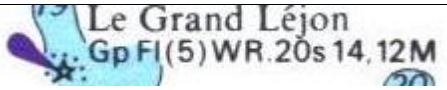
MERCHANT SHIPPING SECRETARIAT
GOVERNMENT OF SRI LANKA
CERTIFICATE OF COMPETENCY EXAMINATION

GRADE : OFFICER IN CHARGE OF A NAVIGATIONAL WATCH ON SHIPS OF 500 GT OR MORE (UNLIMITED)
SUBJECT : COASTAL NAVIGATION
DATE : 08 July 2024 Time : 0900 to 1200 hrs

Time allowed **THREE hours** Total marks : 160
ANSWER ALL QUESTIONS Pass marks : 70%

Formulae and all intermediate steps taken in reaching your answer should be clearly shown. You may draw sketches wherever required. Electronic devices capable of storing and retrieving are **not** allowed.

1) State the meaning of the following Admiralty Chart Abbreviations/symbols as illustrated in BA 5011:

Question number and the place where the symbols can be found on a chart	Symbol
a) On the sea bed	
b) On the surface of the sea	
c) On the sea bed	
d) On the surface of the sea	
e) On the coast	

(04 marks each)

2) A container vessel departed Port Bilbao, Spain heading towards Southampton, UK. At 0800 hrs on 10th of December the GPS position is 48^0 00.0' N, 005^0 40' W. She is capable of making 18 knots and her present draught is 14 m. She also equipped with the equipment required for her size and the type of the vessel.

a) Plot the position at 0800 hrs.

(05 marks)

b) Make a passage from 0800 hrs position to the pilot boarding ground at Southampton, UK giving due respect to international collision regulations, clearly giving the information as required by commonly used standards.

(30 marks)

c) You are still keeping the Spain time onboard, which is GMT +1 hr. Calculate the ETA at Southampton pilot boarding ground.

(05 marks)

d) You encounter thick fog while entering Casquets TSS. What is the best method available to ensure that the vessel is on the charted track by means of terrestrial navigation? With the aid of a diagram of a radar screen describe how to set it up on the radar.

(10 marks)

3) Your vessel has the following particulars:

Air draught = 20.1m

Draught = 8.5 m

She needs to pass under a bridge at Ullapool whose elevation is given as 20 m. The Master wants to keep a clearance of 1.0 m between highest point on the ships and the bridge. Calculate the latest time she can pass under the bridge safely before the morning high tide on 07th February.

(20 marks)

4) A vessel steering 067^0 (G) at 12 knots observed Start Point light (50^0 14' N, 003^0 38' W) to bear 025^0 (G) at 1200 hrs and at 1330 hrs the same light bore 316^0 (G). A tidal stream was setting in the direction of 155^0 (T) at 2 knots throughout. The Gyro error was known to be 1^0 (H). Find the following;

a) Position of the vessel at 1200 hrs

(10 marks)

b) Gyro course to steer from 1330 hrs to pass Anvil Point (50^0 35' N, 001^0 56' W) 12 miles off abeam to port counteracting the current.

(10 marks)

c) Find the time when the Anvil point will be abeam

(10 marks)

5) At 1000 hrs the following compass bearings were observed;

Cap Levy Lt. Ho.	120^0 (C)
Cap de la Hague Lt. Ho.	210^0 (C)
Alderney Lt. Ho.	250^0 (C)

