

# CLASS 2/1

## NAVIGATION

### SAILING (GREAT CIRCLE/COMPOSITE GREAT CIRCLE)

01. The vessel's charterer have advised that they wish to route the vessel via Cape Horn (Chile) and have requested the distances for both rhumb line and composite great circle routes (limiting Lat  $58^{\circ}20'S$ ) for the following departure and landfall positions.

Departure Position Wellington  $41^{\circ}22'.0S$   $174^{\circ}50'.0E$

Landfall Position Cape Horn  $56^{\circ}20'.0S$   $067^{\circ}20'.0W$

Calculate EACH of the following:

- i) the rhumb line distance;
- ii) the composite great circle distance
- iii) the ETA at the landfall position off Cape Horn (Time zone +4) if the vessel leaves Wellington (Time Zone -12) at 2215 hrs Standard time on the 8<sup>th</sup> June and follows the composite great circle route. Expected service speed is 16.0 kts.

02. A ship is on a voyage from Brisbane (Australia) to Valpariso (Chile). The Master wishes to take advantage of the shortest possible route without contravening Loadline Rules. The ship is located to the Summer marks. 245 tonnes of fuel and water must be consumed, before the ship can enter the winter zone at  $33^{\circ}S$ . The ship has a service speed of 16 knots and consumes 25 tonnes of fuel and water per day (Actual position of Brisbane  $27^{\circ} 28' 153^{\circ} 03'E$ ).

Departure Position:  $26^{\circ}49' S$   $153^{\circ}10' E$

(Valpariso) Landfall position:  $33^{\circ} 00' S$   $071^{\circ} 37' W$

Calculate the shortest legal distance for the voyage.

03. A 70000 GT bulk carrier is to make a loaded passage between Iquique (Chile) to Hobart (Tasmania) via the Cook Strait (New Zealand).

The vessel will discharge part of the cargo of Sulphate in Wellington (North Island New Zealand).

The vessel's owners have indicated they require a service speed of 14.0 knots.

On departure Iquique the vessel is overloaded with respect to her Winter displacement by 340

tonnes and is expected to consume 36 tonnes of fuel and 10 tonnes of water per day on passage.

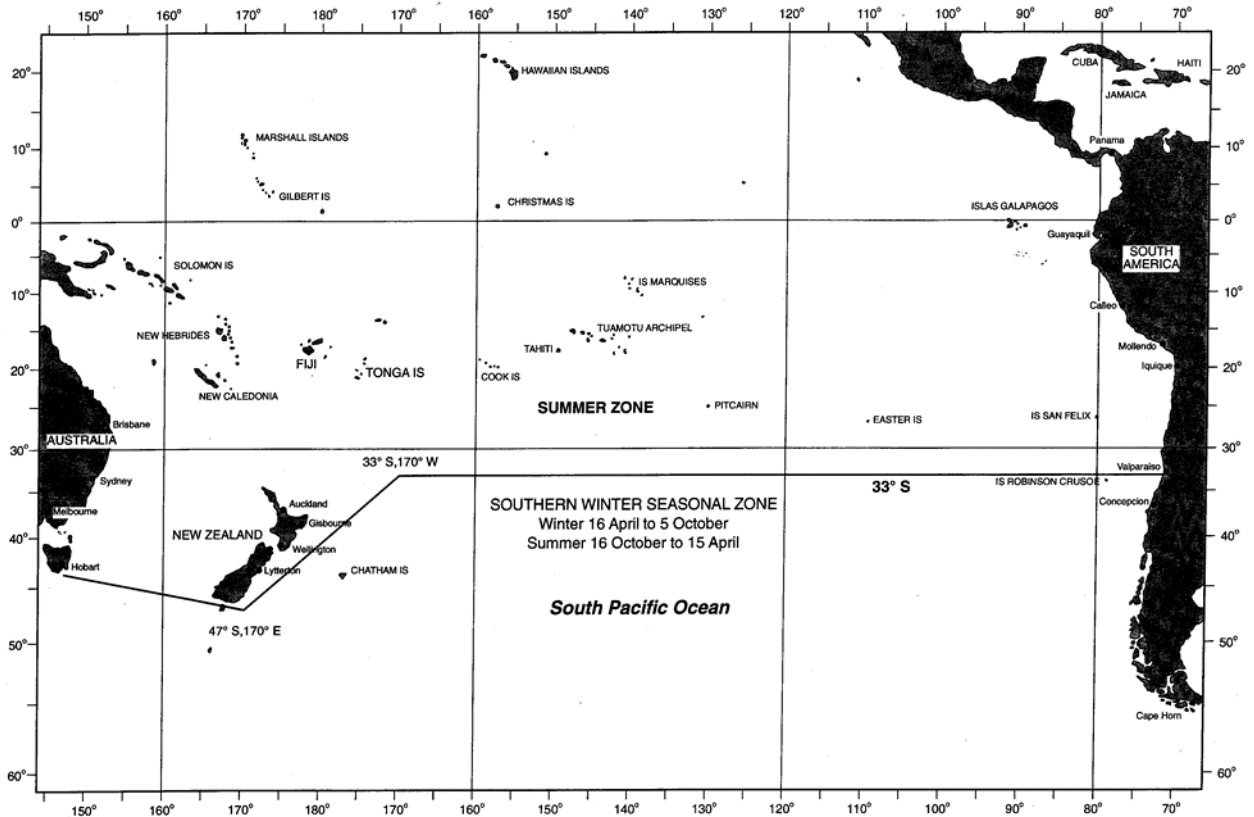
The following departure and landfall positions should be used for the passage to Wellington:

