ANNEXURE 1

EXAMINATION NOTES AND DEVIATION CARD

1. **All** relevant working must be shown on the answer sheet.

2. **All** work done on the chart must be done lightly, using a 2B pencil.

3. Corrections applicable to courses and bearings must be calculated correct to the nearest 1° and plotted to a similar accuracy.

DEVIATION CARD

Comp. Head	Dev.	Comp. Head	Dev.
000	4˚ E	180	3˚ E
010	5˚ E	190	4˚ E
020	4˚ E	200	5˚ E
030	3˚ E	210	4˚ E
040	2˚ E	220	3˚ E
050	1˚ E	230	2˚ E
060	1˚ W	240	1˚ E
070	2˚ W	250	0˚
080	3˚ W	260	1˚ W
090	4˚ W	270	2˚ W
100	5˚ W	280	3˚ W
110	4˚ W	290	4˚ W
120	3˚ W	300	5˚ W
130	2˚ W	310	4˚ W
140	1˚ W	320	3˚ W
150	0˚	330	2˚ W
160	1˚ E	340	1˚ W
170	2˚ E	350	2˚ E

IEB Copyright © 2022

ANNEXURE 2

SUN

App. Alt.	OCT.–MAR. Lower Limb	OCT.–MAR. Upper Limb	App. Alt.	APR.–SEPT. Lower Limb	APR.–SEPT. Upper Limb
° ′	′	′	° ′	′	′
9 34	+10·8	−21·5	9 39	+10·6	−21·2
9 45	+10·9	−21·4	9 51	+10·7	−21·1
9 56	+11·0	−21·3	10 03	+10·8	−21·0
10 08	+11·1	−21·2	10 15	+10·9	−20·9
10 21	+11·2	−21·1	10 27	+11·0	−20·8
10 34	+11·3	−21·0	10 40	+11·1	−20·7
10 47	+11·4	−20·9	10 54	+11·2	−20·6
11 01	+11·5	−20·8	11 08	+11·3	−20·5
11 15	+11·6	−20·7	11 23	+11·4	−20·4
11 30	+11·7	−20·6	11 38	+11·5	−20·3
11 46	+11·8	−20·5	11 54	+11·6	−20·2
12 02	+11·9	−20·4	12 10	+11·7	−20·1
12 19	+12·0	−20·3	12 28	+11·8	−20·0
12 37	+12·1	−20·2	12 46	+11·9	−19·9
12 55	+12·2	−20·1	13 05	+12·0	−19·8
13 14	+12·3	−20·0	13 24	+12·1	−19·7
13 35	+12·4	−19·9	13 45	+12·2	−19·6
13 56	+12·5	−19·8	14 07	+12·3	−19·5
14 18	+12·6	−19·7	14 30	+12·4	−19·4
14 42	+12·7	−19·6	14 54	+12·5	−19·3
15 06	+12·8	−19·5	15 19	+12·6	−19·2
15 32	+12·9	−19·4	15 46	+12·7	−19·1
15 59	+13·0	−19·3	16 14	+12·8	−19·0
16 28	+13·1	−19·2	16 44	+12·9	−18·9
16 59	+13·2	−19·1	17 15	+13·0	−18·8
17 32	+13·3	−19·0	17 48	+13·1	−18·7
18 06	+13·4	−18·9	18 24	+13·2	−18·6
18 42	+13·5	−18·8	19 01	+13·3	−18·5
19 21	+13·6	−18·7	19 42	+13·4	−18·4
20 03	+13·7	−18·6	20 25	+13·5	−18·3
20 48	+13·8	−18·5	21 11	+13·6	−18·2
21 35	+13·9	−18·4	22 00	+13·7	−18·1
22 26	+14·0	−18·3	22 54	+13·8	−18·0
23 22	+14·1	−18·2	23 51	+13·9	−17·9
24 21	+14·2	−18·1	24 53	+14·0	−17·8
25 26	+14·3	−18·0	26 00	+14·1	−17·7
26 36	+14·4	−17·9	27 13	+14·2	−17·6
27 52	+14·5	−17·8	28 33	+14·3	−17·5
29 15	+14·6	−17·7	30 00	+14·4	−17·4
30 46	+14·7	−17·6	31 35	+14·5	−17·3
32 26	+14·8	−17·5	33 20	+14·6	−17·2
34 17	+14·9	−17·4	35 17	+14·7	−17·1
36 20	+15·0	−17·3	37 26	+14·8	−17·0
38 36	+15·1	−17·2	39 50	+14·9	−16·9
41 08	+15·2	−17·1	42 31	+15·0	−16·8
43 59	+15·3	−17·0	45 31	+15·1	−16·7
47 10	+15·4	−16·9	48 55	+15·2	−16·6
50 46	+15·5	−16·8	52 44	+15·3	−16·5
54 49	+15·6	−16·7	57 02	+15·4	−16·4
59 23	+15·7	−16·6	61 51	+15·5	−16·3
64 30	+15·8	−16·5	67 17	+15·6	−16·2
70 12	+15·9	−16·4	73 16	+15·7	−16·1
76 26	+16·0	−16·3	79 43	+15·8	−16·0
83 05	+16·1	−16·2	86 32	+15·9	−15·9
90 00			90 00		