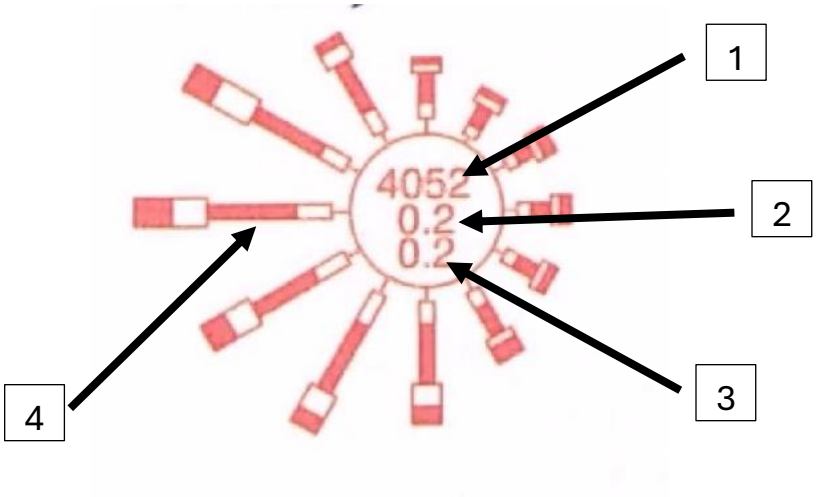
Find the ship's position at 1000 hrs and also the deviation of the compass if variation was 2^0 East.

(20 marks)

6) a) Discussed the use of routine chart for Passage planning (06 Marks)

b) List the SIX different types of data which can be extracted from Routine chart (06 marks)

c) Describe the following wind rose diagram in the Routine chart (02 Marks each)



SCOTLAND – ULLAPOOL

LAT 57°54'N LONG 5°10'W

TIME ZONE **UT(GMT)** TIMES AND HEIGHTS OF HIGH AND LOW WATERS YEAR **2000**

JANUARY

	Time	m		Time	m
1	0323	4.2	**16**	0210	4.1
SA	0915	2.3	SU	0814	2.1
	1547	4.2		1434	4.4
	2203	1.9		2054	1.8
2	0416	4.3	**17**	0321	4.3
SU	1021	2.1	M	0934	1.9
	1637	4.3		1544	4.6
	2254	1.8		2206	1.6
3	0459	4.4	**18**	0424	4.6
M	1112	1.9	TU	1044	1.6
	1719	4.4		1647	4.8
	2337	1.7		2307	1.3
4	0535	4.6	**19**	0517	5.0
TU	1155	1.8	W	1141	1.2
	1756	4.5		1742	5.1
5	0014	1.6	**20**	0000	1.1
W	0610	4.8	TH	0605	5.2
	1233	1.6		1233	0.9
	1831	4.6		1831	5.3
6	0050	1.5	**21**	0048	0.9
TH	0643	4.9	F	0649	5.5
	1309	1.4		1322	0.7
●	1905	4.7	O	1918	5.4
7	0124	1.4	**22**	0134	0.7
F	0715	5.0	SA	0732	5.6
	1344	1.3		1408	0.5
	1936	4.7		2003	5.4
8	0157	1.3	**23**	0218	0.7
SA	0746	5.0	SU	0814	5.5
	1419	1.2		1453	0.5
	2007	4.7		2049	5.3
9	0231	1.3	**24**	0301	0.8
SU	0819	5.0	M	0856	5.4
	1453	1.2		1537	0.6
	2042	4.6		2135	5.0
10	0305	1.3	**25**	0344	1.0
M	0856	4.9	TU	0941	5.2
	1529	1.2		1621	0.9
	2120	4.5		2224	4.8
11	0340	1.4	**26**	0427	1.2
TU	0935	4.8	W	1029	4.9
	1608	1.3		1706	1.2
	2203	4.4		2316	4.5
12	0420	1.6	**27**	0511	1.6
W	1019	4.6	TH	1125	4.5
	1649	1.4		1753	1.5
	2253	4.2			
13	0504	1.7	**28**	0014	4.2
TH	1110	4.5	F	0559	1.9
	1737	1.6		1231	4.2
	2351	4.1		1846	1.9

