-61	Concrete Test Hammer	1
CCA-62	Compressor	1
CCA-63	Miscellaneous Tools & etc.	1
CCA-64	Work Bench	2

New No.	Description	Q'ty
CSA-1	Electric Unconfined Compression Apparatus	1
CSA-2	Consolidation Testing Apparatus	1
CSA-3	Compaction Apparatus	2
CSA-4	C.B.R. Test Apparatus	1
CSA-5	Cone Penetrometer	2
CSA-6	Plate Bearing Test Set	2
CSA-7	Standard Penetrometer	1
CSA-8	Centrifugal Separator for Water Equivalent Test	1
CSA-9	Mechanical Convection Oven	1
CSA-10	Particle Size Analysis Set	1
CSA-11	Liquid Limit Device	1
CSA-12	Plastic Limit Plate	4
CSA-13	Shrinkage Limit Device	4
CSA-14	Field Density Set	4
CSA-15	Sample Splitter	2
CSA-16	Pycnometer	4
CSA-17	Soil Sampling Auger Set	4
CSA-18	Test Sieve Set	4
CSA-19	Water Distillation Apparatus	1
CSA-20	Soil Mixer	1
CSA-21	PW Meter	1
CSA-22	Triple Beam Balance	1
CSA-23	Table Balance	1
CSA-24	Miscellaneous	1
CSA-25	Miscellaneous	1
CSA-26	Work bench	2

• ROAD & HIGHWAY SECTION (CRA) •

New No.	Description	Qty
CRA-1	Motorized Centrifugal Extractor	1
CRA-2	Petroleum Auto-Extractor	1
CRA-3	Asphalt Mixer	1
CRA-4	Hubbard Stability Test Apparatus	1
CRA-5	Marshall Test Apparatus	1
CRA-6	Hot Plate	2
CRA-7	Luer Type Viscosimeter	1
CRA-8	Benkelman Beam Tester	1
CRA-9	Cone Drilling Machine	1
CRA-10	Asphalt Test Sieve	4
CRA-11	Mechanical Convection Oven	1
CRA-12	Balance (Electronic Balance)	1
CRA-13	Balance (Table Platform Scale)	1
CRA-14	Engler's Viscosimeter	4
CRA-15	Universal Asphalt Penetration Tester	1
CRA-16	Asphalt Oven	1
CRA-17	Ring Ball Type Softening Point Tester	4
CRA-18	Ductility Testing Machine	1
CRA-19	Cleveland Flash Point Tester	2
CRA-20	Tag Closed Cup Flash Tester	2
CRA-21	Apparatus for Estimating Moisture in Oil	2
CRA-22	Distillation Apparatus for Cut Back Asphalt	1
CRA-23	Electric Thermostat Water Bath for Asphalt	1
CRA-24	Miscellaneous	1
CRA-25	Work bench	2

• SANITARY & IRRIGATION SECTION (CIA) •

New No.	Description	Qty
CIA-1	Monocular Microscope	4
CIA-2	Hydrometer	10
CIA-3	Trip Balance	4
CIA-4	Glass Wares for Water Testing	4
CIA-5	Standard Solution for PH Check	4
CIA-6	Containers, Tools & Others	4
CIA-7	Instruments Kit for Water Pollution	2
CIA-8	Chemical Balance	4
CIA-9	Incubator	2
CIA-10	PH Meter	4
CIA-11	Water Purifier	1
CIA-12	Electric Drying Oven	2
CIA-13	PH Comparator	4
CIA-14	Steam Sterilizer	2
CIA-15	Blower	1
CIA-16	Flow Regulator	4
CIA-17	Standard Sieve	2
CIA-18	Water Pump	2
CIA-19	Magnetic Stirrer	4
CIA-20	Filtrator	4
CIA-21	Filtrator	1
CIA-22	Heat Bath	4
CIA-23	Centrifuge	1
CIA-24	Centrifugal Precipitator	1
CIA-25	Pump for Experimentation	2
CIA-26	Dust Sampler	1
CIA-27	Bacterial Counter	4
CIA-28	Fluid Circuit and Flow Apparatus	1
CIA-29	Samples	1
CIA-30	Work Bench	4

• SURVEYING SECTION (CUA) •

Item No.	Description	Qty
CUA-1	Theodolite with Metal Tripod	5
CUA-2	Transit with Metal Tripod	5
CUA-3	Auto-level with Metal Tripod	5
CUA-4	Auto-level with Metal Tripod	5
CUA-5	Plane Table	10
CUA-6	Ranging Pole	50
CUA-7	Levelling Staff	10
CUA-8	Sextant	5
CUA-9	Tape Measure (Steel)	10
CUA-10	Tape Measure (Fiber glass)	10
CUA-11	Measurement Rope	10
CUA-12	Electric Calculator	10
CUA-13	Surveying Compass	10
CUA-14	Curvimeter	40
CUA-15	Clinometer	10
CUA-16	Stop Watch	5
CUA-17	Planimeter	10
CUA-18	Planimeter	10
CUA-19	Protractor (Disc)	42
CUA-20	Protractor (Triple beam)	2
CUA-21	Pentagraph	2
CUA-22	Binocular	3
CUA-23	Binocular	2
CUA-24	Counter	10
CUA-25	Pedometer	24
CUA-26	Optical Square	10
CUA-27	Square	10
CUA-28	Trestle	2
CUA-29	Staff Stand	20
CUA-30	Pole Stand	10
CUA-31	Umbrella	15
CUA-32	Sketching Board	42
CUA-33	Thermometer	10
CUA-34	Spring Balance	30
CUA-35	Work bench	2
CUA-36	Research Boat	2

• DRAWING ROOM (CDA) •

Item No.	Description	Qty
CDA-1	Drafting Table	42
CDA-2	Drafting Machine	42
CDA-3	Drawing Board, magnetic	42
CDA-4	Drafting Chair	42
CDA-5	Fluorescent Light	42
CDA-6	Tracing Table	5
CDA-7	Drafting Instrument	42
CDA-8	Drafting Cabinet w/Stand	4
CDA-9	Drafting Paper Suspender w/Stand	4
CDA-10	Blue Copying Machine	1
CDA-11	Scale & Rule	1
	1" scale	
	French Curve Scale	42
	Triangle Scale	42
	Triangle Rule	42
	Straight Rule	42
	Protractor	42
	Free Curve Rule	42
CDA-12	Small Instrument	42
	Brush for Drawing	42
	Paper Gutter	42
	Magnet Plate	42
	Error Plate	42
	Pencil Shaper	42
CDA-13	Template	42
CDA-14	Lettering Card	42
CDA-15	Lettering Pen Set	42
CDA-16	Pantograph	10