Departure position Iquique:  $20^{\circ} 15'.0S$   $070^{\circ} 20'.0W$

Landfall position Wellington:  $41^{\circ} 42'.0S$   $175^{\circ} 18'.0E$

With reference to Datasheet Q I:

- (a) (i) determine the distance to steam to bring the vessel to her Winter displacement;  
(ii) calculate the distance between the departure position and an appropriate vertex on lat 33 degrees South;
- (b) calculate the shortest legal distance between the departure and landfall positions;
- (c) if the vessel leaves the departure position on the 5th June at 0300hrs (ST), determine the ETA at the landfall position, assuming that the vessel will arrive keeping Standard Time for Wellington.



04. The Master has been asked to consider two routes between the following positions:

Departure Position:  $49^{\circ} 47.0' \text{ N } 006^{\circ} 50.0' \text{ W}$

Arrival Position:  $18^{\circ} 20.0' \text{ N } 067^{\circ} 50.0' \text{ W}$

The routes being considered are:

a direct great circle track

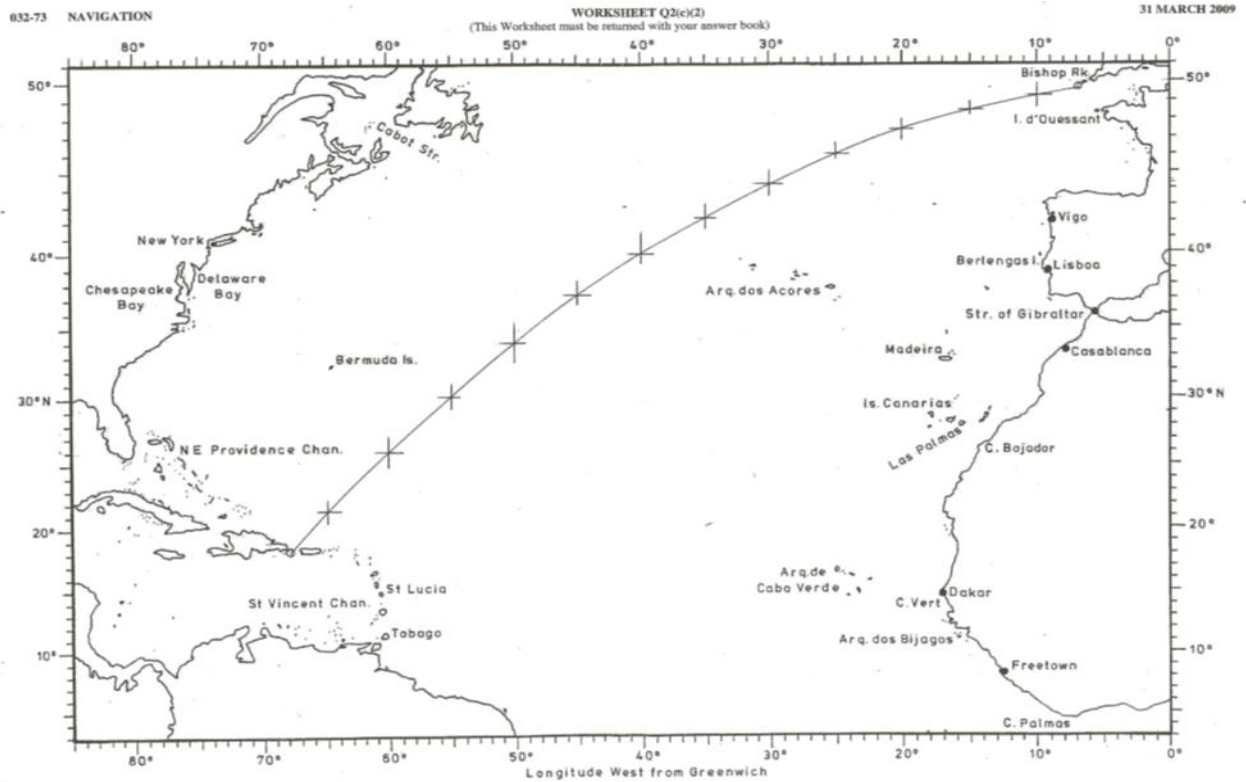
or

a direct rhumb line track

a) calculate the distance on passage for EACH route.

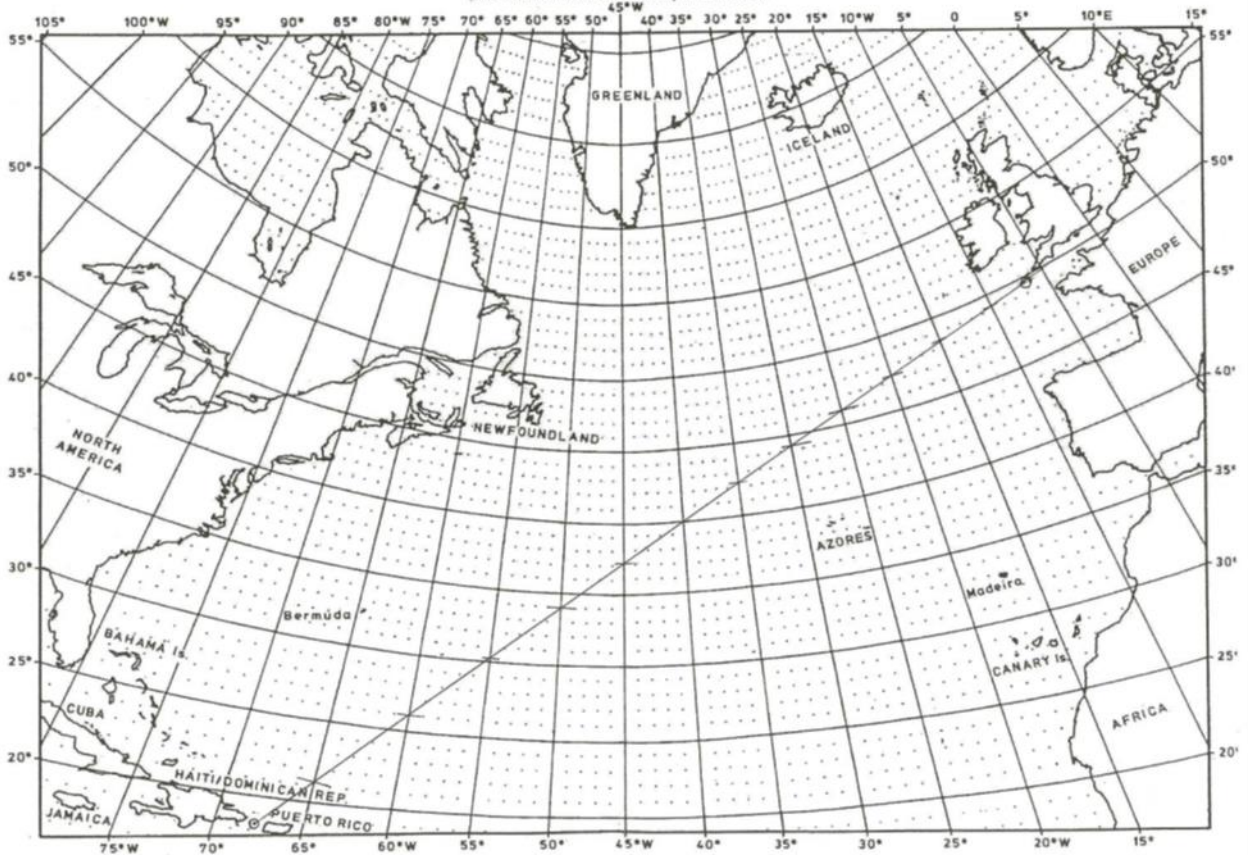
b) Assuming the direct great circle route experiences an adverse current of 1 knot for a distance of 1500 miles, calculate the difference in the ETA's for each route.

c) Plot the direct great circle track on Worksheet Q2(c)(1) and on Worksheet Q2(c)(2)



Candidate's Name .....

