

# **APPENDIX 1**

## **Relations between Test Procedures and Application Equipment**



CHEMISTRY

AMPICILLIN SODIUM POWER

DILUTION	AUTO DILUTOR
IR SPECTRUM	I.R. SPECTROPHOTOMETER
ALKALINITY	pH METER
ABSORBANCE	UV & VISIBLE SPECTROPHOTOMETER
SPECIFIC OPTICAL ROTATION	POLARIMETER
DICHLOROMETHANE	GAS CHROMATOGRAPH
RELATED SUBSTANCES	AGAROS STARCH GE ELECTROPHORESIS DENSITOMETER
WATER	KARL FISHER APPARATUS
ASSAY WATER BATH	WATER BATH THERMOSTATE
WEIGHING	BALANCE

ASCORBIC ACID

IDENTIFICATION OF COPPER	ATOMIC ABSORPTION SPECTROPHOTOMETER
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PHENYL MERCURIC NITRATE & THIMEROSAL

ASSAY (USPZ XIX)	POLAROGRAPHIC METHOD
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ANISE OIL

FREEZING POINT - - - - - FREEZING POINT APPARATUS

REFRACTIVE INDEX - - - - - REFRACTMETER

CEPHALANIDINE POWDER

RELATED SUBSTANCES - - - - - PAPER CHROMATOGRAPHY

CHROPROMAZINE HYDROCHLORIDE

LOSS ON DRYING - - - - - OVEN  
CLIMATIC CHAMBER

SULPHATED ASH - - - - - FURNACE

ASSAY - - - - - POTENTIOMETER

FLUCLOROLONE ACETONIDE

FOREIGN STEROIDS & OTHER IMPURITIES - - - - - THIN LAYER CHROMATOGRAPHY

ASSAY - - - - - H.P.L.C.

GENTAMYCIN SULPHATE INJECTION

NMR SPECTRUM ----- NMR SPECTROMETERY

CLARITY TEST ----- PARTICLE SIZE ANALYSER

GONADORELIN

AMINO ACIDS ----- AMINO ACID ANALYSER

POVIDONE

K-VALUE ----- VISCOMETER

PRIMIDONE

HEAVY METALS ----- KJALDAHL METHOD

SCHAZOO PYRIN TABLETS

HARDNESS ----- HARDNESS TESTER

BUPROFEN TABLETS & POWDER

IDENTIFICATION	GRINDER & VACUUM PUMP
CHROMATOGRAPHY PURITY	REFRIGERATOR
DISSOLUTION	DISSOLUTION APPARATUS
DISINTEGRATION	TABLET DISINTEGRATION MACHINE
WATER DETERMINATION	AMMETER AUTOMATIC BURETTE
ASSAY	MECHANICAL SHAKER
CALCULATIONS	SCIENTIFIC CALCULATOR

BENZYL ALCOHOL & LIGHT PATROEUM

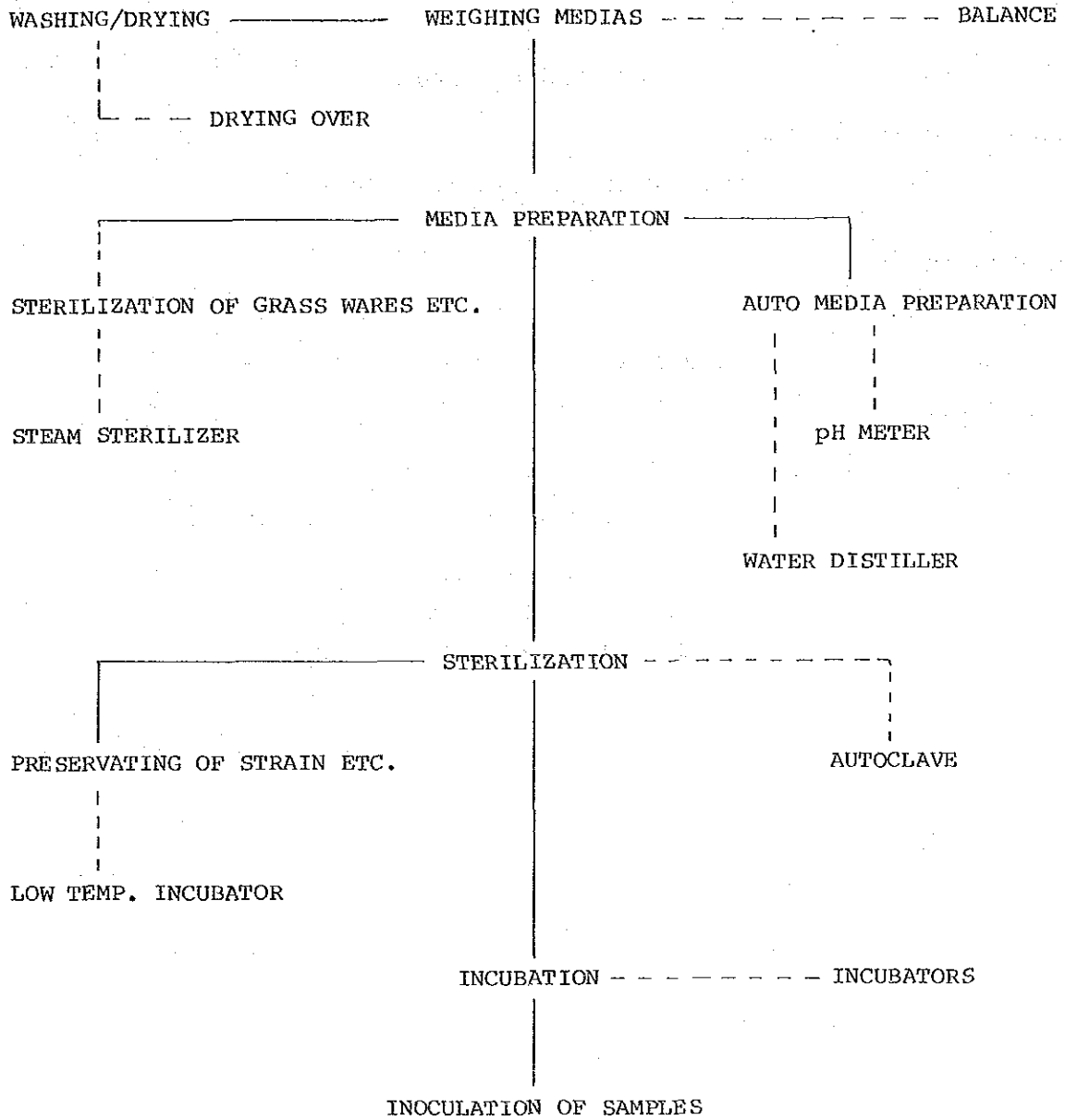
BOILING	BOILING POINT MEASURING APPARATUS
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ASPILIN VITAMIN-C

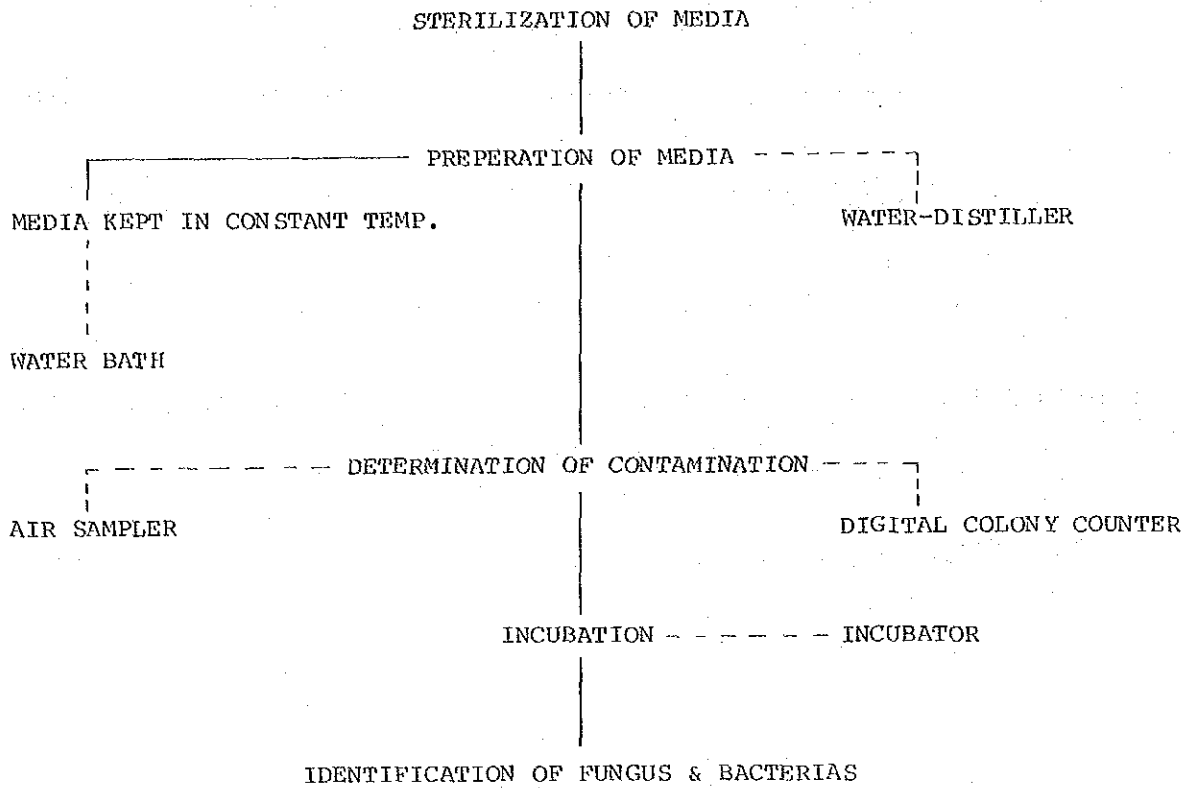
MELTING POINT	MELTING POINT APPARATUS
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MICROBIOLOGY

POTENCY TEST OF ANTIBIOTICS

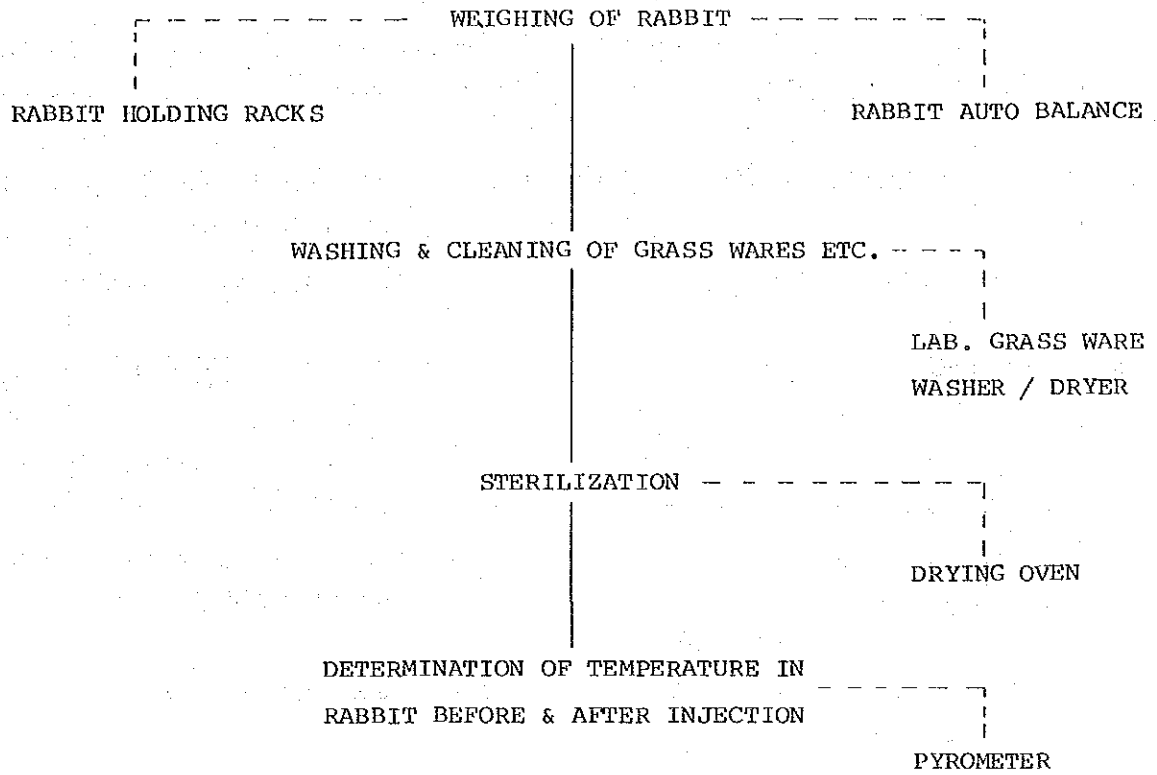


STERILITY TEST FOR VIRUS AND FUNGUS ETC.





PYROGEN TEST eg. DEXTROSE WATER



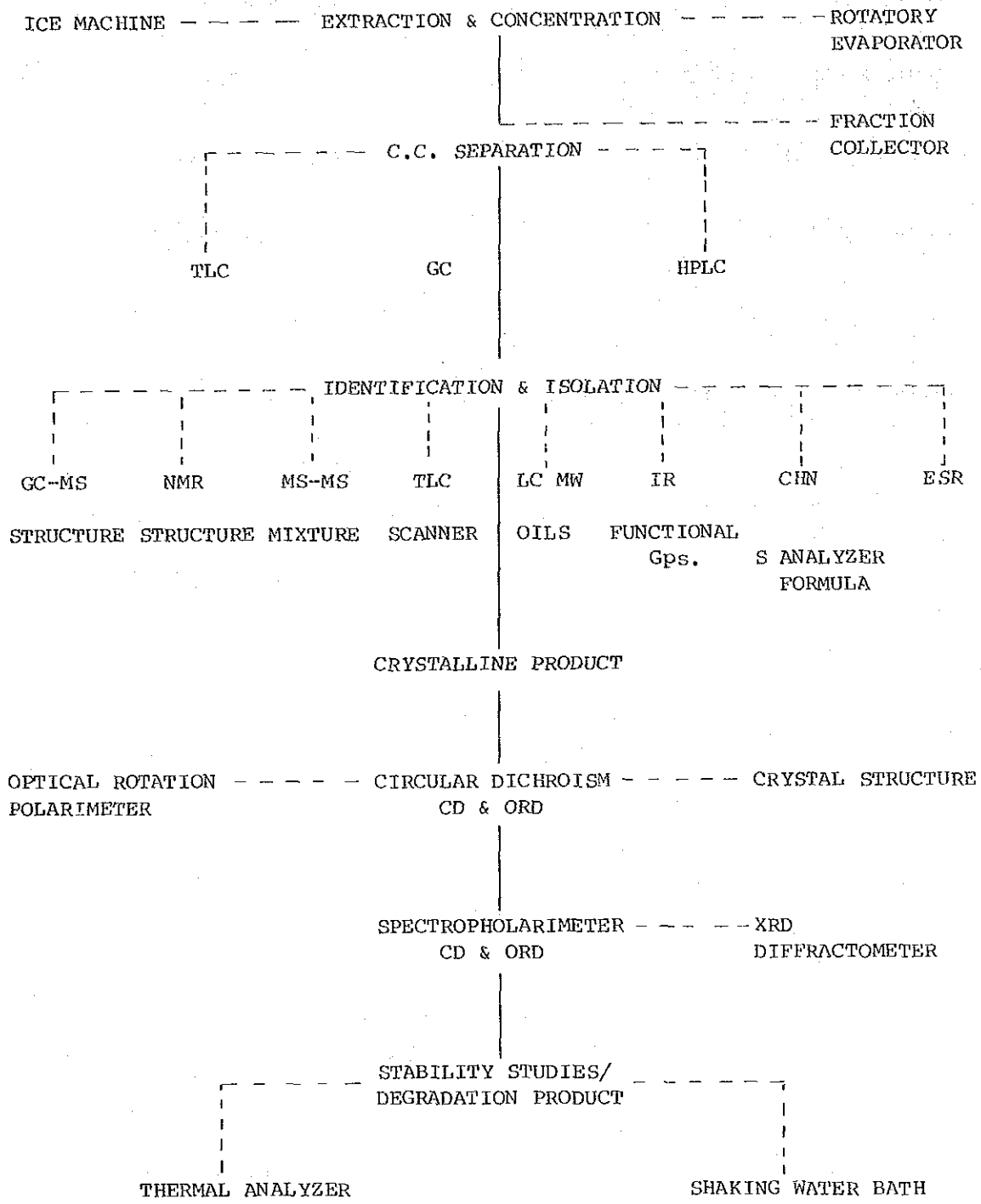
PHARMACOLOGY

PHARMACOLOGICAL SCREENING OF INDIGENOUS DRUGS

KEEPING OF RATS/MICE/RABBITS - - - - -	ANIMAL CAGES
DRYING OF GLASSWARE, PIPPETES, TEST TUBES - - -	GRASSWARE WASHER PIPPETE WASHER DRYER
HEATING OF SAMPLES - - - - -	MANTLE HEATER FOR GRASSWARE
WEIGHING OF MATERIAL - - - - -	ELECTRONIC BALANCE
GRINDING OF MATERIAL - - - - -	MULTI BLENDER MILL
EXTRACTION - - - - -	SOXHLETS APPARATUS
SHAKING, AND DISSOLVING OF GROUND MATERIAL WITH SOLVENTS	SHAKER MAGNETIC STIRRER WATER BATH
EVAPORATION OF SOLUTION - - - - -	ROTARY EVAPORATOR
PURIFICATION - - - - -	PURIFIER
DETERMINATION OF PH. - - - - -	PH METER
HEATING OF RESOLVED MATERIAL - - - - -	HOT PLATES
PYROGEN TEST: MICROBIOLOGICAL ASSAY - - - - -	LAMINAR FLOW
ANALYSIS - - - - -	H.P.L.C.