• APPLIED PHYSICS SECTION (PHA) •

IV COMMON EDUCATIONAL EQUIPMENTS

1. PHA APPLIED PHYSICS SECTION
2. CIA APPLIED CHEMISTRY SECTION
3. ACA AUDIO-VISUAL EQUIPMENTS
4. ECA COMPUTER SECTION

No.	Description	Qty
PHA-1	DC Ammeter	1
PHA-2	DC Ammeter	1
PHA-3	AC Ammeter	1
PHA-4	AC Ammeter	1
PHA-5	DC Voltmeter	1
PHA-6	AC Voltmeter	1
PHA-7	Galvanometer	1
PHA-8	Circuit Tester	1
PHA-9	Digital Multimeter	1
PHA-10	Insulation Resistance Test	1
PHA-11	Wattmeter	1
PHA-12	Meter Stick Bridge	1
PHA-13	Wheatstone Bridge	1
PHA-14	DC Potentiometer	1
PHA-15	Cadmium Standard Cell	1
PHA-16	Dial Resistor	1
PHA-17	Dial Resistor	1
PHA-18	Dial Resistor	1
PHA-19	Test Oscillator	1
PHA-20	Low Frequency Oscillator	1
PHA-21	Oscilloscope	1
PHA-22	Dual Trace Synchroscope	1
PHA-23	Electric Digital Counter	1
PHA-24	Gate Time Equipment	1
PHA-25	Gauss Meter	1
PHA-26	Recorder (Multi-Range)	1
PHA-27	X-Y Recorder	1
PHA-28	Electro Magnet	1
PHA-29	Low Frequency Generator	1
PHA-30	Specific Heat of Liquid Determination	1
PHA-31	Light Source	1
PHA-32	Spectro Lamp	1
PHA-33	Spectrometer	1
PHA-34	Measurement of Magnetic Field	1
PHA-35	Electro Magnetic Force Measuring	1
PHA-36	Radiation Detector	1
PHA-37	Regulated DC Power Supply	2
PHA-38	GM Survey Meter	1

APPLIED CHEMISTRY SECTION (CHA)

No.	Description	Qty
PHA-35	Synoscope	1
PHA-36	Automatic Voltage Regulator	1
PHA-37	Frequency Analyzer	1
PHA-38	Impact Tester	1
PHA-39	Hardness Tester	1
PHA-40	Heat Expansion Measuring Unit	1
PHA-41	Reometer	1
PHA-42	Polarimeter	1
PHA-43	Molecule Model	1
PHA-44	Surface Grinder	1
PHA-45	Molding Press	1
PHA-46	Cutting Machine	1
PHA-47	Slide Projector	1
PHA-48	Overhead Projector	1
PHA-49	Projection Screen	1
PHA-50	Dark Room Equipment	1
PHA-51	Microscope TV System	1
PHA-52	8 mm Projector	1
PHA-53	Motion Picture Camera	1
PHA-54	Thermal Conductivity Meter	1

No.	Description	Qty
CHA-1	Muffle Furnace	1
CHA-2	Tubular Furnace	1
CHA-3	Crucible Furnace	1
CHA-4	Automatic Mortar & Pestle	1
CHA-5	Swing Grinding Mill	1
CHA-6	Ro-Tap Vibrator	1
CHA-7	Centrifuge	1
CHA-8	Rotary Vacuum Pump	1
CHA-9	Optical Pyrometer	1
CHA-10	Radiation Thermometer	1
CHA-11	Mixer	1
CHA-12	Magnetic Stirrer with Hot Plate	1
CHA-13	Stirrer	1
CHA-14	Magnetic Stirrer	1
CHA-15	Hot Plate	1
CHA-16	Hot Plate	1
CHA-17	Oil Bath	1
CHA-18	Oil Bath	1
CHA-19	Water Bath	1
CHA-20	Water Bath	1
CHA-21	Electronic Analytical Balance	1
CHA-22	Electronic Analytical Balance	2
CHA-23	Trip Balance	1
CHA-24	Trip Balance	1
CHA-25	Trip Balance	1
CHA-26	Trip Balance	2
CHA-27	Top Loading Balance	1
CHA-28	Chemical Balance	1
CHA-29	Analytical Balance	1
CHA-30	Electric Drying Oven (Vacuum)	1
CHA-31	Electric Drying Oven	1
CHA-32	Electric Drying Oven	1
CHA-33	Gas Analyzer	1
CHA-34	Moisture Meter	1
CHA-35	Refractometer	1
CHA-36	Spectrophotometer	1
CHA-37	Flame Photometer	1
CHA-38	pH Meter	1
CHA-39	Photometric Calorimeter	1

