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ภาคผนวก

ผนวก ก.

ผลการวิเคราะห์ข้อมูลในการสร้างความถูกต้องของผลการตรวจวิเคราะห์

ผนวก ก(1). Linear regression analysis ของเส้นโค้งมาตรฐาน (Standard curve)

ผนวก ก(2). เปรียบเทียบผลจากกรรมวิธีการตรวจวิเคราะห์สองวิธี (Pair t-test)

ผนวก ก(3). เปรียบเทียบผลจากกรรมวิธีการตรวจวิเคราะห์สองวิธี (Bartletts test)

ผนวก ก(4). เปรียบเทียบ % recovery จากกรรมวิธีการตรวจวิเคราะห์สองวิธี

RAW DATA FOR LINEAR REGRESSION ANALYSIS

CONCENTRATION	O.D.
1.00	.065
2.00	.120
3.00	.155
4.00	.210
5.00	.300
6.00	.325
7.00	.375
8.00	.470
9.00	.500
10.00	.575

SLOPE	=	.056636
CORR.COEFF.	=	.996263
T VALUE	=	32.624211
X-INTERCEPT	=	.035313

CORRECTED O.D. FROM LINEAR REGRESSION EQUATION

CONCENTRATION	O.D.
1.00	.055
2.00	.111
3.00	.168
4.00	.225
5.00	.281
6.00	.338
7.00	.394
8.00	.451
9.00	.508
10.00	.564

NO.	METHOD A	METHOD B	DIFF.	DIFF.SQUARE
1	101.00	98.00	-3.00	9.0000
2	116.00	121.00	5.00	25.0000
3	163.00	172.00	9.00	81.0000
4	86.00	91.00	5.00	25.0000
5	258.00	272.00	14.00	196.0000
6	143.00	149.00	6.00	36.0000
7	207.00	209.00	2.00	4.0000
8	322.00	332.00	10.00	100.0000
9	112.00	112.00	0.00	0.0000
10	374.00	390.00	16.00	256.0000
11	75.00	72.00	-3.00	9.0000
12	92.00	96.00	4.00	16.0000
13	98.00	101.00	3.00	9.0000
14	104.00	100.00	-4.00	16.0000
15	72.00	76.00	4.00	16.0000
16	88.00	85.00	-3.00	9.0000
17	141.00	146.00	5.00	25.0000
18	78.00	81.00	3.00	9.0000
19	110.00	120.00	10.00	100.0000
20	102.00	104.00	2.00	4.0000
21	98.00	94.00	-4.00	16.0000
22	92.00	93.00	1.00	1.0000
23	100.00	105.00	5.00	25.0000
24	285.00	280.00	-5.00	25.0000
25	102.00	102.00	0.00	0.0000
26	374.00	388.00	14.00	196.0000
27	86.00	85.00	-1.00	1.0000
28	94.00	98.00	4.00	16.0000
29	144.00	149.00	5.00	25.0000
30	108.00	112.00	4.00	16.0000

SUMD. = 108.00 SDSQ.= 1266.0000
DBAR = 3.60

S.D. = 5.50
T = 3.59

SIGNIFICANT AT P = .05

ผนวก ก(2).

RESULTS FROM FIRST METHOD

102.00	104.00	102.00	101.00	104.00	105.00
103.00	102.00	103.00	104.00	102.00	100.00
104.00	102.00	105.00	106.00	101.00	101.00
104.00	105.00	102.00	103.00	105.00	101.00
102.00	103.00	103.00	105.00	102.00	104.00

METHOD A. N(1) = 30 SD(1) = 1.53

RESULTS FROM SECOND METHOD

107.00	108.00	106.00	107.00	110.00	109.00
108.00	111.00	108.00	108.00	106.00	108.00
110.00	108.00	112.00	112.00	108.00	106.00
112.00	114.00	106.00	108.00	109.00	107.00
108.00	110.00	110.00	114.00	110.00	111.00

METHOD B: N(2) = 30 SD(2) = 2.25

COMPUTED CHI-SQUARE = 4.13

ดูหน้า ก(3).

RECOVERY OF FIRST METHOD

NO	METHOD A	AFTER ADD	RECOVERY
1	101.00	200.00	99.50
2	116.00	210.00	97.22
3	163.00	254.00	96.58
4	86.00	188.00	101.08
5	258.00	350.00	97.77
6	143.00	240.00	98.77
7	207.00	302.00	98.37
8	322.00	408.00	96.68
9	112.00	216.00	101.89
10	374.00	455.00	95.99
11	82.00	180.00	98.90
12	100.00	196.00	98.00
13	78.00	180.00	101.12
14	86.00	184.00	98.92
15	92.00	186.00	96.88
16	100.00	204.00	102.00
17	146.00	240.00	97.56
18	112.00	208.00	98.11
19	92.00	196.00	102.08
20	70.00	164.00	96.47
21	74.00	164.00	94.25
22	122.00	218.00	98.20
23	168.00	266.00	99.25
24	86.00	186.00	100.00
25	92.00	186.00	96.88
26	120.00	210.00	95.45
27	112.00	208.00	98.11
28	274.00	366.00	97.86
29	112.00	210.00	99.06
30	92.00	186.00	96.88

MEAN = 95.16

ผนวก ก(4).

RECOVERY OF SECOND METHOD

NO	METHOD B	AFTER ADD	RECOVERY
1	98.00	190.00	95.96
2	121.00	210.00	95.02
3	172.00	268.00	98.53
4	91.00	186.00	97.38
5	272.00	358.00	96.24
6	149.00	240.00	96.39
7	209.00	300.00	97.09
8	332.00	420.00	97.22
9	112.00	214.00	100.94
10	390.00	465.00	94.90
11	85.00	175.00	94.59
12	106.00	200.00	97.09
13	76.00	168.00	95.45
14	90.00	182.00	95.79
15	96.00	190.00	96.94
16	106.00	202.00	98.06
17	155.00	246.00	96.47
18	118.00	210.00	96.33
19	100.00	185.00	92.50
20	74.00	180.00	103.45
21	78.00	170.00	95.51
22	118.00	202.00	92.66
23	164.00	252.00	95.45
24	88.00	180.00	95.74
25	98.00	192.00	96.97
26	124.00	210.00	93.75
27	118.00	204.00	93.58
28	284.00	360.00	93.75
29	116.00	204.00	94.44
30	96.00	190.00	96.94

MEAN = 93.07

ผนวก ก(4).

PERCENT RECOVERY OF

METHOD A	METHOD B
99.50	95.96
97.22	95.02
96.58	98.53
101.08	97.38
97.77	96.24
98.77	96.39
98.37	97.09
96.68	97.22
101.89	100.94
95.99	94.90
98.90	94.59
98.00	97.09
101.12	95.45
98.92	95.79
96.88	96.94
102.00	98.06
97.56	96.47
98.11	96.33
102.08	92.50
96.47	103.45
94.25	95.51
98.20	92.66
99.25	95.45
100.00	95.74
96.88	96.97
95.45	93.75
98.11	93.58
97.86	93.75
99.06	94.44
96.88	96.94

VARIANCE(A) = 13.7438 VARIANCE(B) = 14.4771

COMPUTED F = .9494

NOT SIGNIFICANT AT P = .05

ผนวก ก(4).

ผนวก ข.

ข้อมูลที่ใช้ในการสร้างแผนภูมิควบคุมความแม่นยำ พร้อมตารางวิคราะห์ค่าความแปรปรวนสองทางสำหรับการตรวจวิเคราะห์

1. Serum transaminase
2. Serum creatinine
3. Blood urea nitrogen

LABORATORY PRECISION

Name of the test...SERUM.TRANSAMINASE.....

Technician's name..VEERAVUDHT.M..NONDH....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
19-11-75	1	42.5	175	132.5
20-11-75	2	55.0	165	110.0
21-11-75	3	56.0	164	108.0
24-11-75	4	48.5	167	118.5
25-11-75	5	48.5	166	117.5
26-11-75	6	45.0	165	120.0
27-11-75	7	58.5	160	101.5
28-11-75	8	50.0	165	115.0
1-12-75	9	47.5	165	117.5
2-12-75	10	45.5	160	114.5
3-12-75	11	48.5	164	115.5
4-12-75	12	46.5	168	121.5
8-12-75	13	50.0	170	120.0
9-12-75	14	49.0	168	119.0
11-12-75	15	51.0	168	117.0
12-12-75	16	49.0	168	119.0
15-12-75	17	46.5	165	118.5
16-12-75	18	53.0	170	117.0
17-12-75	19	52.0	178	126.0
18-12-75	20	53.0	180	127.0
19-12-75	21	45.0	178	113.0
22-12-75	22	47.0	171	124.0
23-12-75	23	48.5	170	121.5
24-12-75	24	45.5	175	129.5
25-12-75	25	48.5	167	118.5
26-12-75	26	50.0	170	120.0
29-12-75	27	50.0	168	118.0
30-12-75	28	48.0	164	116.0
2- 1-76	29	52.5	172	119.5
5- 1-76	30	48.0	168	120.0

DETERMINATION OF SERUM TRANSAMINASE. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	214128.31	59	3629.29	
DAYS	447.19	29	15.42	.79
POOLS	213070.00	1	213070.00	10983.51
ADDITIVITY	67.95	1	67.95	3.50
RESIDUAL	543.17	28	19.40	

LABORATORY PRECISION

Name of the test...CREATININE.....

Technician's name..VEERAVUDHT M. NONDH....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
19-11-75	1	1.40	5.00	3.60
20-11-75	2	1.40	4.90	3.50
21-11-75	3	1.52	5.20	3.68
24-11-75	4	1.48	5.10	3.62
25-11-75	5	1.33	4.90	3.57
26-11-75	6	1.40	5.00	3.60
27-11-75	7	1.24	5.20	3.96
28-11-75	8	1.33	5.00	3.67
1-12-75	9	1.40	5.00	3.60
2-12-75	10	1.40	5.00	3.60
3-12-75	11	1.28	5.10	3.82
4-12-75	12	1.44	5.20	3.76
8-12-75	13	1.44	5.10	3.66
9-12-75	14	1.37	5.10	3.73
11-12-75	15	1.37	5.10	3.73
12-12-75	16	1.33	5.10	3.77
15-12-75	17	1.68	4.90	3.22
16-12-75	18	1.57	5.00	3.43
17-12-75	19	1.52	5.10	3.53
18-12-75	20	1.33	5.00	3.67
19-12-75	21	1.48	5.30	3.82
22-12-75	22	1.40	5.00	3.60
23-12-75	23	1.37	5.00	3.63
24-12-75	24	1.40	5.00	3.60
25-12-75	25	1.61	4.90	3.29
26-12-75	26	1.44	5.00	3.56
29-12-75	27	1.44	5.00	3.56
30-12-75	28	1.52	5.20	3.68
2- 1-76	29	1.40	5.20	3.80
5- 1-76	30	1.40	5.10	3.70

DETERMINATION OF CREATININE.

ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	198.63	59	3.37	
DAYS	.25	29	.01	.77
POOLS	198.05	1	198.05	17426.30
ADDITIVITY	.00	1	.00	.25
RESIDUAL	.32	28	.01	

LABORATORY PRECISION

Name of the test. BLOOD UREA NITROGEN

Technician's name. VEERAVUDHT M. NONDH

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
19-11-75	1	20.4	62.0	41.6
20-11-75	2	18.3	61.0	42.7
21-11-75	3	18.5	63.0	44.5
24-11-75	4	17.2	64.0	46.8
25-11-75	5	18.1	62.5	44.4
26-11-75	6	17.9	64.5	46.6
27-11-75	7	17.2	63.0	45.8
28-11-75	8	19.1	65.0	45.9
1-12-75	9	16.9	62.5	45.6
2-12-75	10	17.9	61.0	43.1
3-12-75	11	18.8	63.0	44.2
4-12-75	12	18.1	63.0	44.9
8-12-75	13	20.7	61.5	40.8
9-12-75	14	17.9	62.5	44.6
11-12-75	15	15.7	65.0	49.3
12-12-75	16	17.9	62.0	44.1
15-12-75	17	21.6	61.0	39.4
16-12-75	18	19.7	64.0	44.3
17-12-75	19	16.6	63.0	46.4
18-12-75	20	18.5	64.0	45.5
19-12-75	21	19.4	63.5	44.1
22-12-75	22	16.6	62.5	45.9
23-12-75	23	17.6	62.0	44.4
24-12-75	24	19.7	65.0	45.3
25-12-75	25	16.9	61.5	44.6
26-12-75	26	17.9	63.0	45.1
29-12-75	27	18.5	62.0	43.5
30-12-75	28	17.2	64.0	46.8
2- 1-76	29	17.9	64.0	46.1
5- 1-76	30	17.9	62.5	44.6

DETERMINATION OF BLOOD UREA NITROGEN. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	30056.71	59	509.44	
DAYS	36.41	29	1.26	.66
POOLS	29966.88	1	29966.88	15830.70
ADDITIVITY	.41	1	.41	.22
RESIDUAL	53.00	28	1.89	

ผนวก ค.

ผลของการใช้แผนภูมิควบคุมความแม่นยำควบคู่กัน
กับตารางวิเคราะห์ค่าความแปรปรวนสองทาง
ตั้งแต่วันที่ 6 ม.ค. 2519 ถึง 29 มี.ค. 2519

ผนวก ค(1)

สำหรับการตรวจวิเคราะห์ Serum transaminase

LABORATORY PRECISION

Name of the test..SERUM TRANSAMINASE.....