Examination Centre .....



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Examination Centre .....

05. A 56 000 GT bulk carrier is due to make a loaded passage between Durban (South Africa) to Melbourne (Victoria, Australia) in December. The following landfall and departure positions are to be used:

Departure Position      30 00.0 S      031 30.0 E

Landfall Position    39 00.0 S      144 00.0 E

The Master asks the Navigating Officer to consider the following routes between the positions:

The recommended route as per Ocean Passages of the World.

The direct great circle route.

A composite great circle route with a limiting latitude of 42 S

a) with reference to datasheet Q1(a), outline the recommended route as per Ocean Passages of the world.

b) on worksheet Q1(b) indicate EACH of the following:

i) the direct great circle track.

ii) the composite great circle route.

c) From Worksheet Q1(b) estimate EACH of the following:

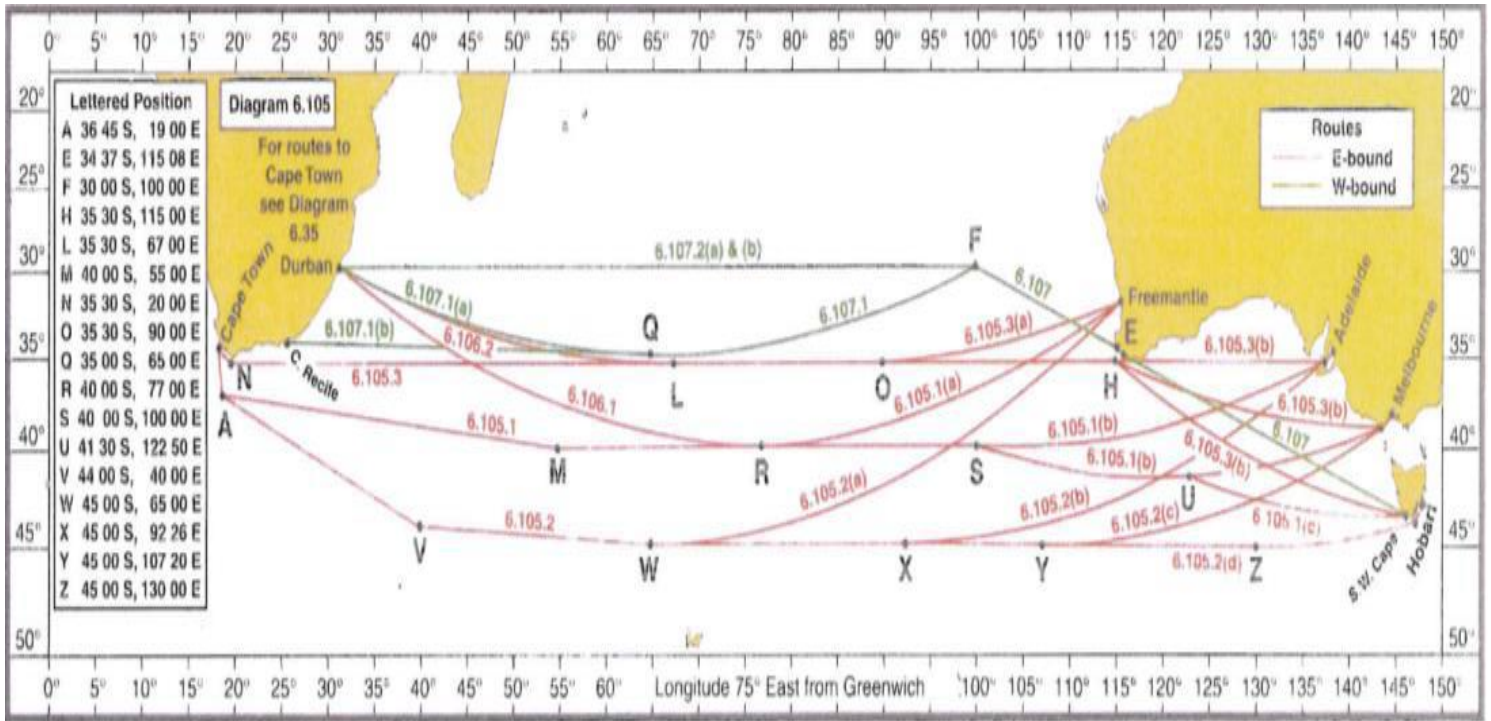
i) the position of the vertex for the direct great circle route;

ii) the position of the vertices for the composite great circle route.

d) Calculate the total distance on passage if the composite great circle route is used.

