APPENDIX A1

Table A1: Line and load data of 28-node radial distribution network

Branch number	Sending end node	Receiving-end node	Resistance (Ω)	Reactance (Ω)	Real power (KW)	Reactive power (KVAr)
1	1	2	1.197053	0.820017	35.3	35.3
2	2	3	1.796003	1.231054	14.0	14.0
3	3	4	1.305953	0.895037	35.3	35.3
4	4	11	2.823051	1.172006	35.3	35.3
5	11	12	1.183985	0.491018	35.3	35.3
6	12	13	1.002001	0.415998	9.0	9.0
7	13	14	0.454960	0.189002	9.0	9.0
8	14	15	0.545952	0.226996	35.3	35.3
9	4	5	1.851058	1.267596	56.0	56.0
10	5	16	2.549954	1.058024	35.3	35.3
11	5	6	1.523995	1.043988	35.3	35.3
12	6	17	1.365969	1.567006	14.0	14.0
13	17	18	0.819049	0.340010	35.3	35.3
14	18	19	1.547953	0.642024	35.3	35.3
15	19	20	1.365969	0.567006	9.0	9.0
16	20	21	3.551955	1.474022	35.3	35.3
17	6	7	1.905024	1.304985	35.3	35.3
18	7	22	1.547953	0.642026	9.0	9.0
19	22	23	1.092025	0.453024	35.3	35.3
20	23	24	0.910041	0.378004	35.3	35.3
21	24	25	0.454960	0.378004	35.3	35.3
22	25	26	0.363968	0.151008	35.3	35.3
23	7	8	1.197053	0.820017	14.0	14.0
24	8	27	0.545952	0.226028	14.0	14.0
25	27	28	0.272976	0.113014	14.0	14.0
26	8	9	0.653037	0.446974	35.3	35.3
27	9	10	1.142966	0.782991	14.0	14.0

Base MVA: 100

Base KV: 11

APPENDIX A2

Table A2: Line and load data of 69-node radial distribution network

Branch number	Sending end node	Receiving-end node	Resistance (Ω)	Reactance (Ω)	Real power (KW)	Reactive power (KVAr)
1	1	2	0.0005	0.0012	0.00	0.00
2	2	3	0.0005	0.0012	0.00	0.00
3	3	4	0.0015	0.0036	0.00	0.00
4	4	5	0.0251	0.0294	0.00	0.00
5	5	6	0.3660	0.1864	2.60	2.20
6	6	7	0.3811	0.1941	40.40	30.00
7	7	8	0.0922	0.0470	75.00	54.00
8	8	9	0.0493	0.0251	30.00	22.00
9	9	10	0.8190	0.2707	28.00	19.00
10	10	11	0.1872	0.0619	145.00	104.00
11	11	12	0.7114	0.2351	145.00	104.00
12	12	13	1.0300	0.3400	8.00	5.50
13	13	14	1.0440	0.3450	8.00	5.50
14	14	15	1.0580	0.3496	0.00	0.00
15	15	16	0.1966	0.0650	45.50	30.00
16	16	17	0.3744	0.1238	60.00	35.00
17	17	18	0.0047	0.0016	60.00	35.00
18	18	19	0.3276	0.1083	0.00	0.00
19	19	20	0.2106	0.0696	1.00	0.60
20	20	21	0.3416	0.1129	114.00	81.00
21	21	22	0.0140	0.0046	5.30	3.50
22	22	23	0.1591	0.0526	0.00	0.00
23	23	24	0.3463	0.1145	28.0	20.00
24	24	25	0.7488	0.2475	0.00	0.00
25	25	26	0.3089	0.1021	14.00	10.00
26	26	27	0.1732	0.0572	14.00	10.00
27	3	28	0.0044	0.0108	26.00	18.60
28	28	29	0.0640	0.1565	26.00	18.60
29	29	30	0.3978	0.1315	0.00	0.00
30	30	31	0.0702	0.0232	0.00	0.00
31	31	32	0.3510	0.1160	0.00	0.00
32	32	33	0.8390	0.2816	14.00	10.00
33	33	34	1.7080	0.5646	19.50	14.00

Continued.....