FEBRUARY

	Time	m		Time	m
1	0430	4.1	**16**	0411	4.4
TU	1047	2.1	W	1035	1.6
	1659	4.1		1641	4.5
	2314	1.9		2257	1.5
2	0515	4.4	**17**	0509	4.7
W	1137	1.9	TH	1135	1.2
	1740	4.3		1736	4.8
	2356	1.7		2351	1.2
3	0553	4.6	**18**	0557	5.1
TH	1217	1.6	F	1226	0.9
	1817	4.5		1823	5.1
4	0033	1.5	**19**	0038	0.9
F	0626	4.8	SA	0638	5.3
	1253	1.4	O	1312	0.6
	1848	4.6		1905	5.3
5	0108	1.3	**20**	0122	0.7
SA	0657	5.0	SU	0717	5.5
	1327	1.2		1355	0.4
●	1918	4.7		1945	5.3
6	0141	1.1	**21**	0203	0.6
SU	0727	5.1	M	0754	5.5
	1401	1.0		1435	0.4
	1947	4.8		2024	5.2
7	0213	1.0	**22**	0243	0.6
M	0758	5.1	TU	0832	5.4
	1434	0.9		1514	0.5
	2019	4.8		2104	5.1
8	0246	1.0	**23**	0321	0.7
TU	0832	5.1	W	0910	5.2
	1508	0.8		1552	0.7
	2055	4.8		2144	4.8
9	0321	1.0	**24**	0359	1.0
W	0908	5.0	TH	0949	4.9
	1545	0.9		1630	1.0
	2134	4.6		2226	4.5
10	0359	1.1	**25**	0437	1.3
TH	0948	4.9	F	1031	4.5
	1624	1.0		1709	1.4
	2217	4.5		2314	4.2
11	0440	1.3	**26**	0518	1.6
F	1034	4.7	SA	1122	4.1
	1708	1.2		1752	1.8
	2309	4.3			
12	0527	1.6	**27**	0015	3.9
SA	1131	4.4	SU	0604	2.0
	1758	1.5		1240	3.8
				1846	2.2
13	0014	4.1	**28**	0131	3.8
SU	0624	1.8	M	0705	2.3
	1243	4.2		1411	3.7
	1900	1.7		2008	2.4

MARCH

	Time	m		Time	m
1	0358	3.9	**16**	0402	4.3
W	1021	2.2	TH	1029	1.5
	1637	3.9		1638	4.4
	2250	2.1		2248	1.5
2	0450	4.1	**17**	0500	4.6
TH	1115	1.9	F	1127	1.1
	1721	4.1		1729	4.7
	2335	1.8		2340	1.2
3	0530	4.4	**18**	0546	4.9
F	1156	1.6	SA	1215	0.8
	1757	4.3		1812	5.0
4	0012	1.5	**19**	0025	0.9
SA	0603	4.7	SU	0624	5.2
	1231	1.3		1258	0.5
	1826	4.6		1849	5.1
5	0046	1.2	**20**	0107	0.7
SU	0633	4.9	M	0659	5.3
	1304	1.0	O	1337	0.4
	1853	4.8		1924	5.2
6	0119	0.9	**21**	0145	0.5
M	0702	5.1	TU	0733	5.3
	1337	0.7		1413	0.4
●	1922	4.9		1958	5.2
7	0151	0.8	**22**	0221	0.5
TU	0734	5.2	W	0807	5.2
	1410	0.6		1448	0.5
	1954	5.0		2032	5.0
8	0225	0.7	**23**	0256	0.6
W	0807	5.3	TH	0841	5.0
	1444	0.5		1522	0.7
	2029	5.0		2106	4.8
9	0300	0.6	**24**	0331	0.9
TH	0843	5.2	F	0915	4.8
	1521	0.5		1555	1.0
	2107	4.8		2140	4.5
10	0338	0.8	**25**	0407	1.1
F	0923	5.0	SA	0949	4.4
	1600	0.7		1631	1.4
	2149	4.6		2217	4.3
11	0419	1.0	**26**	0444	1.5
SA	1009	4.7	SU	1028	4.1
	1642	1.0		1709	1.7
	2239	4.4		2307	4.0
12	0505	1.3	**27**	0526	1.9
SU	1107	4.4	M	1126	3.7
	1731	1.4		1754	2.1
	2343	4.1			
13	0601	1.6	**28**	0031	3.7
M	1224	4.1	TU	0618	2.2
	1833	1.8		1322	3.5
				1904	2.4

