CERTIFICATES OF COMPETENCY IN THE MERCHANT NAVY - DECK OFFICER

STCW 78 as amended CHIEF MATE/MASTER REG. II/2 (UNLIMITED)

032-73 - NAVIGATION

WEDNESDAY, 20 MARCH 2024

0915 - 1145 hrs

Materials to be supplied by examination centres.

Candidate's examination workbook UK and Ireland Tide Tables (Edition Sept 2011) Navigation Formulae Datasheet (Version 3.0 March 2019) Nautical Almanac Nautical Tables Pacific and Atlantic Oceans Tide Tables (Edition Sept 2011)

Examination paper inserts:

Datasheet Q2 Worksheet Q2 Datasheet Q3(1) Datasheet Q3(2) Datasheet Q3(3)

Notes for the guidance of candidates:

1. Examinations administered by the SQA on behalf of the Maritime & Coastguard Agency.
2. Candidates should note that 200 marks are allocated to this paper. To pass candidates must achieve 120 marks.
3. Non-programmable calculators may be used.
4. All formulae used must be stated and the method of working and all intermediate steps must be made clear in the answer.

Maritime & Coastguard Agency

SQA

NAVIGATION

Attempt ALL questions.

Marks for each question are shown in brackets.

All questions refer to a 4000 TEU container ship on passage from Port Canaveral, Florida, USA, to Brest, France, and Lowestoft-England. Service speed 18.5 knots

1. The ship will depart Port Canaveral on 6th December. The Charterer requires that the ship loads the maximum cargo and undertakes the shortest permissible ocean passage at Service Speed.

   The ocean passage will be:

   Port Canaveral Pilot Station: 28°25'N 80°30'W ('Summer' loadline zone); to
   Brest Pilot Station: 48°20'N 04°40'W ('Winter' loadline zone).

   The ship must consume 180 tonnes of fuel at 40 tonnes per day prior to entering the 'Winter' zone at latitude 36°00'N.

   (a) Calculate EACH of the following:

   (i) the required distance to consume the 180 tonnes of fuel; (6)

   (ii) the position at which the ship can enter the 'Winter' zone; (25)

   (iii) the total distance of the ocean passage. (10)

   (b) The ocean passage commences at 1915 hours, Standard Time, 6th December. The Charterer requests an accurate ETA for the ship's arrival at Brest. Inspection of the North Atlantic Routeing Chart indicates:

   - the Gulf Stream will increase the speed made good x 1.0 knot for 600 n.miles after departing Port Canaveral;
   - the North Atlantic current will increase the speed made good x 0.5 knot until the ship enters the 'Winter' zone;
   - the remainder of the ocean passage will require the ship to cross the Azores and Portugal currents, reducing the speed made good by an estimated 0.3 knot.

   Calculate the ETA at Brest, local time. (12)

2. At 0112 hours UT, 13th December, a yachtmaster transmits a message that they are abandoning their craft in DR position 44°45'N 20°30'W and taking to the liferaft.

No further communication is established.

The Maritime Rescue Coordination Centre (MRCC) at Falmouth, UK, assumes the responsibility for the Search and Rescue operation and appoints 'own ship' as the On-Scene Coordinator (OSC).

(a) State EIGHT duties of the OSC. (16)

(b) The Ocean Routeing Chart indicates that the predominant current sets 115°T x 1.8 knots. The present weather conditions are SW'ly wind, Force 6, rain showers, moderate visibility.

The MRCC reports that the yacht certification shows that the yacht is equipped with a standard enclosed liferaft. No information is available whether the yacht crew have deployed the liferaft drogue.

With reference to Datasheet Q2, determine, by plotting or other suitable means, EACH of the following:

(i) set and rate of drift of the liferaft if the drogue has been deployed; (6)

(ii) set and rate of drift of the liferaft if the drogue has not been deployed. (6)

(c) Own ship will arrive on-scene at 0715 hours UT and two other ships report that they will also be on scene at 1030 hours UT.