STARS AND PLANETS

App. Alt.	Corrⁿ
° ′	′
9 56	−5·3
10 08	−5·2
10 20	−5·1
10 33	−5·0
10 46	−4·9
11 00	−4·8
11 14	−4·7
11 29	−4·6
11 45	−4·5
12 01	−4·4
12 18	−4·3
12 35	−4·2
12 54	−4·1
13 13	−4·0
13 33	−3·9
13 54	−3·8
14 16	−3·7
14 40	−3·6
15 04	−3·5
15 30	−3·4
15 57	−3·3
16 26	−3·2
16 56	−3·1
17 28	−3·0
18 02	−2·9
18 38	−2·8
19 17	−2·7
19 58	−2·6
20 42	−2·5
21 28	−2·4
22 19	−2·3
23 13	−2·2
24 11	−2·1
25 14	−2·0
26 22	−1·9
27 36	−1·8
28 56	−1·7
30 24	−1·6
32 00	−1·5
33 45	−1·4
35 40	−1·3
37 48	−1·2
40 08	−1·1
42 44	−1·0
45 36	−0·9
48 47	−0·8
52 18	−0·7
56 11	−0·6
60 28	−0·5
65 08	−0·4
70 11	−0·3
75 34	−0·2
81 13	−0·1
87 03	0·0
90 00	

App. Alt.	Additional Corrⁿ
	1994
	VENUS
	Jan. 1–July 18
°	′
0	
60	+0·1
	July 19–Sept. 6
°	′
0	
41	+0·2
76	+0·1
	Sept. 7–Sept. 28
	Dec. 10–Dec. 31
°	′
0	
34	+0·3
60	+0·2
80	+0·1
	Sept. 29–Oct. 14
	Nov. 25–Dec. 9
°	′
0	
29	+0·4
51	+0·3
68	+0·2
83	+0·1
	Oct. 15–Nov. 24
°	′
0	
26	+0·5
46	+0·4
60	+0·3
73	+0·2
84	+0·1
	MARS
	Jan. 1–Dec. 14
°	′
0	
60	+0·1
	Dec. 15–Dec. 31
°	′
0	
41	+0·2
76	+0·1

DIP

Ht. of Eye	Corrⁿ	Ht. of Eye	Ht. of Eye	Corrⁿ
m		ft.	m	′
2·4	−2·8	8·0	1·0	1·8
2·6	−2·9	8·6	1·5	2·2
2·8	−3·0	9·2	2·0	2·5
3·0	−3·1	9·8	2·5	2·8
3·2	−3·2	10·5	3·0	3·0
3·4	−3·3	11·2	See table ←	
3·6	−3·4	11·9		
3·8	−3·5	12·6	m	′
4·0	−3·6	13·3	20	7·9
4·3	−3·7	14·1	22	8·3
4·5	−3·8	14·9	24	8·6
4·7	−3·9	15·7	26	9·0
5·0	−4·0	16·5	28	9·3
5·2	−4·1	17·4		
5·5	−4·2	18·3	30	9·6
5·8	−4·3	19·1	32	10·0
6·1	−4·4	20·1	34	10·3
6·3	−4·5	21·0	36	10·6
6·6	−4·6	22·0	38	10·8
6·9	−4·7	22·9		
7·2	−4·8	23·9	40	11·1
7·5	−4·9	24·9	42	11·4
7·9	−5·0	26·0	44	11·7
8·2	−5·1	27·1	46	11·9
8·5	−5·2	28·1	48	12·2
8·8	−5·3	29·2	ft.	′
9·2	−5·4	30·4	2	1·4
9·5	−5·5	31·5	4	1·9
9·9	−5·6	32·7	6	2·4
10·3	−5·7	33·9	8	2·7
10·6	−5·8	35·1	10	3·1
11·0	−5·9	36·3	See table ←	
11·4	−6·0	37·6		
11·8	−6·1	38·9	ft.	′
12·2	−6·2	40·1	70	8·1
12·6	−6·3	41·5	75	8·4
13·0	−6·4	42·8	80	8·7
13·4	−6·5	44·2	85	8·9
13·8	−6·6	45·5	90	9·2
14·2	−6·7	46·9	95	9·5
14·7	−6·8	48·4		
15·1	−6·9	49·8	100	9·7
15·5	−7·0	51·3	105	9·9
16·0	−7·1	52·8	110	10·2
16·5	−7·2	54·3	115	10·4
16·9	−7·3	55·8	120	10·6
17·4	−7·4	57·4	125	10·8
17·9	−7·5	58·9		
18·4	−7·6	60·5	130	11·1
18·8	−7·7	62·1	135	11·3
19·3	−7·8	63·8	140	11·5
19·8	−7·9	65·4	145	11·7
20·4	−8·0	67·1	150	11·9
20·9	−8·1	68·8	155	12·1
21·4		70·5		

App. Alt. = Apparent altitude = Sextant altitude corrected for index error and dip.