Technician's name.VEERAVUDHT M..NONDH.....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
6-1-76	1	46.5	169	122.5
7-1-76	2	52.0	165	113.0
8-1-76	3	46.5	168	121.5
9-1-76	4	50.0	174	124.0
12-1-76	5	46.5	166	109.5
13-1-76	6	49.0	161	112.0
14-1-76	7	43.5	162	118.5
15-1-76	8	49.0	171	122.0
16-1-76	9	50.5	171	120.5
19-1-76	10	46.5	175	128.5
20-1-76	11	48.5	169	120.5
21-1-76	12	48.5	166	117.5
22-1-76	13	45.0	174	129.0
23-1-76	14	53.5	177	123.5
26-1-76	15	50.5	170	119.5
27-1-76	16	53.5	175	121.5
28-1-76	17	47.0	166	119.0
29-1-76	18	47.0	167	120.0
30-1-76	19	48.5	162	113.5
2-2-76	20	55.0	167	112.0
3-2-76	21	45.0	171	126.0
4-2-76	22	50.5	168	117.5
5-2-76	23	46.5	163	116.5
6-2-76	24	50.0	177	127.0
9-2-76	25	50.0	165	115.0
10-2-76	26	50.0	160	110.0
11-2-76	27	48.5	174	125.5
12-2-76	28	53.5	167	113.5
13-2-76	29	48.5	170	121.5
16-2-76	30	46.5	164	117.5

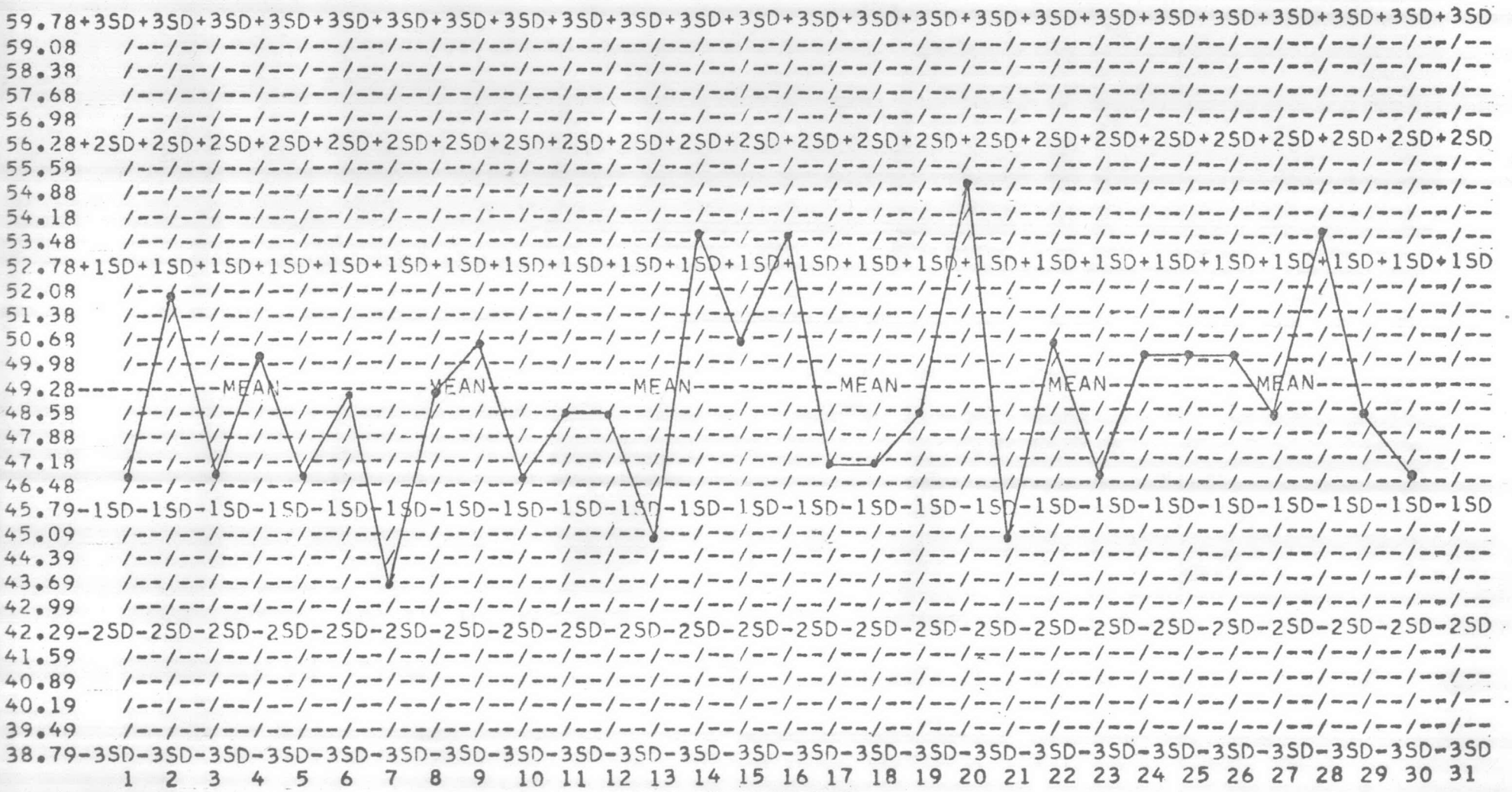
DETERMINATION OF SERUM TRANSAMINASE. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	214299.83	59	3632.20	
DAYS	517.08	29	17.83	1.45
POOLS	213368.07	1	213368.07	17382.31
ADDITIVITY	70.98	1	70.98	5.78
RESIDUAL	343.70	28	12.28	

DETERMINATION OF SERUM TRANSAMINASE. NORMAL POOL.

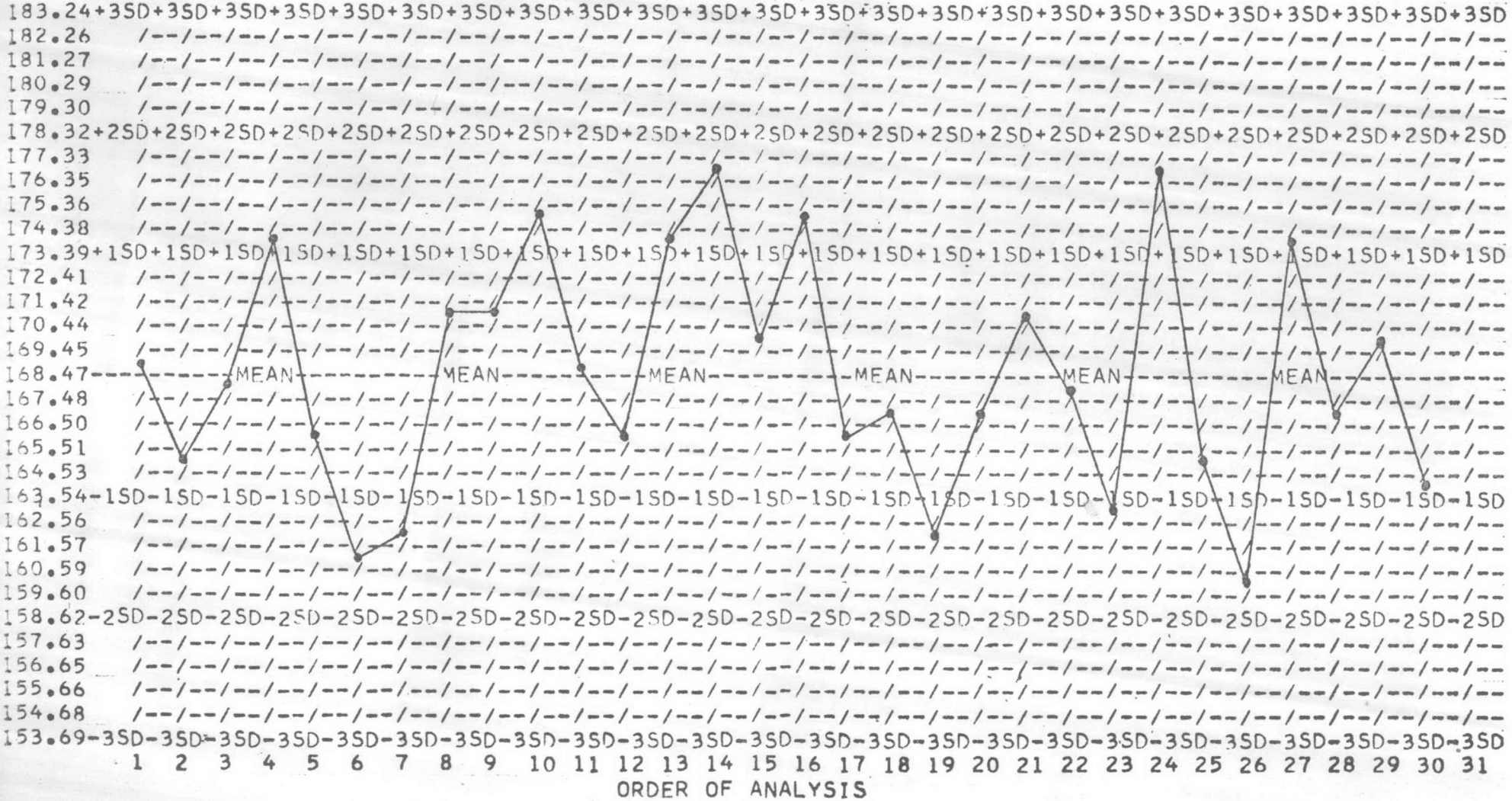
QUALITY CONTROL CHART



N = 30 MEAN = 49.283 S.D. = 3.498 C.V. = 7.098 VARIANCE = 12.236

DETERMINATION OF SERUM TRANSAMINASE. ABNORMAL POOL.

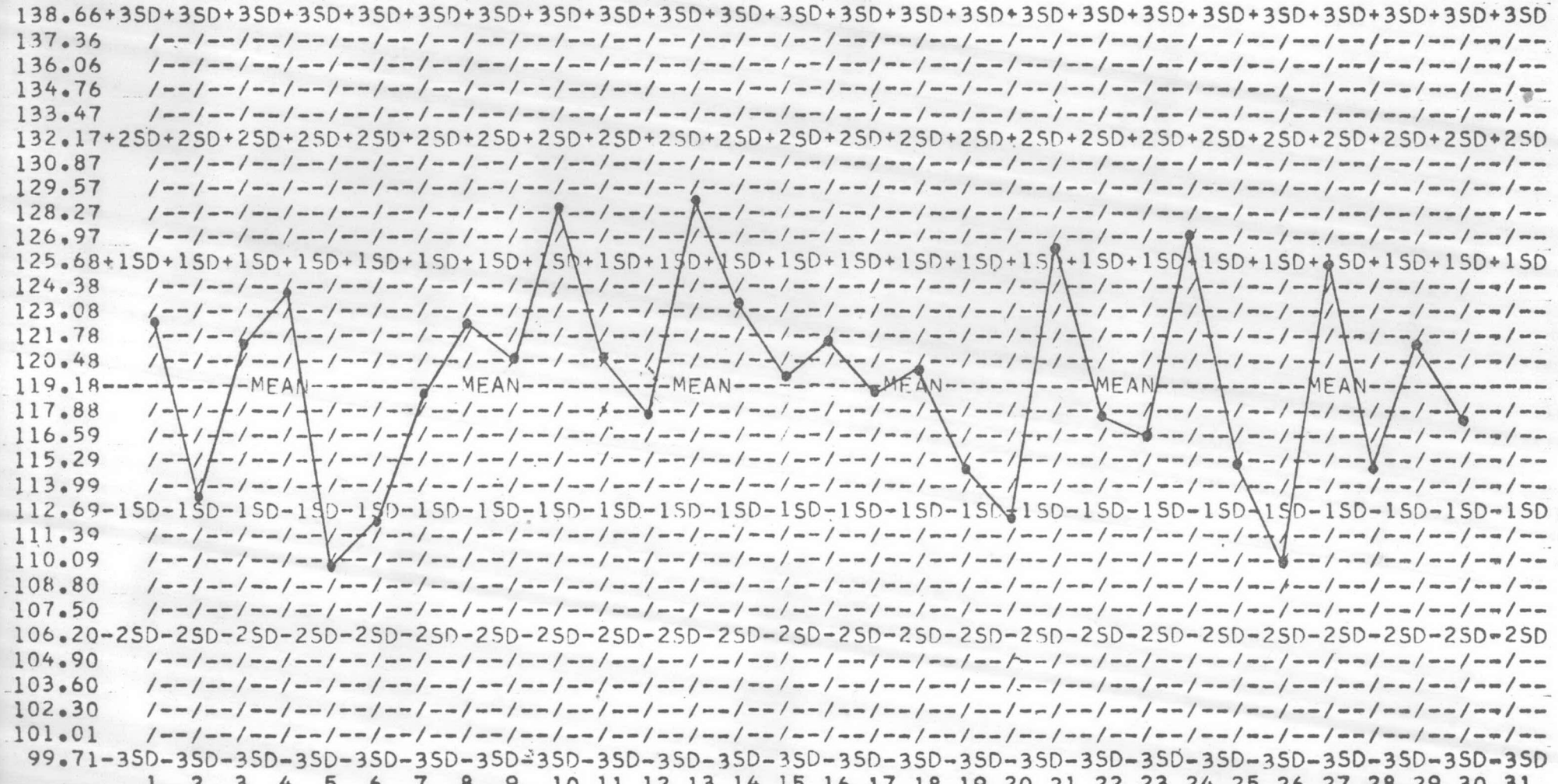
QUALITY CONTROL CHART



N = 30 MEAN = 168.467 S.D. = 4.925 C.V. = 2.924 VARIANCE = 24.257

DETERMINATION OF SERUM TRANSAMINASE. DIFFERENCE BETWEEN POOLS.

QUALITY CONTROL CHART



N = 30 MEAN = 119.183 S.D. = 6.492 C.V. = 5.447 VARIANCE = 42.146

LABORATORY PRECISION

Name of the test..SERUM TRANSAMINASE.....