34	34	35	1.4740	0.4873	6.00	4.00
35	3	36	0.0044	0.0108	26.00	18.55
36	36	37	0.0640	0.1565	26.00	18.55
37	37	38	0.1053	0.1230	0.00	0.00
38	38	39	0.0304	0.0355	24.00	17.00
39	39	40	0.0018	0.0021	24.00	17.00
40	40	41	0.7283	0.8509	1.20	1.00
41	41	42	0.3100	0.3623	0.00	0.00
42	42	43	0.0410	0.0478	6.00	4.30
43	43	44	0.0092	0.0116	0.00	0.00
44	44	45	0.1089	0.1373	39.22	26.30
45	45	46	0.0009	0.0012	39.22	26.30
46	4	47	0.0034	0.0084	0.00	0.00
47	47	48	0.0851	0.2083	79.00	56.40
48	48	49	0.2898	0.7091	384.70	274.50
49	49	50	0.0822	0.2011	384.70	274.50
50	8	51	0.0928	0.0473	40.50	28.30
51	51	52	0.3319	0.1114	3.60	2.70
52	9	53	0.1740	0.0886	4.35	3.50
53	53	54	0.2030	0.1034	26.40	19.00
54	54	55	0.2842	0.1447	24.40	17.20
55	55	56	0.2813	0.1433	0.00	0.00
56	56	57	1.5900	0.5337	0.00	0.00
57	57	58	0.7837	0.2630	0.00	0.00
58	58	59	0.3042	0.1006	100.00	72.00
59	59	60	0.3861	0.1172	0.00	0.00
60	60	61	0.5075	0.2585	1244.00	888.00
61	61	62	0.0974	0.0496	32.00	23.00
62	62	63	0.1450	0.0738	0.00	0.00
63	63	64	0.7105	0.3619	227.00	162.00
64	64	65	1.0410	0.5302	59.00	42.00
65	11	66	0.2012	0.0611	18.00	13.00
66	66	67	0.0047	0.0014	18.00	13.00
67	12	68	0.7394	0.2444	28.00	20.00
68	68	69	0.0047	0.0016	28.00	20.00

Base MVA: 100
Base KV: 12.66

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APPENDIX A3

Table A3: Line and load data of 85-node radial distribution network

Branch number	Sending end node	Receiving end node	Resistance (Ω)	Reactance (Ω)	Real power (KW)
1	1	2	0.108	0.075	00.00
2	2	3	0.163	0.122	00.00
3	3	4	0.217	0.149	56.00
4	4	5	0.108	0.074	00.00
5	5	6	0.435	0.258	35.28
6	6	7	0.272	0.186	00.00
7	7	8	1.197	0.820	35.28
8	8	9	0.108	0.074	00.00
9	9	10	0.598	0.419	00.00
10	10	11	0.544	0.373	56.00
11	11	12	0.544	0.373	00.00
12	12	13	0.598	0.416	00.00
13	13	14	0.272	0.184	35.28
14	14	15	0.326	0.226	35.28
15	2	16	0.728	0.302	35.28
16	3	17	0.455	0.183	112.0
17	5	18	0.820	0.342	56.00
18	18	19	0.637	0.261	56.00
19	19	20	0.455	0.189	35.28
20	20	21	0.819	0.340	35.28
21	21	22	1.548	0.682	35.28
22	19	23	0.182	0.758	56.00
23	7	24	0.910	0.376	35.28
24	8	25	0.455	0.185	35.28
25	25	26	0.364	0.154	56.00
26	26	27	0.546	0.255	00.00
27	27	28	0.273	0.113	56.00
28	28	29	0.546	0.225	00.00
29	29	30	0.546	0.225	35.28
30	30	31	0.273	0.113	35.28
31	31	32	0.182	0.075	00.00
32	32	33	0.182	0.075	14.00
33	33	34	0.819	0.345	00.00
34	34	35	0.637	0.361	00.00
35	35	36	0.182	0.075	35.28
36	26	37	0.364	0.156	56.00
37	27	38	1.002	0.416	56.00
38	29	39	0.546	0.236	56.00
39	32	40	0.455	0.152	35.28
40	40	41	1.002	0.416	0.00
41	41	42	0.273	0.113	35.28

Continued .....