IEB Copyright © 2022

ANNEXURE 3

CONVERSION OF ARC TO TIME

0°–59°		60°–119°		120°–179°		180°–239°		240°–299°		300°–359°			0′·00	0′·25	0′·50	0′·75
°	h m	°	h m	°	h m	°	h m	°	h m	°	h m	′	m s	m s	m s	m s
0	0 00	60	4 00	120	8 00	180	12 00	240	16 00	300	20 00	0	0 00	0 01	0 02	0 03
1	0 04	61	4 04	121	8 04	181	12 04	241	16 04	301	20 04	1	0 04	0 05	0 06	0 07
2	0 08	62	4 08	122	8 08	182	12 08	242	16 08	302	20 08	2	0 08	0 09	0 10	0 11
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12	3	0 12	0 13	0 14	0 15
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16	4	0 16	0 17	0 18	0 19
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20	5	0 20	0 21	0 22	0 23
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24	6	0 24	0 25	0 26	0 27
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28	7	0 28	0 29	0 30	0 31
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32	8	0 32	0 33	0 34	0 35
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36	9	0 36	0 37	0 38	0 39
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40	10	0 40	0 41	0 42	0 43
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44	11	0 44	0 45	0 46	0 47
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48	12	0 48	0 49	0 50	0 51
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52	13	0 52	0 53	0 54	0 55
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56	14	0 56	0 57	0 58	0 59
15	1 00	75	5 00	135	9 00	195	13 00	255	17 00	315	21 00	15	1 00	1 01	1 02	1 03
16	1 04	76	5 04	136	9 04	196	13 04	256	17 04	316	21 04	16	1 04	1 05	1 06	1 07
17	1 08	77	5 08	137	9 08	197	13 08	257	17 08	317	21 08	17	1 08	1 09	1 10	1 11
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12	18	1 12	1 13	1 14	1 15
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16	19	1 16	1 17	1 18	1 19
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20	20	1 20	1 21	1 22	1 23
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24	21	1 24	1 25	1 26	1 27
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28	22	1 28	1 29	1 30	1 31
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32	23	1 32	1 33	1 34	1 35
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36	24	1 36	1 37	1 38	1 39
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40	25	1 40	1 41	1 42	1 43
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44	26	1 44	1 45	1 46	1 47
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48	27	1 48	1 49	1 50	1 51
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52	28	1 52	1 53	1 54	1 55
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56	29	1 56	1 57	1 58	1 59
30	2 00	90	6 00	150	10 00	210	14 00	270	18 00	330	22 00	30	2 00	2 01	2 02	2 03
31	2 04	91	6 04	151	10 04	211	14 04	271	18 04	331	22 04	31	2 04	2 05	2 06	2 07
32	2 08	92	6 08	152	10 08	212	14 08	272	18 08	332	22 08	32	2 08	2 09	2 10	2 11
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12	33	2 12	2 13	2 14	2 15
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16	34	2 16	2 17	2 18	2 19
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20	35	2 20	2 21	2 22	2 23
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24	36	2 24	2 25	2 26	2 27
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28	37	2 28	2 29	2 30	2 31
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32	38	2 32	2 33	2 34	2 35
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36	39	2 36	2 37	2 38	2 39
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40	40	2 40	2 41	2 42	2 43
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44	41	2 44	2 45	2 46	2 47
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48	42	2 48	2 49	2 50	2 51
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52	43	2 52	2 53	2 54	2 55
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56	44	2 56	2 57	2 58	2 59
45	3 00	105	7 00	165	11 00	225	15 00	285	19 00	345	23 00	45	3 00	3 01	3 02	3 03
46	3 04	106	7 04	166	11 04	226	15 04	286	19 04	346	23 04	46	3 04	3 05	3 06	3 07
47	3 08	107	7 08	167	11 08	227	15 08	287	19 08	347	23 08	47	3 08	3 09	3 10	3 11
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12	48	3 12	3 13	3 14	3 15
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16	49	3 16	3 17	3 18	3 19
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20	50	3 20	3 21	3 22	3 23
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24	51	3 24	3 25	3 26	3 27
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28	52	3 28	3 29	3 30	3 31
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32	53	3 32	3 33	3 34	3 35
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36	54	3 36	3 37	3 38	3 39
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40	55	3 40	3 41	3 42	3 43
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44	56	3 44	3 45	3 46	3 47
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48	57	3 48	3 49	3 50	3 51
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52	58	3 52	3 53	3 54	3 55
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56	59	3 56	3 57	3 58	3 59

The above table is for converting expressions in arc to their equivalent in time; its main use in this Almanac is for the conversion of longitude for application to L.M.T. (added if west, subtracted if east) to give G.M.T. or vice versa.