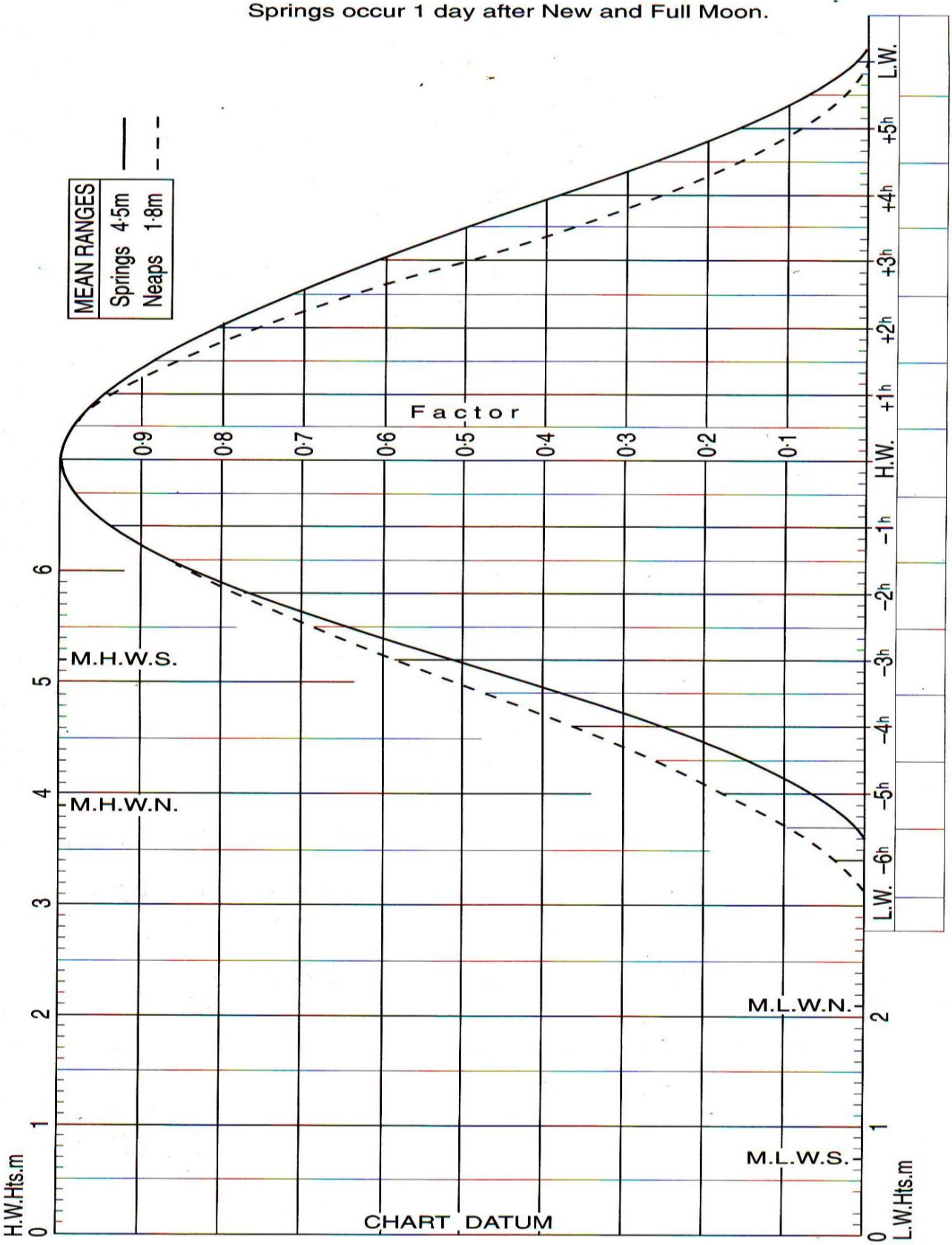
APRIL

	Time	m		Time	m
1	0458	4.3	**16**	0531	4.7
SA	1124	1.5	SU	1157	0.8
	1729	4.3		1756	4.8
	2343	1.5			
2	0532	4.6	**17**	0007	1.0
SU	1200	1.2	M	0607	4.9
	1758	4.6		1238	0.6
				1829	5.0
3	0018	1.2	**18**	0048	0.8
M	0603	4.9	TU	0640	5.0
	1234	0.8	O	1315	0.5
	1825	4.8		1901	5.0
4	0052	0.9	**19**	0124	0.7
TU	0635	5.1	W	0711	5.1
	1308	0.6		1349	0.6
●	1856	5.0		1932	5.0
5	0126	0.6	**20**	0159	0.7
W	0709	5.3	TH	0744	5.0
	1343	0.4		1421	0.7
	1930	5.1		2003	4.9
6	0202	0.5	**21**	0233	0.8
TH	0745	5.3	F	0816	4.8
	1420	0.3		1453	0.8
	2006	5.1		2035	4.8
7	0240	0.5	**22**	0307	0.9
F	0823	5.3	SA	0849	4.6
	1458	0.4		1525	1.1
