

NAUTICAL SCIENCE: PAPER I

MARKING GUIDELINES

Time: 3 hours

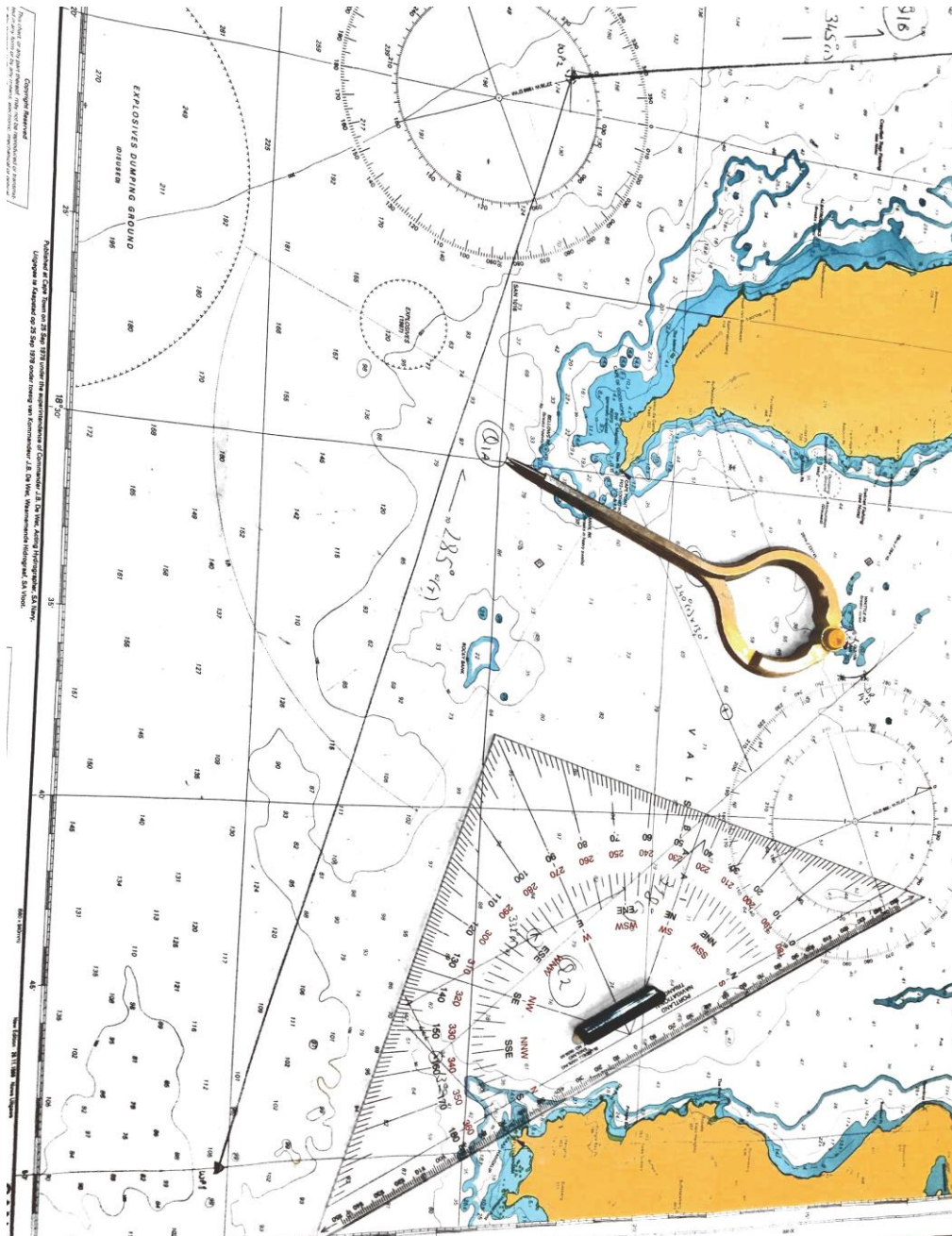