DISSECTING OF RATS	-----	DISSECTING TABLE; BOX
EFFECTS OF MATERIAL ON ISOLATED ORGANS OF ANIMALS	-----	ISOLATED ORGAN BATH (KYMOGRAPH)
PHYSIOLOGICAL PARAMETERS	-----	DYNAMOMETER
TEMPERATURE DETERMINATION	-----	ANALGESY METER
STORAGE OF BLOOD	-----	BLOOD REFIGERATOR
BLOOD CENTRIFUGATION	-----	CENTRIFUGE MACHINE
DETERMINATION OF BLOOD GLUCOSE	-----	SPECTROPHOTOMETER

RESEARCH  
 MEDICINAL PLANT MATERIAL  
 (TRADITIONAL)



PREPARATION OF TOXICOLOGICAL SPECIMENS

CUTTING OF TOXICOLOGY SPECIMENS	ULTRACUT MICROTOME
	ROTARY MICROTOME
	SLIDING MICROTOME
TISSUE PROCESSING	TISSUE PROCESSOR
PREPARATION PARAFFIN BLOCK	PARAFFIN OVEN
SLIDE STAINING	SLIDE STAINER
TISSUE EMBEDDING	TISSUE EMBEDDING CONSOLE
	TISSUE TEK
MICROSCOPIAL IDENTIFICATION	MICROSCOPE

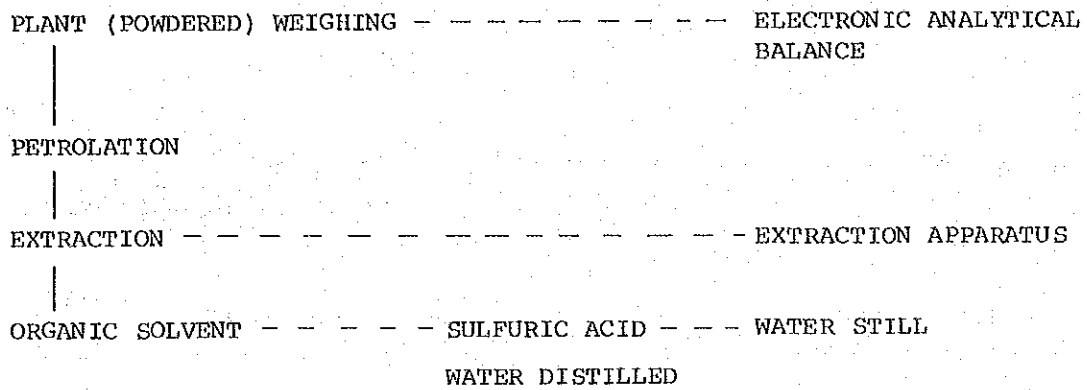
PROTAMINE SULPHATE ASSAY

WEIGHING OF CHEMICALS	BALANCE
REMOVAL OF OX BRAIN	DISSECTION BOX
ACETYLATION AND DRING	OVEN
PREPARATION OF FRESH SALINE SOLUTION	WATER DISTILLATION APPARATUS
	AUTOCLAVE
SAMPLE PREPARATION	WATER BATH
THROMBOKINASE EXTRACTION AND STORAGE	REFRIGERATOR
SEPARATION	CENTRIFUGE
STANDARDISATION	

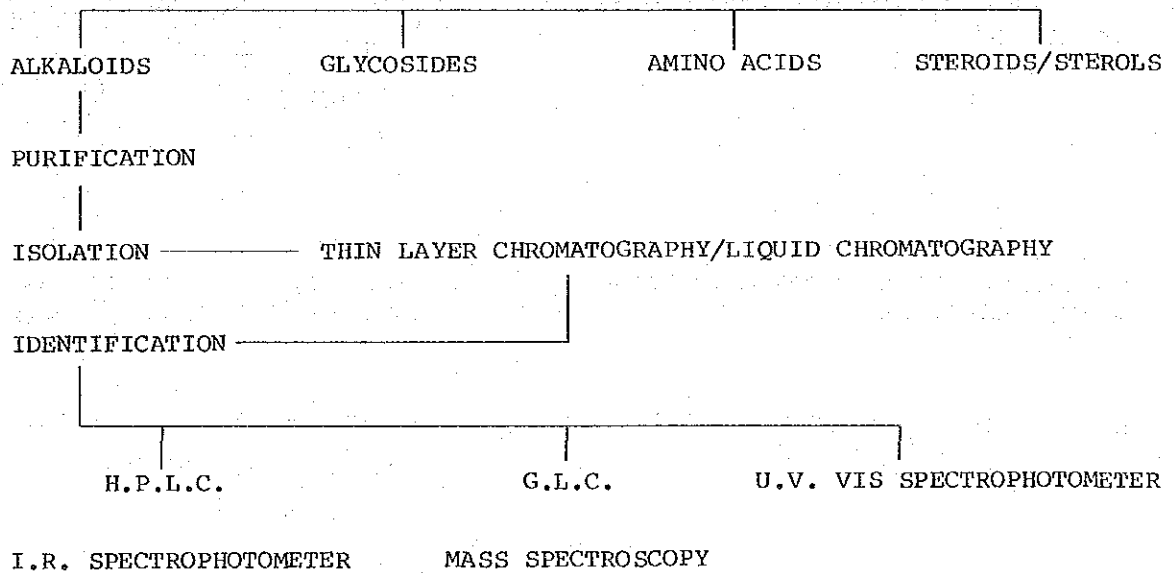
THERAPEUTIC DRUG MONITORING OF GENTAMICIN, DIGOXIN, THEOPHYLLINE  
& PHENYTOIN

SAMPLE STORAGE	-----	LOW TEMPERATURE FREEZER
SAMPLE PREPARATION	-----	WATER BATH
	-----	WATER STILL
	-----	FILTRATION APPARATUS
TERMINATION OF BLOOD LEVEL	-----	H.P.L.C.
	-----	ELISA

PHARMACEUTICS/NARCOTICS



GENERAL SCREENING BY CHEMICAL METHOD



PHARMACOGNOSY

COLLECTION PREPARATION AND WEIGHING OF MATERIAL (HERVS)	---	BALANCE, OVEN
HYDROLYSIS	-----	WATER BATH CHEMICALS, GRASS WARES
PREPARATION ON EXTRACTION/ DRYING OF PLANT EXTRACT	-----	ROTARY EVAPORATOR
IDENTIFICATION OF NATURAL DRUGS	-----	SPECTROPHOTOMETER
IDENTIFICATION FOR DIFFERENT NATURAL COMPOUNDS	-----	GAS CHROMATOGRAPH TLC CHROMATOGRAPH COLUM CHROMATOGRAPH PAPER CHROMATOGRAPH
FURTHER IDENTIFICATION BY PRODUCING SPECTRA OF DIFFERENT COMPONENTS IN NATURAL COMPOUNDS	-----	H.P.L.C.
BIOLOGICAL/MICROBIOLOGICAL ACTIVITIES OF THE ISOLATED COMPOUNDS	-----	REFRIGERATOR, DEFREEZER INCUBATOR, LAMINAL FLOW pH METER, ZONE READER COLONY COUNTER, OVEN



TISSUE CULTURE LABS.

SELECTION OF THE VARIETY OF THE PLANT/HERVS

CUTTING, WASHING AND STERILIZATION OF THE MATERIAL (PART OF PARTS OF THE PLANT UNDER INVESTIGATION) FOR MICROPROPAGATION/TISSUE CULTURING AND PREPARATION OF GLASS WARES

CUTTER AND SCISSORS ETC.  
CHEMICAL/OVEN

PREPARATION OF CULTURE MEDIA

pH METER BALANCE  
AUTOCLAVE SHAKER  
MIXER ETC.

TRANSFER OF THE MATERIAL TO CULTURE MEDIA UNDER ASEPTIC CONDITIONS

LAMINAR FLOW

GROWTH OF THE MATERIAL

INCUBATOR

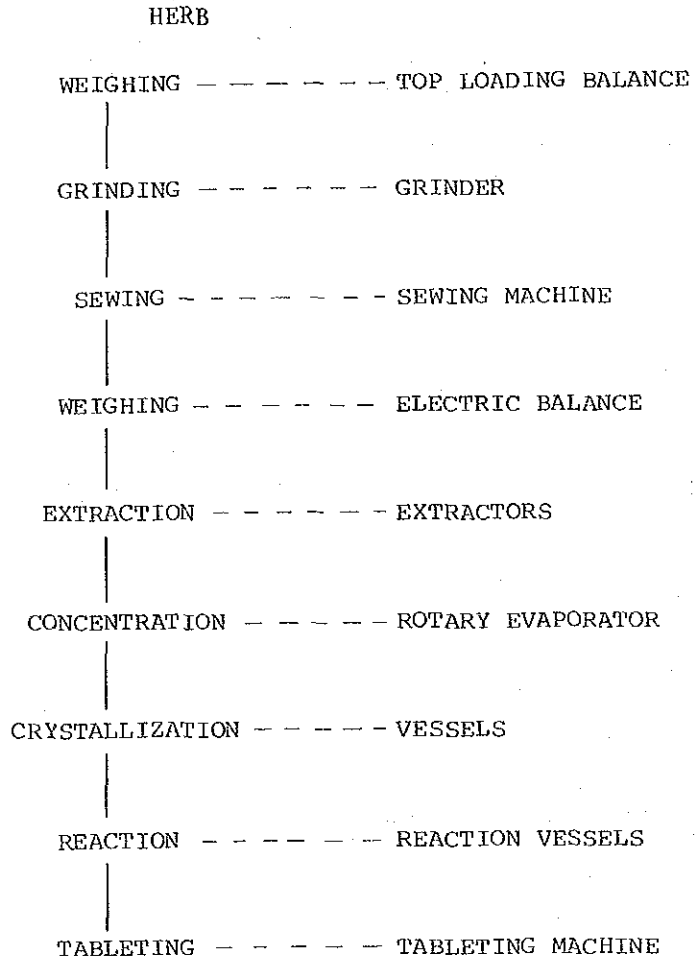
GROWTH CHAMBER

TRANSFER OF THE MINI PLANT FOR GROWTH IN LARGE SCALE UNDER CONTROLLED TEMP.

GREEN HOUSE

UNANI • HOMEOPATHY

PROCESSING OF HERBAL MATERIAL



## **APPENDIX 2**

### **Outline of the Islamic Republic of Pakistan**



## Outline of the Islamic Republic of Pakistan

### 1. Land, population

The Islamic Republic of Pakistan (Pakistan) was founded in 1947. Pakistan is situated in southwest Asia and has an area of more than 800,000 km<sup>2</sup> or, about twice the size of Japan. The country is divided into five provincial governments.

Pakistan's population numbered 110 million people in 1987. Recently, due to better health and medical standards, the population has been enjoying a low crude death rate and a substantial increase in life expectancy at birth.

### 2. National economy

#### 1) Economic structure

Pakistan promotes liberal economic policies, including an emphasis on the welfare of the people. Pakistan remains neutral to non-aligned countries while maintaining diplomatic ties with the west, Islamic nations, and China.

During its founding years, 90 percent of the some 1,400 companies existing on the Indian subcontinent followed into the Hindu Indian side and left only a mere 140 some companies on the Pakistan side. Over the past 40 years, this number has evolved into the Pakistan Chamber of Commerce and Industry which now has registrants in the tens of thousands, most whom have separated into smaller companies, or expanded into different fields.

Approximately 40 percent of Pakistan's national product is attributed to agricultural products such as sugar cane, wheat, rice, maize, cotton, etc.

The national product comprised by the manufacturing industry has grown rapidly to about six percent. The rapid growth can be attributed to an import policy based on industrialization which promotes the full use of existing industrial skills, and therefore expands the labor market.

The import policy inhibits imports of items that can be produced domestically at an adequate level of quality.

The index for retail prices rose from 3.6 of 1986 and 1987 to 5.8 in 1987 and 1988. These figures reflect the inconsistent weather, long draughts and heavy rains, on the previous year's crops. Furthermore the international price for cooking oil and powdered milk rose tremendously.

The current administration is trying to promote a basic economic policy which would carry out an economic restructuring program while maintaining the high growth rate. In addition, fairer tax system reforms are underway while emphasis is also being weighed on a People's Programme. The People's Programme is an attempt to reduce poverty and extend the benefits of Pakista's recent economic advancement to all Pakistanis. The program also projects toward further benefits for employment, education, health care, and social welfare.

Note, the annual income for one person as of 1987 is \$395.

## 2) Economic movements

A major social problem in Pakistan is the tremendous number of Afghanistan refugees, more than 3 million. To alleviate the situation, Pakistan receives aid toward the Afghanistan refugees both from international relief institutions and allies.

To compensate for the annual finance deficit, the Pakistan government reduced indirect tax percentages last July and increased public utilities charges. This caused the worst rate of inflation recorded over the last 11 years. The rate of increase for retail prices is expected to rise 11% over the year-ago minimum level. (Last year's rate of increase was 6.3%, the year before was 3.6%.)

## 3) Trade, international trade balance

Cotton accounts for more than half of all Pakistan's exports. This valuable resource is suffering lately from international price drop and a weakening Ruby. Although imports are being restrained as much as possible, the weakening Ruby nonetheless attributes to a slight increase, therefore being the cause of the trade deficit.

Important necessities such as crude oil and gasoline account for 14% of all imports. This import is expected to increase further unless Pakistan can discover and develop a new petroleum fuel.

Japan is Pakistan's largest trading country for both imports and exports. Major import items include transportation equipment, electrical machinery, general machinery, steel copper. Major export items include cotton, cotton flowers, skin, shrimp (which accounted for 88.7% of all exports in 1987).

Fortunately, the money sent from overseas Pakistanis worth the total amount of exports) help the international trade balance at a minimum.





## **APPENDIX 3**



### Explanatory Notes for Code

AC	Analytical Chemistry
MB	Microbiology
PH	Pharmacology
PP	Pilot Production
TX	Toxicology
AH	Animal House
QC	Quality Control
GI	Glassware
CA	Additional Request (1)
MA	Additional Request for MB
PA	Additional Request for PH
PC	Pharmaceutics
TA	Additional Request for TX
LF	Accessory Equipment
AD	Additional Request (2)

## Equipment List of Initial Request

### Analytical Chemistry

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
AC-01	High Performance Liquid Chromatograph	1	1
AC-02	Gas Chromatograph with FID/TCD	1	1
AC-03	Gas/Mass Spectrophotometer	1	1
AC-04	Spectorophotometer, Atomic Absorption System	1	1
AC-05	I. R. Spectrophotometer	1	1
AC-06	Digital Polarimeter	1	1
AC-07	Fluorescence Spectrophotometer	1	1
AC-08	UV/VIS Spectrophotometer	1	1
AC-09	Digital pH Meter	2	3
AC-10	Titrator, Karl Fisher Model	1	1
AC-11	Melting Point Measuring unit Glass type	2	3
AC-11-2	Boiling Point Measuring unit Glass type	2	3
AC-11-3	Freezing Point Measuring unit Glass type	2	3
AC-12	Potentiometer	3	1
AC-13	Melting Point, Automatic	1	1
AC-14	Balance, Micro & Electronic, 0.1mg, Max 200g	4	4
AC-15	Tablet Dissolution unit, 6 Chamber type	1	1
AC-16	Tablet Disintegration unit, 2 Chamber type	2	1
AC-17	Balance, Top Loading type, Max. 3kg	2	2
AC-18	Muffle Furnace, 3L, Cubical type	4	2
AC-19	Vacuum Drying Oven	2	1
AC-19-1	Vacuum Pump	2	2
AC-19-2	Cooling unit with Oil Trap unit	2	2
AC-20	Water Bath unit, 7L, Room Temp. +5 ~110 °C	4	1
AC-21	Water Bath unit, Shaking type with Universal Rack	1	1
AC-22	Mixer for Test Tube	2	2

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
AC-23	Moisture Meter, Infrared, Lamp type	2	1
AC-24	Glass Instrument Washer, Table top type	2	2
AC-25	Fraction Collector with Liquid Chromato unit	1	1
AC-26	Refractometer, Table top Model	3	2
AC-27	Viscometer with Water Bath unit	2	2
AC-28	Tensil Testing Unit for Sutures & Bandage	1	1
AC-29	Particle Counter	1	
AC-30	Magnetic Stirrer, with Hot Plate	4	6
AC-31	Magnetic Stirrer	2	3
AC-32	Peristaltic Pump, 2 Head type	1	2
AC-33	Rotary Evaporator, 0.5L	6	4
AC-34	Glass Instruments Dryer	2	1
AC-35	Agar Gel Electrophoresis, Universal type	1	1
AC-36	Paper Electrophoresis	1	3
AC-37	Flask Shaker, Recipro type, 500ml x 6	4	3
AC-38	KBr Attachment for I.R. Spectrophotometer	1	
AC-39	Liquid Cell for I.R. Spectrophotometer	10	
AC-40	Water Still Equipment	2	
AC-41	Reagent Refrigerator	4	5
AC-42	Particle Counter for Liquid	1	1
AC-43	Distillation unit	4	1
AC-44	Heating Mantle for Beaker, 4 Kinds/1 set	8	4
AC-45	Separating Extractor, Max. 1L Flask x 3	2	1
AC-46	Water Bath unit, Soxhelet for 6 Flask	8	11
AC-47	Dispencer unit with Amber Bottle, 1,000ml, 0.1ml	15	14
AC-48	Micro Pippette, Digital, 0.01 Micro	12	16
AC-49	Degassing System for HPLC	1	
AC-50	Automatic Voltage Stabilizer, 1 KV	3	3
AC-51	Shieve Shaker, Electric	1	

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
AC-52	Water Bath unit, Shaking type with Universal Rack	1	
AC-53	Emit-St	1	
AC-54	Scientific Calculator, Table top Model	5	2

### Microbiology

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
MB-55	Clean Bench, Safety Cabinet type	1	1
MB-56	Particle Counter, Liquid Model	1	1
MB-57	Microscope, Zooming for 4~40 X	1	1
MB-58	Microscope, Inverted	1	1
MB-59	Microscope, for Biological Study with Camera System	1	1
MB-60	Incubator for Microbic Culture, 72L	2	4
MB-61	Reagent Refrigerator	3	3
MB-62	Hot Air Sterilizer	1	1
MB-63	Electric Steam Sterilizer, Cylindrical & Inhoused type	1	2
MB-64	Water Purifier with RO System, 1.5 L/H	1	1
MB-65	Balance, Micro & Electronic, 0.1mg, Max. 200g	1	1
MB-66	Balance, Top Loading type, Max. 3 kg	1	1
MB-67	Colorimeter	1	
MB-68	Ultra Centrifuge	1	1
MB-69	Digital Colony Counter	1	1

Pharmacology

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
PH-70	Micro Dynamometer with Recorder	1	1
PH-71	Plithysmometer for Rat and Mice	1	1
PH-72	Magunus Chamber, 2 Glass unit type	1	1
PH-73	Hot Plate, Rectangular type	2	2
PH-74	Analgesy Meter (hot plate)	1	3
PH-75	Microscope for Dissecting	1	1
PH-76	Centrifuge, Table top type, Bio-Assey Model	1	1
PH-77	Water Still Equipment, 1.8l/h	1	1
PH-78	Animal Dissecting Table, each different type	1	1
PH-79	Feeder, Water Bottle, Urine Cage for above	10	
PH-80	Aseptic Animal Cage	2	
PH-81	Other Miscellaneous Equipment		



### Small Scale Pilot Plant

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
PP-82	Tablet Maker, Table top type	1	1
PP-83	Mixer for Drug Powder, V & Table top type	1	1
PP-84	Granulator	1	
PP-85	Granule Drying Cabinet	1	
PP-86	Capsule Filler	1	1
PP-87	Ampule Sealer, Table top type	1	1
PP-88	Ampule Filling Machine	1	
PP-89	Ampule Washing Machine	1	
PP-90	Hot Air Sterilizer	1	
PP-91	Hardness Tester	1	1
PP-92	Homogenizer, Ultrasonic System	1	1
PP-93	Balance, Top Loading type, Max. 3 Kg.	1	1
PP-94	Deionization System	1	
PP-95	Apparatus for Gel Filtration	1	
PP-96	Extractor, 2/5/10 Liter Capacities	2	6
PP-97	Vacuum Drying Oven	1	3
PP-98	Essential Oil Extractor, Manual type, 1L	2	
PP-99	Essential Oil Extractor, Motor Compressed type, 5L	2	
PP-100	Steam Distillation Apparatus, Glass Large Scale	2	
PP-101	Centrifuge, Ultra High Speed Model, 80,000 rpm	1	1

Toxicology

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
TX-102	Centrifuge, High Speed Refrigerated type, 25,000 rpm	1	1
TX-103	Homogenizer, Ultrasonic System	2	2
TX-104	Blender Mill	1	1
TX-105	Voltmetric Analyzer (Pulse Polarograph)	1	
TX-106	Blender Waring	1	1
TX-107	Liquid Nitrogen Plant	1	
TX-108	Microscope, with Magnifier, Phase Contrast & Fluorescent	1	1

Animal House

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
AH-01	Animal Cage, Poly-Carbonate with Cover, Mice/Rat	2,000	810
AH-02	Animal Cage, Poly-Carbonate with Cover, Mice/Hamster	1,000	480
AH-03	Animal Cage, SUS Basket type, 5 unit type	432	90
AH-04	Animal Cage, SUS, for Hamster	12	210
AH-05	Animal Cage, SUS, for G. P.	200	140
AH-06	Animal Cage, SUS, for Rabbit	8	100
AH-07	Animal Cage, SUS, for Monkey	100	10
AH-08	Food Container	20	20
AH-09	Animal Cage, SUS Basket type, for Rat	20	20
AH-10	Wash Tube	20	
AH-11	Cart for Transportation with Dust Collection Bag	40	10
AH-12	Small Animal Dissecting Table	2	
AH-13	Animal Dissecting Table, Middle Size	2	2
AH-14	Protection unit for Rats, Mice & G. Pigs	10	
AH-15	Wire Cage for Rats	96	
AH-16	Hygrothermometer, Digital for Animal Room	12	12
AH-17	Incubator for Microbic Culture, 72L	1	1
AH-18	Electric Steam Sterilizer, Cylindrical & Inhoused type	1	1
AH-19	Microscope, for Biological Study, 1,500 X	1	1
AH-20	Microscope, Stereoscopic	1	
AH-21	Colony Counter	1	
AH-22	Magnetic Stirrer, with Hot Plate	1	1
AH-23	Digital pH Meter	1	
AH-24	Reagent Refrigerator	1	1
AH-25	Balance, Micro & Electronic, 0.01mg. Max. 60g.	1	1
AH-26	Vacuum Cleaner for Animal House	3	2
AH-27	Dehumidifier	3	
AH-28	Glass Instrument Dryer	2	