42	41	43	0.455	0.189	35.28
43	34	44	1.002	0.416	53.28
44	44	45	0.911	0.378	35.28
45	45	46	0.911	0.378	35.28
46	46	47	0.546	0.226	14.00
47	35	48	0.637	0.264	00.00
48	48	49	0.182	0.075	00.00
49	49	50	0.364	0.151	36.28
50	50	51	0.455	0.189	56.00
51	48	52	1.366	0.567	00.00
52	52	53	0.455	0.189	35.28
53	53	54	0.546	0.226	56.00
54	52	55	0.546	0.226	56.00
55	49	56	0.546	0.226	14.00
56	9	57	0.273	0.133	56.00
57	57	58	0.819	0.340	00.00
58	58	59	0.182	0.075	56.00
59	58	60	0.546	0.226	56.00
60	60	61	0.728	0.302	56.00
61	61	62	1.002	0.415	56.00
62	60	63	0.182	0.075	14.00
63	63	64	0.728	0.302	00.00
64	64	65	0.182	0.075	00.00
65	65	66	0.182	0.075	56.00
66	64	67	0.455	0.189	00.00
67	67	68	0.910	0.378	00.00
68	68	69	1.092	0.453	56.00
69	69	70	0.455	0.189	00.00
70	70	71	0.546	0.226	35.28
71	67	72	0.182	0.075	56.00
72	68	73	1.092	0.453	00.00
73	73	74	0.273	0.113	56.00
74	73	75	1.002	0.416	35.28
75	70	76	0.546	0.226	56.00
76	65	77	0.091	0.037	14.00
77	10	78	0.637	0.264	56.00
78	67	79	0.546	0.226	35.28
79	12	80	0.728	0.302	56.00
80	80	81	0.364	0.151	00.00
81	81	82	0.091	0.037	56.00
82	81	83	1.092	0.453	35.28
83	83	84	1.002	0.416	14.00
84	13	85	0.819	0.340	35.28

Base MVA: 100, Base KV: 11, p.f=0.8

APPENDIX B1

Table B1: Common conductor data for 26 and 32 node networks

Type of conductor	Area of cross section (mm^2)	Resistance (Ohms/Km)	Reactance (Ohms/Km)	Max. Current carrying capacity (Amps.)	Cost of conductor (Rs./Km)
Squirrel	12.90	1.3760	0.3896	70.0	2889.0
Weasel	19.35	0.9108	0.3797	100.0	4338.0
Rabbit	32.26	0.5441	0.3673	148.0	7306.0
Raccon	48.39	0.3657	0.3579	200.0	10950.0

Other Data:

Interest and depreciation cost on feeder conductor α =0.1

Peak power loss constant **Kp** = 4000 Rs./ KW

Cost of annual energy loss constant **Ke** = 2.5 Rs./ KWh

Loss factor **lsf** = 0.2

APPENDIX B2

Table.B2: Line and load data of 26-node radial distribution network

Branch number	Sending end node	Receiving end node	Conductor Name	Distance (Km)	Load (KVA)	Sectional peak Load at 0.8 p.f (KVA)
1	1	2	Weasel	0.7	0.0	2356.25
2	2	3	Weasel	0.2	160.0	2356.25
3	3	4	Weasel	0.2	100.0	2156.25
4	4	5	Weasel	0.3	100.0	2031.25
5	5	6	Weasel	0.5	100.0	1906.25
6	6	7	Weasel	0.1	100.0	1781.25
7	7	8	Weasel	0.1	100.0	1656.25
8	8	9	Weasel	0.2	100.0	1531.25
9	9	10	Weasel	0.2	100.0	1406.25
10	10	11	Weasel	0.2	0.0	1281.25
11	11	12	Weasel	0.4	100.0	1281.25
12	12	13	Weasel	0.3	100.0	1156.25
13	13	14	Weasel	0.3	0.0	1031.25
14	14	15	Weasel	0.1	100.0	1031.25
15	15	16	Weasel	0.15	250.0	906.25
16	16	17	Weasel	0.15	315.0	593.25
17	17	18	Weasel	0.4	160.0	200.25
18	2	19	Weasel	0.1	200.0	375.00
19	19	20	Weasel	0.1	100.0	125.00
20	11	21	Weasel	0.1	100.0	250.00
21	21	22	Weasel	0.1	100.0	125.00
22	11	23	Weasel	0.4	100.0	250.00
23	23	24	Weasel	0.1	100.0	125.00
24	14	25	Weasel	0.1	250.0	437.50
25	25	26	Weasel	0.1	125.0	100.00