Technician's name..VEERAVUDHT M. NONDH....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
17-2-76	1	50.0	162	112.0
18-2-76	2	46.5	174	127.5
19-2-76	3	55.0	166	111.0
20-2-76	4	50.5	174	123.5
23-2-76	5	46.5	170	123.5
24-2-76	6	56.5	170	113.5
25-2-76	7	50.0	165	115.0
26-2-76	8	50.5	176	125.5
27-2-76	9	53.5	165	111.5
1-3-76	10	48.5	163	114.5
2-3-76	11	50.5	172	121.5
3-3-76	12	48.5	163	114.5
4-3-76	13	53.5	168	114.5
5-3-76	14	46.5	160	113.5
8-3-76	15	47.0	172	125.0
9-3-76	16	45.0	174	129.0
10-3-76	17	49.0	168	119.0
11-3-76	18	46.5	166	119.5
12-3-76	19	52.0	162	110.0
15-3-76	20	43.5	167	123.5
16-3-76	21	48.5	160	111.5
17-3-76	22	47.0	166	119.0
18-3-76	23	50.0	155	105.0
19-3-76	24	48.5	160	111.5
22-3-76	25	50.5	163	112.5
23-3-76	26	45.0	159	114.0
24-3-76	27	53.5	157	103.5
25-3-76	28	48.5	162	113.5
26-3-76	29	49.0	155	106.0
29-3-76	30	46.5	154	107.5

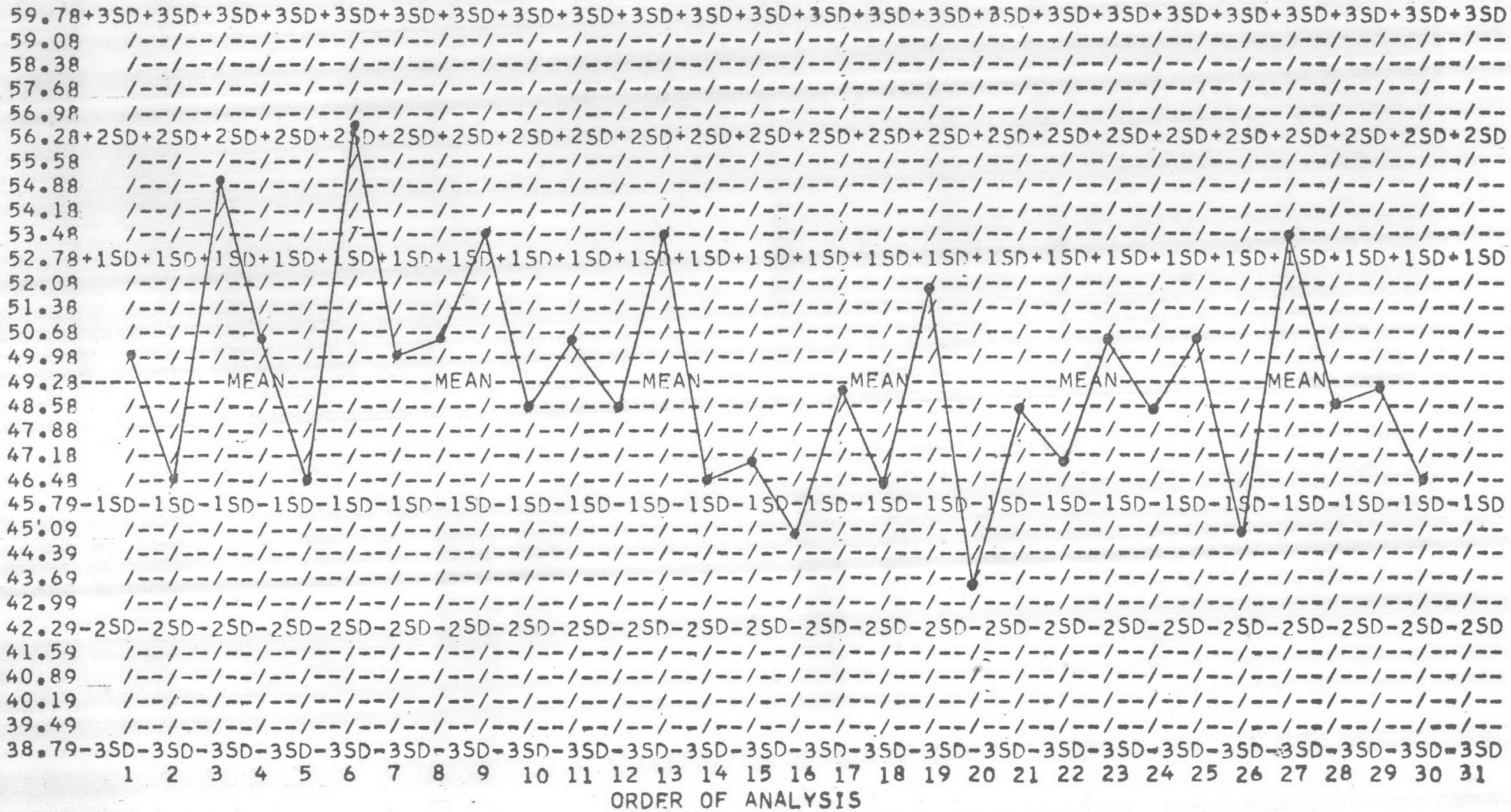
DETERMINATION OF SERUM TRANSAMINASE. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	202145.58	59	3426.20	
DAYS	678.08	29	23.38	1.50
POOLS	200797.35	1	200797.35	12870.51
ADDITIVITY	233.31	1	233.31	14.95
RESIDUAL	436.84	28	15.60	

DETERMINATION OF SERUM TRANSAMINASE. NORMAL POOL.

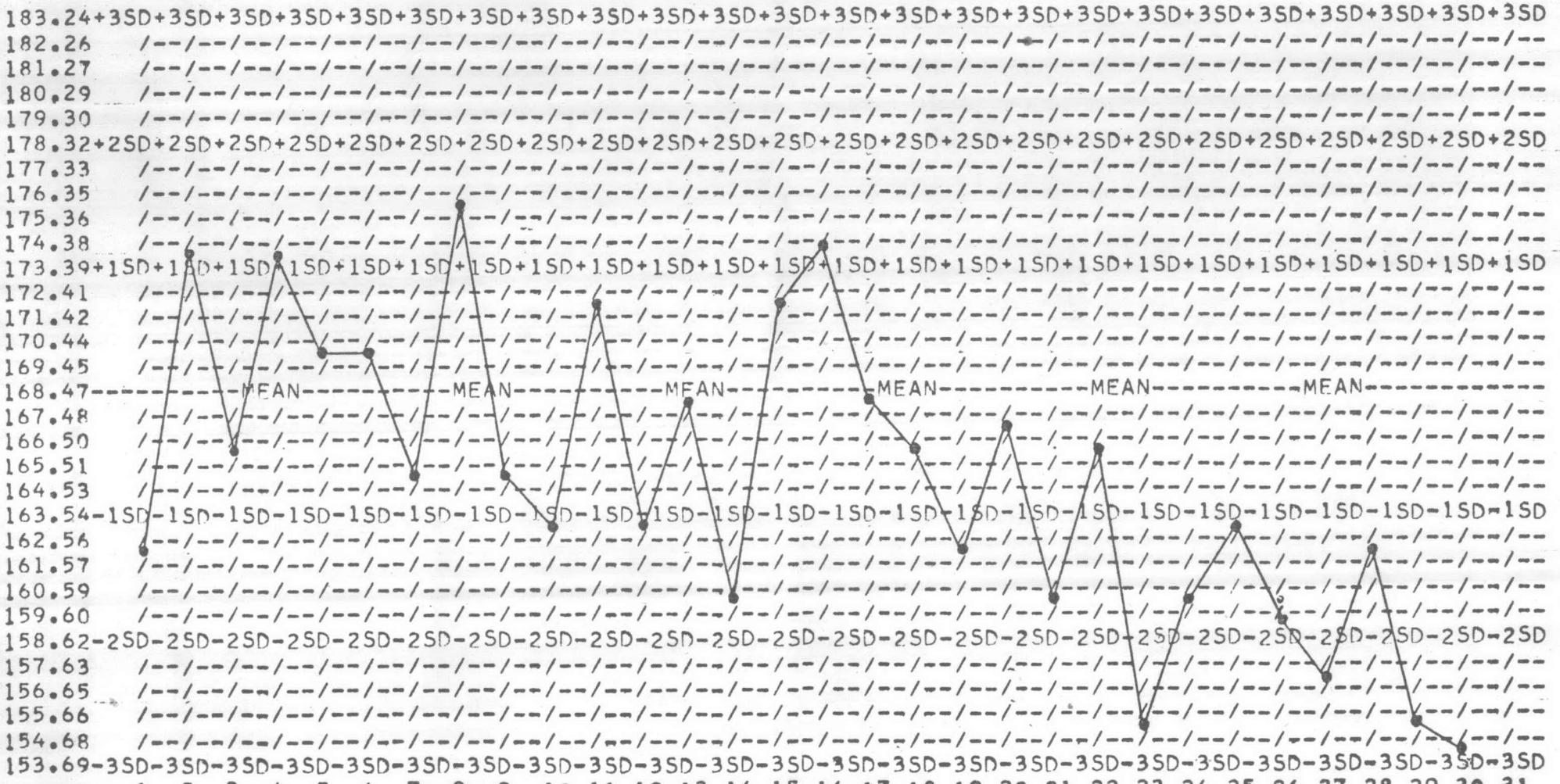
QUALITY CONTROL CHART



N = 30 MEAN = 49.283 S.D. = 3.498 C.V. = 7.098 VARIANCE = 12.236

DETERMINATION OF SERUM TRANSAMINASE. ABNORMAL POOL.

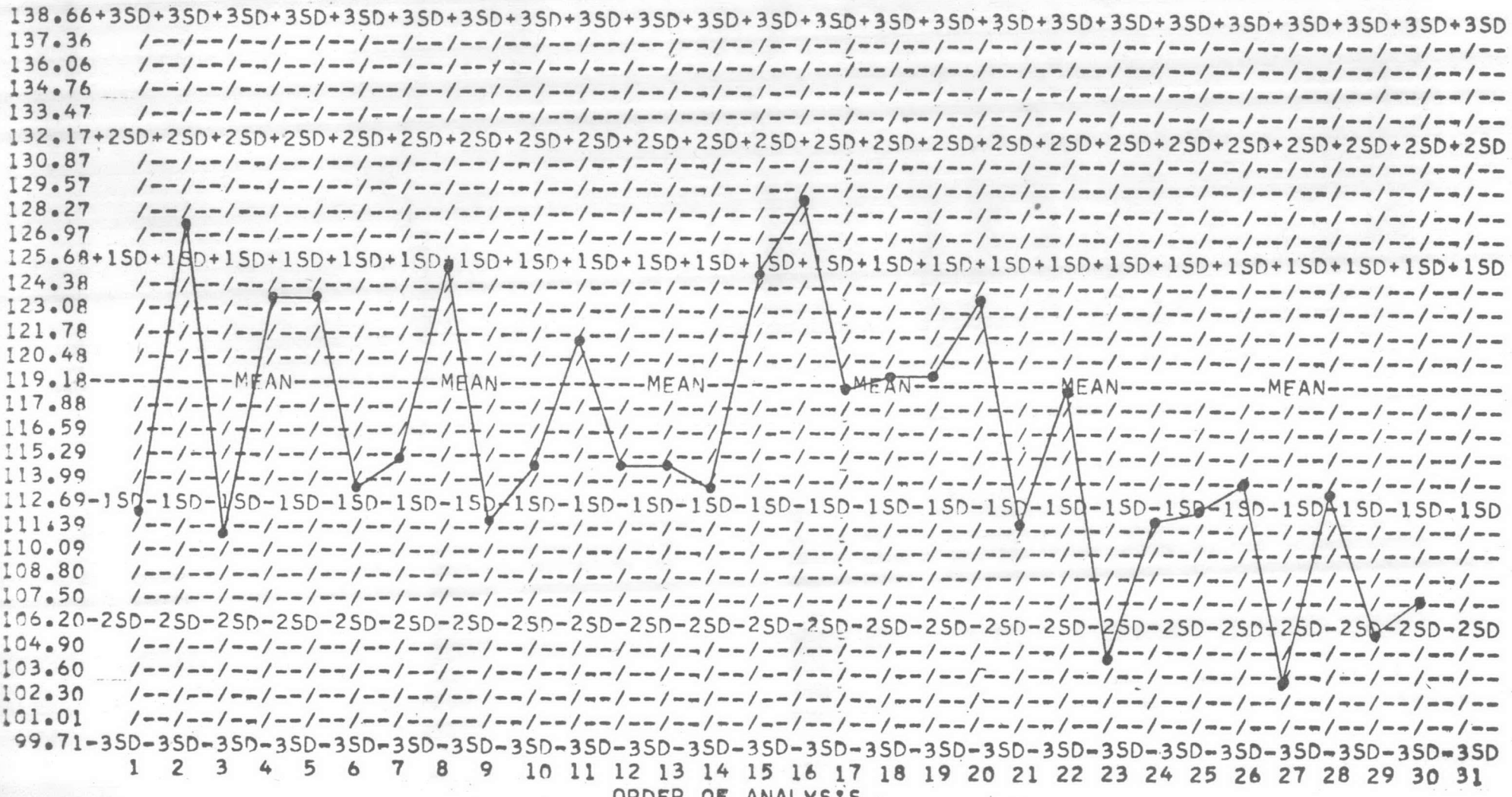
QUALITY CONTROL CHART



N = 30 MEAN = 168.467 S.D. = 4.925 C.V. = 2.924 VARIANCE = 24.257

DETERMINATION OF SERUM TRANSAMINASE. DIFFERENCE BETWEEN POOLS.

QUALITY CONTROL CHART



N = 30 MEAN = 119.183 S.D. = 6.492 C.V. = 5.447 VARIANCE = 42.146

ผนวก ค(2)

สำหรับการตรวจวิเคราะห์ Serum creatinine

LABORATORY PRECISION

Name of the test...CREATININE.....