State, giving reasons, which search pattern(s) would be considered the most appropriate commencing at:

(i) 0715 hours UT; (6)

(ii) 1030 hours UT. (6)

(d) If an initial search fails to locate a distressed craft, outline how EACH of the following may be used to re-evaluate the datum position:

(i) Current Rose Chart; (5)

(ii) Vector Mean Current Chart. (5)

3. The intended passage through the Dover Straits is to use the NE traffic lane, commence leaving the lane when the MPC buoy is abeam, cross the SW traffic lane and join the Traffic Routeing Scheme for northbound traffic.

The onward passage to Lowestoft requires the ship to transit Traffic Routeing Schemes through areas of offshore exploration and exploitation.

Datasheet Q3(1) is provided for reference.

The Master chairs a meeting with the Bridge Team to discuss the intended passage.

(a) The planned track and MPC buoy are shown on Datasheets Q3(2) and Q3(3).

The ETA at position 50°45'N 01°20'E is 2200 hours UT 21st December.

The Voyage Plan specifies that the Dover Straits transit will be at 'Full Ahead' engine speed 15.0 knots.

Summarise the tidal stream and its influence on the ship's course and speed during the 2 hour transit of the Dover Straits Traffic Routeing Schemes. (25)

(b) Outline TEN navigation and watchkeeping considerations, specifically pertaining to transiting areas of offshore exploration and exploitation, that the Master should discuss with the Bridge Team. (20)

4. The exchange of information between the Master and the Pilot contributes to the safety of navigation within pilotage waters.

(a) State the purpose of the Pilot Card. (10)

(b) On arrival at the Bridge and prior to any discussion regarding the inbound passage, the Master and Pilot must exchange information.

State EACH of the following:

(i) FIVE items of information that should immediately be provided by the Master to the Pilot; (10)

(ii) THREE items of information that should immediately be provided by the Pilot to the Master. (6)

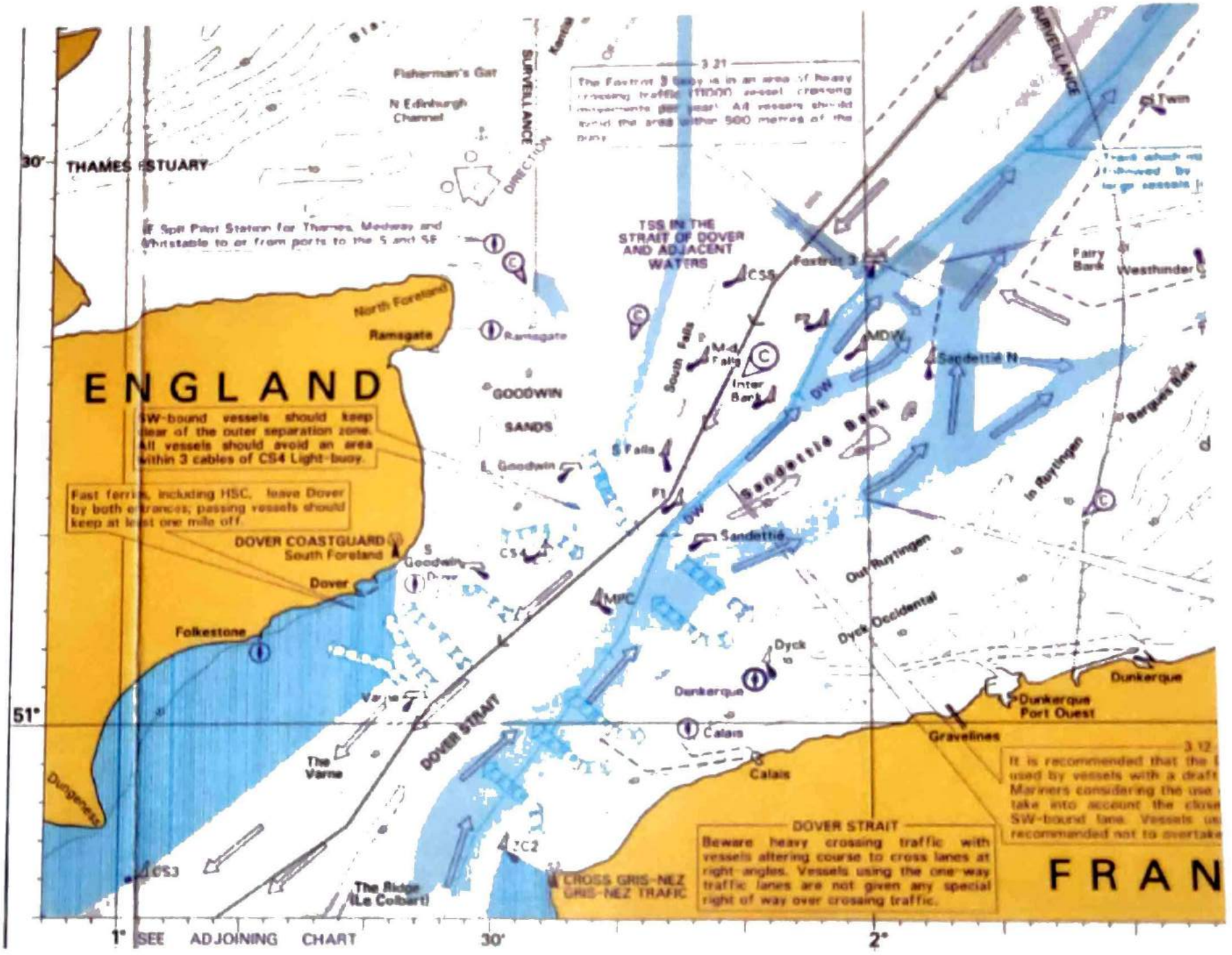
(c) The Pilot advises the Master that own ship will need to overtake a small vessel whilst transiting the entrance channel. Current MCA guidance outlines the cause, effects and dangers of Interaction.