IEB Copyright © 2022

ANNEXURE 4

1994 NOV. 30, DEC. 1, 2 (WED., THURS., FRI.)

233

UT (GMT)	SUN G.H.A.	SUN Dec.	MOON G.H.A.	MOON v	MOON Dec.	MOON d	MOON H.P.
d h	° ′	° ′	° ′	′	° ′	′	′
30 00	182 53.3	S21 34.0	225 40.0	7.4	S11 28.2	10.4	60.4
01	197 53.1	34.4	240 06.4	7.3	11 38.6	10.4	60.4
02	212 52.8	34.9	254 32.7	7.2	11 49.0	10.3	60.5
03	227 52.6	.. 35.3	268 58.9	7.2	11 59.3	10.3	60.5
04	242 52.4	35.7	283 25.1	7.0	12 09.6	10.2	60.5
05	257 52.2	36.1	297 51.1	7.0	12 19.8	10.1	60.5
06	272 51.9	S21 36.5	312 17.1	6.8	S12 29.9	10.0	60.6
W 07	287 51.7	36.9	326 42.9	6.8	12 39.9	10.0	60.6
E 08	302 51.5	37.3	341 08.7	6.8	12 49.9	9.9	60.6
D 09	317 51.3	.. 37.7	355 34.5	6.6	12 59.8	9.8	60.6
N 10	332 51.0	38.1	10 00.1	6.5	13 09.6	9.7	60.7
E 11	347 50.8	38.5	24 25.6	6.5	13 19.3	9.7	60.7
S 12	2 50.6	S21 38.9	38 51.1	6.4	S13 29.0	9.6	60.7
D 13	17 50.4	39.4	53 16.5	6.3	13 38.6	9.5	60.8
A 14	32 50.1	39.8	67 41.8	6.2	13 48.1	9.4	60.8
Y 15	47 49.9	.. 40.2	82 07.0	6.1	13 57.5	9.3	60.8
16	62 49.7	40.6	96 32.1	6.1	14 06.8	9.2	60.8
17	77 49.4	41.0	110 57.2	5.9	14 16.0	9.2	60.8
18	92 49.2	S21 41.4	125 22.1	5.9	S14 25.2	9.0	60.9
19	107 49.0	41.8	139 47.0	5.8	14 34.2	9.0	60.9
20	122 48.8	42.2	154 11.8	5.7	14 43.2	8.8	60.9
21	137 48.5	.. 42.6	168 36.5	5.7	14 52.0	8.8	60.9
22	152 48.3	43.0	183 01.2	5.6	15 00.8	8.7	61.0
23	167 48.1	43.4	197 25.8	5.4	15 09.5	8.5	61.0
1 00	182 47.8	S21 43.8	211 50.2	5.4	S15 18.0	8.5	61.0
01	197 47.6	44.2	226 14.6	5.4	15 26.5	8.4	61.0
02	212 47.4	44.5	240 39.0	5.2	15 34.9	8.2	61.0
03	227 47.1	.. 44.9	255 03.2	5.2	15 43.1	8.2	61.1
04	242 46.9	45.3	269 27.4	5.1	15 51.3	8.0	61.1
05	257 46.7	45.7	283 51.5	5.0	15 59.3	8.0	61.1
06	272 46.5	S21 46.1	298 15.5	5.0	S16 07.3	7.8	61.1
07	287 46.2	46.5	312 39.5	4.8	16 15.1	7.7	61.1
T 08	302 46.0	46.9	327 03.3	4.8	16 22.8	7.7	61.1
H 09	317 45.8	.. 47.3	341 27.1	4.8	16 30.5	7.4	61.2
U 10	332 45.5	47.7	355 50.9	4.6	16 37.9	7.4	61.2
R 11	347 45.3	48.1	10 14.5	4.6	16 45.3	7.3	61.2
S 12	2 45.1	S21 48.5	24 38.1	4.5	S16 52.6	7.1	61.2
D 13	17 44.8	48.9	39 01.6	4.5	16 59.7	7.1	61.2
A 14	32 44.6	49.2	53 25.1	4.3	17 06.8	6.9	61.2
Y 15	47 44.3	.. 49.6	67 48.4	4.4	17 13.7	6.7	61.2
16	62 44.1	50.0	82 11.8	4.2	17 20.4	6.7	61.3
17	77 43.9	50.4	96 35.0	4.2	17 27.1	6.5	61.3
18	92 43.6	S21 50.8	110 58.2	4.1	S17 33.6	6.4	61.3
19	107 43.4	51.2	125 21.3	4.1	17 40.0	6.3	61.3
20	122 43.2	51.5	139 44.4	4.0	17 46.3	6.1	61.3
21	137 42.9	.. 51.9	154 07.4	4.0	17 52.4	6.1	61.3
22	152 42.7	52.3	168 30.4	3.8	17 58.5	5.8	61.3
23	167 42.5	52.7	182 53.2	3.9	18 04.3	5.8	61.3
2 00	182 42.2	S21 53.1	197 16.1	3.8	S18 10.1	5.6	61.3
01	197 42.0	53.4	211 38.9	3.7	18 15.7	5.5	61.3
02	212 41.7	53.8	226 01.6	3.7	18 21.2	5.4	61.3
03	227 41.5	.. 54.2	240 24.3	3.6	18 26.6	5.2	61.4
04	242 41.3	54.6	254 46.9	3.6	18 31.8	5.0	61.4
05	257 41.0	55.0	269 09.5	3.5	18 36.8	5.0	61.4
06	272 40.8	S21 55.3	283 32.0	3.5	S18 41.8	4.8	61.4
07	287 40.5	55.7	297 54.5	3.5	18 46.6	4.6	61.4
08	302 40.3	56.1	312 17.0	3.4	18 51.2	4.5	61.4
F 09	317 40.1	.. 56.5	326 39.4	3.4	18 55.7	4.4	61.4
R 10	332 39.8	56.8	341 01.8	3.3	19 00.1	4.2	61.4
I 11	347 39.6	57.2	355 24.1	3.3	19 04.3	4.1	61.4
D 12	2 39.3	S21 57.6	9 46.4	3.3	S19 08.4	3.9	61.4
A 13	17 39.1	57.9	24 08.7	3.2	19 12.3	3.8	61.4
Y 14	32 38.9	58.3	38 30.9	3.2	19 16.1	3.7	61.4
15	47 38.6	.. 58.7	52 53.1	3.2	19 19.8	3.5	61.4
16	62 38.4	59.0	67 15.3	3.1	19 23.3	3.3	61.4
17	77 38.1	59.4	81 37.4	3.2	19 26.6	3.2	61.4
18	92 37.9	S21 59.8	95 59.6	3.1	S19 29.8	3.1	61.4
19	107 37.7	22 00.1	110 21.7	3.1	19 32.9	2.8	61.4
20	122 37.4	00.5	124 43.8	3.0	19 35.7	2.8	61.4
21	137 37.2	.. 00.9	139 05.8	3.1	19 38.5	2.6	61.4
22	152 36.9	01.2	153 27.9	3.0	19 41.1	2.4	61.3
23	167 36.7	01.6	167 49.9	3.1	19 43.5	2.3	61.3
	S.D. 16.2	d 0.4	S.D.	16.5		16.7	16.7