	2045	5.0		2107	4.6
8	0320	0.6	**23**	0342	1.2
SA	0906	5.0	SU	0923	4.3
	1539	0.6		1559	1.4
	2128	4.8		2143	4.3
9	0403	0.8	**24**	0418	1.4
SU	0957	4.7	M	1003	4.0
	1623	1.0		1635	1.7
	2220	4.5		2231	4.1
10	0452	1.2	**25**	0459	1.8
M	1100	4.4	TU	1057	3.8
	1713	1.4		1717	2.0
	2329	4.2		2341	3.8
11	0551	1.5	**26**	0549	2.0
TU	1223	4.1	W	1227	3.5
	1818	1.8		1816	2.3
12	0058	4.0	**27**	0111	3.7
W	0710	1.8	TH	0700	2.2
	1357	3.9		1410	3.5
	1945	2.0		2004	2.4
13	0231	4.0	**28**	0228	3.8
TH	0856	1.7	F	0842	2.1
	1523	4.1		1526	3.7
	2124	1.9		2128	2.2

ULLAPOOL

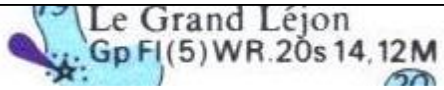
MEAN SPRING AND NEAP CURVES

Springs occur 1 day after New and Full Moon.