Explain, with the aid of diagrams, the cause and effects of Interaction for EACH of the following situations:

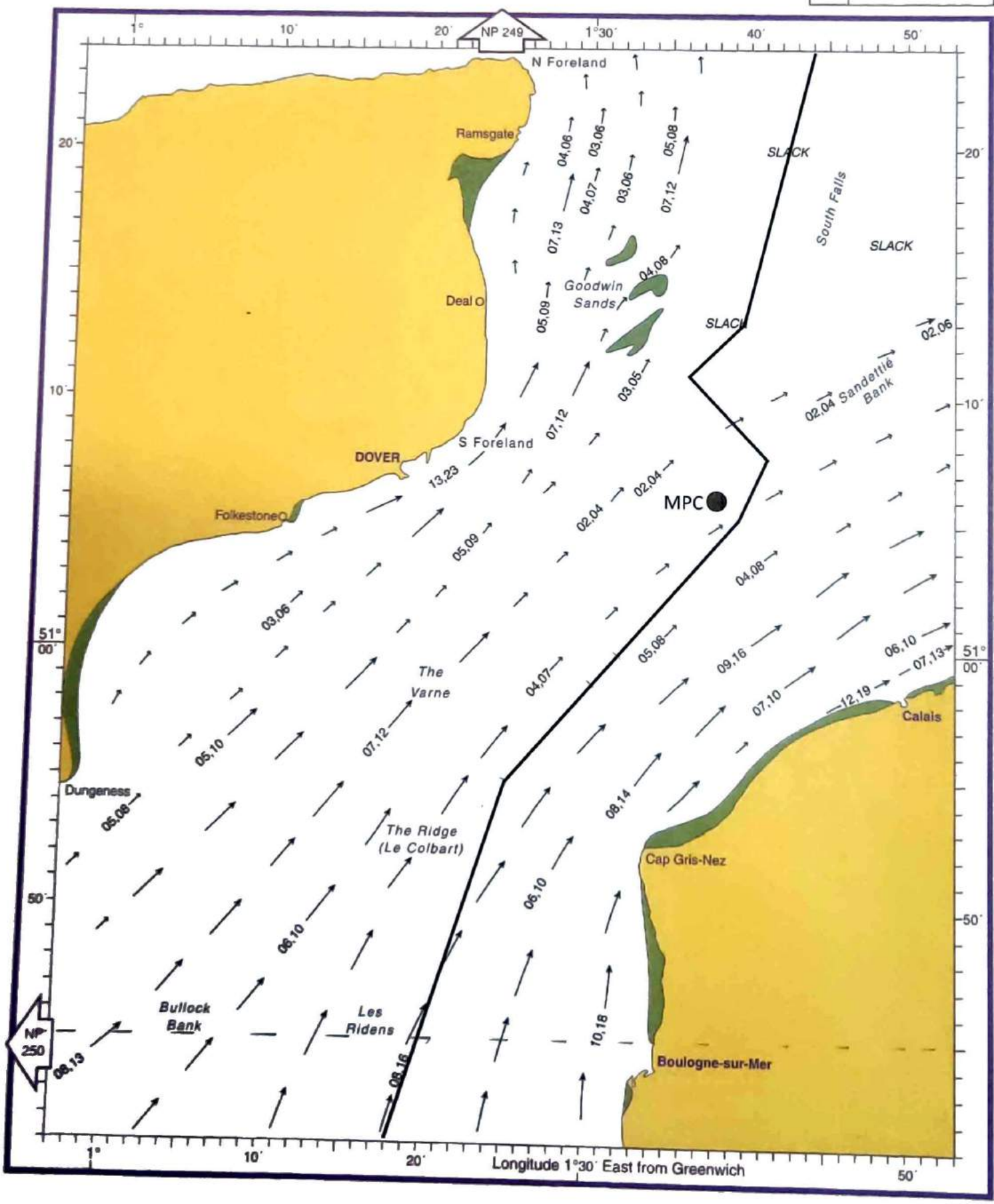
(i) bow of own ship approaching stern of the small vessel; (10)