Base MVA: 100

Base KV: 11

APPENDIX B3

Table B3: Line and load data of 32-node radial distribution network

Branch number	Sending end node	Receiving end node	Conductor Name	Distance (Km)	Load (KVA)	Sectional peak Load at 0.8p.f (KVA)
1	1	2	Rabbit	0.2	100.0	3399.46
2	2	3	Rabbit	0.2	100.0	3345.41
3	3	4	Rabbit	0.43	100.0	3291.35
4	4	5	Rabbit	0.6	300.0	3237.30
5	5	6	Rabbit	0.22	0.0	3075.14
6	6	7	Rabbit	0.16	63.0	1392.43
7	7	8	Rabbit	0.3	100.0	1358.38
8	8	9	Rabbit	0.1	250.0	1304.32
9	9	10	Rabbit	0.4	500.0	1169.19
10	10	11	Rabbit	0.6	500.0	898.92
11	11	12	Rabbit	0.24	250.0	628.65
12	12	13	Rabbit	0.24	250.0	493.51
13	13	14	Rabbit	0.6	0.0	358.38
14	14	15	Rabbit	0.5	350.0	350.00
15	6	16	Rabbit	0.25	250.0	1682.70
16	16	17	Rabbit	0.11	100.0	1547.57
17	17	18	Rabbit	0.11	350.0	1493.51
18	18	19	Rabbit	1.00	63.0	1304.32
19	19	20	Rabbit	0.32	0.0	837.84
20	20	21	Rabbit	0.25	250.0	729.73
21	21	22	Rabbit	0.1	0.0	524.59
22	22	23	Weasel	0.2	100.0	405.41
23	23	24	Weasel	0.3	100.0	351.35
24	24	25	Weasel	0.1	200.0	297.30
25	25	26	Weasel	0.5	350.0	350.00
26	19	27	Weasel	0.1	250.0	432.43
27	27	28	Weasel	0.43	550.0	550.00
28	20	29	Weasel	0.25	200.0	200.00
29	22	30	Weasel	0.1	250.0	139.19
30	30	31	Weasel	0.15	100.0	100.00
31	14	32	Weasel	0.2	313.0	313.00

Base MVA: 100, Base KV: 11

APPENDIX C1

Table.C1: Line and load data of 15-bus network

Branch number	Sending end node	Receiving end node	Resistance (Ω)	Reactance (Ω)	Power (KVA), p.f=0.7
1	1	2	1.35309	1.32349	63.0
2	2	3	1.17024	1.14464	100.0
3	3	4	0.84111	0.82271	200.0
4	4	5	1.52348	1.02760	63.0
5	2	9	2.01317	1.35790	100.0
6	9	10	1.68671	1.13770	63.0
7	2	6	2.55727	1.72490	200.0
8	6	7	1.08820	0.73400	200.0
9	6	8	1.25143	0.84410	100.0
10	3	11	1.79553	1.21110	200.0
11	11	12	2.44845	1.65150	100.0
12	12	13	2.01317	1.35790	63.0
13	4	14	2.23081	1.50470	100.0
14	4	15	1.19702	0.80740	200.0

Other Data:

Annual cost per unit energy loss constant **(Ke)** = 2.5 Rs./ KWh

Cost of the installed capacitor constant **(Kc)** =165 Rs. / KVAr

APPENDIX D1

Table D1: Line, load and tie switch data of IEEE-16 node network

Br No.	Sending end node	Receiving end node	Resistance (Ω)	Reactance (Ω)	Real power (MW)	Reactive power (MVAr)	End node capacitor (MVAr)
1	1	4	0.097470	0.129960	2.00	1.60	0.0
2	4	5	0.103968	0.142956	3.00	1.50	1.1
3	4	6	0.116964	0.233928	2.00	0.80	1.2
4	6	7	0.051984	0.051984	1.50	1.20	0.0
5	2	8	0.142956	0.142956	4.00	2.70	0.0
6	8	9	0.103968	0.142956	5.00	3.00	1.2
7	8	10	0.142956	0.142956	1.00	0.90	0.0
8	9	11	0.142956	0.142956	0.60	0.10	0.6
9	9	12	0.103968	0.142956	4.50	2.00	3.7
10	3	13	0.142956	0.142956	1.00	0.90	0.0
11	13	14	0.116964	0.155952	1.00	0.70	1.8
12	13	15	0.142956	0.142956	1.00	0.90	0.0
13	15	16	0.051984	0.051984	2.10	1.00	1.8
Tie switches data							
14	5	11	0.051984	0.051984	-	-	
15	10	14	0.051984	0.051984	-	-	
16	7	16	0.155952	0.155952	-	-	