(assume an extra 136 miles will be added, sailing to and from the respective pilot stations.)

e) Calculate the ETA at the Melbourne pilot station, if the vessel drops the Durban Pilot at 0600hrs ST, 18th December and maintains an average speed of 15.8 knots.

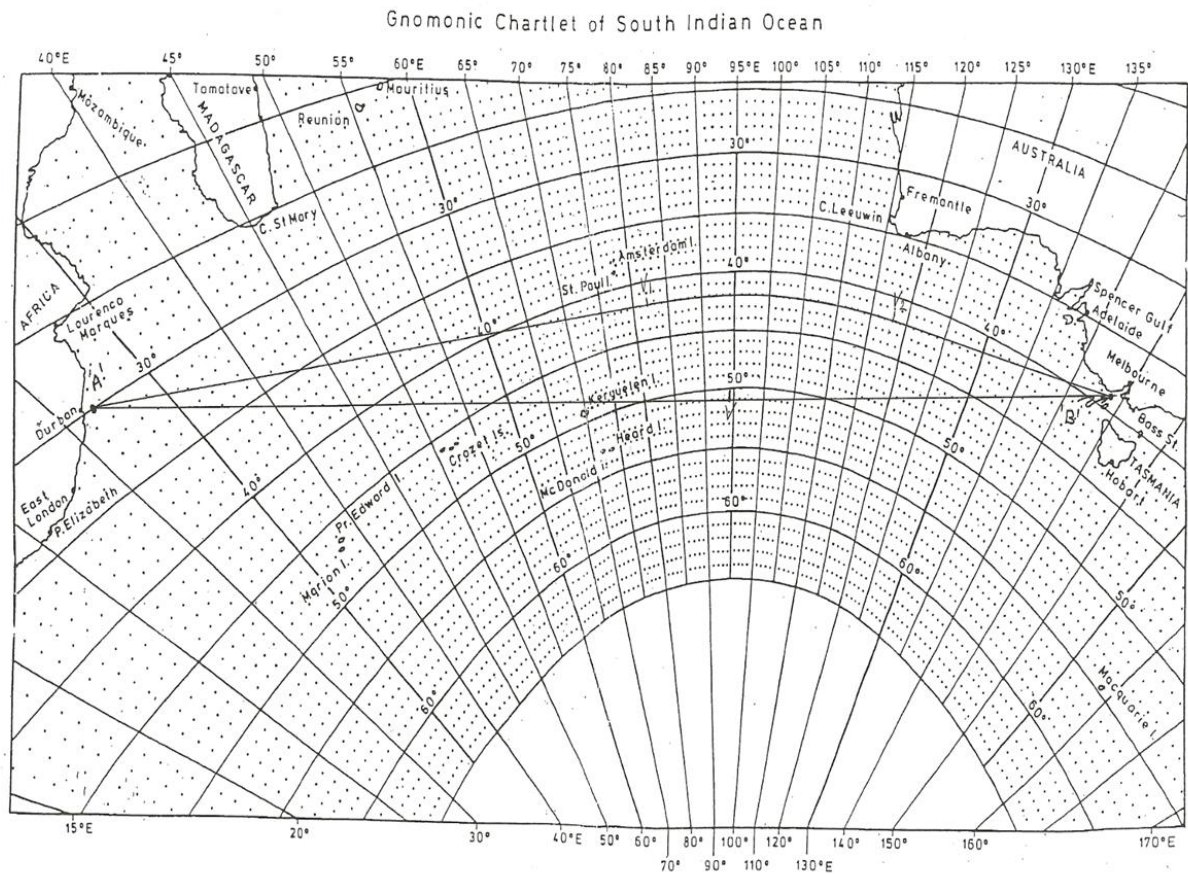


6.105 Cape Town → West and south coasts of Australia  
 6.106 Durban → West and south coasts of Australia  
 6.107 West and south coasts of Australia → Durban and Cape Town

Data Sheet Q1(a)



(This Worksheet must be returned with your answer book)



Candidate's Name .....

Examination Centre .....

06. Find the distance, initial course along the composite great circle track between Cape Agulhas ( $34^{\circ}54'S$ ,  $020^{\circ}01'E$ ) and Cape Leewin ( $34^{\circ}26'S$ ,  $115^{\circ}04'E$ ) applying  $40^{\circ}S$  as the limiting latitude.
07. A 115000 GT bulk carrier is to make a loaded passage between Valparaiso (Chile) to Yokohama (Japan), carrying a cargo of phosphates and is expected to have a departure draught of 16.6 metres.