150 marks

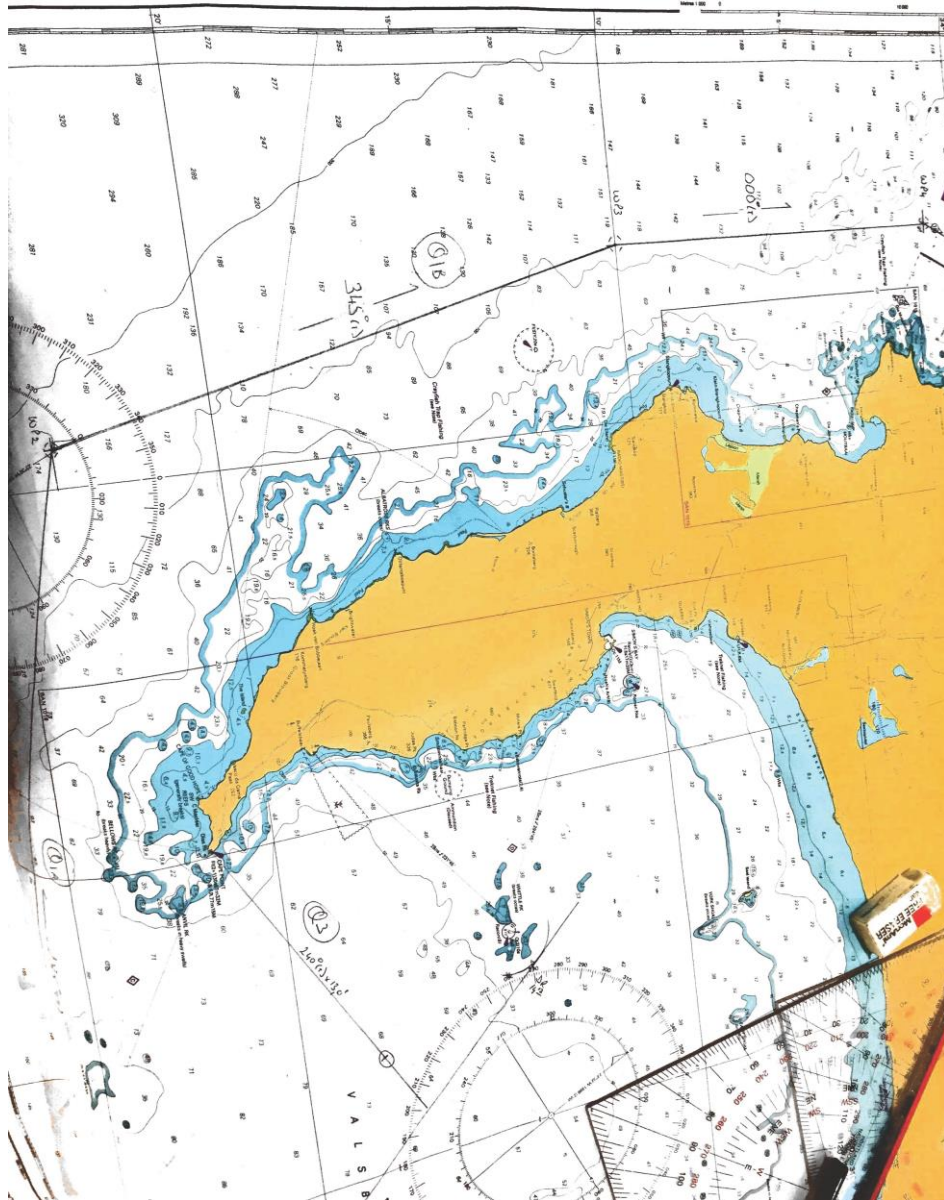
These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