(ii) own ship abeam of the small vessel. (6)

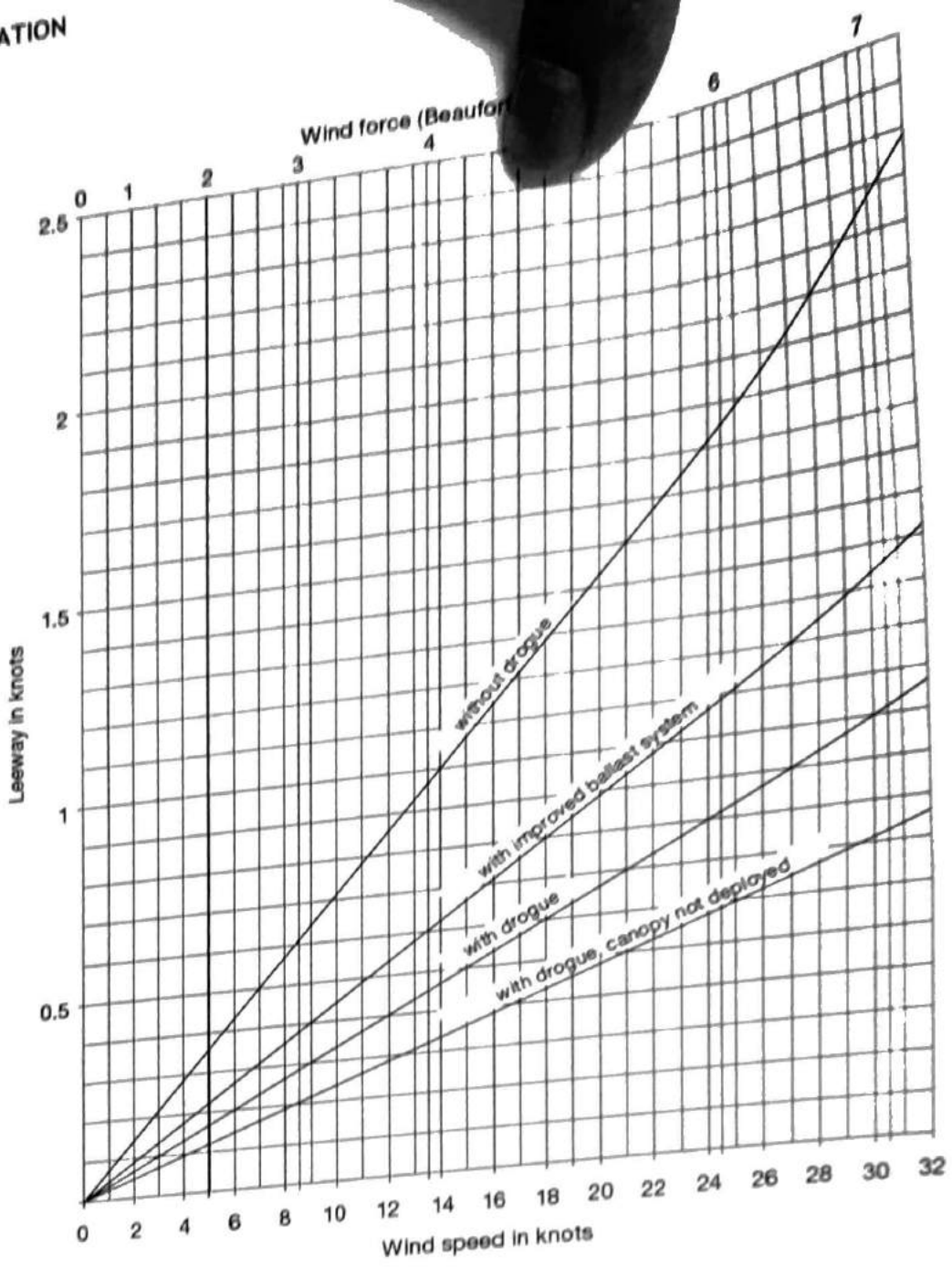
(d) Outline FIVE factors to consider if one ship is to overtake another in restricted waters, to reduce the dangers of Interaction. (10)


THAMES ESTUARY
Fisherman's Gat
N Edinburgh Channel
SURVEILLANCE
DIRECTION
TSS IN THE STRAIT OF DOVER AND ADJACENT WATERS
Foxtrot 3
CS5
Fairy Bank
Westhinder
North Foreland
Ramsgate
ENGLAND
SW-bound vessels should keep clear of the outer separation zone. All vessels should avoid an area within 3 cables of CS4 Light-buoy.
GOODWIN SANDS
South Falls
Mid Falls
Inner Bank
MDW
Sandettie N
DW
Sandettie Bank
Barges Bank
In Ruytingen
Fast ferries, including HSC, leave Dover by both entrances; passing vessels should keep at least one mile off.
DOVER COASTGUARD
South Foreland
Goodwin
CS4
Sandettie
Out Ruytingen
Dover
MPC
Dyck Occidental
Folkestone
Dyck
Dunkerque
Dunkerque Port Ouest
Gravelines
Calais
DOVER STRAIT
The Varne
Dungeness
CS3
CC2
The Ridge (Le Colbart)
CROSS GRIS-NEZ
GRIS-NEZ TRAFIC
DOVER STRAIT
Beware heavy crossing traffic with vessels altering course to cross lanes at right angles. Vessels using the one-way traffic lanes are not given any special right of way over crossing traffic.
FRAN
30'
51°
1°
30'
2°
SEE ADJOINING CHART

1 BEFORE HW DOVER




HW DOVER
NP 249
N Foreland
Ramsgate
Deal
DOVER
S Foreland
Folkestone
Goodwin Sands
South Falls
10.18 Sandettié Bank
MPC
The Varne
Dungeness
The Ridge (Le Colbart)
Cap Gris-Nez
Calais
Boulogne-sur-Mer
Bullock Bank
Les Ridens
NP 250
Longitude 1°30 East from Greenwich



Liferaft leeway