The vessel carries navigation equipment as per statute and has a service speed of 16.0 knots. The

vessel is due to depart Valparaiso on the 1<sup>st</sup> September.

The vessel is to use the following departure and landfall positions.

Departure Position    33 03.0 S      071 48.0 W

Landfall Position     35 18.0 N      139 42.0 E

Calculate EACH of the following:

- a) the great circle distance;
- b) the final course on the great circle track;
- c) the position of the vertex, lying North of the Equator.

08. An 10000 GT general cargo vessel is to make a loaded passage between Charleston (South Carolina, USA) to Odessa (Ukraine) calling at Nouakchott (Mauretania) and Istanbul (Turkey) en route

The vessel's owners have indicated they require a service speed of 19.0 knots.

The vessel's owners have requested that it follows the shortest possible route between Charleston and Nouakchott, using the following positions for the ocean passage.

Departure position    32°48'.0N      79°51'.0W

Landfall position     18°03'.0N      16°18'.0W

- (a) Calculate the total distance on passage.
- (b) Determine the latitude and longitude of the vessel at the northernmost point along the track.
- (c) Determine the distance off the island of Bermuda (32°21'N 64°48'W) when the vessel crosses longitude 64°48'W, stating whether the vessel passes North or South of the island.



## ASTRONOMICAL FIXES/ STAGGER OBSERVATION

1. In DR  $36^{\circ}48'S$ ,  $110^{\circ}37'E$ , an ex-meridian sight gave an obs lat of  $37^{\circ}00'S$  and a PL of  $100^{\circ}-280^{\circ}$  ( T ). After steaming  $000^{\circ}$  ( T ) for 87 M and  $270^{\circ}$  ( T ) for 110M, an intercept of 7.2' ( Away ) from Az  $086^{\circ}$  ( T ) was obtained working from the earlier obs Lat. Find the position of the ship at the time of 2<sup>nd</sup> observation.
  
2. On 1st Sep'92 , AM DR  $18^{\circ}00'N$ ,  $178^{\circ}11'E$ , the sextant altitude of the Pole Star was  $18^{\circ}47.4'$ , at 05h 21m 08s by chronometer ( error 01m 18s slow ). HE 12.5m, IE 1.6', on the arc. Find the direction of PL and a position through which it passes.
  
3. In DR  $56^{\circ}11'N$   $72^{\circ}23'E$ , an intercept of 6.3'(Away) from Az  $130^{\circ}$ (T) was obtained by an astronomical observation. The vessel then steered  $243^{\circ}$ (T) for 43 miles by log when another astronomical observation gave an intercept of 2.2' towards Az  $210^{\circ}$ (T). The DR used for the second observation was obtained directly by allowing the run to the first DR. Find the position of the vessel at the second observation.
  
4. On 4th March 1992 , DR  $27^{\circ}18'N$   $168^{\circ}11'W$ , the sextant altitude of the Sun's LL near the meridian was  $56^{\circ}19.8'$  when chron showed 11h 13m 24s (error 01m 20s slow). If HE was 12m and IE was 2.8' on the arc, find the direction of the PL and a position through which it passes. (using ex-meridian method)
  
5. Prior to departure the Master decides to increase the passing distance to 30 miles due south of Bermuda due to the fact that the island is surrounded by low lying islands, banks and reefs on which there are numerous wrecks and obstructions.

At the vessel's intended service speed it will be due to pass Bermuda approx 2 hours after sunrise on the 13th September.

The OOW obtains the following observations during morning twilight on the 13th under clear skies, good visibility and calm seas. The vessel was steaming at 19 knots on a course of  $095^{\circ}$ (T).

| Time     | Object   | Azimuth           | True Alt          | Calc Alt          |
|----------|----------|-------------------|-------------------|-------------------|
| 0545 hrs | Arcturus | $037^{\circ}$ (T) | $41^{\circ}15'.7$ | $41^{\circ}10'.9$ |
| 0550 hrs | Rigel    | $130^{\circ}$ (T) | $43^{\circ}13'.8$ | $43^{\circ}20'.4$ |
| 0555 hrs | Vega     | $315^{\circ}$ (T) | $36^{\circ}45'.3$ | $36^{\circ}39'.4$ |
| 0603 hrs | Canopus  | $220^{\circ}$ (T) | $58^{\circ}19'.5$ | $58^{\circ}27'.1$ |

a) Determine the vessel's position at 0600 hrs. using a DR position of  $31^{\circ}45'N$   $62^{\circ}24'W$  to work each sight.