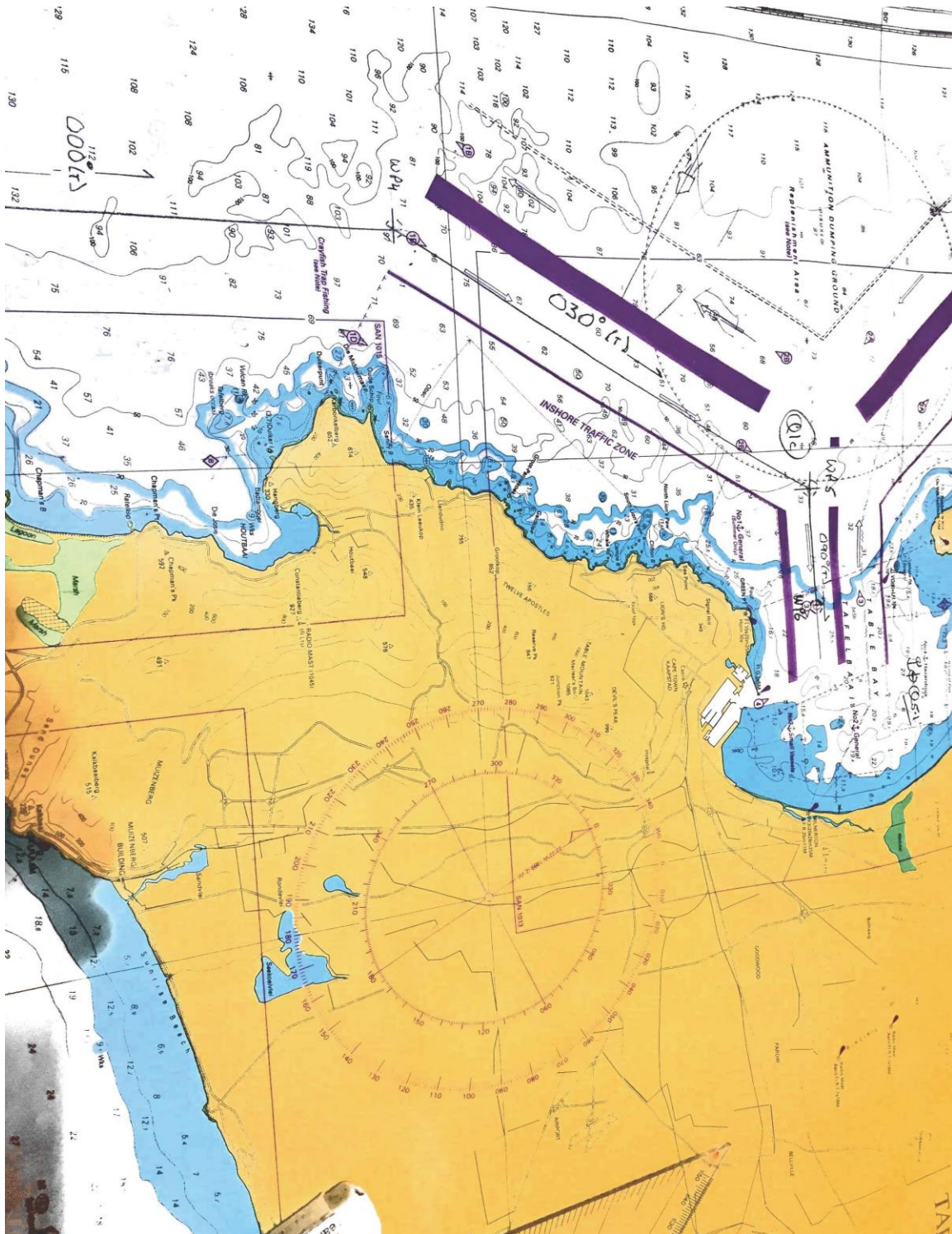
The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

SECTION A: PRACTICAL CHARTWORK**QUESTION 1**

- | | | |
|-----|---------------------------------|-------------|
| 1.1 | True course to counter current | 326° (T) |
| | Leeway | 5° – |
| | Course to steer | 321° (T) |
| | | Chart |
| 1.2 | Set & drift | 085° × 0,8' |
| | | Chart |
| 1.3 | New course required at 10:30 | 339° (T) |
| | Course to allow for set & drift | 333° (T) |
| | | Chart |