Answers

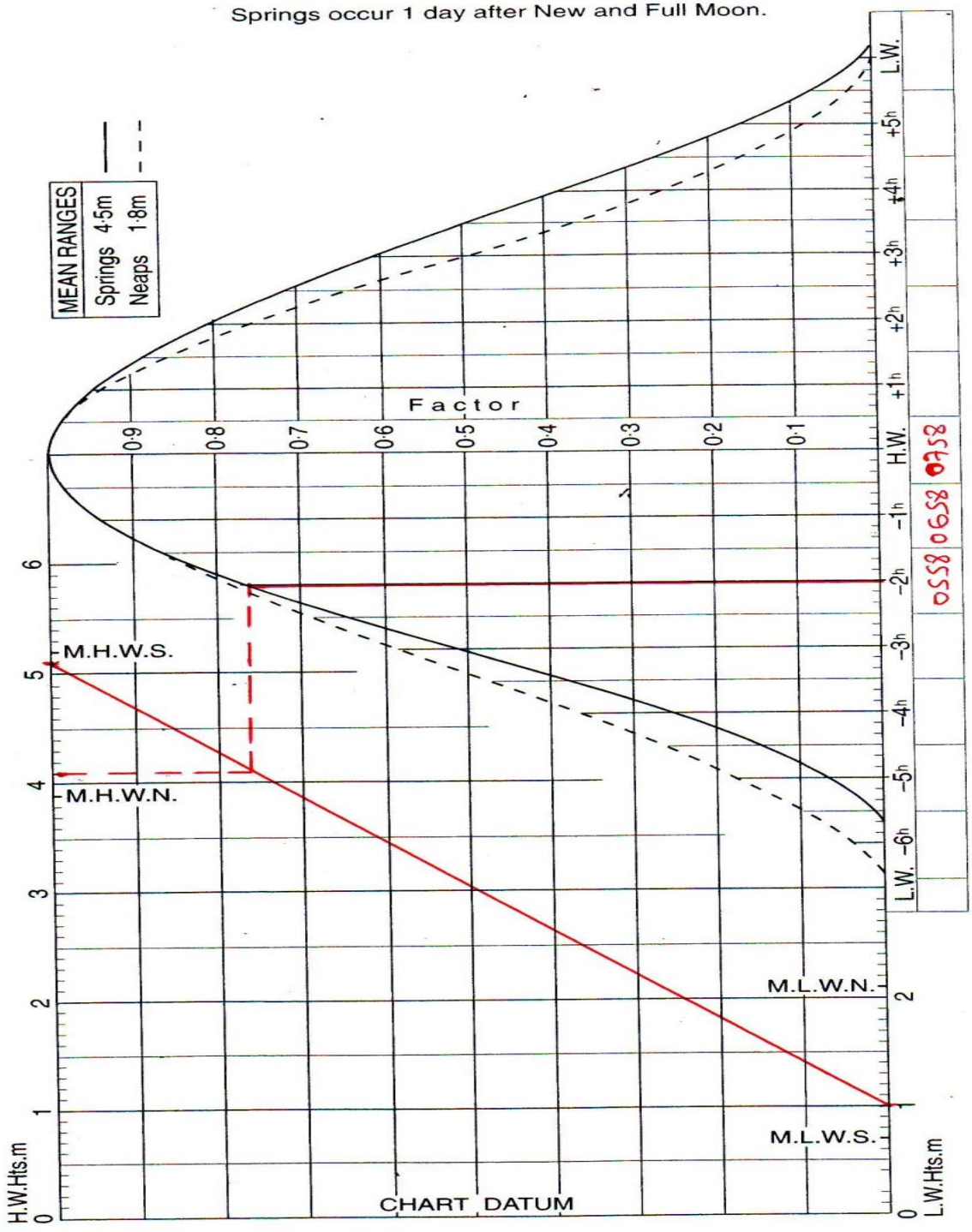
Answer 1

Question number and the place where the symbols can be found on a chart	Symbol	Answers
a) On the sea bed		Wreck, depth 90 m, wire swept and position approximate
b) On the surface of the sea		Yellow colour special buoy with light, flash yellow
c) On the sea bed		Depth of 20 m with contour
d) On the surface of the sea		Tidal diamond 'N'
e) On the coast		Light house with Group flashes 5 every 20 seconds, white and red colour, white colour range 14 m & red colour range of 12 m

Answer 3

Ship's air draught = 20.1 m
Clearance required = 1.0 m
Total height required = 21.1 m
Elevations of bridge = 20 m
MHWS = 5.2 m
Elevations from chart datum = 25.2 m
Available clearance = 25.2 – 21.1 = 4.1m
Therefore, after 4.1 m of tide she can not pass the bridge.

Latest time before the morning high tide she can cross the bridge = 0558 hrs


ULLAPOOL
MEAN SPRING AND NEAP CURVES
Springs occur 1 day after New and Full Moon.
MEAN RANGES
Springs 4·5m
Neaps 1·8m
Factor
0·9
0·8
0·7
0·6
0·5
0·4
0·3
0·2
0·1
H.W.
L.W.
+5h
+4h
+3h
+2h
+1h
−1h
−2h
−3h
−4h
−5h
−6h
0558 0658 0758
M.H.W.S.
M.H.W.N.
M.L.W.N.
M.L.W.S.
CHART DATUM
H.W.Hts.m
L.W.Hts.m
0
1
2
3
4
5
6

Answer 4

1200 hrs position 49^0 58' N, 003^0 49' W
061^0 (G)
Distance to Anvil point = 65'
SMG = 11.9 knots
Steaming time = 5hrs 28 mins
ETA = 1858 hrs

Answer 5

49^0 50'N, 001^0 53'W,

Deviation 6^0 (W)