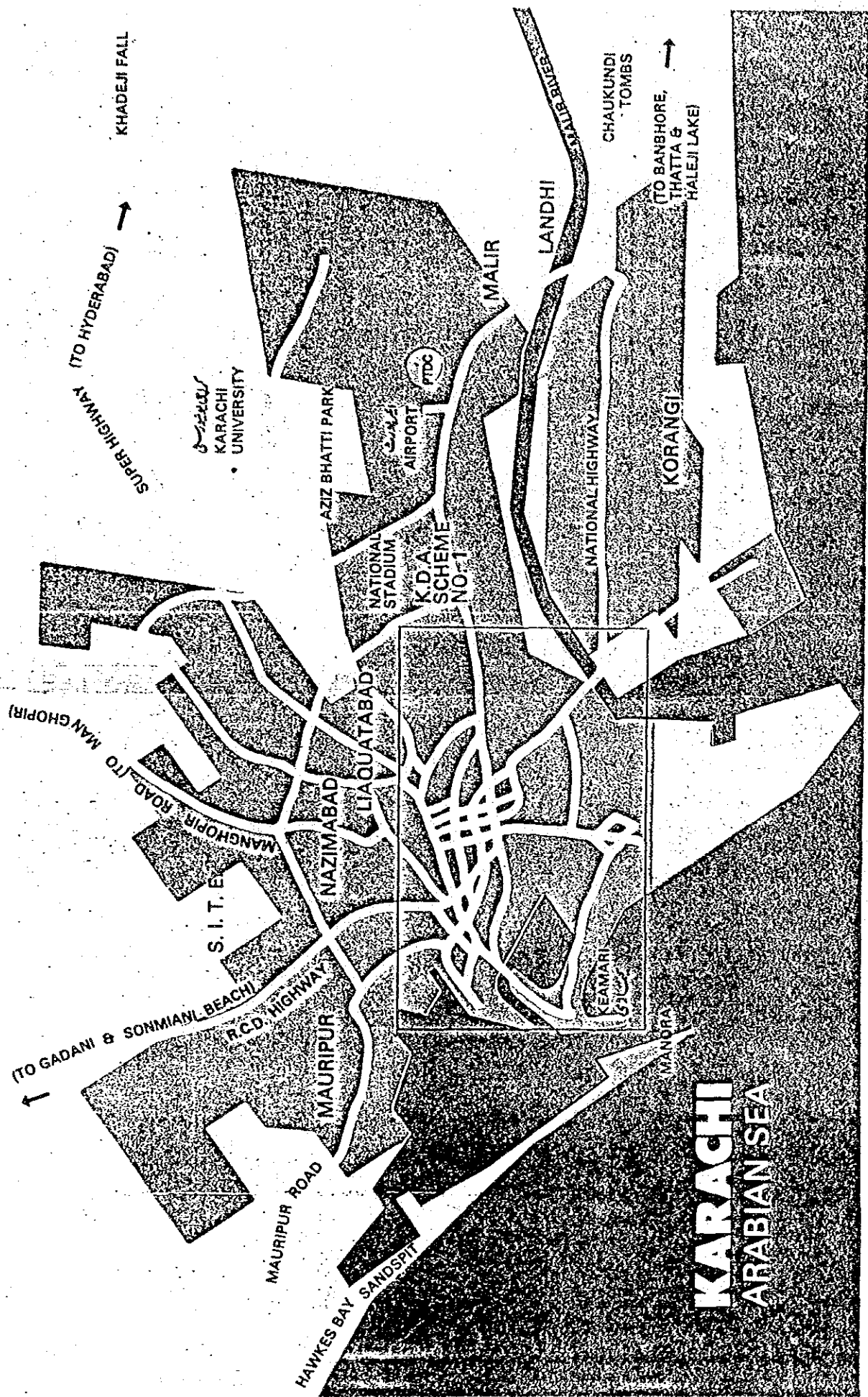
• AUDIO-VISUAL EQUIPMENTS (ACA) •

No.	Description	Qty.
CHA-40	Extra High Purity Water Distilling Apparatus	1
CHA-41	Water Distilling Apparatus	1
CHA-42	Viscosity Thermostatic Bath	1
CHA-43	Set of Glass Wares	1
CHA-44	Platinum Set	1
CHA-45	Set of Porcelain Ware	1
CHA-46	Polychylene Wares	1
CHA-47	Chemical Test Accessories	1
CHA-48	Set of Mortar	1
CHA-49	Hydrometer	1
CHA-50	Thermometer	1
CHA-51	Surface Temperature Indicator	1
CHA-52	Digital Hygrometer	1
CHA-53	Tachometer	1
CHA-54	Handy Cooler	1
CHA-55	Water Jet Pump	1
CHA-56	Manometer (Inclined)	1
CHA-57	Manometer (U Type)	1
CHA-58	Pressure Gauge	1
CHA-59	Pilot Tube	1
CHA-60	Vacuum Gauge	1
CHA-61	Vacuum Gauge	1
CHA-62	Laboratory Portable Pump	1
CHA-63	Rotary Evaporator	1
CHA-64	Ultrasonic Cleaner	1
CHA-65	Jar	1
CHA-66	Refrigerator	1
CHA-67	Scintillation Counter	1
CHA-68	Sieves	1

No.	Description	Qty.
ACA-1	Overhead Projector w/Stand	3
ACA-2	Screen	3
ACA-3	16 mm Projector	3
ACA-4	Slide Projector	3
ACA-5	TV/VTR Set w/Stand	3
ACA-6	Copy Machine	1
ACA-7	Monochrome Film Processor	1
ACA-8	Monochrome Sheet Processor	1
ACA-9	35 MM Camera	1

COMPUTER (ECA) : Low Priority

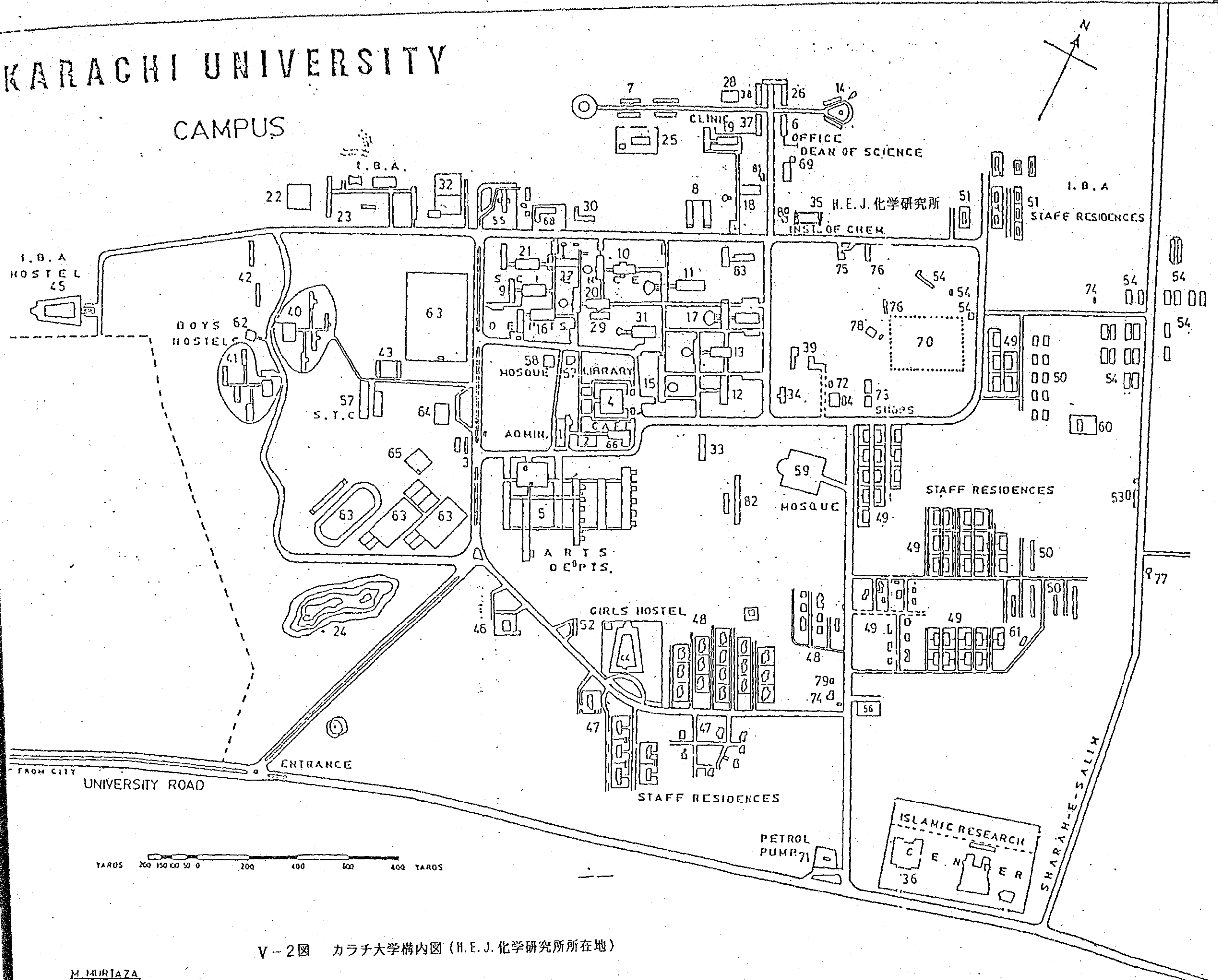
No.	Description	Qty
ECA-1	CPU with FDD x 1	20
ECA-2	Green Monitor	20
ECA-3	FD	50
ECA-4	Printer	20
ECA-5	Software	20
ECA-6	Software	20
ECA-7	PC Semi Main Unit	1
ECA-8	PC Semi Terminal	20
ECA-9	Headset	21
ECA-10	Connection Cable 10 m	4
ECA-11	Connection Cable 5 m	16
ECA-12	Spare Parts	1
ECA-13	Operation Manual	5