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
AH-29	Stop Watch	1	
AH-30	Animal Cage/Rack Washer	2	1
AH-31	Animal Cage, Disposable, for Mice	2,000	100
AH-32	Metabolism Cage for Rat & 3 Test Group type	10	3
AH-33	Metabolism Cage for Mice & Test Group type	10	3
AH-34	Metabolism Cage for Rabbit	5	5
AH-35	Shelves for Animal Cage, Mice, SUS	100	40
AH-36	Shelves for Animal Cage, SUS	100	40
AH-37	Animal Cage, for Dog, with Castor	50	10
AH-38	Poultry Cage	500	20
AH-39	Water Feeding Bottle, Poly-Carbonate, 250ml	3,000	900
AH-40	Automatic Treatment System	50	
AH-41	Automatic Watering System	10,000	
AH-42	Bottle Filler	50	
AH-43	Water Bottle Case	500	
AH-44	Card Holder for Animal	500	500
AH-45	Pyrogen Test for Rabbit Holder, 5 unit	200	6
AH-46	Pyrogen Test Shelves	25	2

Pharmacognosy

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
QC-01	Electric Steam Sterilizer, Cylindrical & Inhoused type	2	1
QC-02	Balance, Micro & Electronic, 1.0mg, Max. 200g	2	1
QC-03	Calculator for Scientific	2	2
QC-04	Centrifuge, High Speed Refrigerated type, 25,000 rpm	2	2
QC-05	Water Distillation unit, 1.8L/H, Glass type	1	1
QC-06	Incubator for Microbic Culture, 72L	2	1
QC-07	Incubator for Microbic, Low Temp. type	4	1
QC-08	Microscope, Inverted	2	2
QC-09	Digital pH Meter	2	
QC-10	Cellulose Acetate Electrophoresis unit	20	1
QC-11	Microscope, for Biological Study with Camera System	3	
QC-12	Deep Freezer, -30°C Horizontal type	2	1
QC-13	Microtitration Plate, 96 well	10,000	
QC-14	Microtitration Plate, 24 well	1,000	
QC-15	Titertec Plate Sealer	6	
QC-16	Plate Sealing Apparatus	2	
QC-17	Plate Sealing Tap	50	
QC-18	Titertec Pipette Bulb	100	
QC-19	Spare Blader for Plate Sealing	10	
QC-20	Liquid Nitrogen Storage Ampoules	2,000	
QC-21	Liquid Nitrogen Container	2	2
QC-22	Micro Plate Dispenser	2	
QC-23	Magnetic Stirrer, with Hot Plate	2	2
QC-24	Clean Bench	6	1
QC-25	Mixer for Test Tube	2	2
QC-26	Glass Instrument Washer, Automatic, with Racks	1	2
QC-27	Filter Holder for Syringe, 47mm	10	1
QC-28	Flask for Plant Cultivation, 500ml	20,000	200
QC-29	Flask for Plant Cultivation, 250ml	20,000	220

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
QC-30	Glass Syringe, 0.5ml	200	
QC-31	Glass Syringe, 10 ml	200	
QC-32	Laboratory Glove, Long Arm Size	50	
QC-33	U. V. Lamp, Table type	10	
QC-34	Reagent Refrigerator	3	1
QC-35	Magnetic, Teflon Coated, 2 inches	14	
QC-36	Colony Counter	2	
QC-37	Micro Plate Shaker	2	1
QC-38	Drying Oven	1	
QC-39	Deep Freezer, -30 °C Horizontal type	4	3
QC-40	Glass Instrument Washer, Automatic, with Racks	2	1
QC-41	Kymography Unit	2	1
QC-42	Micro Plate Dilutor	100	1
QC-43	Stop Watch	3	1
QC-44	Timer, Laboratory Use	3	2
QC-45	Pipette set 0.5~5 ml 10 pcs./1 case	30	30
QC-46	Pipette set Ultra Micro 3 pcs.	30	20
QC-47	Disposal Pipette, 10 ml	5,000	
QC-48	Disposal Pipette, 0.1ml	5,000	
QC-49	Multi Channel Pipetter, 5~50ml	2	20
QC-50	Multi Channel Pipetter, 5~200ml	2	
QC-51	Minumum Essential Medium (Eagle)	200	
QC-52	Medium 199	50	
QC-53	Phenol Red Solution	50	
QC-54	Fungizone	100	
QC-55	L. Glylamino	500	
QC-56	Essential Aminoacid	500	
QC-57	Fetal Bovine Serum	500	
QC-58	Trypsin, HDT	500	
QC-59	Horse Serum	59	

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
QC-60	Trypan Blue Solution, 100 x 50	470	
QC-61	Labo Detergent, 7 x 1 x 200 Lit.	1,500	
QC-62	Laboratory Glove, Heatproof type	20	
QC-63	Bijouxbottle, 28 ml with Cap	1,000	250
QC-63-1	Bijouxbottle, 18 ml with Cap	1,000	250
QC-64	Vials for Serum Storage	2,000	
QC-65	Vial for Serum Storage, 2 ml	2,000	
QC-66	Pipette Bulbs	30	
QC-67	Pipette Bulbs	3	
QC-68	Pipette Bulbs	3	
QC-69	Pipette Bulbs	3	
QC-70	Syringe Filter	1,000	
QC-71	Pi-pump, 2ml	12	
QC-72	Pi-pump, 10ml	12	
QC-73	Pi-pump, 25ml	12	
QC-74	Pressure Pump	1	
QC-75	Filtration Pump unit	1	2
QC-76	96 well Microplate, U	1,000	1,000
QC-77	96 well Microplate, Flat Bottom	1,000	
QC-78	Pipette Tips, 10 ~100 Micro ml.	1,000	
QC-79	Disposal Pipette Tips	5,000	
QC-80	Hydrometer	2	
QC-81	Incubator, Low Temp. CO2 type	2	
QC-82	Incubator for Microbic, CO2 type	2	1
QC-83	Label Marker	2	1
QC-84	Magnetic Stirrer, with Hot Plate	2	1,000
QC-85	Centrifuge Test Tube, 50 ml	1,000	1,000
QC-86	Centrifuge Test Tube, 20 ml	1,000	1,000
QC-87	Centrifuge Test Tube, 10 ml	1,000	1,000
QC-88	Pipette Filter	1,000	

Glassware

		Requested Quantity in Initial Request	Adopted Quantity in Equipment List
GI-01	Pipette set	198	
GI-02	Pipette with Bulbs	280	
GI-03	Cylinder, Graduated, 10/25/50/100ml each 1 cas	260	60
GI-04	Flask set with Cover & Graduated, 10~2,000ml each 1 case	352	30
GI-05	Flask set, Erlenmyer, 100/200/500ml each 1 case	168	30
GI-07	Glass Filter set, 30/60/140ml each one	72	20
GI-08	Separatory Funnels 100/200/300/500ml each	180	15
GI-08-1	Separatory Funnels 1,000/2,000/3,000ml each	120	10
GI-09	Beaker set, 100/200/500ml each one	300	30
GI-09-1	Beaker set, 1,000/2,000ml each one	252	30
GI-13	Burette Glass Stopcock, Plain/Amber each 4 pcs./1 set	100	10
GI-13-1	Burette Mohr, Plain/Amber each 4 pcs./1 set	60	10
GI-15	Specific Gravity Bottles, Gay-Lussac with Thermometer	24	20
GI-16	Pycnometer 50 ml	24	
GI-17	Reflex Condensers	100	
GI-18	Flask set, Distilling, Englar, 100/125/200ml each 1 case	24	10
GI-19	Ammonium Ion Distilling set	12	6
GI-20	Flask set Round-bottom, 300/500/1,000ml each 1 case	12	20
GI-21	Culture Tubes	144	
GI-22	Petri Dish with Cover, 75/90/120ml each 1 case	1,000	15
GI-23	Slide Glass, White & Polishing type 100 pcs./1 case	100	100
GI-23-1	Cover Glass, 22 x 22, 24 x 24, each 1,000 pcs.	20	20
GI-24	Crucibles, Porcelain	36	
GI-25	Crucibles, Cinerated	36	



## Equipment List for Additional Request

Name of Equipment	Code No. of Adopted Equipment	Quantity
<b>I. Analytical Chemistry</b>		
1. FT/NMR Spectrophotometer		
2. Automatic Polarimeter		
3. CHN Analyzer		
4. Polarization Colorimeter		
5. Thermal Analyzer		
6. MS/MS Spectrophotometer		
7. Ice Maker	CA-07	1
8. Auto Diluter	CA-08	1
9. Fume Hood		
10. Digital pH Meter		
11. Experimental Glass Stand with Hook set	CA-11	3
12. Rubber Gloves		
13. Dessolution Testing Machine for Table with Spectrophotometer		
14. Particle Counter		
15. X-Ray Diffractometer		
16. Electron Spin Resonance		
17. TLC Instruments	CA-17	2
1) TLC Streaker Unit	CA-17-1	1
2) TLC Spray Chamber	CA-17-2	1
18. Moisturemeter, Balance Type		

	Name of Equipment	Code No. of Adopted Equipment	Quantity
19.	Platform Scale		
20.	Automatic Hardness Tester for Tablet & Capsule		
21.	Disintegration Unit for Table & Capsule		
22.	Friability Tester	CA-22	1
23.	Flask Shaker, Recipro Type, 500 ml x 6	CA-23	2
23-1	Flask Share, Rotated Type, 500 ml x 6	CA-23-1	1
24.	Liquid Chromatograph for Fraction		
25.	Electric Oven		
26.	Electric Sieving Unit		
27.	Thin Layer Chromato Scanner, Denstometric Type	CA-27	1
	TLC Streaker, Unit	CA-27-1	1
28.	Dissolution Unit for Capsule & Tablet		
29.	Densitometer		
30.	Kjeldahl Nitrogen Digesting & Distilling Unit	CA-30	1
31.	Magnetic Sirrer, Low Speed Model, 500 ml x 6	CA-31	1
31-1.	Magnetic Stirrer, Low Speed Model, for Max. 2,000 ml	CA- 31-1	1
32.	High Speed Amino Acid Analyzer		
33.	Air Compressor, Low Noise Type		
<b>II. Microbiology</b>			
1.	Digital pH Meter	MA-01	1
2.	Water Bath		
3.	Washing Drying Machine for Glassware		
4.	Incubatory, Low Temperature Type		

	Name of Equipment	Code No. of Adopted Equipment	Quantity
5.	Zone Reader with TV Camera System	MA-05	1
6.	Automatic Media Preparator/Pipetter		
7.	Magnetic Stirrer, with Hot Plate	MA-07	2
8.	Flask Shaker, 250 ml x 12	MA-08	1
9.	Mixer	MA-09	2
10.	Electric Oven		
11.	Ultra Violet Viewer, Table Top Type	MA-11	1
12.	Pyrogen Test Weighing Scale	MA-12	2
13.	Pyrogen Testing Analyzer		
14.	Rack for Pyrogen Test		

### III. Pharmacology

1.	Microscope Camera System		
2.	Microscope for Biology, 1,500 x		
3.	Microscope with Polarized Light		
4.	Microscope for Dissection		
5.	Microscope, Inversion Type		
6.	Microscope, Stereoscopic Type		
7.	Microscope with TV System		
8.	Analgesy Meter (Hot plate)		
9.	Analgesy Meter (Pressure type)		
10.	Analgesy Meter Tail flic)		
11.	Water Distillation Unit		
12.	Water Distillation Unit, 1.8 l/hr., Glass Type	PA-12	1
13.	Clean Bench		
14.	Draft Chamber, Table Top Type		

	Name of Equipment	Code No. of Adopted Equipment	Quantity
15.	Electric High Pressure Steam Sterilizer		
16.	Hot Air Sterilizer		
17.	Reagent Refrigerator		
18.	Deep Freezer, -30°C Horizontal Type, 130 l	PA-18	1
19.	Blood Refrigerator		
20.	Auto Washing Machine for Glassware		
21.	Test Tube Washing Machine		
22.	Pipette Cleaner Ultrasonic	PA-22	1
23.	Electric Oven		
24.	Electric Balance, 0.1 mg		
25.	Micropipette		
26.	Micropipette, Fine		
27.	Centrifuge, High Speed Refrigerator		
28.	Magnetic Stierrer	PA-28	1
29.	Magnetic Stirrer with Hot Plate	PA-29	1
30.	Centrifugal for Hepalin, Table Top Type		
31.	Ultrasonic Dispensor	PA-31	1
32.	Balance, Ultra Micro & Electronic, 0.01 mg	PA-32	1
33.	Magnetic Stirrer, Low Temperatures		
34.	Balance, Top Loading Type, Max. 3 kg	PA-34	1
35.	Homogenizer	PA-35	2
36.	Blender Mill, Max. 4 l, Thermo Control Type	PA-36	1
37.	Hot Plate with Electronic Control Unit		
38.	UV/VIS Spectrophotometer, W Beam, 900 NM	PA-38	1
39.	Fluorescence Spectrophotometer	PA-39	1
40.	I.R. Spectrophotometer	PA-40	1

	Name of Equipment	Code No. of Adopted Equipment	Quantity
41.	Automatic Blood Pressure/Pulse Meter		
42.	High Speed Amino Acid Analyzer		
43.	Vacuum Rotary Evaporator		
44.	Magnetic Stirrer, Big Scale		
45.	Heating Mantle for Beaker, 4 kinds/1 set	PA-45	1
46.	Heating Mantle for Fask, 4 kinds/1 set	PA-46	1
47.	Kymograph		
48.	Water Bath Unit, Shaking Type with Universal Rack	PA-48	1
49.	Water Bath, 0 – 100°C		
50.	Rat Cage Rack		
51.	Metabolism Cage for Mouce		
52.	Metabolism Cage for Rat		
53.	Breeding Cage		
54.	Cage for Disinfected Animals		
55.	Samll Animal Dissecting Instrument Set	PA-55	4
56.	Middle Animal Dissecting Instrument Set	PA-56	1
57.	Clean Rack for Animal		
58.	Electric Dynamometer		
59.	Micrometer for Electronic Microscope		
60.	Cryostat		
61.	Microtome, Rotational Type, Table Top Model	PA-61	1
62.	Microtome, Sliding Type, Table Top Model	PA-62	1
63.	Microtome, Freezing Unit, Electonic, Table Top Model	PA-63	1
64.	Paraffin Tissue Embedding Unit, Automatic	PA-64	1
65.	Paraffin Block Cooler, Table Top Type	PA-65	1

	Name of Equipment	Code No. of Adopted Equipment	Quantity
66.	Paraffin Oven	PA-66	1
67.	Slide Warmer, Table Top Type	PA-67	1
68.	Paraffin Moulding Set	PA-68	1
69.	Automatic Stainer, Table Top Type	PA-69	1
70.	Slide Glass Cabinet, Table Top Model	PA-70	3
71.	High Performance Liquid Chromatograph with UV/DRI Detector	PA-71	1
72.	Enzyme Immunoassay Analyzer (ELISA)	PA-72	1
73.	Spare Brades for Microtome		
74.	Spare Brade Holder for Microtome		
75.	Knife Holder for Microtome		
76.	Tissue Embedding Cassette		
77.	Tissue Block Maker		
78.	Tissue Block Set		
79.	Microtome Check Adoptor		
80.	Laboratory Management Information System		
81.	Software for Laboratory Management Information System		

#### IV. Pharmaceutics/Narcotics

1.	Gaschro/Mass Spectrophotometer		
2.	High Performance Liquid Chromatograph (Existing)	PC-02	1
3.	Gas Chromatograph with FID/TCD with Hydrogen Generator	PC-03	1
4.	UV/VIS Sepctrophotometer, W Beam (Existing) 900 NM	PC-04	1
5.	I.R. Spectrophotometer, (Existing)	PC-05	1

	Name of Equipment	Code No. of Adopted Equipment	Quantity
6.	Digital pH Meter	PC-06	1
7.	Automatic M.P. Tester		
8.	B.P. Tester, Glassware		
9.	Gel Point TEster, Glassware		
10.	Balance, Micro & Electronic, 0.1 mg, Max. 200 g	PC-10	1
11.	Water Bath		
12.	Reagent Refrigerator		
13.	Water Distillation Unit, 1.8 //hr.		
14.	Homogenizer, Ultrasound Type		
15.	Balance, Weighing Scale, Max. 30 kg	PC-15-1	1
16.	Pure Water Manufacturing Unit		
17.	Capsule Filling Machine, Table Top Type		
18.	Hardness Tester for Tablet		
19.	Deionized Water Manufacturing Unit		
20.	Electrophoresis, Agar Gel Type		
21.	Liquid-Liquid Extraction Unit		
22.	Oil Squeezer, Manual Type		
23.	Oil Squeezer, Electric Oil Pressure Type		
24.	Distillation Reaction Unit		
25.	Centrifuge		
26.	Fume Hood, 1,300 kW	PC-26	1
27.	TLC Scanner		
28.	TLC Instruments (FR-03 x 4)	PC-28	6
	TLC Streaker Unit, Manual Type	PC-28-2	1
29.	Fraction Collector for Column Chromato High Pressure Column Type	PC-29	1
30.	Tablet Disintegration Unit		

	Name of Equipment	Code No. of Adopted Equipment	Quantity
31.	Dissolution Unit for Tablet 6 Chamber Type	PC-31	1
32.	Drugs Absorption Simulator		
33.	Drugs Dissolution Simulator		
34.	Peristaltic Pump		
35.	Peristaltic Pump, Programmed Type		
36.	Calculator for Chemical Calculation		
37.	Auto Pipetter		
38.	Particle Counter		
39.	Aspirator with Cooling Circuit	PC-39	5
40.	Titration, Karl Fischer Model		
41.	Cooling Unit, 0 - 100°C, 5 l	PC-41	1
42.	Tensile Testing Unit for Gause & Bandage		
43.	Rotary Evaporator, 10 l		
44.	Rotary Evaporator, 20 l		
45.	Cooling Unit with Oil Trap Unit	PC-45	3
46.	Vacuum Pump, Oil Rotary Type	PC-46	3
47.	Reaction Unit		
48.	Solid-Liquid Reactor		
49.	Distillation & REaction Unit		
50.	Thin Film Flush Evaporator		
51.	TLC Scanner	PC-51	1
52.	Electronic Tachometer		
53.	Mixer for Test Tube	PC-53	3

#### V. Pharma Cognosy/Traditional Medicine

1. Microscope
2. Microscope for Biology, 1,500 x



	Name of Equipment	Code No. of Adopted Equipment	Quantity
3.	Hot Air Sterilizer		
4.	Balance, Top Loading Type, Max. 3 kg	PA-34	1
5.	Electronic Balance, 0.1 mg		
6.	Rotary Evaporator		
7.	TLC Instruments	CA-17-2	2
8.	UV/Vis Spectrophotometer		
9.	Goggle for UV		
10.	Desicator		
11.	Centrifuge, Table Top		
12.	Electric Steam Sterilizer, High Pressure Type		
13.	Clean Bench		
14.	Magnetic Stirrer, with Hot Plate	PA-29	1
15.	Magnetic Stirrer		
16.	Electric Oven		
17.	Digital pH Meter	PC-06	1
18.	Water Distillation Unit, 1.8 l/hr., Glass Type		
19.	Reagent Refrigerator		
20.	Separator/Extractor, 1 l x 3		
21.	Filtration Pump Unit		
22.	Filter Holder Set, sus		
23.	Filter Set, Membrane, 0.22		
24.	Incubator		
25.	Draft Chamber		
26.	Incubator, CO <sub>2</sub> Type		
27.	Homogenizer, Low Speed Model	TA-04	1
28.	Homogenizer, High Speed Model	TA-05	1
29.	Motor Stirrer	TA-06	3