Base MVA: 100

Base KV: 11.50

APPENDIX D2

Table D2: Line, load and tie switch data of 33-node network

Branch number	Sending end node	Receiving end node	Resistance (Ω)	Reactance (Ω)	Real power (KW)	Reactive power (KVAr)
1	1	2	0.0922	0.0470	100.00	60.00
2	2	3	0.4930	0.2511	90.00	40.00
3	3	4	0.3660	0.1864	120.00	80.00
4	4	5	0.3811	0.1941	60.00	30.00
5	5	6	0.8190	0.7070	60.00	20.00
6	6	7	0.1872	0.6188	200.00	100.00
7	7	8	0.7114	0.2351	200.00	100.00
8	8	9	1.0300	0.7400	60.00	20.00
9	9	10	1.0440	0.7400	60.00	20.00
10	10	11	0.1966	0.0650	45.00	30.00
11	11	12	0.3744	0.1238	60.00	35.00
12	12	13	1.4680	1.1550	60.00	35.00
13	13	14	0.5416	0.7129	120.00	80.00
14	14	15	0.5910	0.5260	60.00	10.00
15	15	16	0.7463	0.5450	60.00	20.00
16	16	17	1.2890	1.7210	60.00	20.00
17	17	18	0.7320	0.5740	90.00	40.00
18	2	19	0.1640	0.1565	90.00	40.00
19	19	20	1.5042	1.3554	90.00	40.00
20	20	21	0.4095	0.4784	90.00	40.00
21	21	22	0.7089	0.9373	90.00	40.00
22	3	23	0.4512	0.3083	90.00	50.00
23	23	24	0.8980	0.7091	420.00	200.00
24	24	25	0.8960	0.7011	420.00	200.00
25	6	26	0.2030	0.1034	60.00	25.00
26	26	27	0.2842	0.1447	60.00	25.00
27	27	28	1.0590	0.9337	60.00	20.00
28	28	29	0.8042	0.7006	120.00	70.00
29	29	30	0.5075	0.2585	200.00	600.00
30	30	31	0.9744	0.9630	150.00	70.00
31	31	32	0.3105	0.3619	210.00	100.00
32	32	33	0.3410	0.5302	60.00	40.00
Tie-switches data						
33	8	21	2.0000	2.0000	-	-
34	9	15	2.0000	2.0000	-	-
35	12	22	2.0000	2.0000	-	-
36	18	33	0.5000	0.5000	-	-
37	25	29	0.5000	0.5000	-	-

Base Values: 100MVA and 12.66 KV

APPENDIX D3

Table D3: Line, load and tie switch data of 69-node radial distribution network

Branch number	Sending end node	Receiving-end node	Resistance (Ω)	Reactance (Ω)	Real power (KW)	Reactive power (KVAr)
1	1	2	0.0005	0.0012	0.00	0.00
2	2	3	0.0005	0.0012	0.00	0.00
3	3	4	0.0015	0.0036	0.00	0.00
4	4	5	0.0251	0.0294	0.00	0.00
5	5	6	0.3660	0.1864	2.60	2.20
6	6	7	0.3811	0.1941	40.40	30.00
7	7	8	0.0922	0.0470	75.00	54.00
8	8	9	0.0493	0.0251	30.00	22.00
9	9	10	0.8190	0.2707	28.00	19.00
10	10	11	0.1872	0.0619	145.00	104.00
11	11	12	0.7114	0.2351	145.00	104.00
12	12	13	1.0300	0.3400	8.00	5.50
13	13	14	1.0440	0.3450	8.00	5.50
14	14	15	1.0580	0.3496	0.00	0.00
15	15	16	0.1966	0.0650	45.50	30.00
16	16	17	0.3744	0.1238	60.00	35.00
17	17	18	0.0047	0.0016	60.00	35.00
18	18	19	0.3276	0.1083	0.00	0.00
19	19	20	0.2106	0.0696	1.00	0.60
20	20	21	0.3416	0.1129	114.00	81.00
21	21	22	0.0140	0.0046	5.30	3.50
22	22	23	0.1591	0.0526	0.00	0.00
23	23	24	0.3463	0.1145	28.0	20.00
24	24	25	0.7488	0.2475	0.00	0.00
25	25	26	0.3089	0.1021	14.00	10.00
26	26	27	0.1732	0.0572	14.00	10.00
27	3	28	0.0044	0.0108	26.00	18.60
28	28	29	0.0640	0.1565	26.00	18.60
29	29	30	0.3978	0.1315	0.00	0.00
30	30	31	0.0702	0.0232	0.00	0.00
31	31	32	0.3510	0.1160	0.00	0.00
32	32	33	0.8390	0.2816	14.00	10.00
33	33	34	1.7080	0.5646	19.50	14.00
34	34	35	1.4740	0.4873	6.00	4.00
35	3	36	0.0044	0.0108	26.00	18.55
36	36	37	0.0640	0.1565	26.00	18.55
37	37	38	0.1053	0.1230	0.00	0.00
38	38	39	0.0304	0.0355	24.00	17.00
39	39	40	0.0018	0.0021	24.00	17.00

Continued...