Lat.	Twilight Naut.	Twilight Civil	Sunrise	Moonrise 30	Moonrise 1	Moonrise 2	Moonrise 3
°	h m	h m	h m	h m	h m	h m	h m
N 72	07 50	09 49	▬	06 07	08 41	▬	▬
N 70	07 34	09 10	▬	05 42	07 50	10 08	▬
68	07 21	08 43	10 35	05 23	07 18	09 10	10 40
66	07 10	08 22	09 46	05 09	06 55	08 36	09 59
64	07 01	08 06	09 15	04 57	06 37	08 12	09 31
62	06 53	07 52	08 53	04 46	06 22	07 52	09 09
60	06 45	07 40	08 34	04 38	06 09	07 37	08 52
N 58	06 39	07 30	08 19	04 30	05 59	07 23	08 37
56	06 33	07 21	08 06	04 23	05 49	07 12	08 25
54	06 28	07 13	07 55	04 18	05 41	07 01	08 14
52	06 23	07 06	07 45	04 12	05 34	06 53	08 04
50	06 18	06 59	07 36	04 07	05 27	06 44	07 55
45	06 08	06 45	07 18	03 57	05 13	06 27	07 37
N 40	05 59	06 32	07 02	03 48	05 01	06 13	07 22
35	05 50	06 22	06 49	03 41	04 51	06 02	07 09
30	05 42	06 12	06 38	03 35	04 43	05 51	06 58
20	05 28	05 55	06 18	03 24	04 28	05 34	06 39
N 10	05 13	05 39	06 01	03 14	04 15	05 19	06 23
0	04 57	05 23	05 45	03 05	04 03	05 04	06 07
S 10	04 40	05 06	05 29	02 56	03 51	04 50	05 52
20	04 19	04 47	05 12	02 47	03 38	04 35	05 36
30	03 52	04 24	04 51	02 36	03 24	04 18	05 17
35	03 35	04 10	04 39	02 30	03 16	04 08	05 06
40	03 14	03 54	04 26	02 23	03 06	03 56	04 54
45	02 46	03 33	04 09	02 15	02 55	03 43	04 39
S 50	02 07	03 07	03 49	02 05	02 42	03 27	04 21
52	01 45	02 53	03 39	02 01	02 36	03 19	04 13
54	01 15	02 38	03 28	01 56	02 29	03 11	04 03
56	00 19	02 19	03 16	01 51	02 22	03 01	03 53
58	////	01 56	03 01	01 45	02 13	02 51	03 41
S 60	////	01 24	02 44	01 38	02 04	02 38	03 27

Lat.	Sunset	Twilight Civil	Twilight Naut.	Moonset 30	Moonset 1	Moonset 2	Moonset 3
°	h m	h m	h m	h m	h m	h m	h m
N 72	▬	13 48	15 47	12 11	11 39	▬	▬
N 70	▬	14 27	16 03	12 37	12 32	12 23	▬
68	13 03	14 54	16 16	12 57	13 04	13 22	14 04
66	13 51	15 15	16 27	13 13	13 28	13 56	14 45
64	14 22	15 32	16 37	13 26	13 47	14 21	15 14
62	14 45	15 45	16 45	13 37	14 03	14 41	15 35
60	15 03	15 57	16 52	13 47	14 16	14 57	15 53
N 58	15 18	16 08	16 59	13 55	14 27	15 10	16 08
56	15 31	16 17	17 04	14 02	14 37	15 22	16 20
54	15 42	16 25	17 10	14 09	14 46	15 33	16 31
52	15 52	16 32	17 15	14 15	14 54	15 42	16 41
50	16 01	16 39	17 19	14 20	15 01	15 50	16 50
45	16 20	16 53	17 30	14 32	15 16	16 08	17 08
N 40	16 35	17 05	17 39	14 42	15 28	16 22	17 23
35	16 48	17 16	17 47	14 50	15 39	16 34	17 36
30	17 00	17 26	17 55	14 58	15 48	16 45	17 47
20	17 19	17 43	18 10	15 10	16 04	17 03	18 06
N 10	17 37	17 59	18 25	15 22	16 19	17 19	18 22
0	17 53	18 15	18 41	15 32	16 32	17 34	18 38
S 10	18 09	18 32	18 58	15 43	16 45	17 49	18 53
20	18 27	18 51	19 20	15 54	16 59	18 05	19 09
30	18 47	19 14	19 47	16 07	17 15	18 23	19 28
35	18 59	19 28	20 04	16 14	17 25	18 34	19 39
40	19 13	19 45	20 25	16 23	17 36	18 46	19 52
45	19 29	20 05	20 53	16 33	17 48	19 01	20 06
S 50	19 50	20 32	21 32	16 45	18 04	19 18	20 24
52	20 00	20 46	21 55	16 50	18 11	19 27	20 33
54	20 11	21 01	22 25	16 57	18 19	19 36	20 42
56	20 23	21 20	23 29	17 04	18 28	19 46	20 53
58	20 38	21 44	////	17 11	18 38	19 58	21 05
S 60	20 55	22 17	////	17 20	18 50	20 12	21 19