V-1 図 カラチ大学所在地

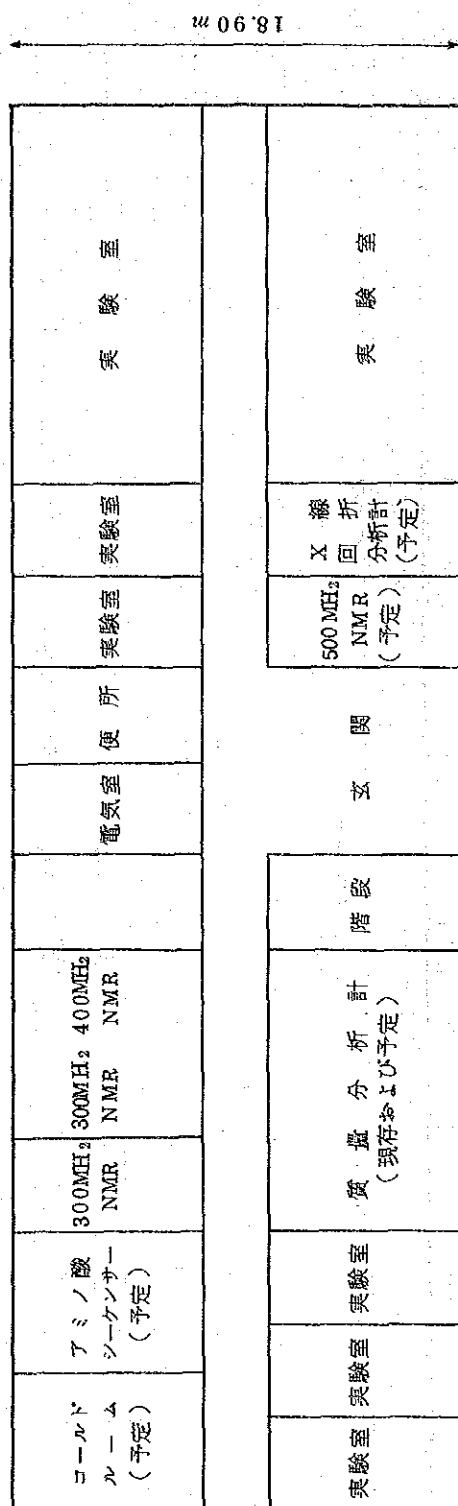
KARACHI UNIVERSITY

CAMPUS

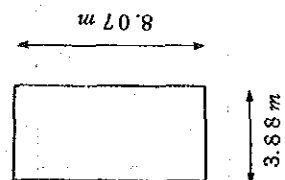


1. Administration
2. Controller of Examinations
3. Engineer's Office, Post Office U.B.L.
4. Dr. Mahmud Hussain Library
5. Faculty of Arts & Faculty of Islamic Studies
6. Office, Dean, Faculty of Science
- Science Departments
7. Applied Chemistry
8. Applied Physics
9. Bio-Chemistry
10. Botany
11. Chemistry
12. Geography
13. Geology
14. Genetics
15. Mathematics
16. Microbiology
17. Physics
18. Physiology
19. Statistics
20. Zoology
21. Faculty of Pharmacy
22. Department of Commerce
23. I.B.A. (Institute of Business Administration)
- Research Centres
24. Observatory
25. Vertebrate & Pest-Control Research Centre
26. National Hematological Research Centre
27. M.A.H. Qadri Biological Research Centre
28. Water Reclamation Research Project
29. Invertebrate Reference Collection Centre
30. Cereal Disease Research Centre
31. Centre of Excellence in Marine Biology
32. Applied Economics Research Centre
33. Pakistan Study Centre
34. P.C.C.T. (Bureau of Composition Compilation & Translation)
35. Muslim Ibrahim Jinnah Post-Graduate Research Centre for Chemistry
36. Islamic Research Centre
37. Clinic
38. M.C.C.
39. Old Boys Building & Alla Mushta School

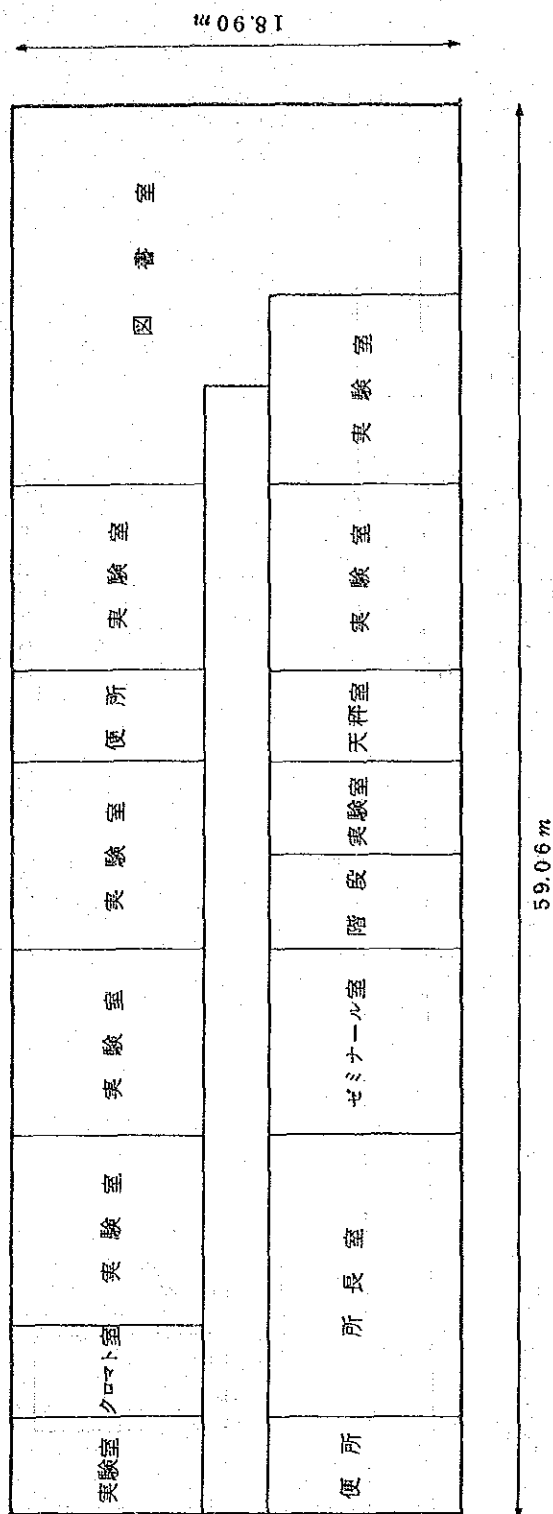
V-2図 カラチ大学構内図 (H.E.J. 化学研究所所在地)