Technician's name..VEERAVUDHT M. NONDH.....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
6-1-76	1	1.47	5.10	3.63
7-1-76	2	1.37	5.20	3.83
8-1-76	3	1.33	5.00	3.67
9-1-76	4	1.52	5.20	3.68
12-1-76	5	1.37	4.90	3.53
13-1-76	6	1.57	5.10	3.53
14-1-76	7	1.44	5.00	3.56
15-1-76	8	1.28	5.00	3.72
16-1-76	9	1.40	5.20	3.80
19-1-76	10	1.44	5.00	3.56
20-1-76	11	1.44	5.10	3.66
21-1-76	12	1.37	5.10	3.73
22-1-76	13	1.57	5.10	3.53
23-1-76	14	1.62	5.30	3.68
26-1-76	15	1.44	5.00	3.56
27-1-76	16	1.37	5.10	3.73
28-1-76	17	1.44	4.90	3.46
29-1-76	18	1.40	5.00	3.60
30-1-76	19	1.40	4.90	3.50
2-2-76	20	1.40	5.00	3.60
3-2-76	21	1.33	5.00	3.67
4-2-76	22	1.24	5.10	3.86
5-2-76	23	1.40	5.00	3.60
6-2-76	24	1.52	5.20	3.68
9-2-76	25	1.37	4.90	3.53
10-2-76	26	1.57	4.90	3.33
11-2-76	27	1.44	5.10	3.66
12-2-76	28	1.47	5.10	3.66
13-2-76	29	1.37	5.20	3.83
16-2-76	30	1.24	5.00	3.76

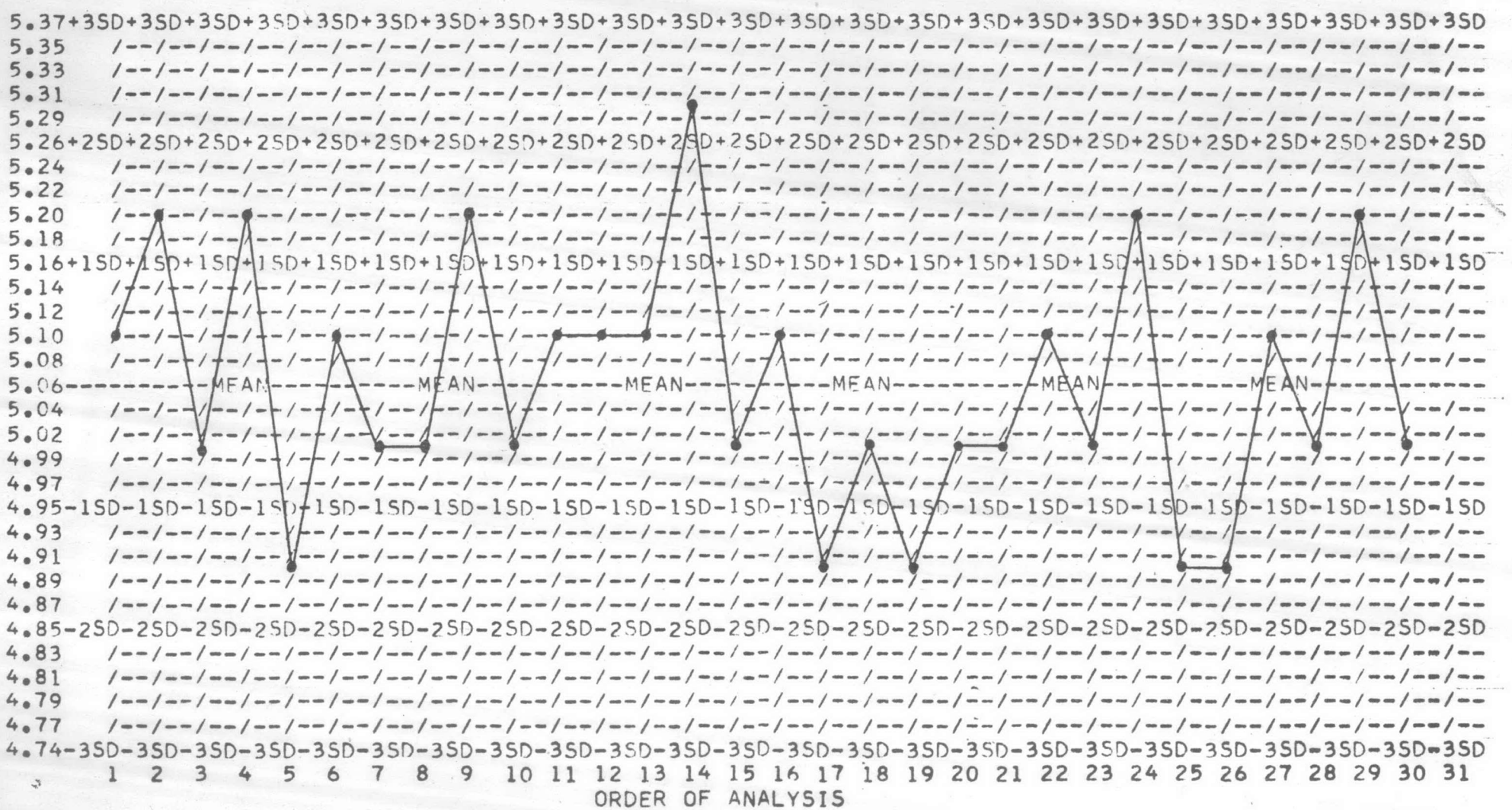
DETERMINATION OF CREATININE. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	198.64	59	3.37	
DAYS	.38	29	.01	1.76
POOLS	198.05	1	198.05	26846.79
ADDITIVITY	.00	1	.00	.61
RESIDUAL	.21	28	.01	

DETERMINATION OF CREATININE. ABNORMAL POOL.

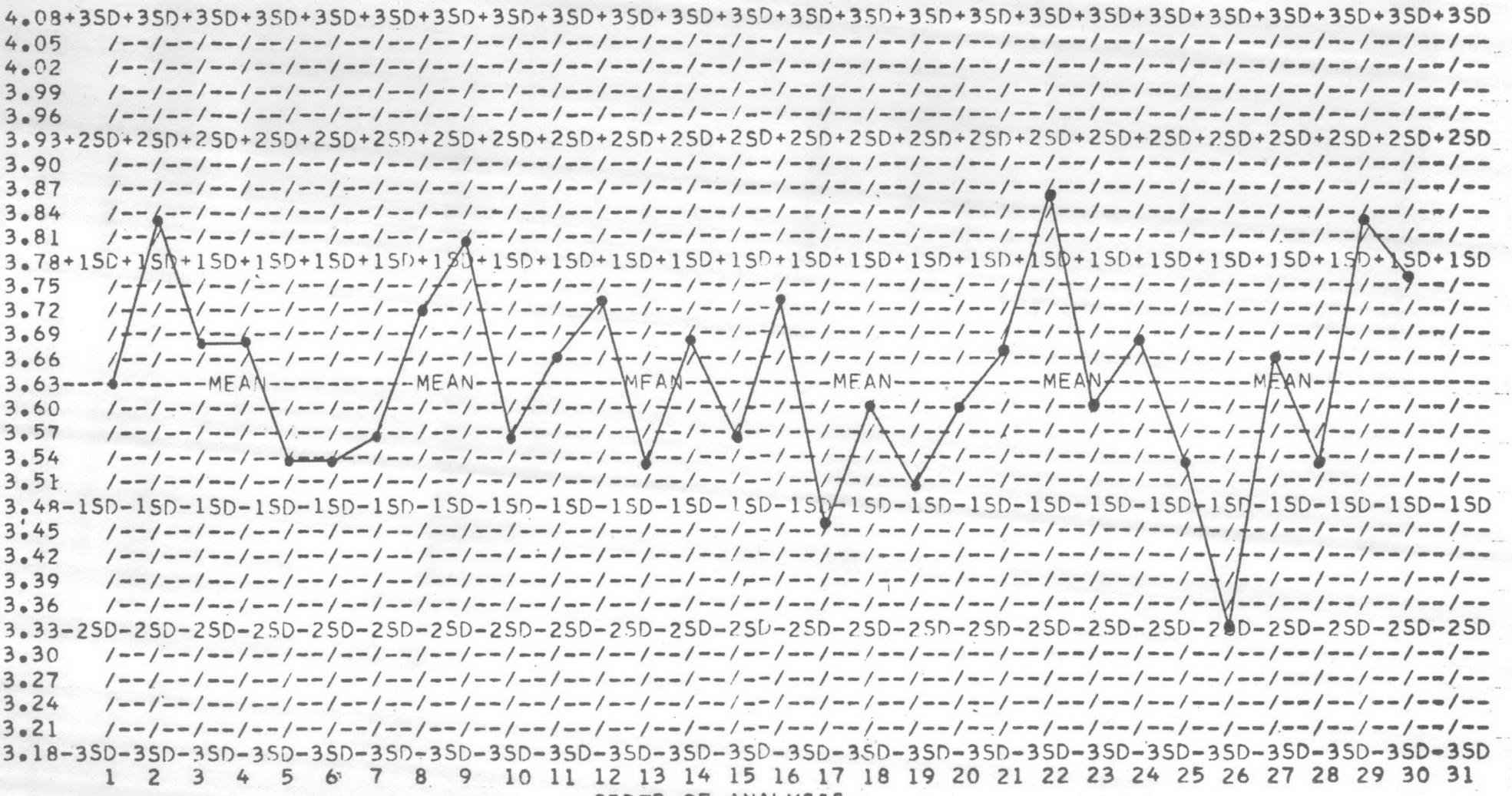
QUALITY CONTROL CHART



N = 30 MEAN = 5.057 S.D. = .104 C.V. = 2.057 VARIANCE = .011

DETERMINATION OF CREATININE. DIFFERENCE BETWEEN POOLS.

QUALITY CONTROL CHART



N = 30 MEAN = 3.632 S.D. = .150 C.V. = 4.122 VARIANCE = .022

LABORATORY PRECISION

Name of the test...CREATININE.....

Technician's name..VEERAVUDHT M. NONDH....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
17-2-76.	1	1.44	5.00	3.56
18-2-76.	2	1.37	4.90	3.53
19-2-76.	3	1.40	5.10	3.70
20-2-76.	4	1.47	5.10	3.63
23-2-76.	5	1.37	5.00	3.63
24-2-76.	6	1.24	4.80	3.56
25-2-76.	7	1.37	4.90	3.53
26-2-76.	8	1.40	4.90	3.50
27-2-76.	9	1.52	5.10	3.58
1-3-76.	10	1.33	4.90	3.57
2-3-76.	11	1.28	5.00	3.72
3-3-76.	12	1.40	5.10	3.70
4-3-76.	13	1.47	4.90	3.43
5-3-76.	14	1.40	5.00	3.60
8-3-76.	15	1.37	4.80	3.43
9-3-76.	16	1.47	4.90	3.43
10-3-76.	17	1.33	5.00	3.67
11-3-76.	18	1.40	5.00	3.60
12-3-76.	19	1.47	5.10	3.63
15-3-76.	20	1.57	5.20	3.63
16-3-76.	21	1.47	5.20	3.73
17-3-76.	22	1.52	5.30	3.78
18-3-76.	23	1.57	5.20	3.63
19-3-76.	24	1.52	5.10	3.58
22-3-76.	25	1.57	5.30	3.73
23-3-76.	26	1.61	5.30	3.69
24-3-76.	27	1.52	5.20	3.68
25-3-76.	28	1.61	5.20	3.59
26-3-76.	29	1.65	5.30	3.65
29-3-76.	30	1.69	5.40	3.71

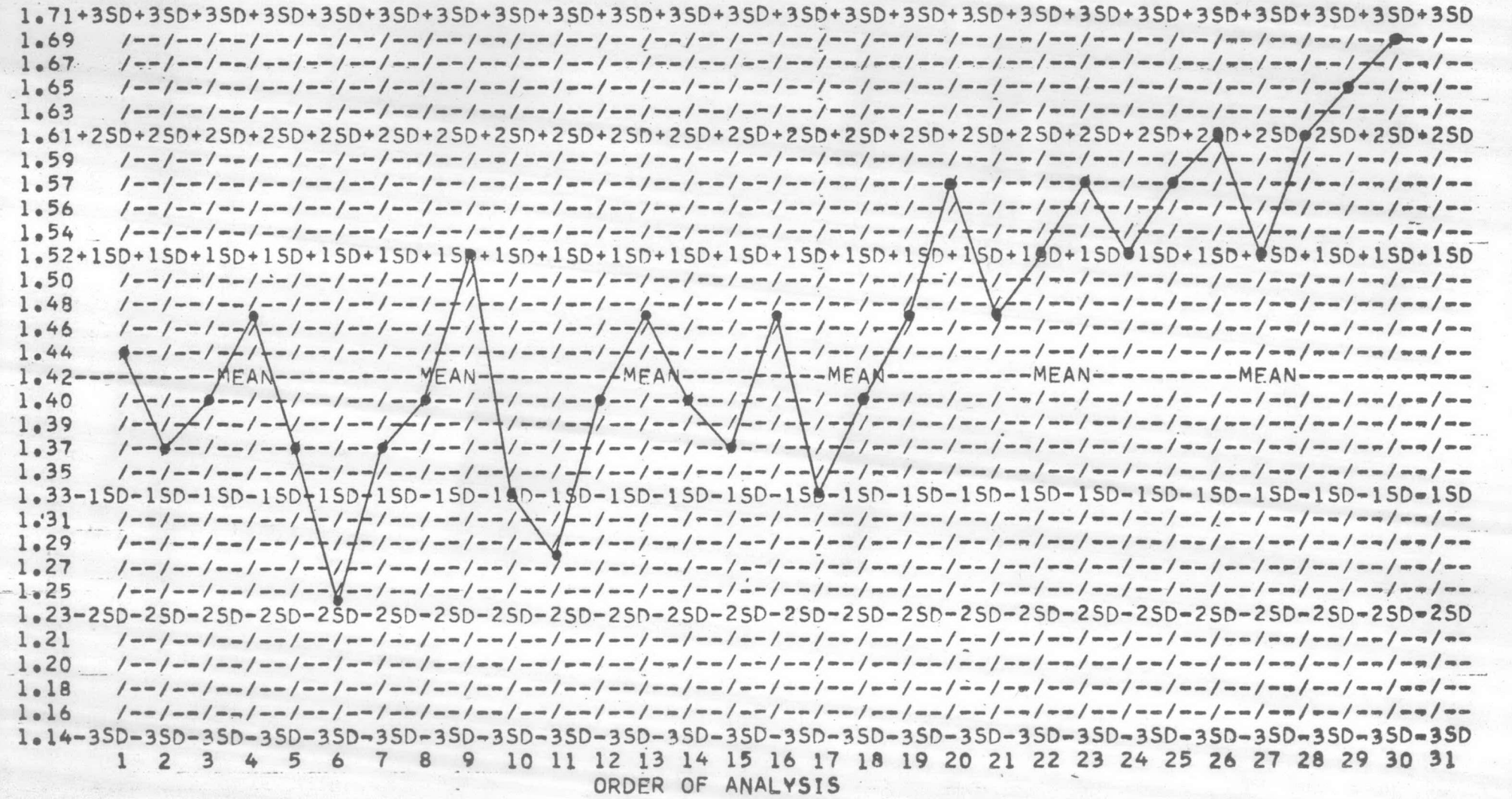
DETERMINATION OF CREATININE. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	196.95	59	3.34	
DAYS	.99	29	.03	11.84
POOLS	195.84	1	195.84	68170.21
ADDITIVITY	.04	1	.04	14.69
RESIDUAL	.08	28	.00	

DETERMINATION OF CREATININE. NORMAL POOL.