QUESTION 2**2.1 Chart work**

Course to make Whittle Rock abeam	=	CHART 343° (T)
True course to steer to counter current	=	356° (T)
Variation	=	22° W
Magnetic course	=	018° (M)
Deviation	=	4° E
Compass course to steer	=	014° (C)

2.2 Distance over ground in ½	=	5,1'
Speed over ground	=	10,2 knots
Distance to Whittle Rock abeam	=	15,3 M
@ 12,4 kts	=	1 ^h 30 ^m
ETA Whittle Rock abeam	=	14:30

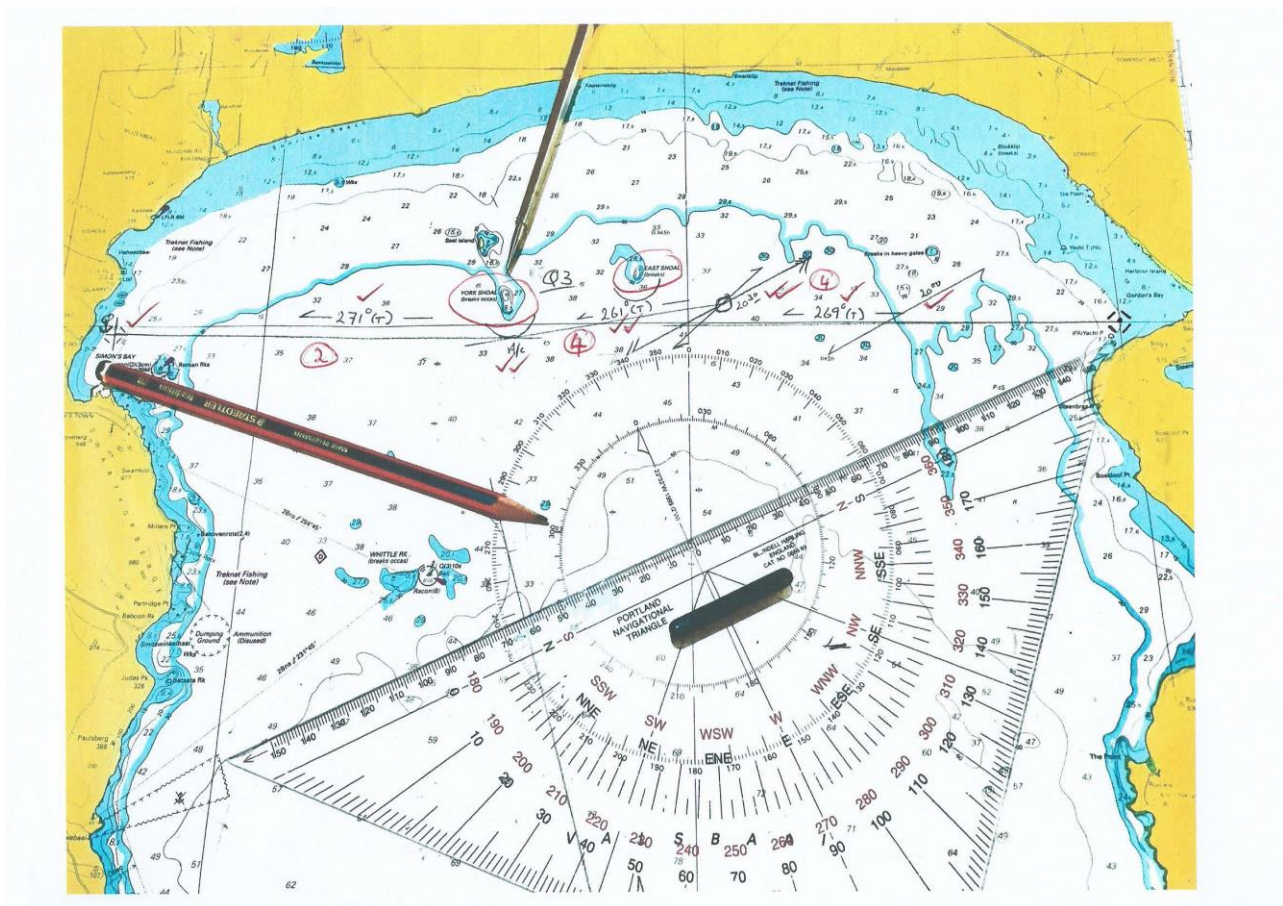
QUESTION 3

- 3.1 20:30 Position on the chart SSE of "East Shoal".
- 3.2 The two immediate hazards are "East Shoal" and "York Shoal". The vessel must keep at least $\frac{1}{2}$ mile south of these two hazards.

From the 20:30 position the vessel is in danger of being close to "East Shoal" and hitting "York Shoal". The Navigator should therefore alter course to the South.

- 3.3 As indicated on the chart immediately adjust course to the south to 261° (T). Thereafter when York Shoal has been cleared to the south alter course to 271° (T) to make for the anchorage position in Simon's Bay.