	Name of Equipment	Code No. of Adopted Equipment	Quantity
30.	Blender Mill, Max. 4 l, Thermo Control Type		
31.	Willey's Dispenser for Plant, Table Top Type	TA-10	1
32.	Ball Mill with Container Pot Set	TA-11	1
33.	Grinding Mill, Max. 1 l	TA-12	1
34.	Oil Squeezer, Manual		
35.	Oil Squeezer, Oil Pressure Type		
36.	Centrifuge, High Speed Refrigerated Type		
37.	Electro Phresis, Cellulose Type		
38.	Deep Freezer, -30°C Horizontal Type, 130 l	PA-18	1
39.	Pippette Cleaner Ultrasonic	PA-22	1
40.	Flask Shaker, Recipro Type, 500 ml x 6		
41.	Flask Shaker, Rotated Type, 500 ml x 6		
42.	Water Bath		
43.	Ultra Violet Viewer, Table Top Type	MA-11	1

#### VI. Other Accessory Equipment

1.	Typewriter, Table Top & Computerized Type	LF-02	3
2.	Electric Copy Machine	LF-03	2
3.	Projector, for 35 mm Slide Picture	LF-04	1
4.	Projector, Over-Head Model	LF-05	1
5.	Film Enlarger	LF-06	1
6.	Micro Film Camera System	LF-07	1
7.	Film Viewer	LF-08	1

	Name of Equipment	Code No. of Adopted Equipment	Quantity
<b>VII. Equipment Recommended by Basic Design Study Team</b>			
1.	Chromato Instrument Cabinet	AD-01	6
2.	Gas/Mass Instrument Cabinet	AD-01-1	1
3.	Ultrasonic Cleaner, Table Top Type	AD-03	1
4.	Water Pre-treatment Unit, RO System, 100 l/hr.	AD-07	1
5.	Water Pre-treatment Unit, RO System, 100 l/hr.	AD-07	1
6.	Water Pre-treatment Unit, RO System, 100 l/hr.	AD-07	1
7.	Chemical Waste Treatment Unit, Max. 20 l	AD-08	1
8.	Chemical Waste Treatment Unit, Max. 20 l	AD-08	1
9.	Chemical Waste Treatment Unit, Max. 20 l	AD-08	1
10.	Animal Weighing Scale, for Mice	AD-15	2
11.	Animal Weighing Scale, for Rat	AD-15-1	2
12.	Animal Weighing Scale, for Rabbit	AD-15-2	2
13.	Thermometer for Mice, Thermister type	AD-16	2
14.	Thermometer for Rat, Thermister Type	AD-16-1	2
15.	Thermometer for Rabbit, Thermister Type	AD-16-2	2
16.	Foreign Material Detector for Ampule, Table Top Type	AD-17	1
17.	Micro Plate Washer	AD-20	1
18.	Micro Plate Incubator	AD-21	1
19.	Micro Plate Centrifuge	AD-22	1
20.	Fume Hood (FR-19=1) 1,300 W	AD-26	3

	Name of Equipment	Code No. of Adopted Equipment	Quantity
21.	Animal REspirator, Universal Model	AD-31	2
22.	Plant Cell Culture 42 pcs. with Cultivation Tube 100 pcs.	AD-35	2
23.	Plant Cultivation Shelve, 4 Shelves Type with Blumunator	AD-36	1
24.	Gas Chromtograph Detector FPD Unit	AD-37	1
25.	Balance Table, Shock Absorption Type	AD-38	3

VIII. Additional Request made during Explanation of Draft Fianl Report

1.	Drug Analyzer (Drug Therapeutic Monitor)	PC-79	1
2.	Personal Computer	LF-09	3

# **APPENDIX 4**

## **Equipment List**



## Chemistry Section (I)

Code	Equipment	Quantity
AC-01	High Performance Liquid Chromatograph, UV/DRI/Fluo.Detec. & Degassor	1
AC-02	Gas Chromatograph with FID/TCD, CRT, & Hydrogen Generator	1
AC-03	Gas/Mass Spectrophotometer, With L.C. Interface	1
AC-04	Spectrophotometer, Atomic Absorption System	1
AC-05	I.R. Spectrophotometer, Fourier Transform System	1
AC-06	Digital Polarimeter	1
AC-07	Fluorescence Spectrophotometer	1
AC-08	UV/VIS Spectrophotometer, W. Monochro. & 2,800 NM	1
AC-09	Digital pH Meter (FR-18)	3
AC-10	Titration, Karl Fischer Model	1
AC-11	Melting Point Measuring Unit Glass Type (FR-18=1)	3
AC-11-2	Boiling Point Measuring Unit Glass Type (FR-18-1)	3
AC-11-3	Freezing Point Measuring Unit Glass Type (FR-18-1)	3
AC-12	Potentiograph, Polarization, Photometric & Potential Difference	1
AC-13	Melting Point, Automatic	1
AC-14	Balance, Micro & Electronic, 0.1 mg, Max. 200 g	2
AC-14-1	Balance, Micro & Electronic, 1.0 mg, Max. 200 g (FR-18=1)	2
AC-15	Tablet Dissolution Unit, 6 Chamber & Photometric Type	1
AC-16	Tablet Disintegration Unit, 2 Chamber Type	1
AC-17	Balance, Top Loading type, Max. 3 kg	2
AC-18	Muffle Furnace, 3l, Cubical Type	2
AC-19	Vacuum Drying Oven, 27l	2
AC-19-1	Vacuum Pump, Oil Rotary Type	2
AC-19-2	Cooling Unit with Oil Trap Unit	2
AC-20	Water Bath Unit, 7l, Room Temp +5 - 80°C	1
AC-21	Water Bath Unit, Shaking Type with Universal Rack	1
AC-22	Mixer for Test Tube	2
AC-24	Glass Instrument Washer, Table Top Type	2
AC-25	Fraction Collector with Preparative Chromatic Unit	1
AC-26	Refractometer, Table Top Model	2
AC-27	Viscometer with Water Bath Unit	1
AC-27-1	Viscometer set, Glass Instrument	1

Code	Equipment	Quantity
AC-28	Tensile Testing Unit for Sutures & Bandage, 12 pcs. Set	1
AC-30	Magnetic Stirrer, with HOt Plate (FR-03)	6
AC-31	Magnetic Stirrer (FR-07)	3
AC-32	Peristaltic Pump, 2 Head Type	2
AC-33	Rotary Evaporator, 0.5 l	1
AC-33-1	Rotary Evaporator Vertical Type, 0.5 l	1
AC-33-2	Rotary Evaporator, 1 l	1
AC-33-3	Rotary Evaporator Vertical Type, 1 l	1
AC-34	Glass Instruements Dryer	1
AC-35	Agar Gel Electrophoresis, Universal Type, with Electric Stabilizer	1
AC-36	Paper Electrophoresis with Paper & Electric Stabilizer	1
AC-36-1	Paper Chromatograph Set with Paper	2
AC-37	Flask Shaker, Recipro Type, 500 ml x 6	1
AC-37-1	Flask Shaker, Rotative Type, 500 ml x 6	1
AC-37-2	Separating Extractor, Max. 3 l Flask x 3, with 3 l Flask 6 pcs.	1
AC-41	Reagent Refrigerator (FR-18) 300 l	5
AC-42	Particle Counter	1
AC-43	Water Distillation Unit, 1.8 l/hr	1
AC-44	Heating Matle for Beaker, 4 kinds/1 set	2
AC-44	Heating Mantle for Flask, 4 kinds/1 set	2
AC-45	Separating Extractor, Max. 1 l Falsk x 3, with 1 l, 0.5 l/Flask each 6 pcs.	1
AC-46	Water Bath Unit, Soxhlet for 6 Flask	2
AC-46-1	Soxhlet Glass Unit 6 pcs./1 set 150 ml	2
AC-46-2	Soxhlet Glass Unit 6 pcs./1 set 250 ml	2
AC-46-3	Soxhlet Glass Unit 6 pcs./1 set 500 ml	2
AC-46-4	Soxhlet Glass Unit 6 pcs./1 set 1,000 ml	2
AC-46-5	Soxhlet Glass Unit 6 pcs./1 set 2,000 ml	1
AC-47	Dispenser Unit with Amber Bottle, 1,000 ml, 0.1 ml	4
AC-47-1	Dispenser Unit with Amber Bottle, 1,000 ml, 0.5 ml	4
AC-47-2	Dispenser Unit with Amber Bottle, 1,000 ml, 1.0 ml	4
AC-47-3	Dispenser Unit with Amber Bottle, 1,000 ml, 2.0 ml	2
AC-48	Micro Pipette, Digital, 0.01 Micro	4
AC-48-1	Micro Pipette, Digital, 0.1 Micro	4
AC-48-2	Micro Pipette, Digital, 1 Micro	4



Code	Equipment	Quantity
AC-48-3	Micro Pippette, Digital, 10 Micro	4
AC-50	Automatic Voltage Stabilizer, 1 kV	3
AC-54	Scientific Calculator, Table Top Model	2
AD-01	Chromato Instrument Cabinet	6
AD-01-1	Gas/Mass Instruments Cabinet	1
AD-03	Ultrasonic Cleaner, Table Top Type	1
AD-08	Chemical Waste Treatment Unit, Max. 20 l	1
AD-26	Fume Hood (FR-19=1), 1,300 W	3
AD-37	Gas Chromatograph Detector, FPD Unit	1
AD-38	Balance Table, Shock Absorption Type	3
CA-06	Ice Maker, Cubicle Type	1
CA-07	Dilutor, Automatic with 25 ml Syringe	1
CA-11	Experimental Glass Instruments Stand with Hook Set	3
CA-17-2	TIC Spray Chamber (Pc-28-3)	1
CA-22	Friability Tester	1
CA-27	Thin Layer Chromato Scanner, densitometric Type	1
CA-27-1	TLC Streaker, Unit	1
CA-30	Kjeldhal Nitrogen Digesting & Distilling Unit	1
LF-01	Balance Table, Wallside Type	1
MA-11	Ultra Violet Viewer, Table Top Type	1
PA-22	Pippette Cleaner, Ultrasonic	1
PA-31	Ultrasonic Disperser	2
PA-32	Balance, Ultra Micro & Electronic, 0.01 mg	1
PA-35	Homogenizer	2
PC-02	High Performance Chromatograph with UV-Detector (Existing)	1
PC-03	Gas Chromatograph with FID/TCD with Hydrogen Generator	1
PC-04	UV/VIS Spectrophotometer, W Beam (Existing) 900 NM	1
PC-05	I.R. Spectrophotometer (Existing)	
PC-28	TLC Instruments (FR-03 x 4)	6
PC-28-2	TLC Streaker Unit, Manual Type	1
PC-29	Fraction Collector for Column Chromato, High Pressure Column Type	1
PC-39	Aspirator with Cooling Cricuit	3
PC-45	Cooling Unit	1
PC-51	Thin Layer Chromato Scanner	1

Code	Equipment	Quantity
PC-73	High Performance Liquid Chromatograph (Existing)	1
PC-79	Drug Analyzer	1
QC-26	Gass Isntrument Washer, Table Top Type	1
QC-32	Laboratory Glove, Long Arm Size	20
QC-44	Timer, Laboratory Use (FR-05=1)	2
QC-62	Laboratory Glove, Heat Proof Type	5
QC-83	Label Marker	1

## Chemistry Section (II) (Glassware)

Code	Equipment	Quantity
GI-03	Cylinder, Graduated, 10/25/50/100 ml each 1 case	20
GI-03-1	Cylinder, Graduated, 250/500 ml each 1 case	40
GI-04	Flask Set with Cover and Graduated, 10 - 2,000 ml each 1 case	30
GI-05	Flask Set, Erlenmeyer, 100/200/500 ml each 1 case	30
GI-07	Glass Filter Set, 30, 60, 140 ml each one	20
GI-08	Separatory Funnels 100, 200, 300, 500 ml each	15
GI-08-1	Separatory Funnels 1,000, 2,000, 3,000 ml each	10
GI-09	Beaker Set. 100, 200, 500 ml each one	30
GI-09-1	Beaker Set. 1,000, 2,000 ml each one	30
GI-13	Burette with Straight Glass Stopcock, plain/Amber each 4 pcs./1 set	10
GI-13-1	Burette Mohr, Plain/Amber each 4 pcs./1 set	10
GI-15	Specific Gravity Bottles, Gay-Lussac with Thermometer	20
GI-18	Flask Set, Distilling, Englar, 100/125/200 ml each 1 case	10
GI-19	Ammonium Ion Distillation Set	6
GI-20	Flask Set Round-bottom, 300/500/1,000 ml each 1 case	20
GI-22	Petri Dish with Cover, 75, 90, 100, 120 ml, each 1 case	15
GI-23	Slide Glass, White & Polishing Type 100 pcs/1 case	100
GI-23-1	Cover Glass, 22 x 22, 24 x 24, each 1,000 pcs.	20
QC-45	Pipette Set 0.5 - 5 ml 10 pcs./1 case	30
QC-46	Pipette Set Ultra Michro 3 pcs.	20
QC-49	Pipette Set with Cap 5 - 20 ml, 10 pcs./1 case	20
QC-85	Centrifuge Test Tube. 50 ml	200
QC-86	Centrifuge Test Tube, 10 ml, Round Bottom	200
QC-87	Centrifuge Test Tube, 10 ml, Conical Bottom	200

## Microbiology Section

Code	Equipment	Quantity
AC-20	Water Bath Unit, 7l, Room Temp + 5 - 80°C	1
AC-34	Glass Instrument Dryer	1
AC-40	Water Still Equipment, 30l/hr., Semi Auto Model	1
AC-47	Dispenser Unit with Amber Bottle, 1,000 ml, 0.1 ml	3
AC-47-1	Dispenser Unit with Amber Bottle, 1,000 ml, 0.5 ml	3
AC-47-2	Dispenser Unit with Amber Bottle, 1,000 ml, 1.0 ml	3
AC-47-3	Dispenser Unit with Amber Bottle, 1,000 ml, 2.0 ml	3
AC-48-2	Micro Pipette, Digital, 1 Micro	3
AC-48-3	Micro Pipette, Digital, 10 Micro	3
AD-07	Water Pre-treatment Unit, RO System, 100 l/hr	1
AD-08	Chemical Waste Treatment Unit	1
MA-01	Digital pH Meter	1
MA-05	Zone Reader with TV Camera System	1
MA-07	Magnetic Stirrer, with Hot Plate	2
MA-08	Flask Shaker, 250 ml x 12	1
MA-09	Mixer	2
MB-55	Clean Bench, Safety Cabinet Type, 1,300 W	1
MB-56	Particle Counter	1
MB-57	Microscope, Zooming for 4 - 40X	1
MB-58	Microscope, Inverted	1
MB-59	Microscope, for Biological Study with Camera System	1
MB-60	Incubator for Microbic Culture, 72l (GR-22, GR-24)	4
MB-61	Reagent Refrigerator, 300 l	3
MB-62	Hot Air Sterilizer, 150 l	1
MB-63	Electric Steam Sterilizer, Cylindrical & Inhoused Type (GR-24=1)	2
MB-64	Water Purifier with RO System, 1.5 l/hr	1
MB-65	Balance, Micro & Electronic, 0.1 mg, Max. 200 g	1
MB-66	Balance, Top Loading Type, Max. 3 kg	1
MB-69	Digital Colony Counter	1
PA-18	Deep Freezer, -30°C Horizontal Type, 130 l	1
PA-22	Pipette Cleaner Ultrasonic	1
PC-53	Mixer for Test Tube	1

Code	Equipment	Quantity
PP-94	Deionization System	1
QC-04	Centrifuge, High Speed Refrigerated Type, 25,000 rpm	1
QC-04-1	Centrifuge, Table Top Type, 5,000 rpm	1
QC-07	Incubator for Microbic, Low Tem. Type	1
QC-24-1	Clean Bench, Bio-Hazared Type, 1,300 W	1
QC-27	Fiter HOLder for Syringe, 13 mm, 25 mm, 1 set, SUS, with Filter	6
QC-33	U/V Sterilizer, Table Top Type	8
QC-40	Glass Instrumer Washer, Automatic, Table Top Type	2
QC-44	Timer, Laboratory Use	1
QC-75	Filtration Pump Unit	1
QC-75-1	Filter Holder Set, SUS, 3 Types	3
QC-75-2	Filter Set, Membrane, 0.22 Micron, 3 Types	3
QC-82	Incubator for Microbic, CO <sub>2</sub> Type, with Regulator	1

### Clinical Pharmacology/Pharmacology Section (I)

Code	Equipment	Quantity
AC-20	Water Bath Unit, 7l, Room Temp +5 - 80°C	1
AC-23	Moisturemeter, Infrared, Lamp Type	1
AC-48-2	Micro Pipette, Digital, 1 Micro	2
AC-48-3	Micro Pipette, Digital, 10 Micro	2
AD-31	Animal Respirator, Universal Model	2
AH-18	Electric Steam Sterilizer, Cylindrical & Inhoused Type (QC-01)	2
AH-19	Microscope, for Biological Study, 1,500X	1
AH-19-1	Microscope Dissecting, Stereo Type	1
AH-22	Magnetic Stirrer, with Hot Plate (OR-01=1)	3
AH-23	Digital pH Meter (CA-19)	2
AH-24	Reagent Refrigerator	1
AH-25	Balance, Micro & Electronic, 0.01 mg, Max. 60 g	1
AH-25-1	Balance, Micro & Electronic, 0.1 mg, Max. 200 g	1
AH-26	Vacuum Cleaner for Animal House	3
AH-45	Pyrogen Test Rabbit Holder, 5 units	6
AH-45-1	Pyrogen Test Rabbit Holder, 3 units	3
AH-46	Pyrogen Test Shelves	2
AH-46-1	Pyrogen Test Table, Cart Type	3
AH-46-2	Pyrogen Monitor System	1
MA-12	Pyrogen Test Weighing Scale	2
PA-38	UV/VIS Spectrophotometer, W Beam, 900 NM	1
PA-39	Fluorescence Spectrophotometer	1
PA-40	I.R. Spectrophotometer	1
PA-45	Heating Mantle for Beaker, 4 kinds/set	1
PA-46	Heating Mantle for Flask, 4 kinds/set	1
PA-48	Water Bath Unit, Shaking Type with Universal Rack	1
PA-55	Small Animal Dissecting Instrument set	4
PA-56	Middle Animal Dissecting Instrument set	1
PA-71	High Performance Liquid Chromatograph with UV/DRI Detector	1
PC-53	Mixer for Test Tube (QC-25)	2
PH-70	Micro Dynamometer with Recorder	1
PH-71	Plithysmometer for Rat and Mice	1

Code	Equipment	Quantity
PH-72	Magunus Chamber, 2 Glass Unit Type	1
PH-73	Hot Plate, Rectangular Type	2
PH-74	Analgesy Meter (Hot plate)	1
PH-74-1	Analgesy Meter (Pressure type)	1
PH-74-2	Analgesy Meter (Tail flic)	1
PH_75	Microscope, for Dissecting	1
PH-77	Water Still Equipment, 1.8 l/hr	1
PH-78	Animal Dissecting Table, Each Different Type	1
PP-90	Hot Air Sterilizer	1
PP-97	Vacuum Drying Oven, 27 l with Vacuum Pump & Cold Trap, Cooling Unit	1
QC-04	Centrifuge, High Speed Refrigerated Type, 25,000 rpm	1
QC-04-1	Centrifuge, Table Top Type 5,000 rpm	1
QC-10	Cellulose Acetate Electrophoresis Unit with Electric Stabilizer	1
QC-21	Liquid Nitrogen Container, 20 l	2
QC-27	Filter Holder for Syringe, 13 mm, 25 mm 1 set, SUS, with Filter	1
QC-32	Laboratory Glove, Long Arm Size	15
QC-39	Deep Freezer, -30°C Horizontal Type, 130 l	1
QC-41	Kymography Unit	1
QC-41-1	Sphygmomanometer for Rabbits	1
QC-41-2	Sphygmomanometer for Rat	1
QC-41-3	Pen Writer Set for Kymography	1
QC-43	Stop Watch	1
QC-44	Timer, Laboratory Use	1
QC-62	Laboratory Glove, Heatproof Type	5
QC-83	Label Marker	1