Day	SUN Eqn. of Time 00 h	SUN Eqn. of Time 12 h	SUN Mer. Pass.	MOON Mer. Pass. Upper	MOON Mer. Pass. Lower	MOON Age	MOON Phase
	m s	m s	h m	h m	h m	d	
30	11 34	11 23	11 49	09 18	21 47	27	●
1	11 12	11 01	11 49	10 17	22 48	28	
2	10 49	10 38	11 49	11 19	23 51	29	

IEB Copyright © 2022

ANNEXURE 5

PREDICTED HOURLY HEIGHTS IN METRES

SIMON'S TOWN

NOVEMBER 2007

		00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
TD	1	0.70	0.61	0.60	0.68	0.84	1.03	1.21	1.34	1.38	1.34	1.22	1.07	0.92	0.80	0.72	0.70	0.76	0.87	1.02	1.15	1.24	1.26	1.20	1.08
FV	2	0.94	0.81	0.72	0.69	0.72	0.83	0.97	1.12	1.25	1.33	1.34	1.27	1.16	1.02	0.89	0.77	0.71	0.72	0.79	0.92	1.06	1.17	1.23	1.22
S	3	1.14	1.02	0.90	0.78	0.71	0.71	0.78	0.91	1.07	1.23	1.35	1.39	1.35	1.24	1.08	0.91	0.76	0.66	0.65	0.72	0.86	1.03	1.18	1.27
$	4	1.28	1.21	1.08	0.92	0.78	0.68	0.66	0.73	0.88	1.08	1.27	1.41	1.46	1.41	1.27	1.08	0.87	0.69	0.58	0.58	0.68	0.86	1.07	1.25
M	5	1.36	1.35	1.25	1.08	0.89	0.71	0.61	0.61	0.71	0.91	1.15	1.37	1.51	1.53	1.44	1.25	1.00	0.76	0.57	0.49	0.53	0.69	0.92	1.17
TD	6	1.36	1.45	1.40	1.25	1.03	0.79	0.61	0.53	0.58	0.74	0.99	1.27	1.49	1.60	1.57	1.41	1.15	0.86	0.61	0.46	0.43	0.54	0.76	1.04
W	7	1.31	1.48	1.51	1.41	1.18	0.91	0.67	0.51	0.49	0.60	0.84	1.13	1.42	1.61	1.66	1.55	1.31	1.00	0.69	0.47	0.37	0.42	0.61	0.89
TD	8	1.20	1.45	1.57	1.53	1.35	1.07	0.77	0.54	0.44	0.49	0.68	0.97	1.29	1.55	1.69	1.65	1.46	1.15	0.81	0.53	0.36	0.34	0.47	0.73
FV	9	1.05	1.36	1.57	1.61	1.49	1.23	0.91	0.62	0.45	0.42	0.56	0.81	1.14	1.44	1.65	1.70	1.58	1.31	0.97	0.63	0.39	0.30	0.37	0.59
S	10	0.90	1.23	1.50	1.63	1.59	1.38	1.07	0.75	0.51	0.41	0.47	0.67	0.97	1.29	1.56	1.69	1.65	1.45	1.13	0.78	0.49	0.33	0.32	0.47
$	11	0.74	1.07	1.38	1.58	1.63	1.50	1.23	0.91	0.62	0.45	0.43	0.56	0.81	1.12	1.42	1.62	1.66	1.54	1.27	0.94	0.62	0.40	0.33	0.40
M	12	0.62	0.92	1.23	1.49	1.61	1.56	1.37	1.07	0.77	0.54	0.44	0.50	0.68	0.96	1.25	1.50	1.62	1.58	1.39	1.10	0.78	0.52	0.38	0.39
TD	13	0.53	0.78	1.07	1.35	1.53	1.57	1.45	1.22	0.94	0.68	0.53	0.50	0.60	0.81	1.08	1.34	1.51	1.56	1.45	1.23	0.95	0.68	0.49	0.43
W	14	0.49	0.66	0.92	1.19	1.40	1.51	1.49	1.34	1.10	0.86	0.66	0.56	0.58	0.71	0.92	1.16	1.36	1.47	1.46	1.33	1.11	0.86	0.65	0.52
TD	15	0.51	0.60	0.78	1.02	1.24	1.40	1.46	1.40	1.24	1.04	0.84	0.69	0.63	0.67	0.80	0.99	1.18	1.34	1.40	1.36	1.22	1.03	0.83	0.67
FV	16	0.59	0.60	0.70	0.86	1.06	1.24	1.36	1.39	1.33	1.20	1.03	0.87	0.75	0.71	0.74	0.84	0.99	1.15	1.27	1.32	1.28	1.17	1.01	0.85
S	17	0.73	0.66	0.67	0.75	0.88	1.05	1.20	1.31	1.36	1.32	1.22	1.08	0.93	0.81	0.75	0.75	0.82	0.94	1.08	1.20	1.26	1.26	1.18	1.05
$	18	0.91	0.79	0.72	0.70	0.75	0.86	1.01	1.17	1.30	1.37	1.37	1.29	1.15	0.99	0.84	0.73	0.70	0.74	0.85	1.00	1.15	1.25	1.29	1.24
M	19	1.13	0.99	0.84	0.73	0.67	0.69	0.80	0.96	1.16	1.33	1.45	1.47	1.39	1.22	1.02	0.81	0.66	0.59	0.62	0.75	0.94	1.14	1.30	1.37
TD	20	1.34	1.22	1.04	0.85	0.69	0.60	0.61	0.73	0.94	1.19	1.42	1.57	1.59	1.48	1.27	1.00	0.73	0.53	0.45	0.50	0.67	0.92	1.19	1.39
W	21	1.48	1.44	1.29	1.06	0.81	0.60	0.49	0.52	0.69	0.96	1.27	1.55	1.71	1.71	1.55	1.26	0.92	0.60	0.38	0.31	0.40	0.64	0.95	1.27
TD	22	1.51	1.60	1.53	1.32	1.02	0.72	0.49	0.39	0.46	0.68	1.01	1.38	1.68	1.83	1.79	1.56	1.21	0.81	0.45	0.23	0.20	0.35	0.65	1.03
FV	23	1.39	1.64	1.70	1.58	1.31	0.95	0.61	0.38	0.31	0.42	0.71	1.09	1.49	1.79	1.91	1.81	1.53	1.11	0.68	0.32	0.13	0.15	0.36	0.72
S	24	1.14	1.51	1.74	1.76	1.58	1.25	0.86	0.51	0.30	0.27	0.43	0.76	1.17	1.58	1.85	1.93	1.78	1.44	1.00	0.56	0.23	0.09	0.16	0.42
$	25	0.82	1.25	1.61	1.80	1.77	1.54	1.17	0.77	0.44	0.27	0.28	0.48	0.83	1.24	1.62	1.86	1.88	1.69	1.32	0.88	0.48	0.21	0.12	0.23
M	26	0.53	0.93	1.35	1.67	1.80	1.72	1.46	1.09	0.71	0.42	0.29	0.33	0.55	0.89	1.28	1.62	1.80	1.78	1.56	1.20	0.80	0.45	0.24	0.20
TD	27	0.35	0.65	1.04	1.42	1.68	1.76	1.64	1.37	1.02	0.69	0.45	0.36	0.42	0.63	0.95	1.29	1.57	1.70	1.64	1.42	1.09	0.74	0.46	0.31
W	28	0.32	0.49	0.77	1.12	1.44	1.64	1.67	1.54	1.29	0.98	0.71	0.53	0.46	0.52	0.71	0.98	1.26	1.48	1.56	1.49	1.29	1.01	0.73	0.52
TD	29	0.43	0.46	0.62	0.88	1.17	1.42	1.56	1.57	1.45	1.23	0.98	0.77	0.62	0.57	0.62	0.77	0.99	1.21	1.37	1.42	1.36	1.19	0.97	0.76
FV	30	0.61	0.55	0.59	0.73	0.94	1.17	1.37	1.48	1.48	1.38	1.21	1.01	0.84	0.72	0.66	0.69	0.81	0.97	1.14	1.26	1.31	1.26	1.14	0.97