Chart



QUESTION 4

4.1 Draught	2,8 m
UKC	1,0 m
Required depth	3,8 m
Shoal depth	2,5 m
Required height of tide	1,3 m

am Tides 25 November

Depth 01:00 1,25 m

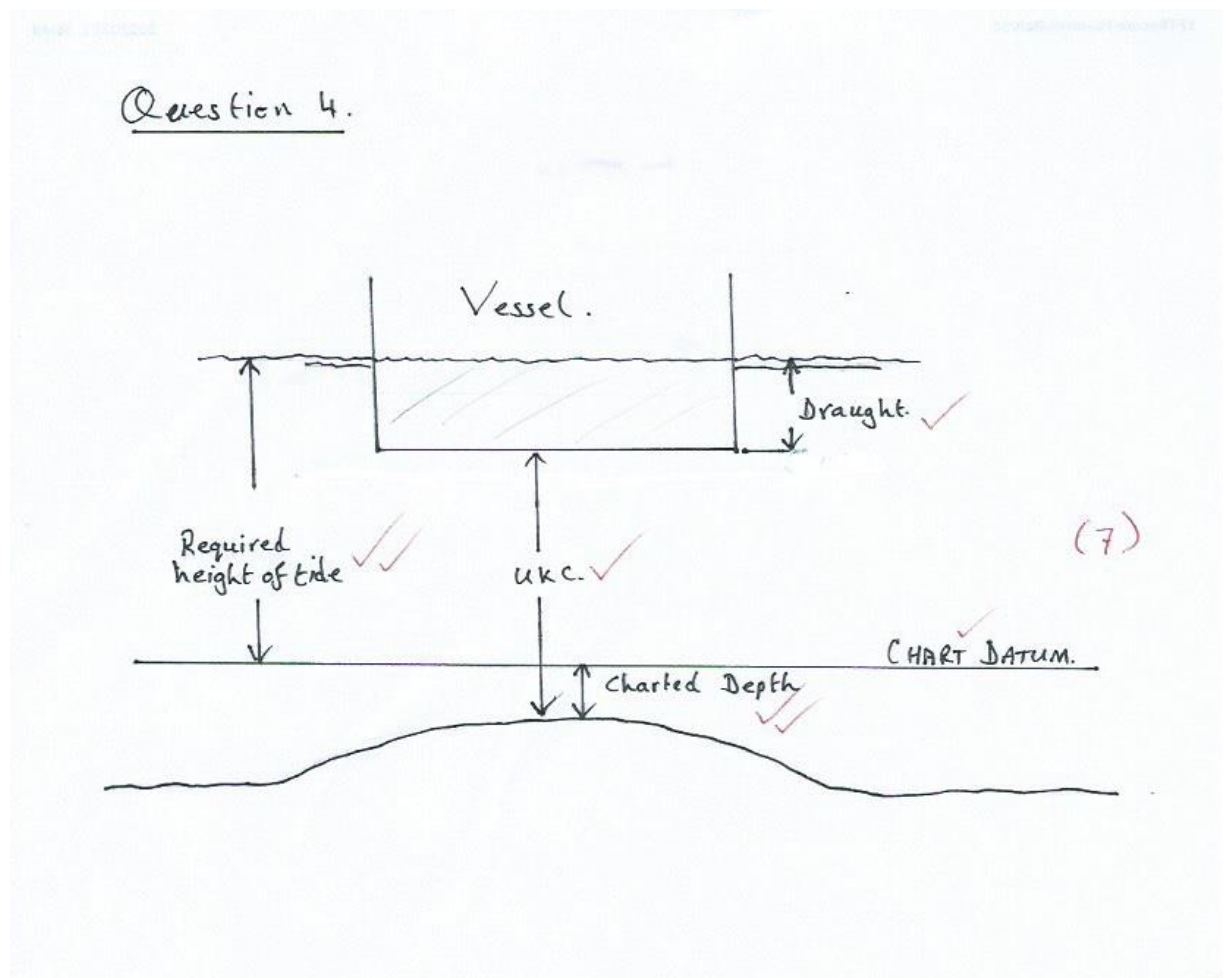
Depth 02:00 1,61 m

Depth Diff over 60 minutes 0,36 m

Time Diff $0,05 \times 60 / 0,36$ 8 min

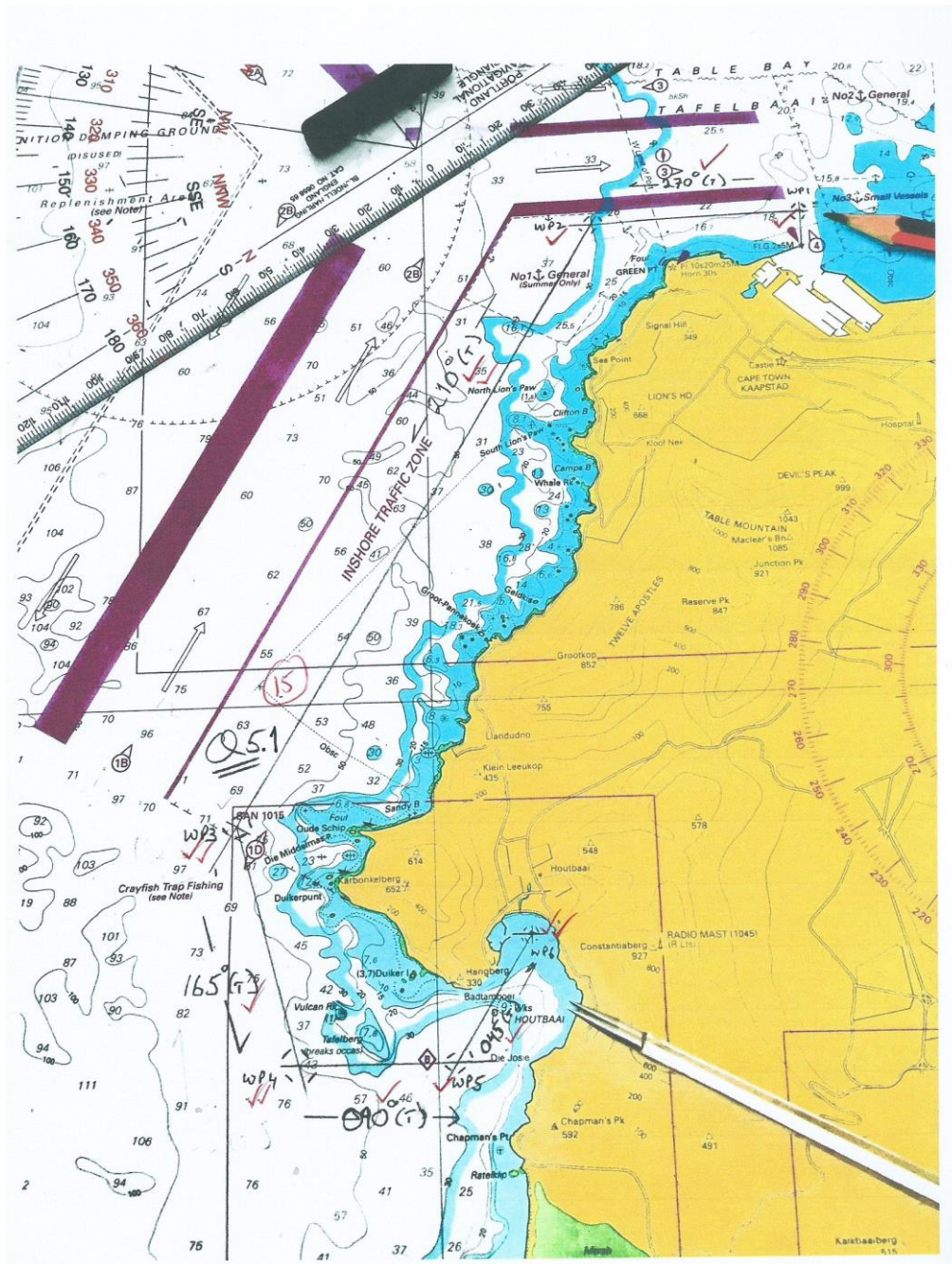
Required 1,3 m will be at 01:08

4.2



4.3 The range of the tide on 25 November was from 1,81–0,25 m ; or 1,56 m.

The duration of the tide is from 03:22 to 09:26 or 6hrs 4mins.

QUESTION 5**5.1 On the chart****5.2 Reporting points for the Inshore Traffic Zone are:**

- "4" on departure Port of Cape Town;