(b) At 0620 hrs the OOW obtains a radar range and bearing of what is thought to be one of the low lying islands south of Bermuda at a range of 26 miles.

The vessel's GPS receiver puts the vessel 0.5 miles to the south of the vessel's charted track, the radar observation puts the vessel 4 miles to the south of the track and the celestial observation above puts the vessel approximately 10 miles to the north of the vessel's track.

Discuss the reliability of EACH of the above observations.

(c) State, with reasons, what action should be taken by the OOW to ensure that the Master's orders, regarding the passing distance off Bermuda, are complied with.

6. On the Morning 21st June, whilst in DR position  $51^{\circ}28'.0$  N,  $027^{\circ}25'.0$  W, at about 0939 hrs ship's time, OOW obtains the following sight of the Sun:

Chronometer time: 11h 28m 44s

Chronometer error: 00m 03s (Fast on UTC)

Sextant altitude of the Sun's lower limb:  $50^{\circ}46'.3$

Index error: 2'.0 off the arc

Height of eye of the observer: 15.7 m

(a) Find the intercept of the Sun and the direction of the position line.

Subsequently at 1427 hrs (UTC), the sextant altitude of the Sun's lower limb at the time of its Meridian Passage was  $61^{\circ}46'.0$

Vessel was steering  $080^{\circ}$  T at its service speed of 14 kts, in the time between the two sights.

(b) Using the information from the two sights, find the vessel's observed position at 1427 hrs (UTC).

## TROPICAL REVOLVING STORM

01. On the 20<sup>th</sup> September, whilst in position 17 15 N 164 30 E, the vessel receives the following typhoon advisory from the Japanese Weather Centre:

2020000UT - Typhoon Charlie

Position 15 00 N 167 30 E

Track 295 (T) Speed of advance 12 knots

Winds 55 knots out to 120 miles 95 knots within 70 miles

a) Draw a plan view of a northern hemisphere TRS showing all the salient features and indicating the likely paths.

b) i) Determine the range and bearing of the storm centre at 20 0000 UT.

ii) Determine, with the aid of a sketch, whether the vessel lies North or South of the forecast track.

c) State the possible actions that are available to the Master to ensure the vessel clears the area as fast as possible and avoids the worst effects of the storm.

02. V/L laying alongside – weather report received of severe typhoon approaching the area. State option open to the master to deal with this emergency, including the advantages, precautions and hazards of each option

## ( Rendezvous )

- 1) A medical emergency occurred on board a target vessel bears  $143^{\circ}T$  at a distance of 175nm from you. The target ship's is doing  $280^{\circ}T$  X 15 kts. Your vessel carries a doctor and has a maximum speed of 20kts. Both vessels are affected by a current setting  $200^{\circ}T$  X 2 kts. What course your vessel must steer to make the rendezvous at the shortest possible time. What will be the ETA to rendezvous if the time now 0600 hrs.
- 2) At 1040 GMT on 16<sup>th</sup> May, a vessel is on fire in the Mediterranean and is now heading for Mercielle, france at 8 kts.  
Vessel's posn at 1040Z  $41^{\circ}26'N$   $006^{\circ}28'E$ .  
Land fall posn at Mersaille  $43^{\circ}18'N$   $005^{\circ}22'E$ ,  
At the same time a fire fighting tug in posn  $42^{\circ}05'N$   $003^{\circ}54'E$  and has a maximum speed of 13kts.
  - a) Find the course required by the tug to rendezvous as soon as possible.
  - b) Calculate the interval between the time of rendezvous and sunset,
3. A vessel is required to rendezvous and stand by another vessel which sustain damage by fire. The damaged vessel is heading for port on a course of  $210^{\circ}T$  at 6 kts. The radar range and bearing of this vessel from you  $115^{\circ}T$  at a distance of 16 nm. Your orders are to take up on the damaged vessel 1 nm off her stbd quarter on a bearing of  $135^{\circ}T$  relative to her heading. Own vessel's maximum speed 14 kts. Find –
  - a) Course to steer to rendezvous,
  - b) Time taken to reach the on station position,
  - c) The bearing at which you would expect to sight the vessel if visibility is 5 miles,
4. Vessel 'X' receives a call for assistance from vessel 'Y' at 0800hrs. Vessel 'Y' has a fire onboard and it's bearing  $220^{\circ}T$  X 48M from vessel 'X'. Vessel 'Y' is steaming at 12kn on a course of  $270^{\circ}T$ , because of an E'ly wind. If the max speed of 'X' is 24kn, what course must it set in order to rendezvous at the earliest time and what's the ETA of 'X' at the rendezvous point?
5. On 12<sup>th</sup> Nov at 1400Z, in posn  $32^{\circ}40.0'N$ ,  $141^{\circ}22.0'E$  and has a max speed of 18kts. A

distress call is received from a v/l on fire in posn  $33^{\circ}08.0'N$ ,  $140^{\circ}13.6'E$ . heading  $235^{\circ}T$  at 6kts.