IEB Copyright © 2022

ANNEXURE 6

SIMON'S TOWN

2007

TIME ZONE - 2 TIME ZONE - 2

OCTOBER						NOVEMBER						DECEMBER					
DAY	TIME	M	DAY	TIME	M	DAY	TIME	M	DAY	TIME	M	DAY	TIME	M	DAY	TIME	M
1 M	05 59 12 06 18 23	1.58 0.45 1.59	16 T	05 31 11 29 17 37 23 51	1.46 0.56 1.45 0.54	1 T	01 36 08 00 14 45 20 42	0.59 1.38 0.70 1.26	16 F	00 23 06 51 13 06 19 05	0.58 1.39 0.70 1.32	1 S	02 06 08 40 15 25 21 15	0.65 1.42 0.72 1.24	16 $	00 58 07 31 13 54 19 49	0.55 1.52 0.64 1.37
2 T	00 45 06 54 13 12 19 27	0.44 1.43 0.61 1.39	17 W	06 09 12 11 18 18	1.37 0.66 1.34	2 F	03 01 09 34 16 23 22 17	0.69 1.34 0.70 1.24	17 S	01 24 08 03 14 28 20 25	0.65 1.36 0.74 1.27	2 $	03 18 09 54 16 43 22 34	0.73 1.40 0.71 1.23	17 M	01 58 08 36 15 06 21 03	0.62 1.51 0.64 1.33
3 W	01 55 08 13 14 56 21 03	0.60 1.30 0.72 1.26	18 T	00 36 07 02 13 16 19 20	0.64 1.28 0.76 1.24	3 S	04 32 10 59 17 40 23 34	0.70 1.39 0.64 1.29	18 $	02 47 09 28 15 56 21 55	0.70 1.38 0.70 1.29	3 M	04 35 11 00 17 46 23 42	0.75 1.42 0.67 1.28	18 T	03 12 09 47 16 22 22 24	0.66 1.53 0.60 1.35
4 T	03 36 10 07 16 52 22 51	0.69 1.27 0.71 1.25	19 F	01 51 08 36 15 04 21 06	0.73 1.22 0.80 1.20	4 $	05 42 11 58 18 32	0.66 1.46 0.57	19 M	04 13 10 41 17 09 23 11	0.67 1.47 0.59 1.37	4 T	05 40 11 55 18 34	0.72 1.46 0.60	19 W	04 32 10 56 17 32 23 39	0.66 1.58 0.51 1.41
5 F	05 16 11 40 18 11	0.66 1.36 0.61	20 S	03 46 10 25 16 45 22 49	0.74 1.27 0.73 1.26	5 M	00 28 06 31 12 41 19 10	1.37 0.59 1.54 0.49	20 T	05 22 11 39 18 06	0.59 1.60 0.45	5 W	00 35 06 30 12 39 19 12	1.35 0.67 1.51 0.53	20 T	05 45 11 59 18 33	0.60 1.65 0.40
6 S	00 09 06 23 12 37 19 02	1.34 0.58 1.47 0.51	21 $	05 13 11 35 17 51 23 55	0.66 1.41 0.59 1.39	6 T	01 09 07 08 13 17 19 42	1.45 0.53 1.61 0.42	21 W	00 11 06 17 12 30 18 55	1.49 0.49 1.73 0.31	6 T	01 17 07 11 13 18 19 45	1.43 0.62 1.56 0.46	21 F	00 42 06 47 12 57 19 26	1.51 0.51 1.73 0.30
7 $	00 59 07 07 13 17 19 38	1.43 0.49 1.58 0.42	22 M	06 09 12 23 18 40	0.53 1.58 0.43	7 W	01 44 07 40 13 48 20 10	1.52 0.48 1.66 0.37	22 T	01 03 07 06 13 17 19 41	1.60 0.39 1.84 0.19	7 F	01 54 07 47 13 53 20 16	1.50 0.56 1.60 0.41	22 S	01 38 07 43 13 51 20 16	1.62 0.42 1.79 0.22