### Clinical Pharmacology/Pharmacology Section (II) (Toxicology)

Code	Equipment	Quantity
AC-14-1	Balance, Micro & Electronic, 1.0 mg, Max. 200 g	1
AD-20	Micro Plate Washer	1
AD-21	Micro Plate Incubator	1
AD-22	Micro Plate Centrifuge	1
PA-12	Water Distillation Unit, 1.8 l/hr, Glass Type	1
PA-28	Magnetic Stirrer	1
PA-29	Magnetic Stirrer, with Hot Plate	1
PA-32	Balance, Micro & Electronic, 0.01 mg, Max. 60 g	1
PA-34	Balance, Top Loading Type, Max. 3 kg	1
PA-61	Microtome, Rotational Type, Table Top Model	1
PA-62	Microtome, Sliding Type, Table Top Model	1
PA-63	Microtome, Freezing Unit, Electronic, Table Top Model	1
PA-64	Paraffin Tissue Burying Unit, Automatic	1
PA-65	Paraffin Block Coller, Table Top Type	1
PA-66	Paraffin Oven	1
PA-67	Slide Warmer, Table Top Type	1
PA-68	Paraffin Moulding set	1
PA-69	Automatic Statiner, Table Top Type	1
PA-70	Slide Glass Cabinet, Table Top Model	1
PA-72	Enzyme Immunoassay Analyzer (ELISA)	1
PH-76	Centrifuge, Table Top Type, Bio-Assey Model	1
QC-11	Microscope, for Biological Study with Camera System	1
QC-12	Deep Freezer, -30°C Horizontal Type, 130 l	1
QC-22	Micro Plate Dispenser	1
QC-24	Clean Bench, 1,300 W	1
QC-37	Micro Plate Shaker	1
QC-42	Micro Plate Dilutor	1
QC-77	Micro Plate, 96 Hole	500
TX-102	Centrifuge, High Speed Refrigerated Type, 25,000 rpm	1
TX-103	Homogenizer, Ultrasonic System	2



Code	Equipment	Quantity
TX-104	Blender Mill, Max 4 l, Thermo Control Type	1
TX-106	Blender Waring, Max 1 l, Thermo Control Type	1
TX-108	Microscope, w/Magnifier, Phase Contrast & Fluorescent	1

**Clinical Pharmacology/Pharmacology Section (III) (Experiment with Animals)**

Code	Equipment	Quantity
AD-15	Animal Weighing Scale, for Mice	1
AD-15-1	Animal Weighing Scale, for Rat	2
AD-15-2	Animal Weighing Scale, for Rabbit	2
AD-16	Thermometer for Mice, Thermister Type	2
AD-16-1	Thermometer for Rat, Thermister Type	2
AD-16-2	Thermometer for Rabbit, Thermister Type	2
AH-01	Animal Cage, Poly-Carbonate with Cover, Mice/Rat	810
AH-02	Animal Cage, Poly-Carbonate with Cover, Mice/Hamster	480
AH-03	Animal Cage, SUS Basket Type, 5 Unit Type	90
AH-04	Animal Cage, SUS, for Hamster	210
AH-05	Animal Cage, SUS, for G.P	140
AH-06	Animal Cage, SUS, for Rabbit	100
AH-07	Animal Cage, SUS, for Monkey	10
AH-08	Food Container	20
AH-09	Animal Cage, SUS Basket Type, for Rat	20
AH-11	Cart for Transportation with Dust Collecting Bag	5
AH-11-1	Cart for Transportation	5
AH-13	Animal Dissecting Table, Middle Size	2
AH-16	Hygrothermometer, Digital for Animal Room	12
AH-31	Animal Cage, Disposable, for Mice	100
AH-32	Metabolism Cage for Rat & 3 Test Group Type	3
AH-33	Metabolism Cage for Mice & 2 Test Group Type	3
AH-34	Metabolism Cage for Rabbit	5
AH-35	Shelves for Animal Cage, Mice, SUS	40
AH-36	Shelves for Animal Cage, SUS	40
AH-37	Animal Cage, for Dog, with Caster	10
AH-38	Poultry Cage	20
AH-39	Water Feeding Bottle, Poly-Carbonate, 250 ml	300
AH-39-1	Water Feeding Bottle, Poly-Carbonate, 500 ml	300
AH-39-2	Water Feeding Bottle, Poly-Carbonate, 1,000 ml	100
AH-44	Card Holder for Animal	500

### Pharmaceutical/Narcotic Section

Code	Equipment	Quantity
AC-16	Tablet Disintegration Unit 2 Chamber Type	1
AC-33-3	Rotary Evaporator vertical type, 1 l	1
AC-47	Dispenser Unit with Amber Bottle, 1,000 ml, 0.1 ml	2
AC-47-1	Dispenser Unit with Amber Bottle, 1,000 ml, 0.5 ml	3
AC-50	Automatic Voltage Stabilizer, 1 kV	1
AC-51	Shieve Shaker, Electric	1
AC-52	Water Bath unit, Shaking Type with Universal Rack	1
AD-17	Foreign Material Detector for Ampule, Table Top Type	1
PC-10	Balance, Micro & Electronic, 0.1 mg, Max. 200 g	1
PC-15-1	Balance, Weighing Scale, Max. 30 kg	1
PC-26	Fume Hood, 1,300 W	1
PC-31	Dissolution Unit for Tablet, 6 Chamber Type	1
PC-39	Aspirator with Cooling Circuit	1
PC-41	Cooling Unit, 0 - 100°C, 5 l	1
PC-45	Cooling Unit with Oil Trap Unit	2
PC-46	Vacuum Pump, Oil Rotary Type	3
PP-100	Solid/Liquid Extractor, 5 l	1
PP-101	Centrifuge, Ultra High Speed Model, 80,000 rpm	1
PP-82	Tablet Maker, Table Top Type	1
PP-83	Mixer for Drug Powder, V & Table top type	1
PP-86	Capsule Filler	1
PP-87	Ampule Sealer, Table Top Type	1
PP-91	Hardness Tester set, 2 pcs	1
PP-92	Homogenizer, Ultrasonic System	1
PP-93	Balance, Top Loading Type, Max. 3 kg	1
PP-96	Reaction unit, 0.5 l/0.1 l/3 l/5. each one	1
PP-96-1	Distillation & Reaction Unit 5 l	1
PP-96-2	Rotary Evaporator, 10 l	1
PP-96-3	Liquid-Liquid Extraction Unit, Recipro & Table Top Model	1
PP-96-4	Thin Film Flash Evapulator	1
PP-96-5	Rotary Evaporator, 5 l	1
PP-97	Vacuum Drying Oven, 27 l	1

Code	Equipment	Quantity
PP-98	Essential Oil Extractor, Manual Tyhpe, 1 /	1
PP-99	Essential Oil Extractor, Motor Compresed Type, 5 /	1
QC-03	Scientific Calculator, Pocket Compuator Type	2
QC-09	Digital pH Meter	1
QC-24	Clean Bench, 1,300 W	1
QC-32	Laboratory Glove, Long Arm Size	15
QC-34	Reagent Refrigerator, 300 /	1
QC-62	Laboratory Glove, Heatproof Type	10
QC-84	Laboratory Glove, Heatproof Type	1

**Pharmacognosy • Unani/Homeopathic Section**

Code	Equipment	Quantity
AC-33-1	Rotary Evaporator Vertical Type, 0.5 l	1
AC-37-2	Separating Extractor, Max. 3 l Flask x 3	1
AC-47	Dispenser Unit with Amber Bottle, 1,000 ml, 0.1 ml	1
AC-47-1	Dispenser Unit with Amber Bottle, 1,000 ml, 0.5 ml	1
AC-48-2	Micro Pipette, Digital, 1 Micro	2
AC-48-3	Micro Pipette, Digital, 10 Micro	2
AC-51	Shieve Shaker, Electric	1
AD-07	Water Pre-treatment Unit, RO System, 100 l/hr.	1
AD-08	Chemical Waste Treatment Unit, Max. 20 l	1
AD-35	Plant Cell Culture 42 pcs. with Cultivation Tube 100 pcs.	2
AD-36	Plant Cultivation Shelf, 4 Shelves Type with Elumunator	1
AH-28	Glass Instruments Dryer	1
CA-17	TLC Instruments	2
CA-17-1	TLC Streaker Unit	1
CA-17-2	TLC Spray Chamber	1
CA-23	Flask Shaker, Recipro Type, 500 ml x 6	2
CA-23-1	Flask Shaker, Rotative Type, 500 ml x 6	1
CA-31	Magnetic Stirrer, Low Speed Model, 500 ml x 6	1
CA-31-1	Magnetic Stirrer, Low Speed Model, for Max. 2,000 ml	1
MA-11	Ultra Violet Viewer, Table Top Type	1
PA-18	Deep Freezer, -30°C Horizontal Type, 130 l	1
PA-22	Pipette Cleaner Ultrasonic	1
PA-29	Magnetic Stirrer, with Hot Plate	1
PA-34	Balance, Top Loading Type, Max. 3 kg	1
PA-36	Blender Mill, Max. 4 l, Thermo Control Type	1
PA-48	Water Bath Unit, Shaking Type with Universal Rack	1
PC-06	Digital pH Meter	1
PC-39	Aspirator with Cooling Circuit	1
PC-53	Mixer for Test Tube (QC-25)	2
PP-90	Hot Air Sterilizer, 150 l	1
PP-98	Essential Oil Extractor, Manual Type, 1 l	1
PP-99	Essential Oil Extractor, Motor Compressed Type, 5 l	1

Code	Equipment	Quantity
QC-01	Electric Steam Sterilizer, Cylindrical & Inhoused Type	1
QC-02	Balance, Micro & Electronic, 1.0 mg, Max. 200 g	1
QC-04	Centrifuge, High Speed Refrigerated Type, 25,000 rpm	1
QC-04-1	Centrifuge, Table Top Type, 5,000 rpm	1
QC-05	Water Distillation Unit, 1.8 l/hr, Glass Type	1
QC-06	Incubator for Microbic Culture, 72 l	1
QC-07	Incubator for Microbic, Low Temp. Type	1
QC-08	Microscope, Inverted	1
QC-08-1	Microscope, for Biological Study, 1,500 x	1
QC-10	Cellulose Acetate Electrophoresis Unit, with Electric Stabilizer	1
QC-12	Deep Freezer, -30°C Horizontal Type, 130 l	1
QC-23	Magnetic Stirrer, with Hot Plate	2
QC-24	Clean Bench, 1,300 W	1
QC-26	Glass Instrument Washer, Table Top Type	2
QC-27	Filter Holder for Syringe, 13 mm, 25 mm, SUS, with Filter	1
QC-28	Flask for Plant Cultivation, 300 ml	200
QC-29	Flask for Plant Cultivation, 200 ml	200
QC-29-1	Plant Culture Tube, 25 mm	20
QC-34	Reagent Refrigerator, 300 l	1
QC-40	Glass Instrument Washer, Automatic, with Racks	1
QC-43	Stop Watch	1
QC-63	Bijoux Bottles, 28 ml with Cap	250
QC-63-1	Bijoux Bottles, 18 ml with Cap	250
QC-75	Filtration Pump Unit	1
QC-75-1	Filter Holder Set, SUS, 3 Types	3
QC-75-2	Filter Set, Membrane, 0.22 Micron 3 Types	3
QC-82	Incubator for Microbic, CO <sub>2</sub> Type	1
QC-84	Magnetic Stirrer with Hot Plate	1
TA-04	Homogenizer, Low Speed Model	1
TA-05	Homogenizer, High Speed Model	1
TA-06	Motor Stirrer	3
TA-10	Wiley's Dispenser for Plant, Table Top Type	1
TA-11	Ball Mill with Container Pot Set	1
TA-12	Grinding Mill, Max. 1 l	1

### Other Accessory Equipment

Code	Equipment	Quantity
LF-02	Typewriter, Table Top & Computerized Type	3
LF-03	Electric Copy Machine	2
LF-04	Projector, for 35 mm Slide Picture	1
LF-05	Projector, Over-Head Model	1
LF-06	Film Enlarger	1
LF-07	Micro Film Camera System	1
LF-08	Film Viewer	1
LF-09	Personal Computer	3





# ANNEX



## 1. Members of Basic Design Study Team

1. Member of Basic Design Study Team

1-1 Basic Design Study Team (July 17th to August 5th, 1989)

Leader	Dr. Shozo Kamiya	Chief of the Organic Chemistry Division, National Hygienic Institute
Project Coordination	Mr. Mitsuyosi Kawasaki	First Basic Design Study Division, Grant Aid Plan- ning & Survey Department, JICA
Equipment Design 1	Mr. Seijiro Ohmura	International Total Engineering Corporation
Equipment Design 2	Mr. Ryoji Harada	International Total Engineering Corporation
Architectural Facility	Mr. Yasuo Miyamoto	International Total Engineering Corporation

1-2 Basic Design Study Team for Explanation of Draft Final Report  
(September 29th to October 8th, 1989)

Equipment Design 1	Mr. Seijiro Ohmura
Equipment Design 2	Mr. Ryoji Harada

## 2. Survey Schedule

### 1. Basic Design Study Team

NO.	DATE		Schedule	Particulars
1	7/ 17	Mon.	Tokyo → Islamabad (PK-753)	
2	18	Tue.	Islamabad	Courtesy call to Japan Embassy, JICA Office, National Institute of Health (NIH) and EAD.
3	19	Wed.	Islamabad	Discussion with NIH.
4	20	Thu.	Islamabad	Discussion with NIH.
5	21	Fri.	Islamabad	Team Study Meeting.
6	22	Sat.	Islamabad	Site Survey (NIH).
7	23	Sun.	Islamabad	Discussion on Minutes with NIH. Reconciliation of Minutes and Signing by representatives from both Parties. Report to Japan Embassy and JICA Office.
8	24	Mon.	Islamabad → Karachi (PK-301)	Site Survey (Central Drug Lab.)
9	25	Tue.	Karachi	Site Survey (Central Drug Lab.)
10	26	Wed.	Karachi → Tokyo (JL-472)  Karachi → Islamabad (PK-300)	Team Leader and Coordinator leave Karachi for Tokyo.  Consultant Staff - Team Study Meeting
11	27	Thu.	Islamabad	Site Survey. Discussion with NIH.
17	8/2	Wed.		
18	3	Thu.	Islamabad	Report to Japan Embassy and JICA Office.
19	4	Fri.	Islamabad → Karachi (PK-311)	
20	5	Sat.	Karachi → Tokyo (PK-762)	

2. Basic Design Study Team for Explanation of Draft Final Report

NO.	DATE		Schedule	Particulars
1	9/		Tokyo → Islamabad (PK-751)	
2	30	Sat.	Islamabad	Site survey (NIH)
3	10/1	Sun.	Islamabad	Discussion with JICA & Japan Embassy, Discussion with NIH.
4	2	Mon.	Islamabad	Team study meeting.
5	3	Tue.	Islamabad	Discussion with NIH.
6	4	Wed.	Islamabad	Discussion with NIH.
7	5	Thu.	Islamabad	Discussion with NIH.
8	6	Fri.	Islamabad	Team study meeting.
9	7	Sat.	Islamabad → Karachi (PK-309)	Discussion with MOH & EAD. Report to Japan Embassy & JICA office.
10	8	Sun.	Karachi → Bangkok (SR-178) Bangkok → Tokyo (TG-640)	





### 3. Attendants' List

## A t t e n d a n t s '   L i s t

1) Pakistan Side	
Name	Position
1. Mr. Khalid Javid	Section Officer : EAD
2. Dr. Qazi Abdul Saboor Khan	Deputy Director General MOH
3. Dr. Inamul Haq	Chairman, Quality Control, MOH
4. Dr. F. R. Yousuf Fazli	Chief, DCRD, NIH
5. Mr. Khalid Mansoor	Secretary : Accountant, NIH
6. Dr. Imtiaz Ahmad	Manager : Animal House, NIH
7. Dr. Abdul Ghafoor	Executive Director, NIH
8. Mr. Abdyl Qadar Mohmand	S. S. O. : Botang Section, NIH
9. Mr. Fahmid-Jd-Din Ahmad	S. S. O. : Chemistry Section, NIH
10. Dr. Rehan Abdul Hafiz	S. S. O. : Ckinical Ph. s., NIH
11. Mr. Muhammad Asghar	S. O : Chemisrtry S., NIH
12. Mr. Zulfigar Ali	S. O : Microbiology S., NIH
13. Mr. Ghualam Rasool Mashoni	S. O : Pharmacology S., NIH
14. Mr. Shahzad Hussain	S. O : Pharmaceutical S., NIH
15. Mr. Mahammad Akmal Rajput	S. O : Chemistry S., NIH
16. Mrs. Anwar Begum	S. S. O. : Microbiology S., NIH
17. Mr. Haqim Moqbool Hassan	A. S. O. : Unani S., NIH
18. Mr. Iram Ul Haq	Engineer : NIH
19. Mr. Salim mufti	Assitant Director : Central Drugs Laboratory, Karachi
20. Mr. Shezed Almed Khan	Assistant Chief : DITTO
21. Mr. Syed Aftab Ahmad Jaffri	Pharmaceutical Officer , DITTO
22. Dr. Mrs. Mashooda Hassan	Professor : DITTO
23. Mr. Qamar Shah Khan	Executive Engineer : DITTO
24. Dr. Aurangzeb Hassan	Professor : Islamabad University
25. Mr. Aijaz Hassain Memon	Assistant E. E. : PWD
26. Mr. Jufall Cheema Asste	Electric Engineer : PWD

2) Japanese Side

Name

- |                          |   |
|--------------------------|---|
| 1. Mr. Kosuke Imashimizu | First Secretary of Japan Embassy<br>in Pakistan     |
| 2. Mr. Ryosuke Haraguchi | First Secretary of Japan Embassy<br>in Pakistan     |
| 3. Mr. Kunio Waki        | Representative of UNICEF Office<br>in Pakistan      |
| 4. Mr. Kazuo Tanigawa    | Representative of JICA Pakistan<br>Office           |
| 5. Mr. Masato Togawa     | Assistant Representative of JICA<br>Pakistan Office |



#### 4. Copy of Minutes of Discussions

ON

THE BASIC DESIGN STUDY OF

THE PROJECT FOR STRENGTHENING OF DRUG CONTROL  
AND TRADITIONAL MEDICAL CENTER LOCATED IN THE NIH

IN

THE ISLAMIC REPUBLIC OF PAKISTAN

In response to the request made by the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a Basic Design Study on the Project for Strengthening of Drug Control and Traditional Medical Center (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA has sent to the Islamic Republic of Pakistan the Basic Design Team headed by Dr. Shozo Kamiya, Director, Division of Organic Chemistry, National Institute of Hygienic Sciences, Ministry of Health and Welfare, from July 17 to August 5, 1989.

The Team had a series of discussions with the authorities concerned of the Government of the Islamic Republic of Pakistan and conducted a field survey.

As a result of the study, both parties have agreed to recommend to their respective Governments that the major points of understanding reached between them, as attached herewith, should be examined further towards the realization of the Project.

Islamabad, July, . 1989

*Shozo Kamiya*

Dr. Shozo Kamiya  
Leader,  
Basic Design Study Team,  
JICA

*211*  
*[Signature]*  
Dr. Qazi Abdus Saboor Khan  
Deputy Director General,  
Health Division,  
Ministry of Health, Special  
Education & Social Welfare

*[Signature]*  
Mr. Akhtar Iqbal  
Deputy Secretary,  
Economic Affairs Division,  
Ministry of Finance and  
Economic Affairs

Attachment

1. Objective of the Project

The objective of the Project is to improve the quality control of drugs including traditional medicines in the Islamic Republic of Pakistan through supplying laboratory equipments for drug quality control and safty test to Drug Control and Traditional Medical Center located in the National Insititute of Health, Islamabad.