- "1D" at the termination of the Traffic Zone;
- "B" entering Houtbaai.

5.3 SAN 1015 as marked at the end of the Inshore Traffic Zone.

SECTION B: ASTRO-NAVIGATION**QUESTION 6**

LMT mer passage	11: 49
Longitude 017° 50'E	01: 11 (–)
GMT mer pass	10: 38
Zone (+2)	12: 38

Dec. 10:00	21° 56,8' S
'd' (38')	0,2' (+)
Dec 10:38	21° 57,0' S

Sextant alt.	77° 56,2'
Index error	1,0' (+)
Observed alt.	77° 57,2'
Dip	6,1' (–)
Apparent alt.	77° 51,1'
Total correction	16,0' (+)
True alt.	78° 07,1'
	90° 00,0'
Zenith distance ZX	11° 52,9'
Dec. QX	21° 57,0' S
Latitude QZ	33° 49,9' S

Vessel course due south, therefore Longitude remains same as at the star position at 05:30.

Vessel position at meridian passage was **33° 50' S 017° 50' E**

QUESTION 7

7.1	LMT Sunset Lat 32° S	18:52
	Longitude 016° 50' E	01:07 (–)
	GMT sunset	17:45
	Zone (–2)	01:00 (+)
	Zone time	18:45

7.2	Decl. 17:00	21° 50,4' S
	'd' 0,4	0,3' (+)
	Decl. 17:45	21° 50,7' S

$$\begin{aligned} \text{Sin Amp.} &= \text{Sin Dec/Cos Lat} & \text{Sin } 21^\circ 50,7' / \text{Cos } 32^\circ &= 0,4387687 \\ \text{Amplitude} && &= \text{W } 26^\circ \text{N} \end{aligned}$$

True bearing	296°
Compass bearing	323°
Compass error	27° W

7.3	Variation	22° W
	Deviation	5° W

7.4	Ship's head	234° (C)
	Deviation	5° E
	Magnetic heading	229° (M)
	Variation	22° W
	Ship's heading	207° (T)

Total: 150 marks