QUALITY CONTROL CHART



N = 30 MEAN = 1.423 S.D. = .095 C.V. = 6.657 VARIANCE = .009

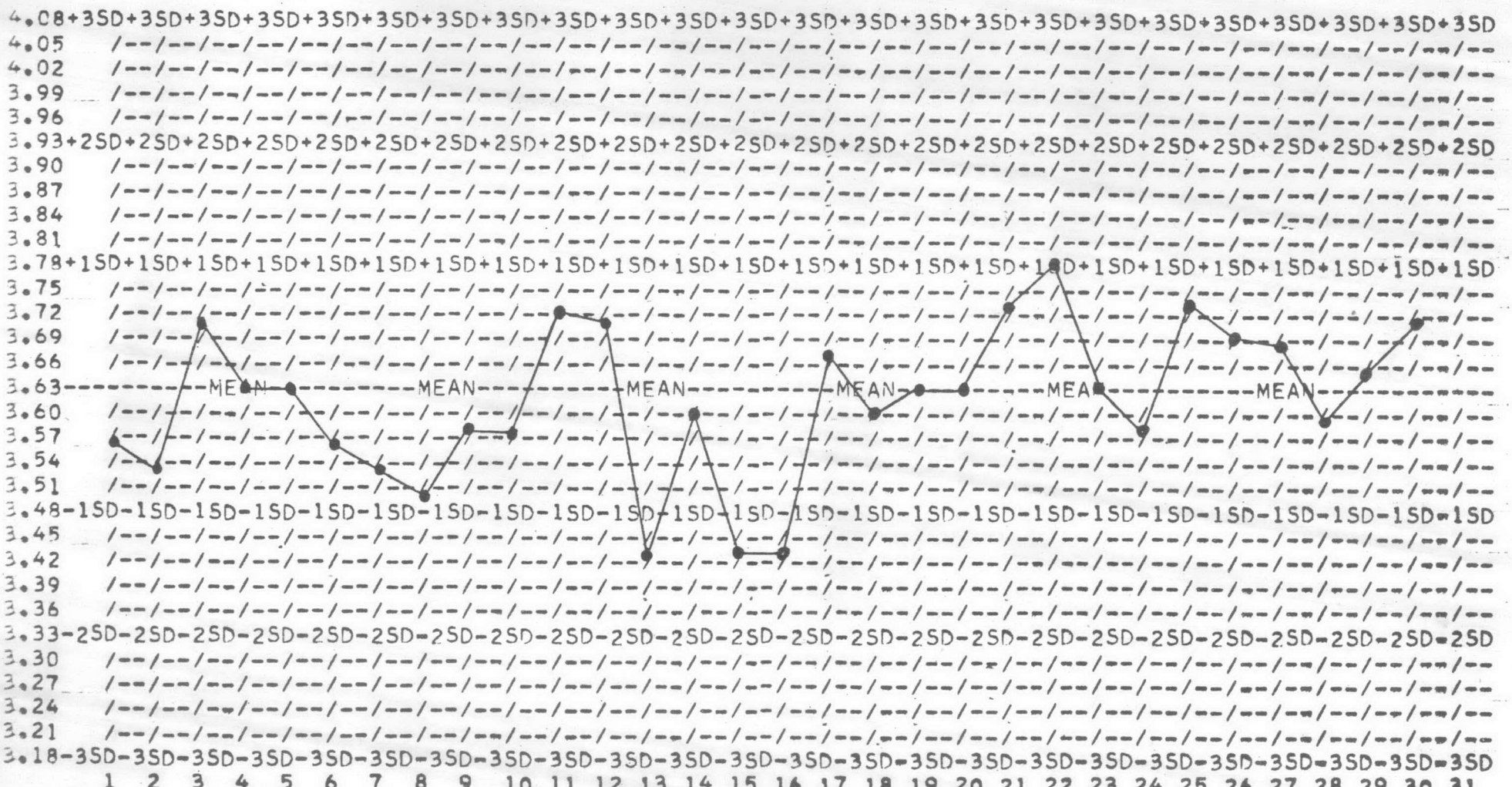
DETERMINATION OF CREATININE. ABNORMAL POOL.

QUALITY CONTROL CHART

= 30 MEAN = 5.057 S.D. = .104 C.V. = 2.057 VARIANCE = .011

DETERMINATION OF CREATININE. DIFFERENCE BETWEEN POOLS.

QUALITY CONTROL CHART



N = 30 MEAN = 3.632 S.D. = .150 C.V. = 4.122 VARIANCE = .022

ผนวก ค(3)

สำหรับการตรวจวิเคราะห์ Blood urea nitrogen

LABORATORY PRECISION

Name of the test.. BLOOD UREA NITROGEN ....

Technician's name. VEERAVUDHT M. NONDH ....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
6-1-76	1	17.9	62.0	44.1
7-1-76	2	20.4	62.5	42.1
8-1-76	3	17.9	61.0	53.1
9-1-76	4	18.3	64.0	45.7
12-1-76	5	17.2	63.0	45.8
13-1-76	6	17.2	63.5	46.3
14-1-76	7	18.3	64.5	46.2
15-1-76	8	17.2	62.0	44.8
16-1-76	9	19.1	63.0	43.9
19-1-76	10	18.1	61.5	43.4
20-1-76	11	16.9	62.5	45.6
21-1-76	12	17.9	60.5	42.6
22-1-76	13	19.7	63.0	43.3
23-1-76	14	17.2	65.0	47.8
26-1-76	15	17.6	65.0	47.4
27-1-76	16	19.1	62.0	42.9
28-1-76	17	16.6	62.5	45.9
29-1-76	18	16.9	62.5	45.6
30-1-76	19	19.4	61.0	41.6
2-2-76	20	17.9	63.5	45.6
3-2-76	21	18.1	61.5	43.4
4-2-76	22	18.8	62.0	43.2
5-2-76	23	17.9	62.5	44.6
6-2-76	24	20.7	65.0	44.3
9-2-76	25	17.9	61.0	43.1
10-2-76	26	21.6	64.0	42.4
11-2-76	27	19.7	63.0	43.3
12-2-76	28	15.7	61.0	45.3
13-2-76	29	19.7	62.5	42.8
16-2-76	30	16.6	61.0	44.4

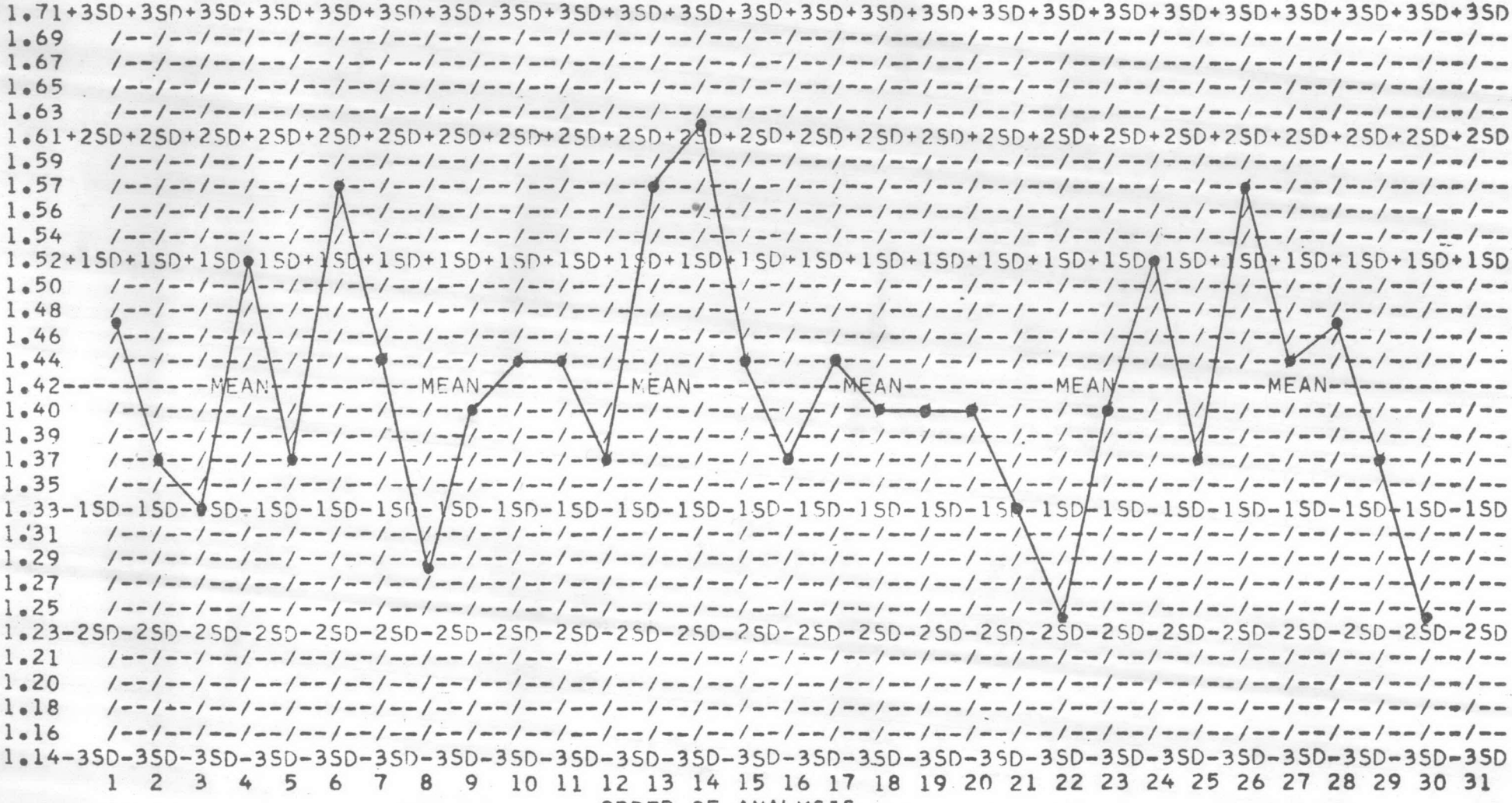
DETERMINATION OF BLOOD UREA NITROGEN. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	29604.47	59	501.77	
DAYS	63.97	29	2.21	1.69
POOLS	29503.84	1	29503.84	22572.84
ADDITIVITY	.07	1	.07	.05
RESIDUAL	36.60	28	1.31	

DETERMINATION OF CREATININE. NORMAL POOL.

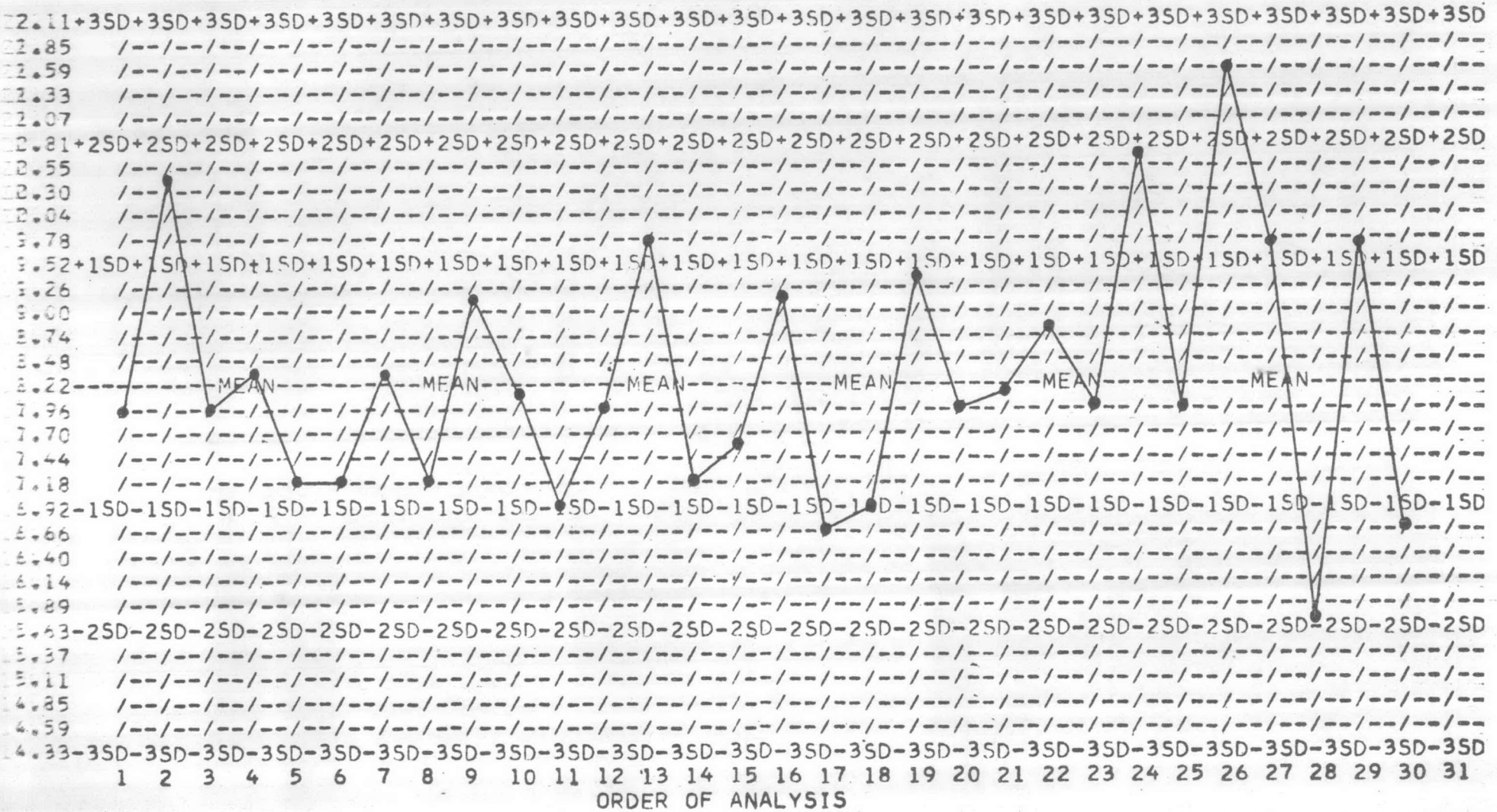
QUALITY CONTROL CHART



N = 30 MEAN = 1.423 S.D. = .095 C.V. = 6.657 VARIANCE = .009

DETERMINATION OF BLOOD UREA NITROGEN. NORMAL POOL.