2. Executing Organization

The executing organization for the Project is the Ministry of Health, within which Planning and Development sections shall be responsible for the excution of the Project in collaboration with the relevant agencies, such as the National Insititute of Health, Pakistan Public Works Department, Central Board of Revenues, Economic Affairs Division etc. Deputy Director General, Health Division shall coordinate the Project and may consult all relevant agencies including Executive Director, NIH.

3. Equipments Requested

The team will convey to the Government of Japan the desire of the Government of Pakistan that the Government of Japan takes necessary measures for procurement of equipments to each section, listed in Annex I, by the Government of Pakistan within the scope of Japanese Economic Cooperation Program in Grant Form.

4. Japanese Grant Aid Program

The Government of Pakistan has understood the Japanese Grant Aid Program explained by the Team.

5. Measures to be taken by the Government of Pakistan

The Government of Pakistan will take necessary measures as listed in Annex II on condition that the Grant Aid by the Government of Japan would be extended to the Project.

6. Budget and Personnel

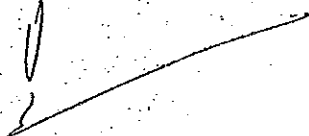
The Government of Pakistan shall prepare the necessary budget and personnel for the operation and maintenance of equipments on condition that the Grant Aid by the Government of Japan would be extended to the Project.

7. Reforming of the Center

The team has confirmed that the Government of Pakistan will make efforts to complete reforming the Center including construction of the new building by the time when equipments will be installed.

8. Training Requested

The Pakistan side explained the necessity of training of some staff of the Center.



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Annex I

The sections that equipments will be installed are as follows:

Sections

1. Analytical Chemistry
2. Pharmaceutics
3. Narcotics
4. Pharmaceutical Development (pilot plant scale)
5. Pharmacology
6. Toxicology
7. Poison Information and Control
8. Pharmacognosy, Traditional Medicines
9. Microbiology
10. Animal House

Equipments to be installed will be proposed by the team, based on the result of analysis of data and informations obtained through the field survey.

V  
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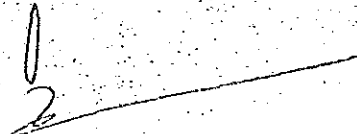
K



Annex II

The necessary measures to be taken by the Government of Pakistan are shown as follows:

1. To ensure prompt unloading, tax exemption, customs clearance at ports of disembarkation in Pakistan and prompt internal transportation therein, of the products purchased under the Grant Aid.
2. To bear the following commissions to the Japanese foreign exchange bank for the banking services, based upon the Banking Arrangement.
  - (1) Advising commission of authorization to pay
  - (2) Payment commission
3. To exempt Japanese Nationals involved in the Project from custom duties, internal taxes and other fiscal levies which may be imposed in Pakistan with respect to the supply of the products and services under the Verified Contracts.
4. To accord Japanese Nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts such facilities as may be necessary for their entry into Pakistan and stay therein for the performance of their works.
5. To bear all the expenses other than those to be borne by the Grant, necessary for the execution of the Project.



K

2. Explanation of Draft Final Report

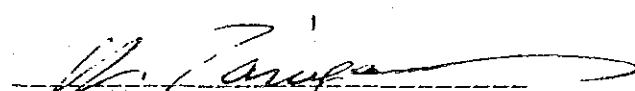
MINUTES OF DISCUSSIONS  
ON  
THE REPORT OF THE BASIC DESIGN STUDY  
ON  
THE PROJECT FOR STRENGTHENING OF DRUG CONTROL  
AND TRADITIONAL MEDICINE CENTER LOCATED IN THE NIH  
IN  
THE ISLAMIC REPUBLIC OF PAKISTAN

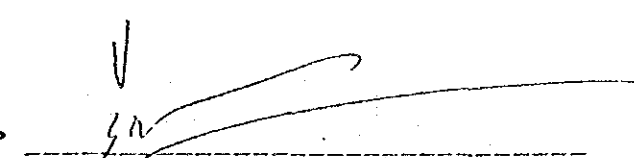
In response to the request made by the Government of the Islamic Republic of Pakistan, the Government of Japan decided to conduct a basic design study on the Project for strengthening of Drug Control and Traditional Medicine Center (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Islamic Republic of Pakistan the study team from July 17 to August 5, 1989.

As a result of the survey and discussions, JICA prepared a Draft Final Report on the study and dispatched the second mission to explain and discuss it from September 29 to October 8, 1989.

Both parties had a series of discussions on the Report and have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

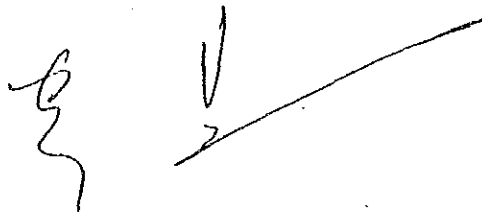
Islamabad, October 12, 1989

  
-----  
Mr. Kazuo Tanigawa  
Resident Representative,  
JICA Pakistan Office

  
-----  
Dr. Qazi Abdus Saboor Khan  
Deputy Director General,  
Health Division,  
Ministry of Health,  
Special Education &  
Social Welfare.

ATTACHMENT

1. The Pakistani side has agreed in principle to the basic design proposed in the Draft Final Report.
2. The Pakistani side has understood Japan's Grant Aid System and reconfirmed the necessary measures to be taken by the Government of the Islamic Republic of Pakistan which are manifested in the Annex II of the "Minutes of Discussions" on the Project signed in July, 1989, on condition that the Grant Aid by the Government of Japan would be extended to the Project.
3. The Governemnt of the Islamic Republic of Pakistan shall appoint the Project Director on urgent basis for technical implementation alongwith the necessary personnel for the operation of, the Drug Control and Traditional Medicine Centre.
4. The title of this Project should be read as "The Project for strengthening of Drug Control and Traditional Medicine Centre located in NIH".
5. The Final Report (10 copies in English) on the Project will be submitted to the Pakistani side during November, 1989.

Handwritten signature and checkmark.



**5. List of Existing Equipment in Drugs Control and  
Research Division**

LIST OF EQUIPMENT PRESENT IN THE CHEMISTRY SECTION

DC & RD, N. I. H. ISLAMABAD

S. NO.	NAME OF EQUIPMENT	DATE OF ARRIVAL	WORKING CONDITION
1.	High performance Liquid Chromatography	1986	In order
2.	pH Meter	1987	"
3.	Digital Ionizer	1987	"
4.	Spectrophotometer Digital	1970	"
5.	Infrared Spectrophotometer	1972	"
6.	Spectrophotometer UV & visible	1970	"
7.	Scanning Sp 8000 Ultraviolet Recorder	1970	Out of order
8.	Disintegrator Machine for Table	1970	In order
9.	Dissolution Apparatus	1987	"
10.	Polarimeter Digital	1970	"
11.	Ovens	1972	"
12.	Mettler Balance Q' ty 3	1970	Two out of order
13.	Refractometer	1970	In order
14.	Water-Bath Thermostate	1987	"
15.	Flask Shaker	1970	"
16.	Magnetic Stirrer	1970	"
17.	Vacuum Oven	1970	"
18.	High Vacuum Pump	1970	"
19.	Furnace	1987	Out of order

(Service Engineer from the respective firms are responsible for the maintenance and repairs of the above instruments.)

NAME OF LIST OF EXISTING EQUIPMENT IN MICROBIOLOGY SECTION

S. NO.      EQUIPMENT IN WORKING CONDITION:

1.      Heavy Duty Dry Oven
2.      Autoclave
3.      Incubator
4.      Microscope
5.      Digital Colony Counter
6.      Balance (Although very old, yet in working condition.)

EQUIPMENT OUT OF ORDER:

1.      Low Temperature Incubator (Spare parts have been obtained from the local market and the NIH engineering workshop is in the process of repairing.)
2.      Electric Balance (Very old, 20 years)
3.      Glass Drying Oven (Not in working condition handed over in NIH workshop for repair.)
4.      Water Bath (Not in working condition elements burnt out.)
5.      Pyrometer (Not in working condition more than 20 years old, given to workshop for repair.)

PHARMACOLOGY SECTION

LIST OF EXISTING EQUIPMENT IN WORKING ORDER:

<u>S. NO.</u>	<u>E Q U I P M E N T</u>	<u>DATE DELIVERED</u>	<u>S T A T U S</u>
1.	Oven, Range: 300c	1968	Working
2.	E. C. G. Machine	1970	"
3.	Balance Sliding	1971	"
4.	Audio Scope	1970	"
5.	Haemocytometer	1974	"
6.	Bright Light Projector	1970	"
7.	Sigmoidoscope	1970	"
8.	B. P. Apparatus	1970	"
9.	Isolated Organ Bath	1985	"
10.	Stethoscope	1982	"
11.	Brodie Table	1967	"
12.	Timing Unit	1970	"
13.	Internal Timer Unit	1973	"
14.	Charging Unit	1974	"
15.	Animal Balance	1974	"
16.	Trolley	1986	"
17.	Sterilizer	1976	"
18.	Shaker	1976	"
19.	Magnetic Shaker	1967	"
20.	Water Bath	1986	"
21.	Electrothermal Heater	1970	"
22.	Stimulator Double channel	1986	"
23.	Refrigerator	1985	"
24.	Stop Watch	1981	"
25.	pH Meter	1987	"
26.	Glucometer with Memory	1989	"



LIST OF EXISTING EQUIPMENT IN THE PHARMACEUTICAL/NARCOTIC SECTION

WORKING STATUS OF EQUIPMENT (OLD)

a) Working order

1. Tablet Machine
2. Granulator
3. Mixer
4. Hardness Tester
5. Disintegrator
6. Sieve Shaker
7. Homogenizer
8. Rotatory Evaporator
9. Ampul Filling
10. Ampoule Sealing
11. Capsule filling
12. Powdering Machine
13. Densitometer/TLC Scanner
14. TLC Equipment for performing 5-10 per day

b) Out of order or not available

1. Fraction collector
2. Vacuum Pumps
3. Fume Hood
4. Columns of all size
5. Paper Tanks for Chromatography
6. Oil Extractor & Oil Extractor Compressed type
7. Soxhlet Apparatus 1-5 liters
8. Balance

UNANI/HOMOEOPATHIC SECTION

<u>EQUIPMENT</u>	<u>Q' TY</u>	<u>CONDITION</u>
1. Hot Air Oven	2	One working, the other is sent to workshop for repair.
2. Water Bath	1	Working
3. Soxhlet Apparatus	2	"
4. Balance	1	"
5. Capsule Filling Machine	1	"
6. Stirrer	1	"

**6. Changes in Foreign Aid and Yen Loans to Pakistan**

TABLE 11.6

## GRANT ASSISTANCE AGREEMENTS SIGNED

[... Contd.]

(US \$ million)

	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	July-March		
													1986-87	1987-88	
<b>I. Consortium Including outside Consortium arrangements:</b>															
1. Canada	4.2	4.7	7.6	3.1	25.7	--	--	1.2	12.1	13.5	28.5	50.6	54.6	54.5	--
2. Germany	1.3	1.3	2.1	--	--	--	--	--	--	--	--	--	--	--	--
3. Japan	--	--	3.4	5.2	23.1	20.2	38.8	48.8	22.9	39.9	47.9	38.1	95.2	29.2	36.3
4. Netherlands	--	5.4	7.0	--	5.9	9.7	10.4	--	7.2	8.9	--	14.1	12.3	--	43.0
5. New Zealand	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6. Norway	2.5	4.1	11.2	11.4	14.8	14.8	12.7	12.3	11.9	11.0	10.1	8.2	7.4	7.1	12.2
7. Sweden	4.3	5.1	4.7	6.5	9.1	9.1	8.2	6.1	--	--	--	--	--	--	--
8. Switzerland	--	--	--	--	--	--	--	7.5	--	--	9.2	--	21.1	15.5	3.1
9. U.K.	2.6	5.7	35.1	75.3	68.5	29.0	--	8.9	15.5	28.0	32.7	22.6	24.6	--	6.1
10. U.S.A.	32.8	2.2	18.5	0.4	0.4	1.5	0.3	27.5	109.5	205.7	167.0	190.9	174.4	110.9	25.0
11. U.N. and Specialised agencies	--	--	--	--	--	--	--	1.1	11.3	20.0	--	--	8.9	--	40.0
12. U.N.D.P. special grant	3.0	3.0	4.7	3.0	9.2	--	19.0	14.4	13.9	13.3	15.8	14.9	13.3	13.3	12.1
13. Ford Foundation	0.1	0.5	0.3	--	--	--	--	--	--	--	--	--	--	--	--
15. EEC	3.0	3.0	3.0	--	--	8.7	6.5	26.4	--	7.0	7.2	--	1.1	1.1	4.3
16. U.N. Emergency	16.0	--	1.0	--	--	--	--	--	--	--	--	--	--	--	--
17. Relief supplies and cash grants from various countries	--	--	6.2	--	--	--	--	--	--	--	--	--	--	--	--
18. World Food Programme	--	--	13.9	14.6	11.5	30.6	11.5	--	18.6	4.0	33.3	19.5	5.7	5.7	3.6
19. Italy	--	--	--	--	--	--	--	--	--	--	10.0	6.1	9.3	8.1	--
20. France	--	--	--	--	--	--	--	--	--	--	--	1.5	4.4	--	--
<b>Sub-Total (I)</b>	<b>81.3</b>	<b>56.8</b>	<b>139.2</b>	<b>141.3</b>	<b>185.2</b>	<b>140.6</b>	<b>122.6</b>	<b>160.2</b>	<b>222.9</b>	<b>351.3</b>	<b>361.7</b>	<b>366.5</b>	<b>462.3</b>	<b>245.4</b>	<b>185.6</b>
<b>II. Non-Consortium:</b>															
1. Australia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2. China	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
<b>Sub-Total (II)</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>III. Islamic Countries</b>															
1. Iran	7.2	0.5	--	--	--	--	--	--	--	--	--	--	--	--	--
2. Saudi Arabia	--	30.0	30.0	10.0	9.0	--	--	--	--	--	--	--	--	--	--
3. U.A.E.	--	--	--	--	2.0	53.0	1.0	--	--	--	--	--	--	--	--
4. Qatar	--	--	--	--	--	--	--	10.0	--	--	--	--	--	--	--
<b>Sub-Total (I+II+III)</b>	<b>88.4</b>	<b>30.5</b>	<b>169.2</b>	<b>151.3</b>	<b>196.2</b>	<b>193.6</b>	<b>123.6</b>	<b>170.2</b>	<b>222.9</b>	<b>351.3</b>	<b>361.7</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>IV. Relief Assistance for Afghan Refugees</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>116.8</b>	<b>109.6</b>	<b>315.6</b>	<b>240.8</b>	<b>155.2</b>	<b>150.0</b>	<b>135.0</b>	<b>129.6</b>	<b>117.6</b>	<b>101.4</b>
<b>V. Indus Tarbela Development Fund:</b>															
1. Australia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2. Canada	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Germany	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4. India	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5. New Zealand	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6. U.K.	2.6	5.7	--	--	20.0	--	--	--	--	--	--	--	--	--	--
7. U.S. (a) Dollars	9.0	9.0	18.0	--	--	--	--	--	--	--	--	--	--	--	--
(b) Rupees	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8. EEC	--	--	--	--	6.0	--	--	--	--	--	--	--	--	--	--
<b>Sub-Total (V)</b>	<b>11.6</b>	<b>14.7</b>	<b>18.0</b>	<b>--</b>	<b>26.0</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>117.6</b>	<b>--</b>
<b>Total (Grants)</b>	<b>100.0</b>	<b>102.0</b>	<b>187.2</b>	<b>151.3</b>	<b>222.2</b>	<b>310.4</b>	<b>233.2</b>	<b>485.8</b>	<b>463.6</b>	<b>506.5</b>	<b>511.7</b>	<b>501.5</b>	<b>591.9</b>	<b>363.0</b>	<b>287.0</b>

-- nil.

.. not available.

FAC : Food Aid Convention.

EEC : European Economic Community.

Note: Commitments in case of Indus/Tarbela represents actual draws from the Indus/Tarbela Development Fund.

Source: Economic Affairs Division.

TABLE 11.7

## TOTAL LOANS AND CREDITS CONTRACTED

Lending Country/ Agency	(US \$ million)														
	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	July-March		
<b>A. Consortium including outside consortium arrangements:</b>															
<b>(a) Bilateral:</b>															
1. Belgium	4.2	4.3	4.0	4.8	5.0	5.2	--	--	0.1	7.2	7.5	--	--	--	--
2. Canada	54.4	70.5	11.6	187.8	21.3	42.3	12.6	40.1	16.3	2.5	35.5	57.8	--	--	--
3. France	26.1	64.6	51.5	45.7	41.3	58.5	60.2	--	26.2	22.8	25.4	56.0	143.0	--	--
4. Germany	22.8	39.3	35.6	27.0	108.9	92.6	35.3	20.5	52.6	104.7	64.4	60.8	188.0	184.3	81.7
5. Italy	9.3	7.7	9.6	10.6	20.0	32.8	16.6	15.0	23.4	18.9	21.5	65.0	2.2	2.2	113.6
6. Japan	23.0	54.8	78.1	74.5	171.1	43.6	107.5	121.1	76.9	178.5	137.3	29.6	6.6	--	251.4
7. Netherlands	11.0	31.2	17.5	--	26.7	19.4	14.9	15.8	12.8	18.7	4.6	--	--	--	--
8. Sweden	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9. U.K.	72.6	--	10.0	18.9	21.2	53.0	31.4	23.8	71.1	34.4	92.0	27.0	3.3	3.3	--
10. U.S.A.	97.8	178.8	248.2	56.4	127.0	149.0	58.4	146.0	199.5	141.3	256.4	233.8	224.5	157.0	154.7
Sub-Total (a)	321.0	451.1	466.1	425.7	542.5	496.3	336.9	382.8	478.9	531.2	637.1	530.0	567.6	346.8	601.4
<b>(b) Multilateral:</b>															
1. IBRD	60.0	50.0	70.0	--	--	--	--	138.5	75.2	131.5	433.0	473.0	170.0	100.0	96.0
2. IFC	--	--	--	--	--	30.9	6.6	3.2	92.3	--	55.4	--	--	--	--
3. IDA	82.0	107.6	94.0	122.2	164.0	221.0	105.0	269.0	228.8	173.3	243.3	184.6	52.9	53.2	--
4. ADB	70.5	119.0	73.6	139.0	143.6	153.6	138.3	239.0	183.4	337.8	372.6	579.1	552.2	545.0	538.3
5. IFAD	--	--	--	--	--	47.5	11.3	11.7	--	24.2	8.6	--	--	--	11.7
Sub-Total (b)	212.5	276.6	237.6	261.2	307.6	453.0	273.3*	661.4	579.7	666.8	1,113.6	1,236.7	1,143.1	698.2	646.0
<b>(Consortium)</b>															
Sub-Total A (a+b)	533.5	727.7	703.7	686.9	850.1	949.3	610.2	1,044.2	1,058.6	1,198.0	1,750.2	1,766.7	1,710.1	1,045.0	1,247.4

\* Includes \$ 12.1 million on account of Indus/Tarbel Insurance Recovery.

(Contd.)