1 スペンの大きさ

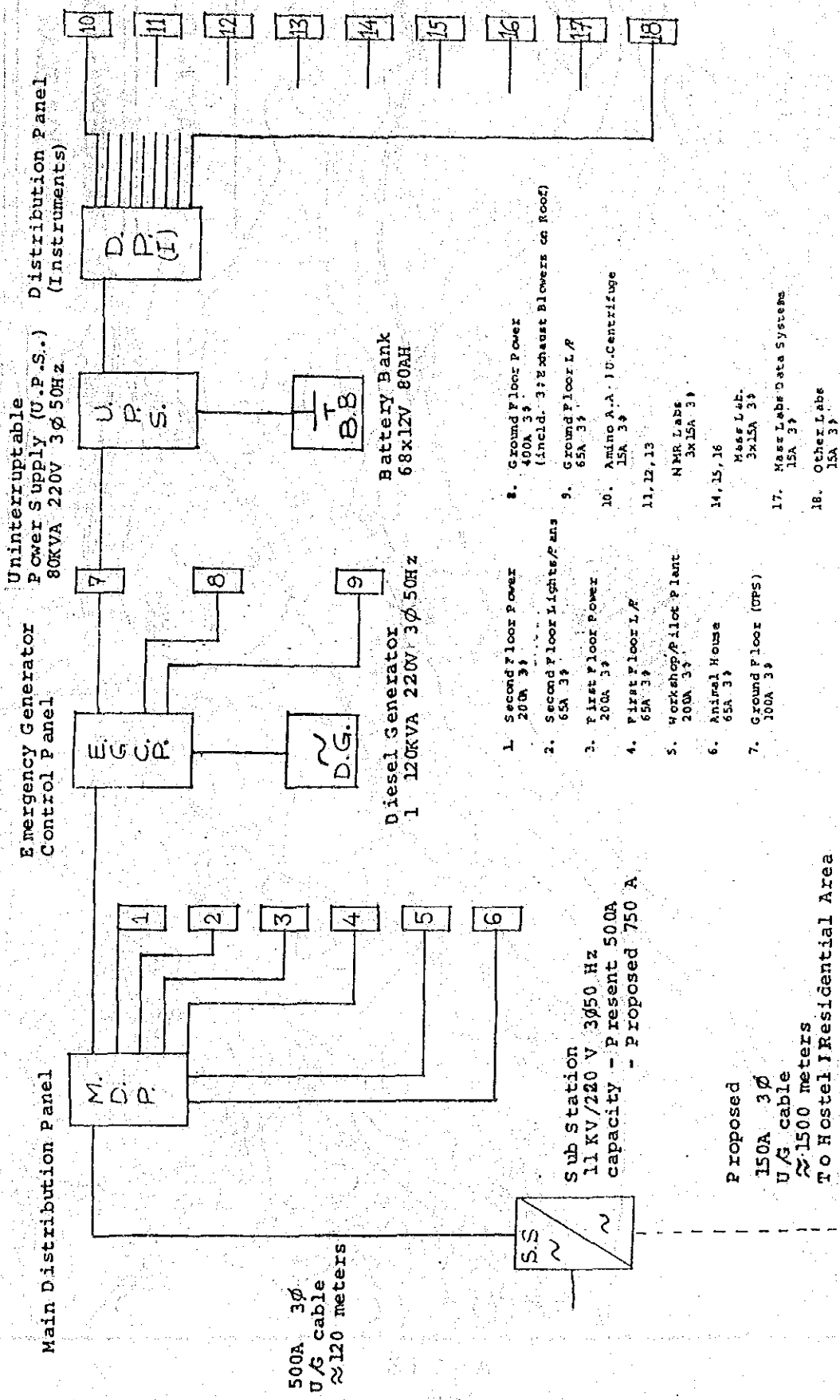


V-3 図 H.E.J. 化学研究所主棟 1 階

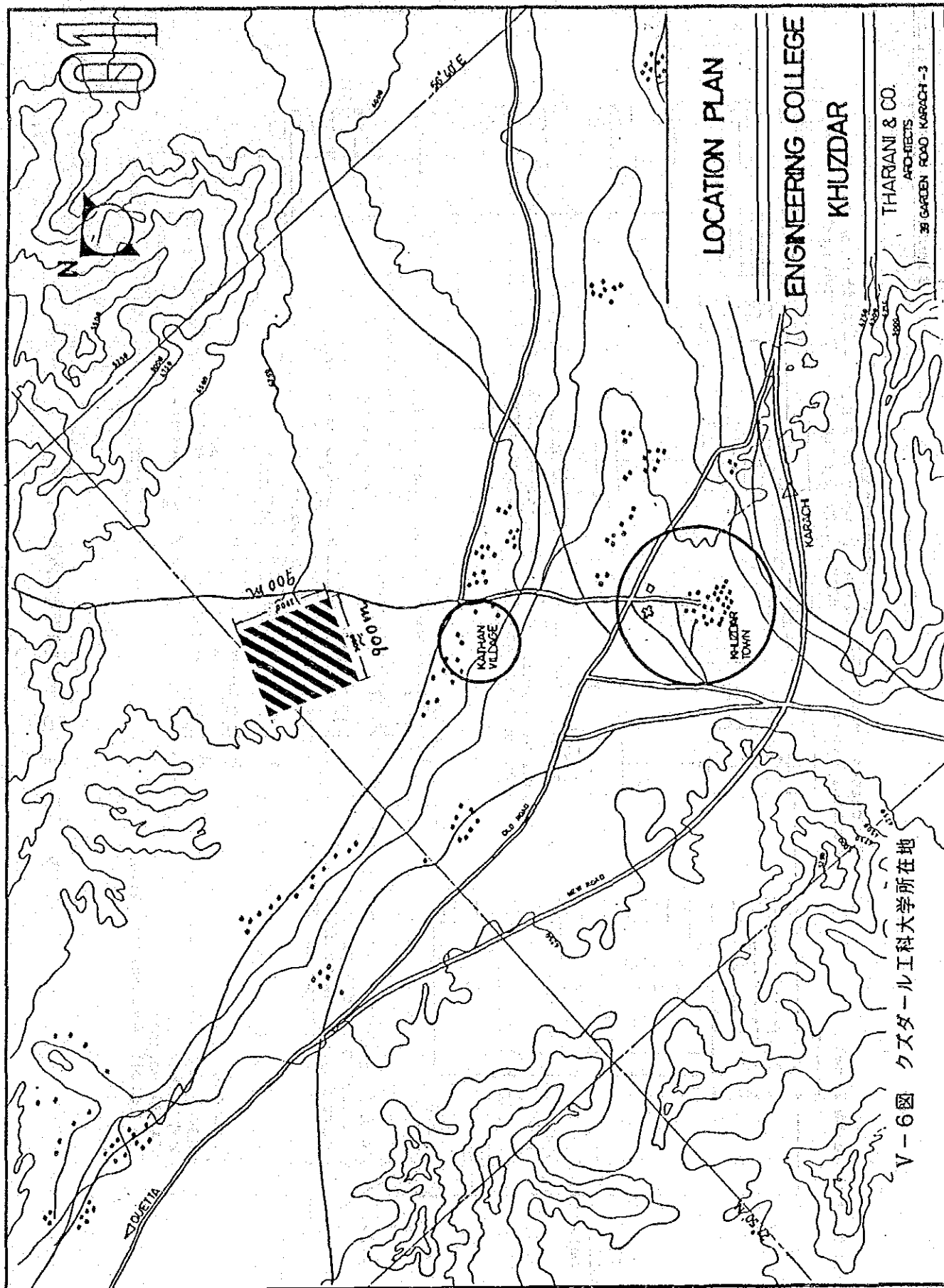


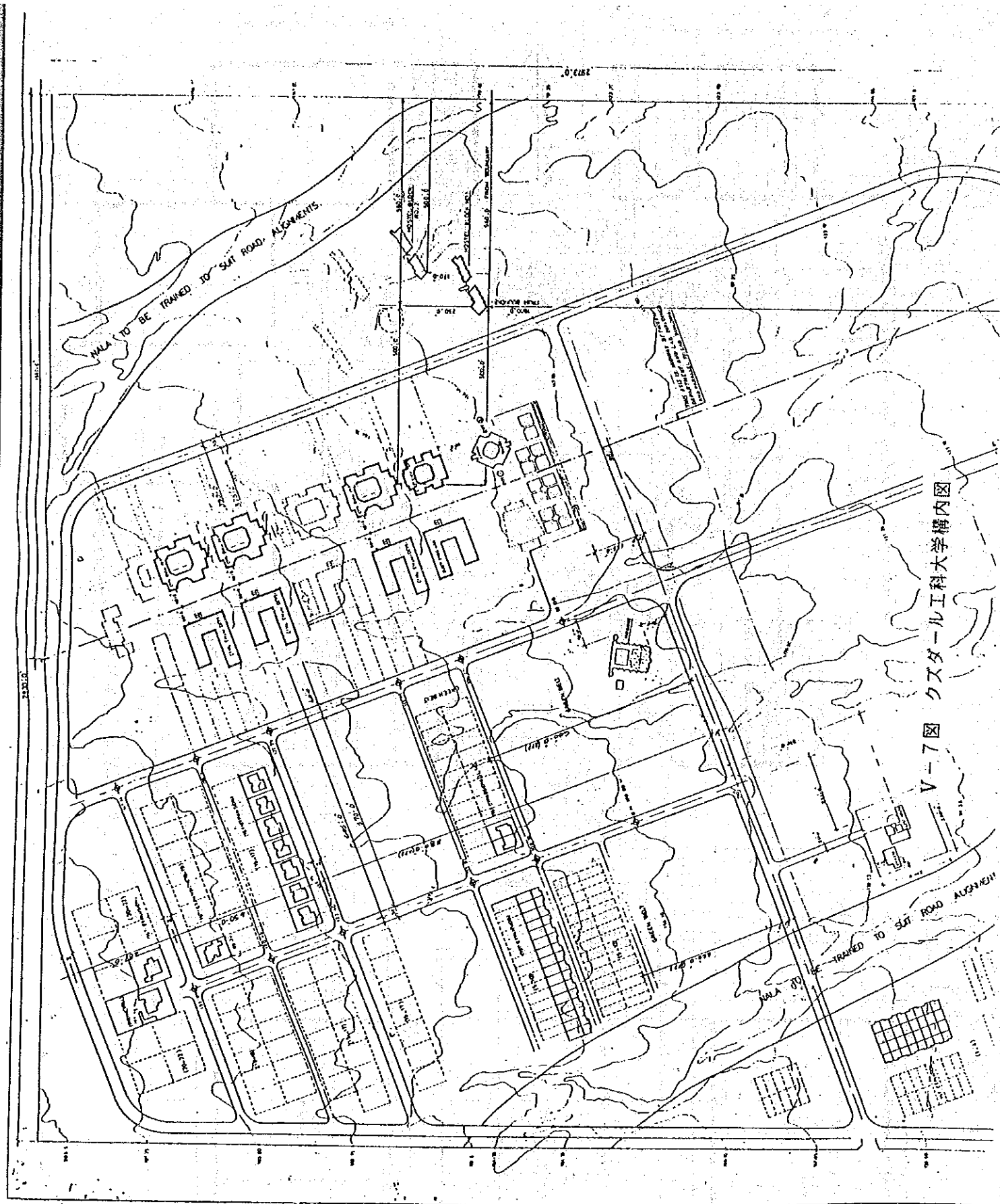
V-4図 H.E.J.化学研究所主棟2階

Electrical Power Distribution

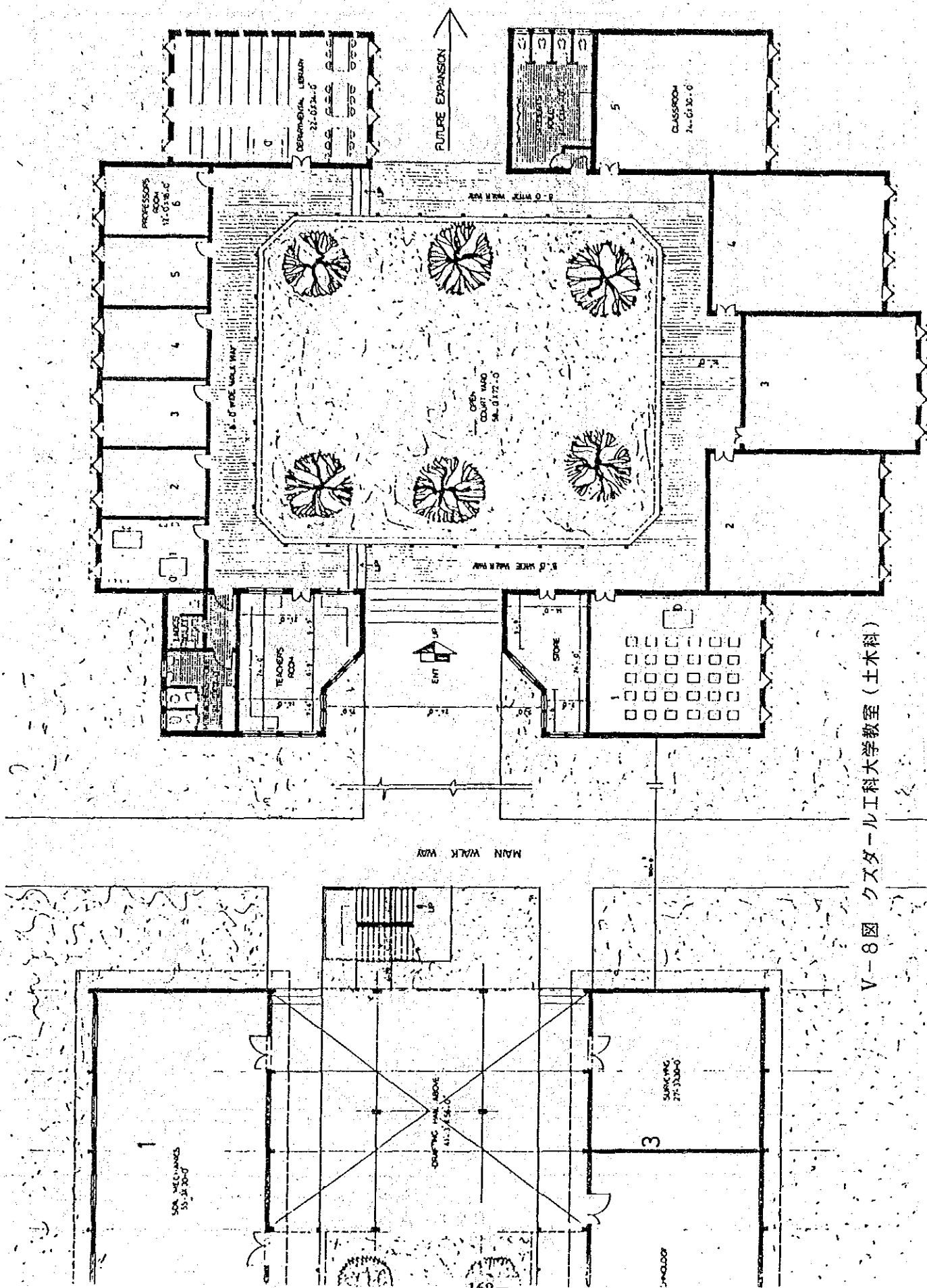


V-5 H. E. J. 化学研究所電気配線系統図

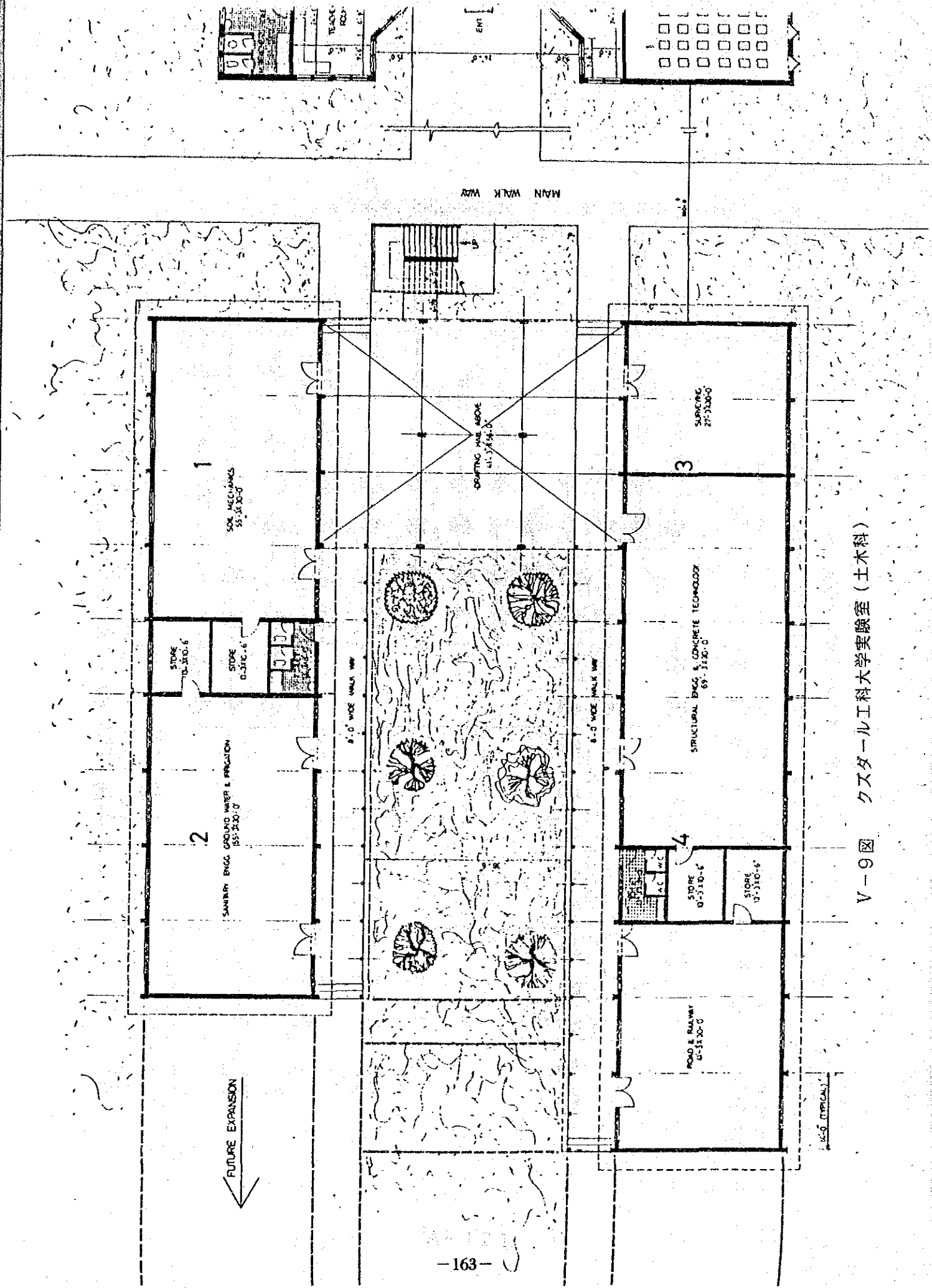




V-7 図 クスダール工科大学構内図



V-8 図 クズダール工科大学教室（土木科）

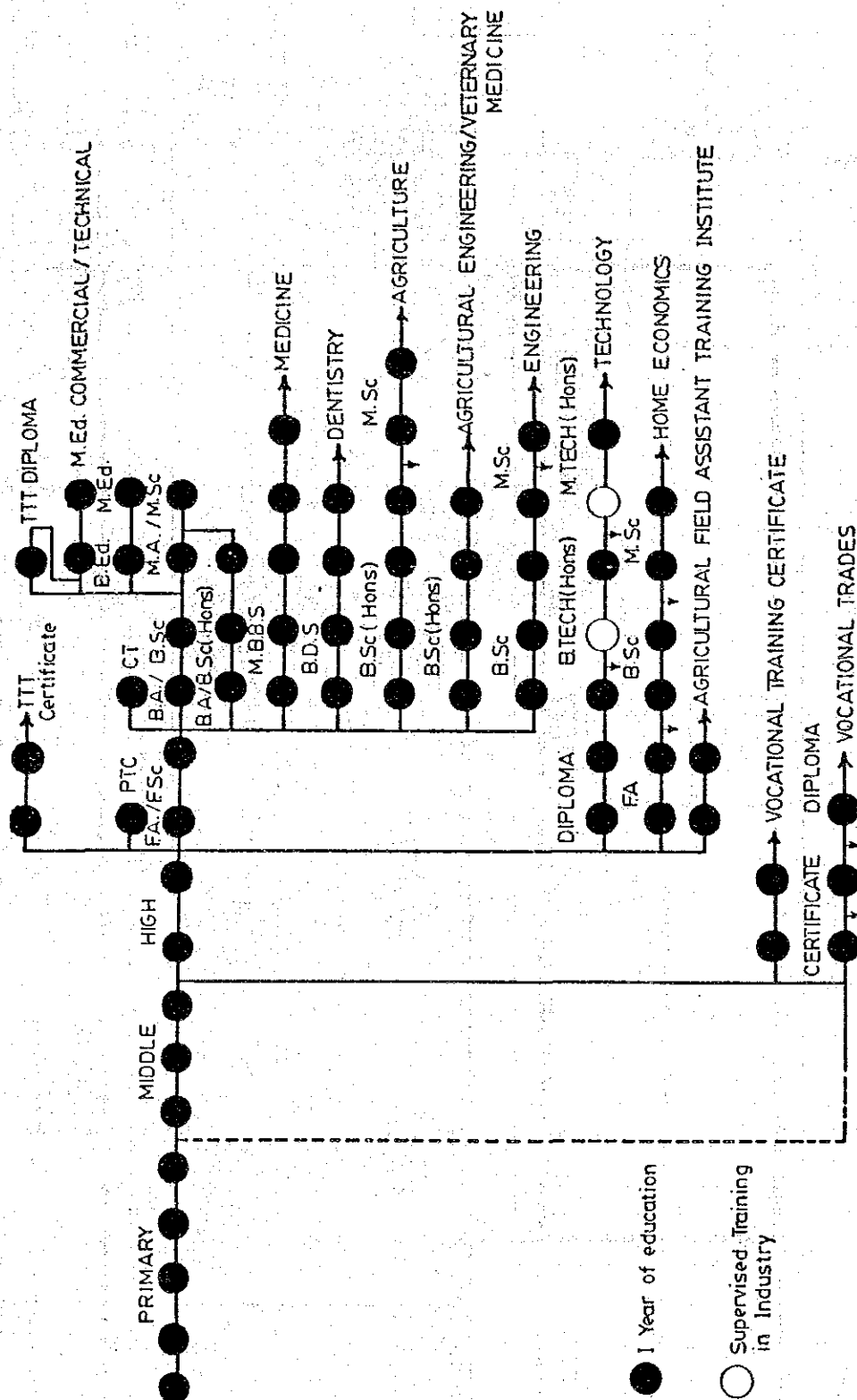


V-9 図 クサツ工科大学実験室（土木科）

VI-1 図 パキスタンの教育制度

STRUCTURE OF THE EDUCATIONAL SYSTEM (FORMAL ONLY)

Grade I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI
Age 5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20/21



VI-2表 州別、都市・地方別、および性別による学校の数
(1983年6月現在)

NUMBER OF INSTITUTIONS BY PROVINCE, LEVEL AND SEX AS ON JUNE, 1983

Province		Primary Schools		Middle Schools		Secondary Schools		Inter Colleges		Degree Colleges	
		F	T	F	T	F	T	F	T	F	T
Punjab	T	15414	42856	1218	3565	677	2112	45	104	34	118
	U	1680	3588	285	550	457	1074				
	R	13734	38998	933	3015	220	1038				
Sind	T	2700	16501	197	855	253	825	11	44	31	110
	U	866	2975	145	422	253	711				
	R	1834	13526	52	433	—	114				
NWFP	T	2151	7564	132	665	118	638	5	22	6	27
	U	185	535	42	102	55	160				
	R	1966	7029	90	563	64	478				
Baluchistan	T	449	3218	43	354	44	174	3	17	1	11
	U	92	271	19	44	38	120				
	R	351	2947	24	310	6	54				
Federal Area	R	253	1958	32	282	32	183	4	16	1	6
	U	—	70	4	10	16	38				
	R	62	1888	28	272	16	145				
A.J.K.	T	875	1955	300	681	75	289	12	33	2	6
	U	80	220	20	70	15	45				
	R	795	1735	280	611	60	244				
Total	T	21842	73782	1922	6402	1200	4221	80	236	75	278
	U	2918	7659	515	1198	834	2148				
	R	18924	66123	1407	5204	366	2073				

Source: Planning Commission Islamabad.
T : Total, U : Urban, R : Rural, F : Female

VI-3 州別、都市・地方別、および性別による生徒・教師の数
(1983年6月現在)

PROVINCE WISE ENROLMENT BY LEVEL AND SEX AS ON JUNE 1983.