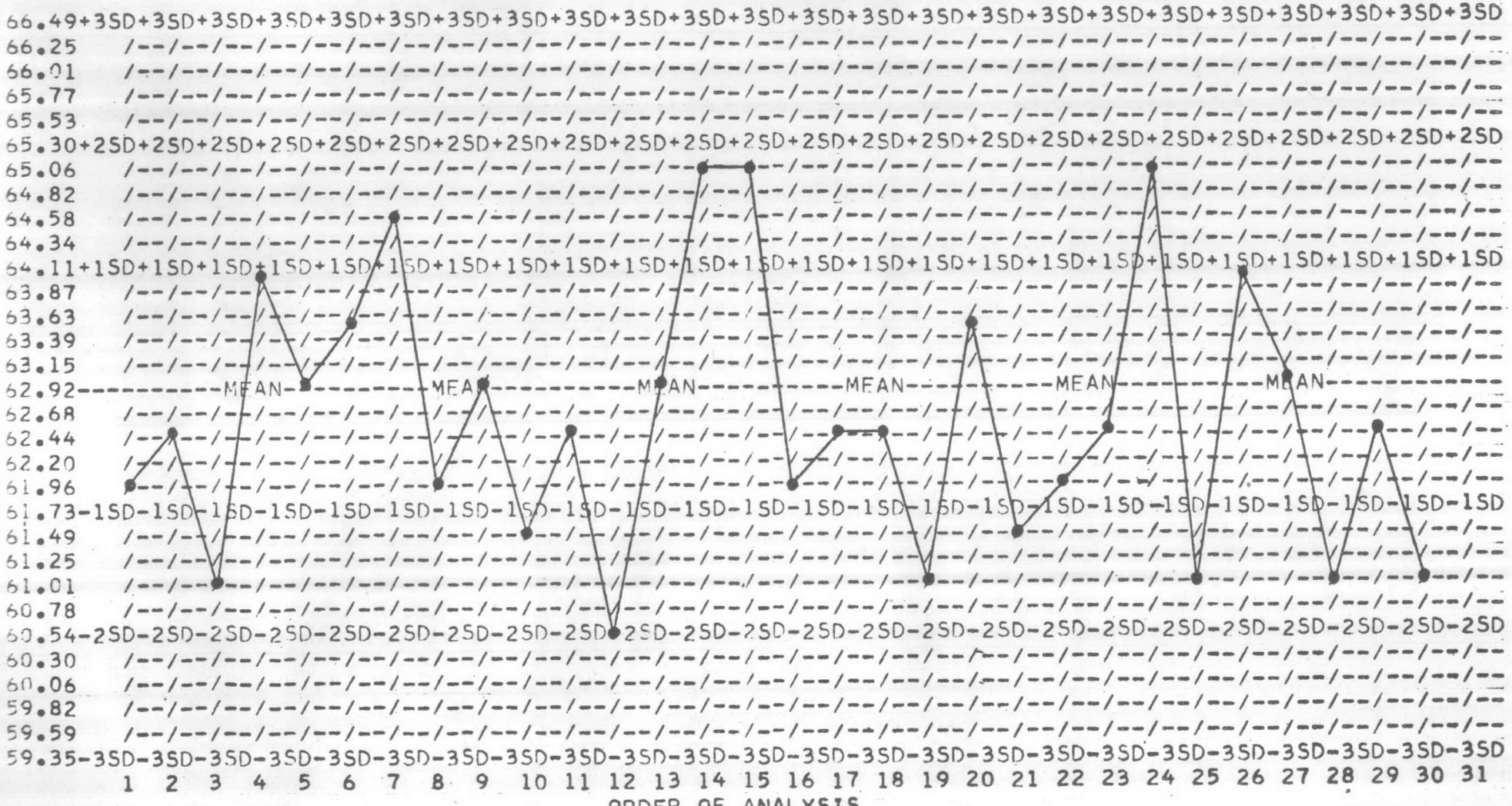
QUALITY CONTROL CHART



N = 30 MEAN = 18.220 S.D. = 1.297 C.V. = 7.119 VARIANCE = 1.682

DETERMINATION OF BLOOD UREA NITROGEN ABNORMAL POOL.

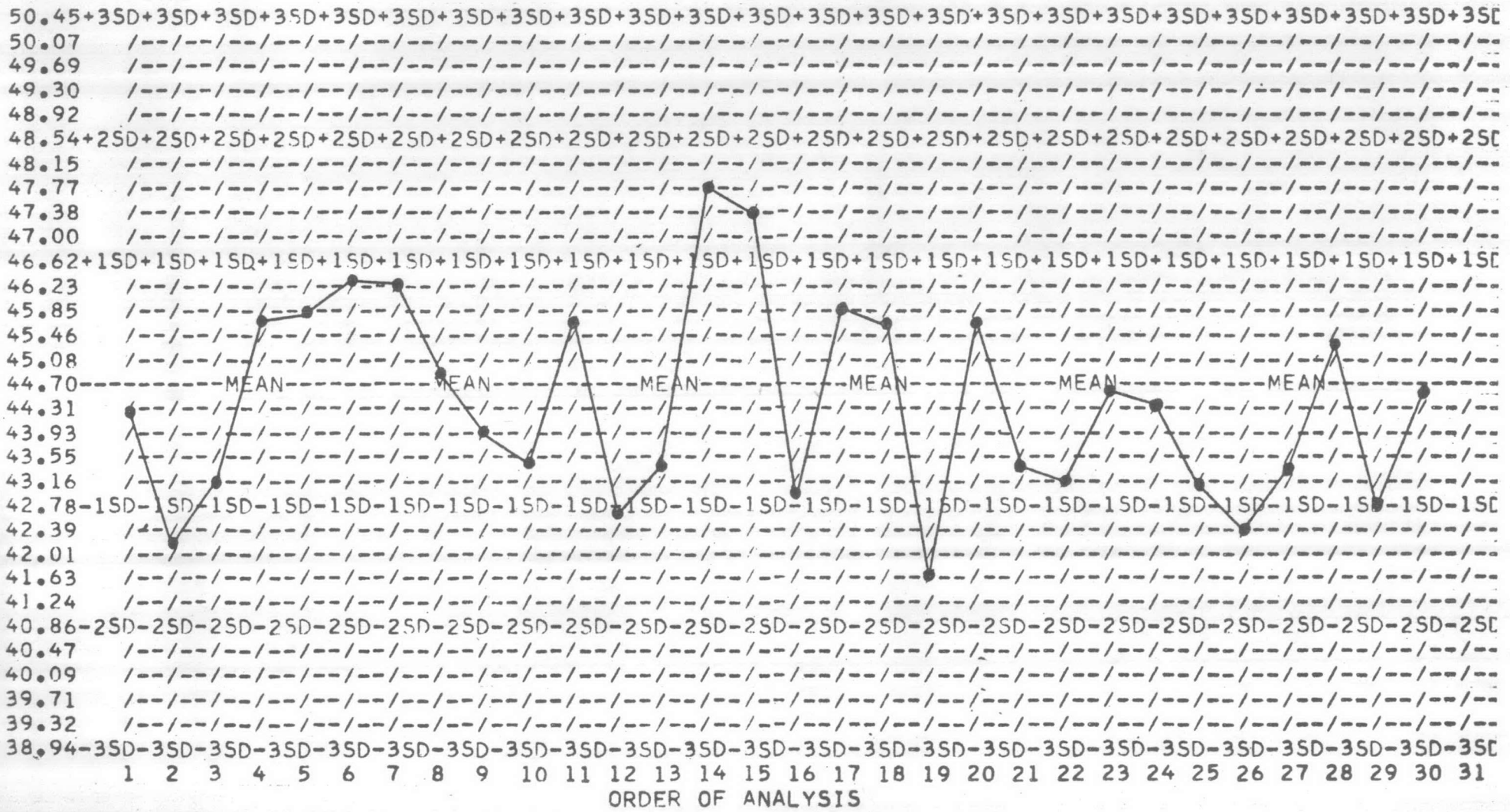
QUALITY CONTROL CHART



N = 30 MEAN = 62.917 S.D. = 1.190 C.V. = 1.891 VARIANCE = 1.415

DETERMINATION OF BLOOD UREA NITROGEN. DIFFERENCE BETWEEN POOLS.

QUALITY CONTROL CHART



N = 30 MEAN = 44.697 S.D. = 1.919 C.V. = 4.294 VARIANCE = 3.684

LABORATORY PRECISION

Name of the test..BLOOD UREA NITROGEN.....

Technician's name.VEERAVUDHT M. NONDH.....

Date	Order of analysis	Normal pool (A)	Abnormal pool (B)	Difference between pools (B-A)
17-2-76	1	17.2	64.0	46.8
18-2-76	2	17.9	65.0	47.1
19-2-76	3	19.4	63.0	43.6
20-2-76	4	17.2	62.0	44.8
23-2-76	5	17.9	64.0	46.1
24-2-76	6	20.7	65.0	44.3
25-2-76	7	18.5	64.0	45.5
26-2-76	8	18.5	61.0	42.5
27-2-76	9	18.1	64.5	46.4
1-3-76	10	18.1	61.0	42.9
2-3-76	11	16.6	62.0	45.4
3-3-76	12	17.2	64.0	46.8
4-3-76	13	17.2	62.0	44.8
5-3-76	14	18.5	63.0	44.5
8-3-76	15	19.7	62.5	42.8
9-3-76	16	17.6	62.0	44.4
10-3-76	17	18.3	62.5	44.2
11-3-76	18	16.9	63.0	46.1
12-3-76	19	17.9	61.5	43.6
15-3-76	20	17.6	61.0	43.4
16-3-76	21	17.9	63.5	45.6
17-3-76	22	20.4	61.5	41.1
18-3-76	23	19.1	64.0	44.9
19-3-76	24	15.7	63.0	47.3
22-3-76	25	17.6	63.0	45.4
23-3-76	26	16.9	62.0	45.1
24-3-76	27	18.8	63.0	44.2
25-3-76	28	21.6	65.0	43.4
26-3-76	29	16.6	62.0	45.4
29-3-76	30	19.4	62.0	42.6

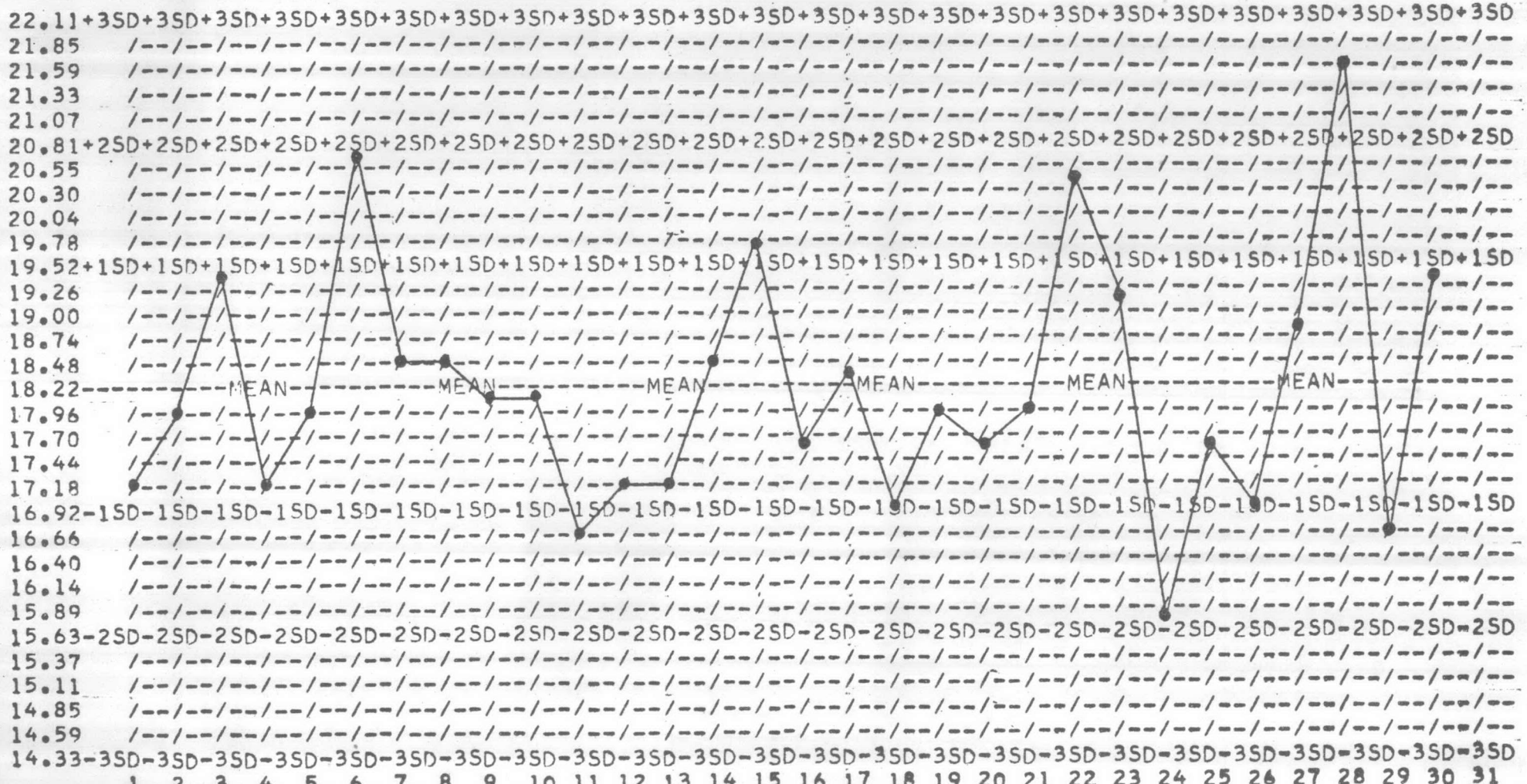
DETERMINATION OF BLOOD UREA NITROGEN. ANALYSIS OF VARIANCE TABLE.

**********TWO WAY ANOVA TABLE**********

	SUM OF SQUARES	D.F.	VARIANCE	COMPUTED F
TOTAL	30063.72	59	509.55	
DAYS	58.90	29	2.03	1.71
POOLS	29971.35	1	29971.35	25205.69
ADDITIVITY	.18	1	.18	.15
RESIDUAL	33.29	28	1.19	

DETERMINATION OF BLOOD UREA NITROGEN. NORMAL POOL.