TABLE 11.7

## TOTAL LOANS AND CREDITS CONTRACTED

	(US \$ million)														
															July-March
(... Contd.)	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1986-87	1987-88
<b>B. Non-Consortium:</b>															
1. Austria	--	--	1.7	0.6	--	1.2	--	--	--	--	--	--	--	--	--
2. Australia	--	1.3	10.3	--	--	--	--	--	--	--	--	--	--	--	--
3. Bulgaria	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4. China	--	4.3	--	5.7	3.6	1.8	3.5	5.4	47.4	--	4.2	--	156.9	130.0	--
5. Czechoslovakia	--	--	--	--	--	--	2.6	--	--	--	--	--	32.3	32.3	--
6. Denmark	6.4	--	--	--	23.8	0.6	5.4	--	--	--	--	--	--	--	--
7. Germany D.R.	2.8	2.6	--	0.6	--	--	--	--	--	--	--	--	--	--	--
8. Kuwait-Suppliers Credit	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
9. Hungary	--	--	--	--	1.8	--	--	--	--	--	--	--	--	--	--
10. Norway	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.0
11. Poland	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
12. Romania	--	--	--	13.9	--	--	45.6	37.8	--	--	--	--	--	--	--
13. Sweden	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.1
14. U.S.S.R.	214.5	3.5	0.1	--	105.7	--	14.5	21.4	7.4	278.4	--	0.2	15.4	--	--
15. Yugoslavia	--	--	--	--	1.4	--	--	--	--	--	--	--	--	--	--
16. Switzerland	--	--	1.4	4.4	5.0	2.7	--	0.1	4.4	--	--	0.2	39.3	--	--
17. Singapore	--	--	--	--	--	0.2	--	--	--	--	1.0	--	--	--	--
18. Spain	--	--	--	--	--	--	--	--	--	1.7	--	--	--	--	--
<b>Sub-Total (B)</b>	<b>223.6</b>	<b>11.6</b>	<b>13.6</b>	<b>25.1</b>	<b>141.3</b>	<b>6.4</b>	<b>71.5</b>	<b>14.6</b>	<b>59.2</b>	<b>280.1</b>	<b>5.2</b>	<b>0.4</b>	<b>243.9</b>	<b>162.3</b>	<b>11.1</b>
<b>C. Islamic Countries:</b>															
1. Abu Dhabi	100.0	--	13.0	40.0	--	--	--	25.2	--	--	--	--	--	--	--
2. Iraq	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
3. Iran	--	48.6	150.0	--	--	--	--	--	--	--	--	--	--	--	--
4. Kuwait	--	50.9	25.0	--	28.3	--	42.7	30.3	13.7	--	--	20.6	10.5	10.5	2.5
5. Libya	50.0	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6. Qatar	10.0	--	--	--	--	6.8	--	--	--	--	--	--	--	--	--
7. Saudi Arabia	97.5	30.0	0.7	--	82.9	260.7	14.7	--	46.4	--	--	--	49.4	49.4	--
8. OPEC Fund	--	--	21.5	11.0	13.0	15.7	--	--	32.0	--	10.0	5.0	3.6	3.6	8.0
9. Islamic Development Bank	--	--	--	16.7	--	6.5	--	27.2	15.9	3.9	34.1	--	15.5	15.2	12.5
<b>Sub-Total (C)</b>	<b>257.5</b>	<b>116.3</b>	<b>210.2</b>	<b>67.7</b>	<b>124.1</b>	<b>289.8</b>	<b>57.4</b>	<b>82.6</b>	<b>108.0</b>	<b>3.9</b>	<b>44.1</b>	<b>25.6</b>	<b>79.0</b>	<b>78.7</b>	<b>23.0</b>
I.M.F. Trust Fund	--	--	--	47.8	71.2	157.4	16.1	--	--	--	--	--	--	--	--
<b>Total Loans</b>	<b>1,014.6</b>	<b>855.6</b>	<b>927.4</b>	<b>827.5</b>	<b>1,186.7</b>	<b>1,402.8</b>	<b>755.2</b>	<b>1,191.4</b>	<b>1,225.7</b>	<b>1,482.0</b>	<b>1,799.5</b>	<b>1,721.7</b>	<b>1,665.6</b>	<b>1,286.0</b>	<b>1,281.5</b>

-- nil.

Source: Economic Affairs Division.

**7. List of Responsible Officer for All Major Equipment,  
Basic Knowledge and Length of Experience**

PHARMACOLOGY/TOXICOLOGY SECTION

RESPONSIBLE OFFICER FOR ALL MAJOR EQUIPMENT:

BASIC KNOWLEDGE AND LENGTH OF EXPERIENCE:

<u>Name of Officer</u>	<u>Equipment</u>	<u>Basic Knowledge</u>	<u>Experience</u>
Mr. G. R. Mashori	Dynamometer	Yes	1 year
Mr. G. R. Mashori	Spectrophotometer	Yes	2 years
Mr. G. R. Mashori	Tissue Processor	No	Nil
Mr. G. R. Mashori	Tissue Embedding Console	No	Nil
Mr. G. R. Mashori	Organ Bath	Yes	2 years
Mr. G. R. Mashori	Fluorescence Microscope	No	Nil
Dr. Rehan Hafiz	Bio-liquid Chromatograph	No	Nil
Dr. Rehan Hafiz	Spectrophotometer	No	Nil
Dr. Rehan Hafiz	Ultra-microtome	No	Nil
Dr. Rehan Hafiz	Laminar Flow	Yes	2 years
Dr. Rehan Hafiz	Homogenizer	Yes	2 years
Dr. Rehan Hafiz	Organ Bath	Yes	2 years
Dr. Rehan Hafiz	Centrifuge	Yes	3 years
Dr. Rehan Hafiz	Cyrostal Microtome	No	Nil
Mr. S. Husain	I. R. Spectrophotometer	Yes	No
Mr. S. Husain	G. C.	Yes	No
Mr. S. Husain	H. P. L. C.	Yes	No
Mr. S. Husain	Tab. Disintegration Apparatus	Yes	1 year
Mr. S. Husain	Particle Size Determining App.	Yes	1 year
Miss. Nafees	U. V. Vis Spectrophotometer	Yes	10 years
Miss. Nafees	Agar Gel Electrophoresis	Yes	5 years
Miss. Nafees	Ultracentrifuge	Yes	5 years



<u>Name of Officer</u>	<u>Equipment</u>	<u>Basic Knowledge</u>	<u>Experience</u>
Miss. Nafees	T.L.C. Scanner	Yes	10 years
Miss. Nafees	Tab. Dissolution Apparatus	Yes	15 years
Miss. Nafees	App. Testing of Sutures and Ligatures	Yes	5 years

CENTRE FOR TRADITIONAL MEDICINE DRUGS CONTROL & RESEARCH DIVISION  
NATIONAL INSTITUTE OF HEALTH  
ISLAMABAD

<u>S. NO.</u>	<u>NAME OF EQUIPMENT</u>	<u>Q' TY</u>
1.	Electric Balance	2
2.	Oil Extractor by Compression	1
3.	Homogenizer High Speed	1
4.	Electric Stirrers	6 (different sizes)
5.	Blender	1
6.	Mortar Grinder (Lab. Mill UT21 YAMATO)	1
7.	Sieving Machine	1
8.	Ball Mill with containers of different sizes (UB 31)	1
9.	Grinding Mill	1

Person responsible : Hakim Moqbool Hassan

Training required : Short term training in extraction techniques and  
Pharmaceutical processing of medicinal herbs.

MICROBIOLOGY SECTION

<u>Name of Officer</u>	<u>Equipment</u>	<u>Basic Knowledge</u>	<u>Experience</u>
Dr. Zulfiqar Ali.	Laminar Flow Cabinet	1.5 years	Nil
	Universal Research Microscope	"	"
	Biohazard Cabinet	"	"
	Digital pH Meter	"	"
	Auto Media preparation	"	"
	Zone Reader	"	"
Mrs. Tahira	Autoclave	2 years	Nil
	Low Temperature Incubator	"	"
	Payrometer	"	"
	Steam Sterilizer	"	"

PERSONAL TRAINING IN MICROBIOLOGY

One person/Officer is to be trained in anti fungal activity of natural product leading to a Master's degree in foreign labs.

One person/Officer is to be trained in anti viral activities of crude drugs in a foreign labs leading to a degree.

One person is to be trained in anti bacterial activity potency, sterility and pyrogen testing of established drugs including crude drugs., in foreign labs.

CHEMISTRY SECTION

EXPERIENCE OF RESPONSIBLE IN USE OF EQUIPMENT

<u>Name of Officer</u>	<u>Equipment</u>	<u>Basic Knowledge</u>	<u>Experience</u>
Mr. Fahmiduddin Ahmed	1. U.V. Visible Spectrophotometer	Yes	19 years
	2. I.R. Spectrophotometer	Yes	14 years
	3. Atomic Absorption	Yes	Nil
	4. G. Chromatography	Yes	7 months
	5. H.P.L.C.	Yes	1 month
	6. Spectro Fluorometer	Yes	2 months
	7. HPLC Preparative	Yes	Nil

## PHARMACOGNOSY SECTION

Mr. Abdul Qadar Khan Mohmand Senior Scientific Officer with qualification of M. Sc. M. Phil and now a Ph.D. Student will handle the following equipment in Pharmacognosy/Botany Section.

1. Spectrophotometer 220 Hitachi
2. Laminar Flow
3. HPLC
4. GC, MS.
5. Balance
6. pH Meter
7. IR

The Senior Scientific Officer is to be trained in Isolation/Characterisation of Flavonoids and their antibacterial, antiviral and antifungal activities in a foreign laboratories.

### EXPERIENCE IN THE UTILIZATION OR HANDLING OF THE EQUIPMENT DEMANDED UNDER JAPANESE GRANTS:

The Officer is already handling HPLC UV Spectrophotometer, IR and certain balances etc. in Quaid-e-Azam University supplied by the Japanese Government. He will have, however in need of some training in IR, GC MS. His further familiarization with HPLC will be additional benefits.

## TISSUE CULTURE LAB.

### Personal Training in Tissue Culture/Micropropagation of Plant Tissues

- a) One person/officer of this section is to be trained in Micro Propagation /Tissue culturing of medicinal plants leading to a post-graduate degree in foreign well-established labs.
  
- b) One Technical Assistant is to be trained in a country based labs of tissue culture.

### Experience in Handling Instrument/Equipment in Tissue-Culture Section

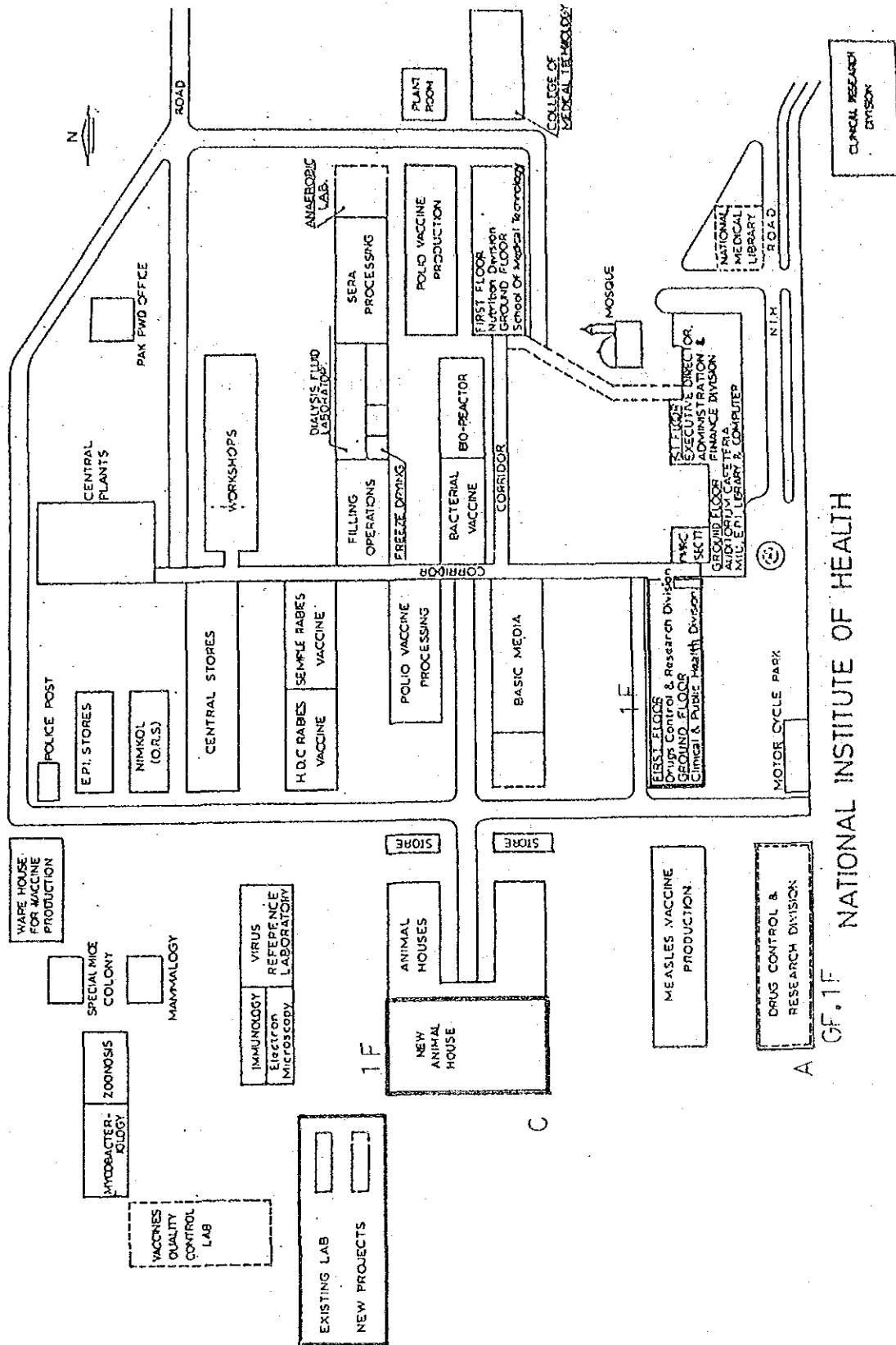
Officers (One Senior Scientific Officer and One Scientific Officer) have the experience in handling the following instrument/equipment used in Tissue Culture Labs.

1. Laminar Flow
2. Autoclave
3. Balance
4. Incubator
5. Refrigerator
6. Magnetic Stirrer
7. pH Meter

However training in computerized or digital type of Balance including a high power of Microscope will be required.



## **8. Floor Drawings of Related Facilities**

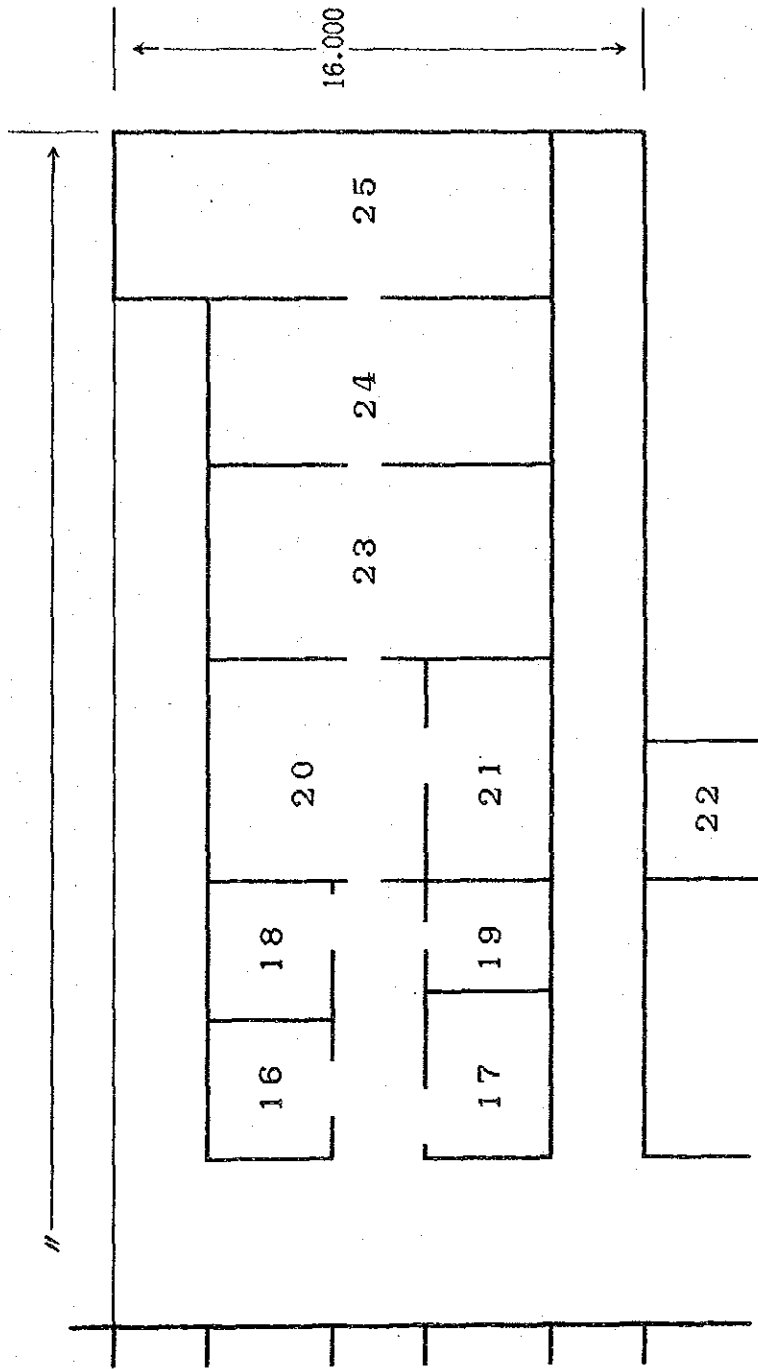


GF.1F NATIONAL INSTITUTE OF HEALTH



Central Drugs Laboratory in Karachi (Floor Drawing - right side)

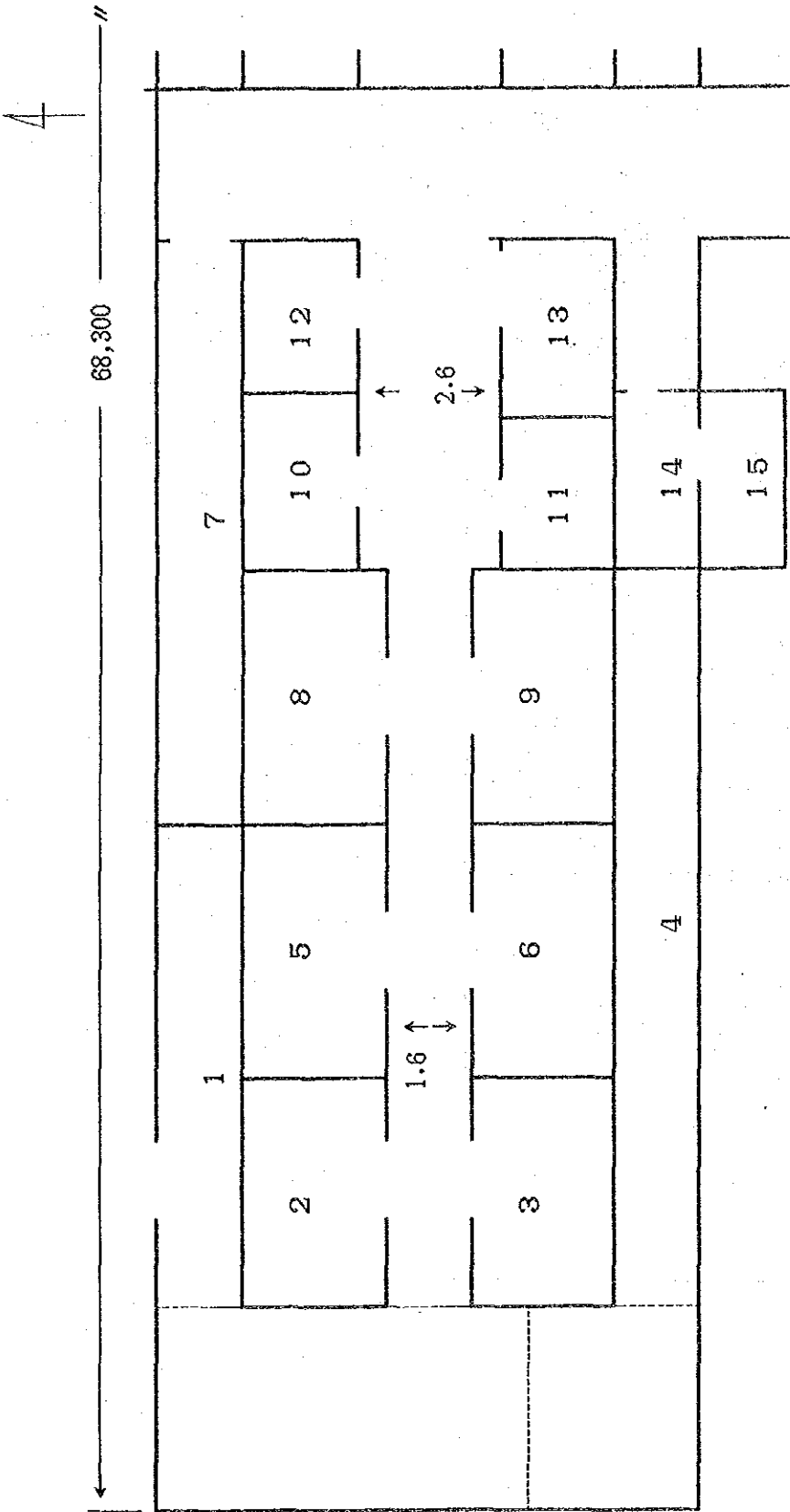
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Next page ←