40	40	41	0.7283	0.8509	1.20	1.00
41	41	42	0.3100	0.3623	0.00	0.00
42	42	43	0.0410	0.0478	6.00	4.30
43	43	44	0.0092	0.0116	0.00	0.00
44	44	45	0.1089	0.1373	39.22	26.30
45	45	46	0.0009	0.0012	39.22	26.30
46	4	47	0.0034	0.0084	0.00	0.00
47	47	48	0.0851	0.2083	79.00	56.40
48	48	49	0.2898	0.7091	384.70	274.50
49	49	50	0.0822	0.2011	384.70	274.50
50	8	51	0.0928	0.0473	40.50	28.30
51	51	52	0.3319	0.1114	3.60	2.70
52	9	53	0.1740	0.0886	4.35	3.50
53	53	54	0.2030	0.1034	26.40	19.00
54	54	55	0.2842	0.1447	24.40	17.20
55	55	56	0.2813	0.1433	0.00	0.00
56	56	57	1.5900	0.5337	0.00	0.00
57	57	58	0.7837	0.2630	0.00	0.00
58	58	59	0.3042	0.1006	100.00	72.00
59	59	60	0.3861	0.1172	0.00	0.00
60	60	61	0.5075	0.2585	1244.00	888.00
61	61	62	0.0974	0.0496	32.00	23.00
62	62	63	0.1450	0.0738	0.00	0.00
63	63	64	0.7105	0.3619	227.00	162.00
64	64	65	1.0410	0.5302	59.00	42.00
65	11	66	0.2012	0.0611	18.00	13.00
66	66	67	0.0047	0.0014	18.00	13.00
67	12	68	0.7394	0.2444	28.00	20.00
68	68	69	0.0047	0.0016	28.00	20.00

Tie switch data

69	11	43	0.5	0.5	-
70	13	21	0.5	0.5	-
71	15	46	1.0	0.5	-
72	50	59	2.0	1.0	-
73	27	65	1.0	0.5	-

Base MVA: 100

Base KV: 12.66

APPENDIX E1

Table E1: Location of existing substation, load points and load of 53-node System

Node number	X (Km)	Y (Km)	Load (KVA) (p.f = 0.80)
S/S	9.2	11.3	0.0
2	1.0	2.0	25.0
3	2.0	15.0	25.0
4	3.0	4.0	25.0
5	4.0	12.0	50.0
6	5.0	11.5	63.0
7	6.0	10.0	63.0
8	7.0	7.0	50.0
9	1.5	5.5	25.0
10	11.5	13.5	16.0
11	7.5	17.5	16.0
12	8.5	15.5	25.0
13	12.5	10.5	50.0
14	11.0	17.5	63.0
15	8.0	7.5	63.0
16	11.0	6.0	25.0
17	5.5	5.5	16.0
18	3.5	8.5	16.0
19	13.0	8.0	16.0
20	14.0	13.0	63.0
21	16.5	14.0	25.0
22	5.5	17.0	25.0
23	20.5	12.0	50.0
24	8.0	9.0	100.0
25	5.0	7.0	100.0

Continued .....

26	8.0	5.5	100.0
27	10.5	8.0	50.0
28	10.5	15.0	50.0
29	9.0	19.0	25.0
30	7.5	19.5	63.0
31	5.5	19.5	63.0
32	3.0	17.5	25.0
33	13.0	15.5	50.0
34	14.0	16.5	50.0
35	12.5	19.0	25.0
36	11.0	20.0	25.0
37	5.0	15.5	50.0
38	2.0	10.5	50.0
38	3.0	3.5	63.0
40	6.0	4.0	25.0
41	9.0	4.5	25.0
42	14.0	11.5	50.0
43	15.0	10.0	50.0
44	15.0	14.5	25.0
45	15.5	12.5	25.0
46	12.0	12.0	63.0
47	14.5	7.5	63.0
48	13.5	6.0	25.0
49	13.0	4.5	16.0
50	13.5	18.0	16.0
51	4.0	5.0	25.0
52	9.5	6.5	16.0
53	9.5	17.0	25.0
54	12.0	2.5	50.0