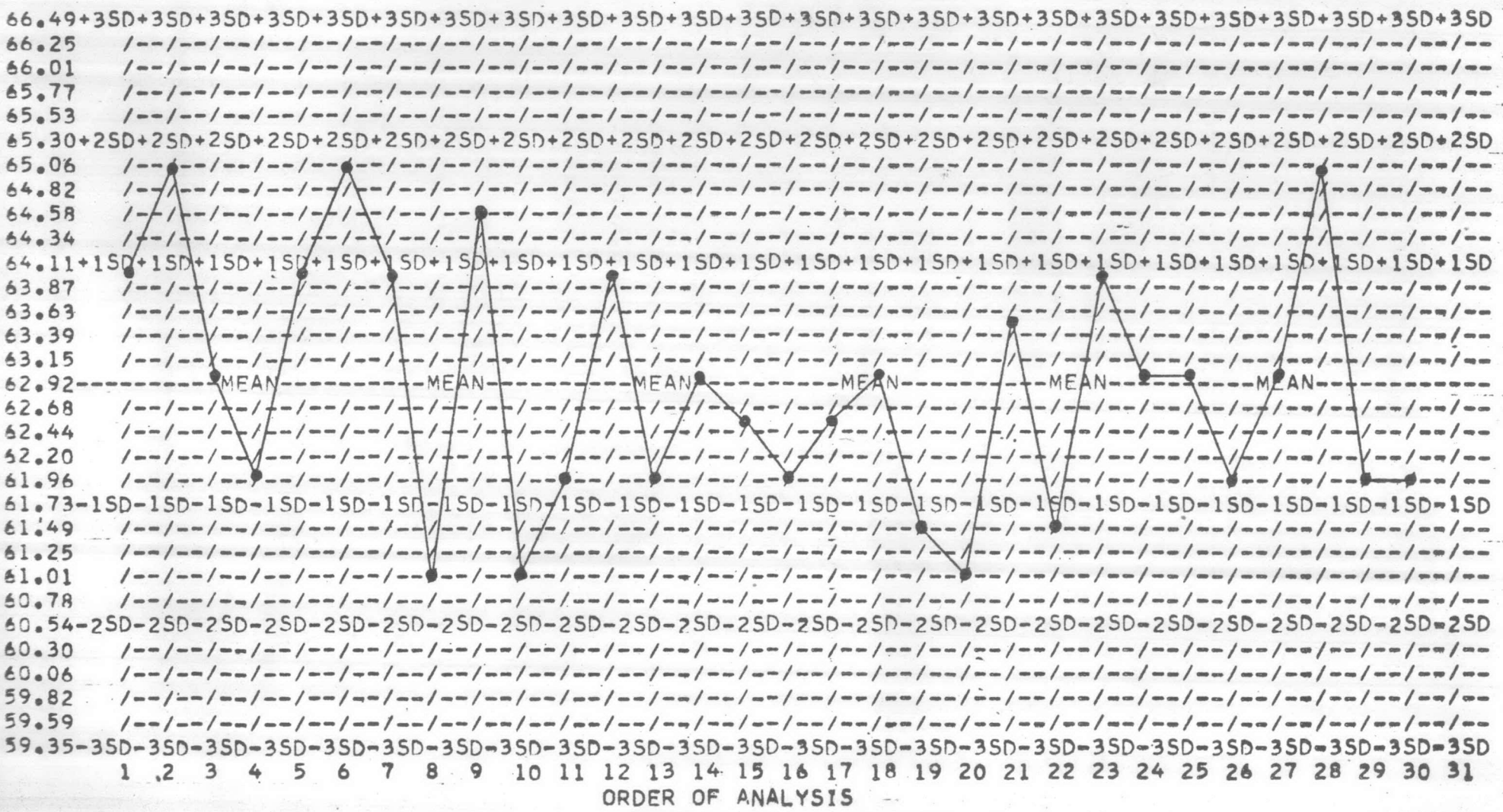
QUALITY CONTROL CHART



N = 30 MEAN = 18.220 S.D. = 1.297 C.V. = 7.119 VARIANCE = 1.682

DETERMINATION OF BLOOD UREA NITROGEN. ABNORMAL POOL.

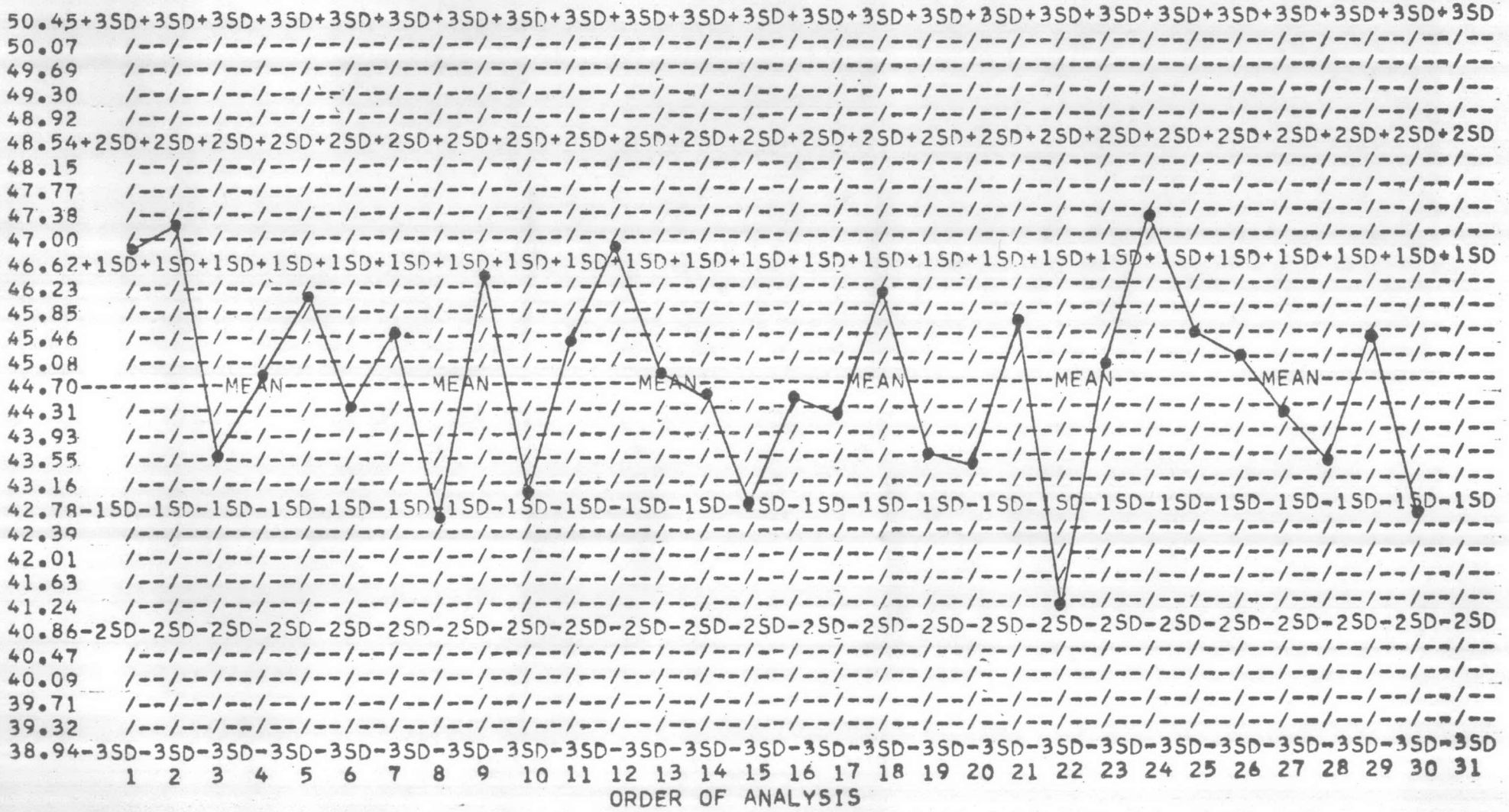
QUALITY CONTROL CHART



N = 30 MEAN = 62.917 S.D. = 1.190 C.V. = 1.891 VARIANCE = 1.415

DETERMINATION OF BLOOD UREA NITROGEN. DIFFERENCE BETWEEN POOLS.

QUALITY CONTROL CHART



N = 30 MEAN = 44.697 S.D. = 1.919 C.V. = 4.294 VARIANCE = 3.684

ผนวก ง.

โปรแกรมคอมพิวเตอร์ที่ใช้ในการวิจัย

โปรแกรมที่ 1

Linear regression analysis

```
      C  LINEAR REGRESSION ANALYSIS OF STANDARD CURVE.
      C
001           DIMENSION CONC(20),OD(20),XXBAR(20),YYBAR(20),
             -XXBSQ(20),Y(20),XXYYB(20),YYBSQ(20)
002           READ(2,1) N
003      1    FORMAT (I2)
004           DO 33 I=1,N
005      33   READ (2,2) CONC(I),OD(I)
006      2    FORMAT (2F8.3)
007           SUMCO = 0.
010           SUMOD = 0.
011           DO 11 I=1,N
012           SUMCO = SUMCO + CONC(I)
013      11   SUMOD = SUMOD + OD(I)
014           COBAR = SUMCO/FLOAT(N)
015           ODBAR = SUMOD/FLOAT(N)
016           SXYB = 0.
017           SXBSQ = 0..
020           SYBSQ = 0.
021           WRITE (3,3)
022      3    FORMAT (////34X,30HRAW DATA FOR LINEAR REGRESSION,
             -1X,8HANALYSIS,//40X,13HCONCENTRATION,10X,4HO.D.)
023           DO 12 I=1,N
024           XXBAR(I) = CONC(I)-COBAR
025           YYBAR(I) = OD(I)-ODBAR
026           XXYYB(I) = XXBAR(I)*YYBAR(I)
027           YYBSQ(I) = YYBAR(I)*YYBAR(I)
030           XXBSQ(I) = XXBAR(I)*XXBAR(I)
031           SXYB = SXYB + XXYYB(I)
032           SXBSQ = SXBSQ + XXBSQ(I)
033           SYBSQ = SYBSQ + YYBSQ(I)
034      12   WRITE (3,4) CONC(I),OD(I)
035      4    FORMAT (42X,F7.2,12X,F6.3)
036           BX = SXYB/SYBSQ
037           BY = SXYB/SXBSQ
040           R = SQRT(BX*BY)
041           DF = N-2
042           T = R*SQRT(DF)/SQRT(1.-R*R)
043           XINT = (BY*COBAR - ODBAR)/BY
044           WRITE (3,6) BY,R,T,XINT
045      6    FORMAT(/41X,13HSLOPE          =,F12.6,/41X,
             -13HCORR.COEFF. =,F12.6,/41X,13HT VALUE      =,
             -F12.6,/41X,13HX-INTERCEPT =,F12.6)
      C  DETERMINE O.D. FROM OPTIMUM EQUATION FOR SCATTER DIAGRAM.
046           WRITE(3,18)
047      18   FORMAT (////30X,26HCORRECTED O.D. FROM LINEAR,
             -1X,19HREGRESSION EQUATION,//40X,13HCONCENTRATION,
             -10X,4HO.D.)
050           DO 15 I=1,N
051           Y(I) = ODBAR + BY*XXBAR(I)
052      15   WRITE (3,4) CONC(I),Y(I)
053           STOP
054           END
```

โปรแกรมที่ 2

Pair t-test

```
      C  STATISTICAL T TEST FOR COMPARING 2 METHODS.
      C
001           DIMENSION A(30),B(30),DATAA(10),DIFF(30),DIFSQ(30)
002           N = 0
003         4 READ(2,1) (DATAA(I),I=1,10)
004         1 FORMAT (10F8.2)
005           DO 11 I=1,10
006           IF (DATAA(I) - 777777.77)2,3,2
007         2 N = N+1
010        11 A(N) = DATAA(I)
011           GO TO 4
012         3 N = 0
013         7 READ(2,1) (DATAA(I),I=1,10)
014           DO 12 I=1,10
015           IF (DATAA(I) - 888888.88) 5,6,5
016         5 N = N+1
017        12 B(N) = DATAA(I)
020           GO TO 7
021         6 SUMD = 0.
022           SDSQ = 0.
023           DO 13 I=1,N
024           DIFF(I) = B(I) - A(I)
025           DIFSQ(I) = DIFF(I)**2
026           SUMD = SUMD + DIFF(I)
027           SDSQ = SDSQ + DIFSQ(I)
030        13 CONTINUE
031           DBAR = SUMD/FLOAT(N)
032           SD = SQRT((SDSQ-(SUMD*SUMD)/FLOAT(N))/FLOAT(N-1))
033           Y = N
034           T = DBAR*SQRT(Y)/SD
035           WRITE (3,8)
036         8 FORMAT (1H1,///22X,3HNO.,5X,8HMETHOD A,5X,8HMETHOD B,
             -6X,5HDIFF.,8X,11HDIFF.SQUARE,/)
037           DO 10 I=1,30
040           WRITE (3,9) I,A(I),B(I),DIFF(I),DIFSQ(I)
041         9 FORMAT (22X,I2,5X,F8.2,5X,F8.2,5X,F7.2,7X,F10.4)
042        10 CONTINUE
043           WRITE (3,14) SUMD,SDSQ,DBAR,SD,T
044        14 FORMAT (//47X,7HSUMD. =,F8.2,1X,6HSDSQ.=,F10.4,/47X,
             -7HDBAR  =,F8.2,//47X,7HS.D.  =,F8.2,/47X,7HT     =,F8.2)
045           TEST = ABS(T)
046           IF (TEST.GT.2.04) GO TO 15
047           WRITE (3,17)
050        17 FORMAT (//47X,26HNOT SIGNIFICANT AT P = .05)
051           GO TO 44
052        15 WRITE (3,16)
053        16 FORMAT (//47X,22HSIGNIFICANT AT P = .05)
054        44 STOP
055           END
```