(No. in Thousands)

Province		Primary* Schools		Middle* Schools		Secondary* Schools		Inter Colleges**		Degree Colleges**	
		F	T	F	T	F	T	F	T	F	T
Punjab	T	1361	3650	266	1004	100	400	6.7	19	44.7	134.3
	U	665	1340	216	576	91	298	—	—	—	—
	R	696	2310	50	428	9	102	—	—	—	—
Sind	T	495	1681	142	427	60.5	180.3	6.2	16.6	41	120
	U	385	965	138	332	60	158	—	—	—	—
	R	110	716	4	95	0.3	22.3	—	—	—	—
NWFP	T	152	824	22	164	10	68	2.2	16.1	0.9	5.8
	U	57	170	17	61	9	31	—	—	—	—
	R	96	654	5	103	1	37	—	—	—	—
Baluchistan	T	38	190	6	30	2	11	1.2	4.9	12.7	53.2
	U	13	43	4	15	1.5	6.5	—	—	—	—
	R	25	147	2	15	0.5	4.5	—	—	—	—
Federal Areas	T	30	188	12.2	43	2.6	14	1.0	5.1	5.1	12.6
	U	12.5	29	6.5	14.5	2.1	5.1	—	—	—	—
	R	17.5	159	5.7	28.5	0.5	8.9	—	—	—	—
A.J.K.	T	70	221	15	55	3	15	—	—	—	—
	U	14	32	10	22	2	7	—	—	—	—
	R	56	189	5	33	1	8	—	—	—	—
Total	T	2146	6754	463	1723	177	668	17.3	61.7	104.4	325.9
	U	1146	2579	391	1020	165	505	—	—	—	—
	R	1000	4175	72	703	12	183	—	—	—	—

Source: *Planning Commission, Islamabad and **Central Bureau of Education, Islamabad.

T : Total, U : Urban, R : Rural, F : Female.

注: 53.2 内 6,000人の間違いと思われる。

PROVINCE WISE NUMBER OF TEACHERS BY LEVEL AND SEX AS ON JUNE 1983

Province	Primary Schools		Middle Schools		Secondary Schools		Inter Colleges		Degree Colleges	
	F	T	F	T	F	T	F	T	F	T
Punjab	33271	95997	12524	37153	12565	41677	680	1596	1739	5781
Sind	15602	48447	2634	6211	7069	16591	186	541	1060	3271
NWFP	4571	18669	1336	6984	1511	11345	53	230	184	984
Baluchistan	1155	6529	460	3460	656	3122	24	159	59	397
Federal Areas	1795	7079	429	2822	1636	5832	65	285	361	855
Total	56394	176721	17383	56630	23437	78567	1008	2811	3403	11252

Source: Central Bureau of Education, Islamabad.

II-1-4・5表 州別、都市・地方別、および性別による生徒・教師の数
(1983年6月現在)

VI-4表 教育開発予算の伸び

EDUCATION AND MANPOWER

Financial Outlays

(Million Rupees)

	First Plan 1955-60)	Second Plan (1960-65)	Third Plan (1965-70)	Non-Plan Period (1970-78)	Fifth Plan (1978-83)	Sixth Plan (Alloca- tions) 1983-88
Primary	23	19	25	444	1413	7000
Secondary	46	95	129	542	1090	4125
Teacher	5	18	15	114	290	305
Technical						
(i) Programmes under Education	7	79	105	314	465	1315
(ii) Programmes under Manpower & Labour	6	7	26	166	286	1020
Colleges	31	68	64	374	537	1300
Universities	40	59	59	399	687	2100*
Scholarships	2	49	77	299	350	660
Mass Literacy					50	750
Social and Cultural Activities	18	14	11	365	**	**
Miscellaneous	54	55	52	425	476	1275
Total	232	463	563	3442	5644	19850

*Includes Rs. 400 million of Engineering Universities which was shown under Technical Education in the past.

**A new sector called "Culture and Sports" has been created and the expenditure shown under that section.

Ⅶ 収集資料リスト

Ⅶ-1 H.E.J 化学研究所研究機材整備計画

- (1) 研究結果の市民に及ぼす効果
- (2) 主要機器を必要とする理由
(N M R、質量分析計、自動X線回折分析計、アミノ酸シーケンサー)
- (3) 生化学実験の内容と必要とする機器
(アミノ酸シーケンサー、高性能液クロ、低温室、冷凍乾燥機)
- (4) その他優先順位の高い機材の必要性
(ガラス器具、フラッシュ型クロマト、回転式蒸発器、高真空ポンプ)
- (5) 研究テーマと所要分析機器の関係表
- (6) 研究テーマとパキスタン医療との関係
- (7) 教授陣の経歴と業績
 - ① Siddiqui 教授の経歴
 - ② Siddiqui 教授の業績
 - ③ Rahman教授の経歴
 - ④ Rahman教授の業績
 - ⑤ Ahmad 教授の経歴
 - ⑥ Ahmad 教授の業績
 - ⑦ Zaidi 教授の経歴
 - ⑧ Zaidi 教授の業績
- (8) H.E.J 研究所の組織図
- (9) H.E.J 研究所設立時設定の機能
- (10) H.E.J 研究所運営予算
- (11) H.E.J 研究所購買基準
- (12) 主要要請機材の設置予定箇所
- (13) 現有主要分析機器
(H.E.J. 紹介パンフレット)
- (14) 電気配線系統図
- (15) 機器分析依頼書例
(H.E.J. 受領)
- (16) 機器分析受託費
- (17) N M R (400 M H Z) 分析チャート

- (18) 天然物化合物に関する分光学的研究国際会議
(1987 年 1 月 11 日～16 日 H.E.J 主催)
- (19) UNESCO-SCAMAP WORKSHOP
(NMR、質量分析計、高性能液クロ等の講義・実演)
- (20) NMR SPECTROSCOPY (解説書)
- (21) MASS SPECTROSCOPY (解説書)
- (22) 天然物化学・国際会議 (1984 年 2 月)
- (23) 天然物化学最近の傾向・国際会議
(1984 年 1 月)
- (24) パキスタンの天然物化学

V-2 クズダール工科大学教育機材整備計画

- (1) クズダール工科大学建設・改定 PC-1
- (2) 実験機材リスト
- (3) クズダール工科大学資料
 - ① 組 織 図
 - ② 政府評議会の構成
 - ③ 実行委員会の構成
 - ④ 政府評議会・実行委員会の機能
 - ⑤ 建設委員会の機能
 - ⑥ 選定委員会の構成
 - ⑦ 経 常 費
 - ⑧ 管理職員のリスト
 - ⑨ 1987 年 10 月までの職員採用スケジュール
 - ⑩ 年度別予定
 - ⑪ 職員配置計画
 - ⑫ 教員募集広告
- (4) 教授・講師応募者リスト
- (5) パルチスタン州教育省資料
 - ① 教員・生徒数統計 (1985 年 10 月 15 日)
 - ② 教育省組織図
 - ③ 年度別投資計画 (1986 - 1987 年)
- (6) NED 工科大学 (カラチ) 紹介
- (7) パキスタン中央政府教育省の組織と機能

(8) 第6次教育5ヶ年計画(1984年パキスタン教育省)

(9) 教育開発実行計画(1979年パキスタン教育省)

JICA