- |                         |                                  |
|-------------------------|----------------------------------|
| 16. Chemist Asst. Room  | 21. Instrument Room              |
| 17. Asst. Director Room | 22. Bath Room                    |
| 18. Asst. Room          | 23. Chemical Section (for men)   |
| 19. Dark Room           | 24. Chemical Section (for women) |
| 20. Library & Rest Room | 25. Wash Room                    |

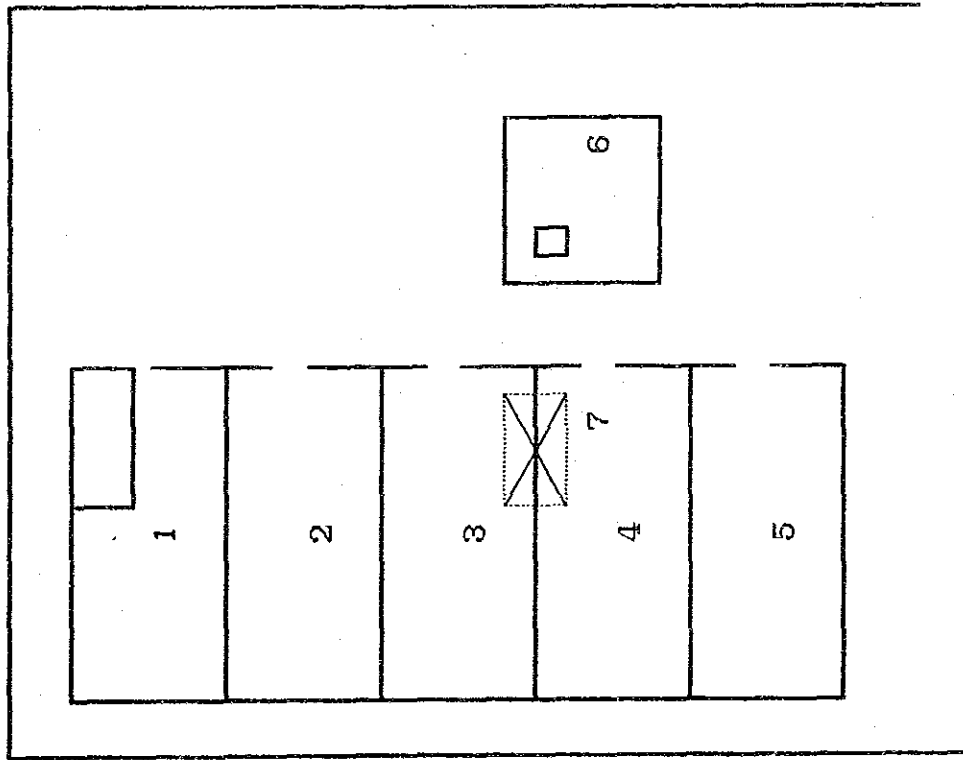
Central Drugs Laboratory (Floor Drawing - left side)



- |                       |   |                             |
|-----------------------|---|-----------------------------|
| 1. Wash Room          | 6. Biology Section                          | 11. Un used                 |
| 2. Biology Section    | 7. Admin. Office                            | 12. Personal Asst. Dr. Room |
| 3. Biology Section    | 8. Collecting & Distribution Room           | 13. Director Room           |
| 4. Store              | 9. Typewriter Room (for document of sample) | 14. Store (Glass Ware)      |
| 5. Store (Glass ware) | 10. Sample Room                             | 15. Store (Glass Ware)      |

Central Drugs Laboratory (Floor Drawing - Animal house)

4 ↑



Animal House

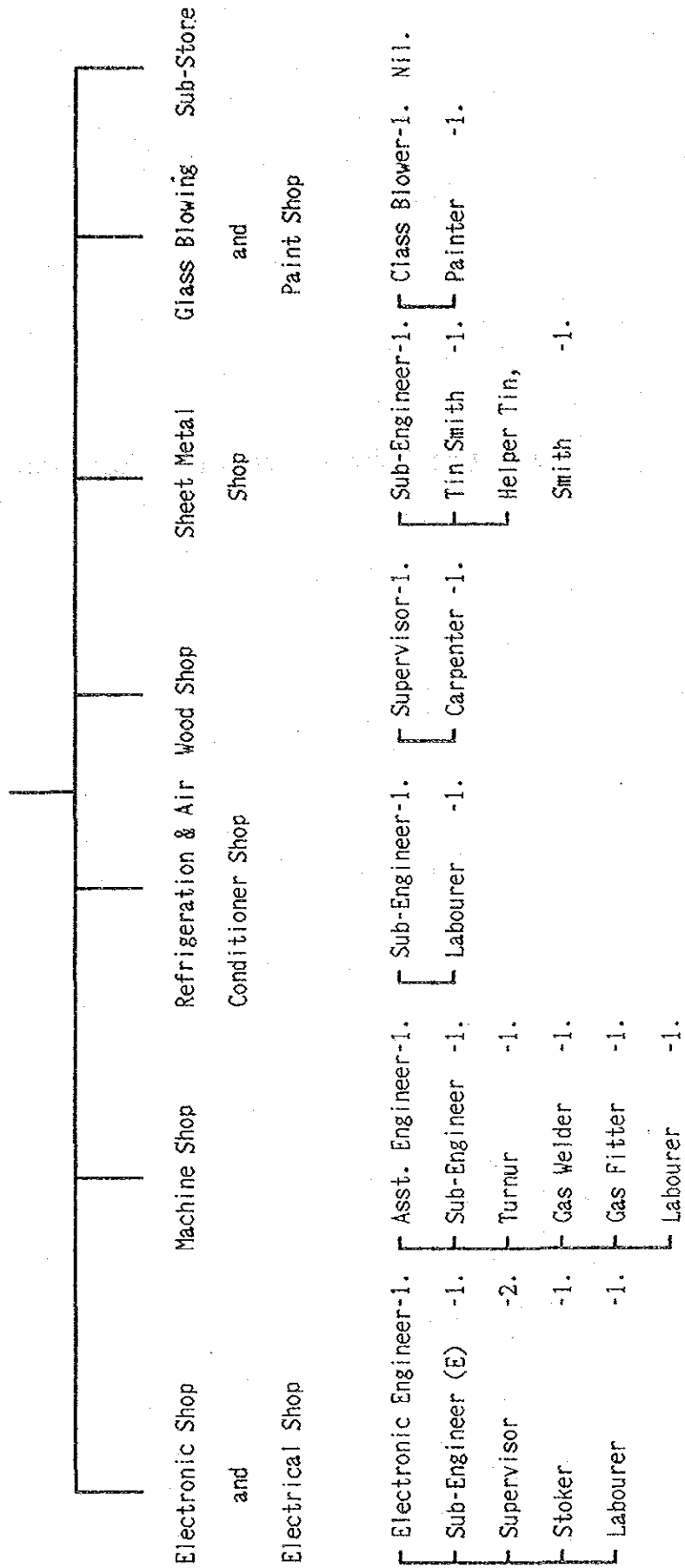
1. Mouse & rabbit
2. Unused
3. Rabbit
4. Unused
5. Chemicals store
6. Water tank
7. Upper water tank



**9. List of Engineers of the Workshop in NIH**

Officer Incharge Workshop Sub-division

(Electronic Engineer)



LIST OF ENGINEERS  
National Institute of Health

<u>S. NO.</u>	<u>NAME OF THE ENGINEERS</u>	<u>QUALIFICATION</u>
1.	Syed Irfan Mahmood	B. Sc. Chemical Engineer
2.	Mr. Nadar Kamal	B. Sc. Engineer
3.	Mr. Akbar Bag	Chemical Engineer
4.	Mr. Abdul Rashid	Polytechnic Engineer, Training in Electromedical Equipment used in Hospitals and Laboratories, Cypus.
5.	Syed Nawab Haider	Polytechnic Engineer, Training in Electromedical Equipment used in Hospitals and Laboratories, Cypus.
6.	Mr. Ikram-Ul-Haq	Polytechnic Engineer, Training in Electron Microscopy from Japan and in Electromedical Equipment used in Hospitals and Laboratories, Cypus.
7.	Mr. Babar Ali Shah	Polytechnic Engineer, Training in Electromedical Equipment used in Hospitals and Laboratories, Cypus.
8.	Mr. Muhammad Aslam Saleemi	Polytechnic Engineer
9.	Mr. Khalil-Ur-Rehman	Polytechnic Engineer
10.	Mr. Saleem Akhtar	Polytechnic Engineer
11.	Mr. Rab Nawaz	Polytechnic Engineer
12.	Mr. Sagheer Ahmad	Polytechnic Engineer
13.	Mr. Muhammad Nazeer	Polytechnic Engineer
14.	Mr. Tanveer Hussain	Polytechnic Engineer
15.	Mr. Muhammad Akmal	Polytechnic Engineer
16.	Mr. Muhammad Tayyeb	Polytechnic Engineer
17.	Mr. Zakir Raza	Polytechnic Engineer





## 10. Collected Data / Materials

1. SUPPLEMENTARY  
DEMANDS FOR GRANTS AND APPROPRIATIONS 1987-88  
[Government of Pakistan, Finance Division, Islamabad]
2. EXPLANATORY MEMORANDUM ON THE BUDGET 1988-89  
[Government of Pakistan, Finance Division, Islamabad]
3. DEMANDS FOR GRANTS AND APPROPRIATIONS THE BUDGET 1988-89  
[Government of Pakistan, Finance Division, Islamabad]
4. ESTIMATES OF FOREIGN ASSISTANCE 1988-89  
[Government of Pakistan, Finance Division, Islamabad]
5. DR. MAHBUB UL HAQ FINANCE MINISTER'S BUDGET SPEECH 1988-89  
[Government of Pakistan, Finance Division, Islamabad]
6. ECONOMIC SURVEY 1987-88  
[Government of Pakistan, Finance Division, Economic Advisor's Wing,  
Islamabad]
7. STATISTICAL SUPPLEMENT ECONOMIC SURVEY 1987-88  
[Government of Pakistan, Finance Division, Economic Advisor's Wing,  
Islamabad]
8. MEMORANDUM FOR THE PAKISTAN CONSORTIUM 1989-90  
[Planning Commission, Government of Pakistan]
9. PORTFOLIO OF AID-WORTHY PROJECTS FOR THE PAKISTAN CONSORTIUM  
[Planning Commission, Government of Pakistan, March/1989]
10. 7TH FIVE YEAR PLAN 1988-93 AND PERSPECTIVE PLAN 1988-2003  
[Planning Commission, Government of Pakistan]

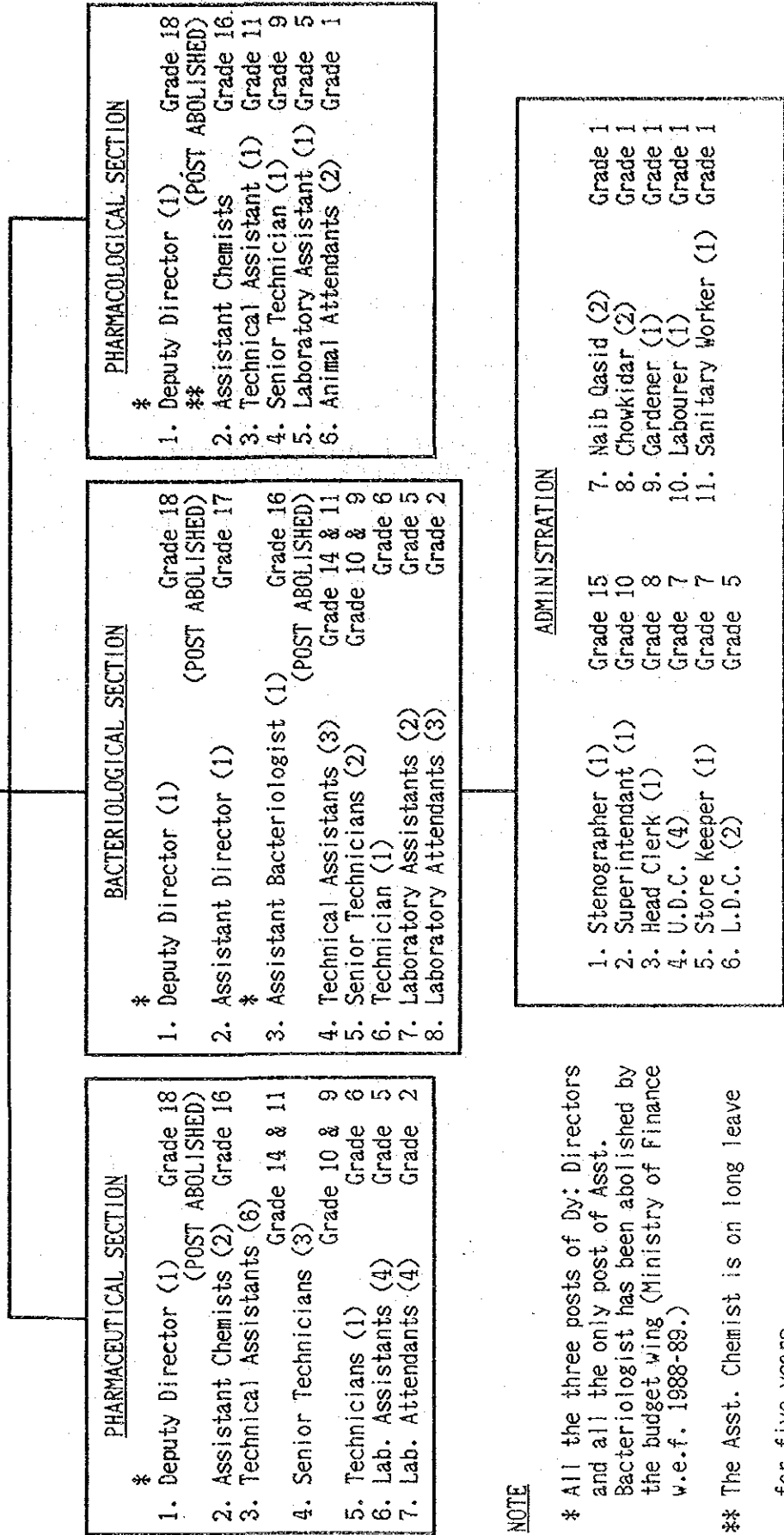
**11. Organization Chart and Table of Samples Tested  
of Central Drugs Laboratory in Karachi**

# ORGANIZATION CHART

## CENTRAL DRUGS LABORATORY

MINISTRY OF HEALTH, GOVERNMENT OF PAKISTAN

DIRECTOR (GRADE - 19)

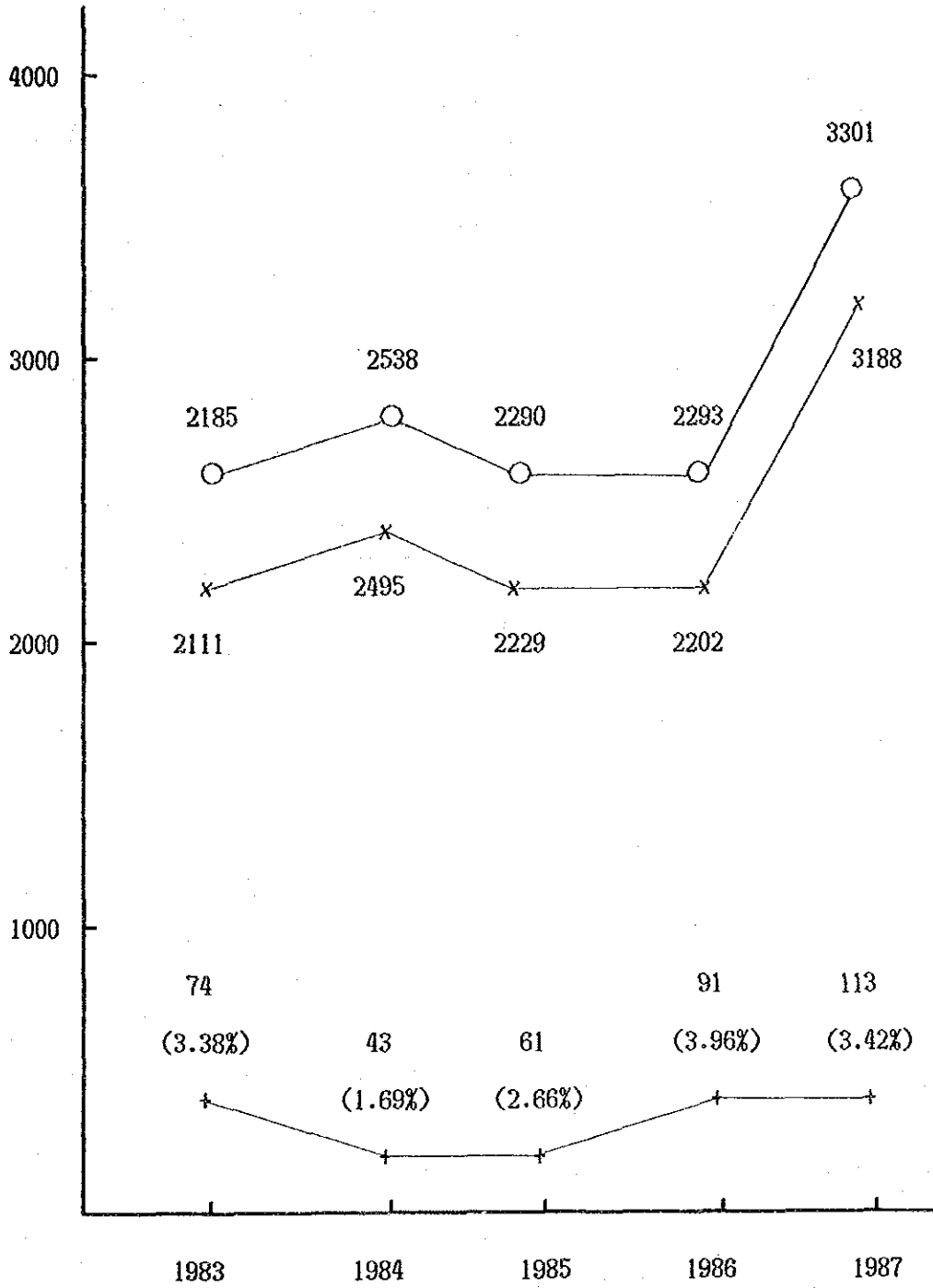


**NOTE**

\* All the three posts of Dy: Directors and all the only post of Asst. Bacteriologist has been abolished by the budget wing (Ministry of Finance w.e.f. 1988-89.)

\*\* The Asst. Chemist is on long leave for five years.

Table number of tested samples



○ Number of sample tested (up to June)  
 x Standard  
 + Below standard





JICA