โปรแกรมที่ 3

Bartletts test

```
      C  BARTLETTS TEST FOR VARIANCE BETWEEN 2 METHODS.
      C
001           DIMENSION A(30),B(30),DATA(10)
002           N = 0
003     4     READ (2,1) (DATA(I),I=1,10)
004     1     FORMAT (10F8.2)
005           DO 11 I=1,10
006           IF (DATA(I) - 777777.77) 2,3,2
007     2     N = N+1
010     11    A(N) = DATA(I)
011           GO TO 4
012     3     CALL SDDEV(A,N,SDA)
013           M = 0
014     7     READ (2,1) (DATA(I),I=1,10)
015           DO 12 I=1,10
016           IF (DATA(I)-888888.88)5,6,5
017     5     M = M+1
020     12    B(M) = DATA(I)
021           GO TO 7
022     6     CALL SDDEV(B,M,SDB)
023           F1 = N-1
024           F2 = M-1
025           SFI = F1 + F2
026           SDASQ = SDA*SDA
027           SDBSQ = SDB*SDB
030           SFSSQ = F1 * SDASQ  +  F2 * SDBSQ
031           SFLOS = F1*ALOG10(SDASQ) + F2*ALOG10(SDBSQ)
032           SBASQ = SFSSQ/SFI
033           S1PFI = 1./F1 + 1./F2
034           BARTM = 2.3026 * (SFI*ALOG10(SBASQ)-SFLOS)
035           BARTC = 1. + 1.*(S1PFI - 1./SFI)/3.
036           CHISQ = BARTM/BARTC
037           WRITE (3,55)
040     55    FORMAT (///35X,25HRESULTS FROM FIRST METHOD,/)
041           WRITE (3,41) (A(I),I=1,N)
042     41    FORMAT (/23X,6F8.2)
043           WRITE (3,42) N,SDA
044     42    FORMAT (//26X,8HMETHOD A,5X,6HN(1) =,I4,5X,
             -7HSD(1) =,F8.2)
045           WRITE (3,66)
046     66    FORMAT (///35X,26HRESULTS FROM SECOND METHOD,/)
047           WRITE (3,41) (B(I),I=1,M)
050           WRITE (3,43) M,SDB,CHISQ
051     43    FORMAT (//26X,8HMETHOD B,5X,6HN(2) =,I4,5X,
             -7HSD(2) =,F8.2,///33X,21HCOMPUTED CHI-SQUARE =,F7.2)
052           STOP
053           END
```

```
FORTRAN     200        SOURCE LISTING AND DIAGNOSTICS                PROGRAM:

001                    SUBROUTINE SDDEV(X,<I,STDDV)
002                    DIMENSION X(30),DIFSQ(30)
003                    SIGMX = 0.
004                    DO 50 I=1,<
005          50        SIGMX = SIGMX+X(I)
006                    XBAR = SIGMX/FLOAT(<I)
007                    SIGMD = 0.
010                    DO 51 I=1,<
011                    DIFSQ(I) = (X(I)-XBAR)**2
012          51        SIGMD = SIGMD + DIFSQ(I)
013                    VAR = SIGMD/FLOAT(K-1)
014                    STDDV = SQRT(VAR)
015                    RETURN
016                    END
```

โปรแกรมที่ 4

เปรียบเทียบ % recovery

```
      C  COMPARISION OF RECOVERY OF 2 METHODS.
      C
001         DIMENSION RECOA(30),RECOB(30),NAME(40),DIFSQ(30)
002         READ (2,10) ITEST,CONC
003   10    FORMAT (I2,F8.2)
004         READ (2,12)(NAME(I),I=1,40)
005         WRITE (3,81)
006   81    FORMAT (1H1,////34X,27HRECOVERY  OF  FIRST  METHOD,/)
007         WRITE (3,12)(NAME(I),I=1,40)
010   12    FORMAT(40A2)
011         SIGMX = 0.
012         DO 21 I=1,ITEST
013         READ (2,11) AMED,AADD
014   11    FORMAT (2F8.2)
015         RECOA(I) = AADD*100./(AMED+CONC)
016         SIGMX = RECOA(I) + SIGMX
017         WRITE (3,13) I,AMED,AADD,RECOA(I)
020   13    FORMAT (21X,I2,6X,F8.2,10X,F8.2,9X,F8.2)
021   21    CONTINUE
022         ABAR = SIGMX/FLOAT(I)
023         WRITE (3,25) ABAR
024   25    FORMAT (//58X,6HMEAN =,F8.2)
025         SIGMD = 0.
026         DO 26 I=1,ITEST
027         DIFSQ (I) = (RECOA(I) - ABAR)**2
030   26    SIGMD = SIGMD + DIFSQ(I)
031         VARA = SIGMD/FLOAT(I-1)
032         READ (2,12) (NAME(I),I=1,40)
033         WRITE (3,82)
034   82    FORMAT (1H1,////34X,28HRECOVERY  OF  SECOND  METHOD,/)
035         WRITE (3,12) (NAME(I),I=1,40)
036         SIGMX = 0.
037         DO 22 I=1,ITEST
040         READ (2,11) AMED,AADD
041         RECOB(I) = AADD*100./(AMED+CONC)
042         WRITE (3,13) I,AMED,AADD,RECOB(I)
043         SIGMX = RECOB(I) + SIGMX
044   22    CONTINUE
045         ABAR = SIGMX/FLOAT(I)
046         WRITE (3,25) ABAR
047         WRITE (3,83)
050   83    FORMAT (1H1,////39X,19HPERCENT RECOVERY OF,//)
051         WRITE (3,14)
052   14    FORMAT (30X,8HMETHOD A,20X,8HMETHOD B,/)
053         SIGMD = 0.
054         DO 24 I=1,ITEST
055         DIFSQ(I) = (RECOB(I) - ABAR)**2
056         SIGMD = SIGMD + DIFSQ(I)
057   24    WRITE (3,15) RECOA(I),RECOB(I)
060   15    FORMAT (29X,F8.2,20X,F8.2)
061         VARB = SIGMD/FLOAT(I-1)
062         F = VARA/VARB
063         WRITE (3,18) VARA,VARB,F
```

```
064     18    FORMAT (///24X,13HVARIANCE(A) =,F8.4,7X,
               -13HVARIANCE(B) =,F8.4,//39X,13HCOMPUTED F  =,F8.4)
065           IF (F.GT.1.86) GO TO 44
066           WRITE (3,33)
067     33    FORMAT (//38X,26HNOT SIGNIFICANT AT P = .05)
070           GO TO 66
071     44    WRITE (3,55)
072     55    FORMAT (//38X,22HSIGNIFICANT AT P = .05)
073     66    STOP
074           END
```

โปรแกรมที่ 5

สร้างแผนภูมิควบคุมความแม่นยำ

(Levy-Jennings chart)

```
      C  PROGRAM CONSTRUCTING LEVY JENNINGS CHARTS FROM
      C  QUALITY CONTROL DATA.
      C
001           DIMENSION X(30),DIFSQ(30),Y(60),NAME(40),XX(10)
002           READ (2,53) ITEST
003        53 FORMAT(A2)
004        50 READ (2,1) (NAME(I),I=1,40)
005         1 FORMAT (40A2)
006           IF (NAME(1) - ITEST) 52,999,52
007        52 N = 0
010        16 READ (2,3) (XX(I),I=1,10)
011         3 FORMAT(10F8.2)
012           DO 51 I=1,10
013           IF (XX(I) - 777777.77)17,101,17
014        17 N = N+1
015           X(N) = XX(I)
016        51 CONTINUE
017           GO TO 16
020       101 SIGMX = 0.
021           DO 100 I=1,N
022       100 SIGMX = SIGMX + X(I)
023           XBAR = SIGMX/FLOAT(N)
024           DO 20 I=1,N
025        20 DIFSQ(I) = (X(I) - XBAR)**2
026           SIGMD = 0.
027           DO 30 I=1,N
030        30 SIGMD = SIGMD + DIFSQ(I)
031           VAR = SIGMD/FLOAT(N-1)
032           STDDV = SQRT(VAR)
033           CVAR = STDDV*100./XBAR
034           WRITE (3,111)
035       111 FORMAT(1H1)
036           WRITE (3,15) (NAME(I),I=1,40)
037        15 FORMAT (14X,40A2,//)
040           WRITE (3,160)
041       160 FORMAT (44X,21HQUALITY CONTROL CHART,/)
042           TSD = STDDV * 3.0
043           ITSD = TSD/15.
044           DO 12 I=1,31
045           SAM = I
046           F = 16. - SAM
047        12 Y(I) = XBAR + (F*ITSD)
050           WRITE (3,4) Y(1)
051         4 FORMAT (1X,F8.2,24(4H+3SD))
052           DO 21 I=2,5
053        21 WRITE (3,5) Y(I)
054         5 FORMAT (1X,F8.2,3X,31(3H/--))
055           WRITE (3,7) Y(6)
056         7 FORMAT (1X,F8.2,24(4H+2SD))
```

```
057           DO 22 I=7,10
060        22 WRITE (3,5) Y(I)
061           WRITE (3,8) Y(11)
062         8 FORMAT (1X,F8.2,24(4H+1SD))
063           DO 23 I=12,15
064        23 WRITE (3,5) Y(I)
065           WRITE (3,9) Y(16)
066         9 FORMAT (1X,F8.2,6(14H----------MEAN),12(1H-))
067           DO 24 I=17,20
070        24 WRITE (3,5) Y(I)
071           WRITE (3,10) Y(21)
072        10 FORMAT (1X,F8.2,24(4H-1SD))
073           DO 25 I=22,25
074        25 WRITE (3,5) Y(I)
075           WRITE (3,11) Y(26)
076        11 FORMAT (1X,F8.2,24(4H-2SD))
077           DO 26 I=27,30
100        26 WRITE (3,5) Y(I)
101           WRITE (3,27) Y(31)
102        27 FORMAT (1X,F8.2,24(4H-3SD))
103           WRITE (3,13)
104        13 FORMAT (12X,92H1  2  3  4  5  6  7  8  9  10 11 12 13 14 15 16 17
             -18 19 20 21 22 23 24 25 26 27 28 29 30 31)
105           WRITE (3,14)
106        14 FORMAT (45X,17HORDER OF ANALYSIS,//)
107           WRITE (3,2) N,XBAR,STDDV,CVAR,VAR
110         2 FORMAT (4X,4HN  =,I3,5X,6HMEAN =,F10.3,6X,6HS.D. =,F10.3,
             -6X,6HC.V. =,F10.3,5X,10HVARIANCE =,F10.3)
111           GO TO 50
112       999 WRITE (3,112)
113       112 FORMAT (1H1,2X,11HEND PROGRAM)
114           STOP
115           END
```

โปรแกรมที่ 6

การวิเคราะห์ค่าความแปรปรวนสองทาง

(Two-way analysis of variance)

```
      C  PROGRAM FOR ANALYSIS OF VARIANCE IN QUALITY CONTROL SYSTEM.
      C
001         DIMENSION A(30),B(30),DS(30),DM(30),DEV(30),SCP(30),DECP(30),
           -AB(10),NAME(40)
002         READ (2,3)ITEST
003       3 FORMAT (A2)
004      33 READ (2,1) (NAME(I),I=1,40)
005       1 FORMAT (40A2)
006         IF (NAME(1) - ITEST) 2,99,2
007       2 N = 0
010      10 READ (2,4) (AB(I),I=1,10)
011       4 FORMAT (10F8.2)
012         DO 5 I=1,10
013         IF (AB(I) - 777777.77) 7,8,7
014       7 N = N+1
015       5 A(N) = AB(I)
016         GO TO 10
017       8 N = 0
020      14 READ (2,4) (AB(I),I=1,10)
021         DO 6 I=1,10
022         IF (AB(I) - 888888.88) 11,12,11
023      11 N = N+1
024         B(N) = AB(I)
025       6 CONTINUE
026         GO TO 14
027      12 SUMA = 0.
030         SUMB = 0.
031         SUMDS = 0.
032         DO 13 I = 1,N
033         DS(I) = A(I) + B(I)
034         DM(I) = DS(I)/2.
035         SUMA = SUMA + A(I)
036         SUMB = SUMB + B(I)
037         SUMDS = SUMDS + DS(I)
040      13 CONTINUE
041         FN = FLOAT(N)
042         SABAR = SUMA/FN
043         SBBAR = SUMB/FN
044         SDSBAR = SUMDS/(2.*FN)
045         SDECP = 0.
046         SOSA = 0.
047         SOSB = 0.
050         SOSDS = 0.
051         SOSDEV = 0.
052         DFGMA = SABAR - SDSBAR
053         DFGMB = SBBAR - SDSBAR
054         DO 15 I = 1,N
055         DEV(I) = DM(I) - SDSBAR
056         SCP(I) = A(I) * DFGMA + B(I) * DFGMB
```

```
057           DECP(I) = DEV(I) * SCP(I)
060           SDECP = SDECP + DECP(I)
061           SOSA = SOSA + A(I) * A(I)
062           SOSB = SOSB + B(I) * B(I)
063           SOSDS = SOSDS + DS(I) * DS(I)
064           SOSDEV = SOSDEV + DEV(I) * DEV(I)
065        15 CONTINUE
066           SQSA = SUMA * SUMA
067           SQSB = SUMB * SUMB
070           SQSDS = SUMDS * SUMDS
071           CFFM = SQSDS/(2.*FN)
072           GSOS = SOSA + SOSB - CFFM
073           BDSOS = SOSDS/2. - CFFM
074           BPSOS = (SQSA + SQSB)/FN - CFFM
075           ASOS = SDECP*SDECP/(SOSDEV*(DFGMA*DFGMA + DFGMB*DFGMB))
076           RSOS = GSOS - BDSOS - BPSOS - ASOS
077           NTDF = 2*N - 1
100           NDDF = N - 1
101           NPDF = 2- 1
102           NADF = 2 - 1
103           NRDF = NTDF - NDDF - NPDF - NADF
104           TVAR = GSOS/FLOAT(NTDF)
105           DVAR = BDSOS/FLOAT(NDDF)
106           PVAR = BPSOS/FLOAT(NPDF)
107           AVAR = ASOS/FLOAT(NADF)
110           RVAR = RSOS/FLOAT(NRDF)
111           FDAY = DVAR/RVAR
112           FPOOL = PVAR/RVAR
113           FADD = AVAR/RVAR
114           WRITE (3,20) (NAME(I),I=1,40)
115        20 FORMAT (//30X,40A2,///30X,26(1H*),19HTWO WAY ANOVA TABLE,
             -27(1H*),///44X,14HSUM OF SQUARES,6X,4HD.F.,7X,8HVARIANCE,
             ,-9X,10HCOMPUTED F)
116           WRITE (3,17) GSOS,NTDF,TVAR
117        17 FORMAT (//30X,5HTOTAL,9X,F12.2,7X,I4,4X,F12.2)
120           WRITE (3,18) BDSOS, NDDF, DVAR, FDAY
121        18 FORMAT (//30X,4HDAYS,10X,F12.2,7X,I4,4X,F12.2,6X,F12.2)
122           WRITE (3,19) BPSOS,NPDF,PVAR,FPOOL
123        19 FORMAT (//30X,5HPOOLS,9X,F12.2,7X,I4,4X,F12.2,6X,F12.2)
124           WRITE (3,23) ASOS,NADF,AVAR,FADD
125        23 FORMAT (//30X,10HADDITIVITY,4X,F12.2,7X,I4,4X,F12.2,6X,F12.2)
126           WRITE (3,24) RSOS,NRDF,RVAR
127        24 FORMAT (//30X,8HRESIDUAL,6X,F12.2,7X,I4,4X,F12.2)
130           WRITE (3,25)
131        25 FORMAT (1H1)
132           GO TO 33
133        99 WRITE (3,26)
134        26 FORMAT (///3X,11HEND PROGRAM)
135           STOP
136           END
```

ประวัติการศึกษา

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สถานที่ทำงาน	แผนกอายุรศาสตร์ คณะแพทยศาสตร์ จุฬาลงกรณ์มหาวิทยาลัย