8 M	01 36 07 41 13 49 20 09	1.52 0.41 1.66 0.35	23 T	00 45 06 53 13 05 19 22	1.53 0.40 1.74 0.27	8 T	02 15 08 09 14 18 20 37	1.58 0.44 1.70 0.33	23 F	01 50 07 52 14 03 20 26	1.71 0.31 1.91 0.11	8 S	02 28 08 20 14 27 20 46	1.56 0.51 1.63 0.37	23 $	02 28 08 34 14 42 21 03	1.72 0.35 1.83 0.18
9 T	02 09 08 10 14 19 20 36	1.59 0.36 1.72 0.31	24 W	01 29 07 33 13 45 20 03	1.67 0.28 1.88 0.13	9 F	02 46 08 38 14 47 21 03	1.62 0.41 1.71 0.30	24 S	02 36 08 39 14 50 21 10	1.78 0.26 1.93 0.09	9 $	02 59 08 53 14 59 21 16	1.60 0.48 1.64 0.35	24 M	03 15 09 24 15 31 21 48	1.78 0.31 1.83 0.17
10 W	02 39 08 36 14 47 21 02	1.64 0.33 1.76 0.28	25 T	02 10 08 13 14 25 20 43	1.77 0.20 1.98 0.04	10 S	03 15 09 07 15 16 21 31	1.64 0.40 1.70 0.30	25 $	03 22 09 26 15 37 21 55	1.81 0.25 1.90 0.12	10 M	03 31 09 26 15 32 21 46	1.62 0.46 1.65 0.34	25 T	04 00 10 12 16 17 22 31	1.82 0.30 1.80 0.21
11 T	03 08 09 02 15 14 21 27	1.67 0.31 1.77 0.27	26 F	02 52 08 53 15 06 21 25	1.84 0.15 2.01 0.02	11 $	03 45 09 37 15 46 21 59	1.63 0.41 1.67 0.33	26 M	04 07 10 15 16 24 22 41	1.80 0.28 1.82 0.19	11 T	04 02 09 59 16 05 22 18	1.64 0.46 1.64 0.35	26 W	04 44 10 59 17 02 23 12	1.81 0.34 1.72 0.27
12 F	03 36 09 29 15 41 21 53	1.67 0.32 1.75 0.28	27 S	03 34 09 35 15 49 22 07	1.85 0.16 1.98 0.06	12 M	04 14 10 08 16 16 22 29	1.61 0.44 1.62 0.37	27 T	04 53 11 06 17 12 23 27	1.76 0.36 1.70 0.30	12 W	04 35 10 36 16 40 22 52	1.63 0.47 1.61 0.38	27 T	05 27 11 45 17 44 23 51	1.77 0.42 1.62 0.37
13 S	04 04 09 56 16 08 22 19	1.64 0.35 1.71 0.31	28 $	04 17 10 20 16 33 22 52	1.81 0.23 1.88 0.16	13 T	04 45 10 42 16 48 23 01	1.57 0.49 1.56 0.43	28 W	05 41 12 01 18 03	1.68 0.46 1.56	13 T	05 11 11 15 17 17 23 29	1.62 0.51 1.57 0.42	28 F	06 09 12 30 18 26	1.69 0.51 1.51
14 $	04 32 10 24 16 36 22 47	1.60 0.40 1.64 0.37	29 M	05 01 11 09 17 20 23 39	1.73 0.34 1.72 0.29	14 W	05 19 11 20 17 24 23 38	1.52 0.56 1.48 0.50	29 T	00 15 06 33 13 00 18 57	0.42 1.58 0.57 1.42	14 F	05 51 11 59 17 59	1.59 0.55 1.51	29 S	00 29 06 52 13 17 19 10	0.48 1.61 0.61 1.39
15 M	05 00 10 55 17 05 23 17	1.54 0.47 1.55 0.45	30 T	05 50 12 04 18 13	1.61 0.47 1.55	15 T	05 59 12 05 18 07	1.46 0.63 1.40	30 F	01 07 07 31 14 08 20 00	0.55 1.49 0.66 1.31	15 S	00 10 06 37 12 51 18 48	0.48 1.56 0.60 1.44	30 $	01 08 07 38 14 10 20 01	0.59 1.51 0.70 1.29
			31 W	00 32 06 46 13 14 19 17	0.45 1.49 0.61 1.38										31 M	01 54 08 33 15 14 21 08	0.70 1.43 0.76 1.22

IEB Copyright © 2022