Find – i) CTS to the RV at the earliest time,  
ii) ETA to RvPt,  
iii) Time when both v/l's will be within 2nm of each other,

6. At 0900, a liferaft bears  $100^{\circ}T$ , at 55nm away from a ship. A N'y wind causes the liferaft to drift at the rate of 3 kts. The ship is expecting a leeway of  $6^{\circ}$  due to above wind's effects. For the course for the ship to steer by and the earliest time it will rendezvous with the liferaft. The Maximum speed of the ship is 17 kts.

Also, find the EP of the rendezvous as the bearing and distance from ship's start position at 0900, if a current of  $155^{\circ}T$  at 2 kts was setting throughout ?

7. At 1100, a vessel ' X ' with an injured seafarer on board bears  $305^{\circ}T$ , 48 miles away steering  $240^{\circ}T$  at 9 kts. After 1 hour, she will alter her course to  $000^{\circ}T$  and increase speed to 12 kts and then will maintain throughout. Find the course to steer by vessel ' X ' in order to rendezvous as soon as possible with the vessel ' Y ', if the maximum speed is 15 kts. Determine the time of rendezvous?

8. At 0450 GMT, on 18<sup>th</sup> June, a tanker in position  $39^{\circ} 42'N$   $145^{\circ} 06'W$  has an injured person requiring urgent medical attention on board.

At the same time a Passenger vessel in position  $40^{\circ} 00'N$   $148^{\circ} 07'W$  heading  $076^{\circ}T$  at 26 kts, has a doctor on board and has agreed to assist. It will maintain course and speed.

It has been agreed that the transfer will take place at sunrise next morning.

Find – i) GMT of Sunrise, ii) Rendezvous position, iii) The course and speed of tanker vessel in order to rendezvous at sunrise.

9. At 1835 GMT on 06<sup>th</sup> May, a Passenger ship steaming at 25 kts in position  $38^{\circ}24'N$   $052^{\circ}42'W$ , following a rhumb line for a landfall at  $40^{\circ}43'N$   $074^{\circ}00'W$ .

A seriously injured person on a bulk carrier is to be transferred to the Passenger vessel, which has a doctor on board, at sunrise next morning. The bulk carrier, at 1835 GMT, is in position  $36^{\circ}48'N$   $058^{\circ} 26'W$ .

Calculate – i) the LMT sunrise for the Passenger vessel, ii) the rendezvous position, iii) the course and speed required by the bulker in order to rendezvous successfully.

10. A seriously injured person on board a tanker is to be transferred to a Passenger vessel with a doctor on board at sunrise.

At 0145 ZT on 6<sup>th</sup> May, tanker vessel is in position  $35^{\circ} 22'n$   $179^{\circ} 32'W$ .

At the same time the Passenger vessel in position  $35^{\circ} 00'S$   $178^{\circ} 30'E$ , on a course of  $090^{\circ}T$  at 27 kts. The Passenger vessel is to maintain it's Course and speed.

Calculate – i) Sunrise time for the passenger vessel, ii) the RV position, iii) Course and speed for the tanker vessel in order to rendezvous successfully.

**11.** Your vessel is in a position latitude  $38^{\circ} 40'S$ , longitude  $120^{\circ} 49'E$ , at 1700 hrs GMT, when a distress message is received. Your maximum speed is 14 knots and you are required to rendezvous with the distress in position latitude  $37^{\circ} 48'S$  longitude  $119^{\circ} 33'E$ . Her course is WNW at 8.0 knots. Find the gyro course to steer to meet the rendezvous if your ships gyro compass has an error of  $2^{\circ}$  High. Allow  $4^{\circ}$  for leeway if a strong easterly wind is blowing. Find also the zone time of the rendezvous

**13.** You are requested to rendezvous and stand by another vessel which has been damaged by fire. The damage vessel is heading for port on a course of  $210^{\circ}(T)$  at speed of 6 knots. The radar bearing and range of this vessel from you is  $115^{\circ}(T)$  distance 16 miles. Your orders are to take up station on the damaged vessel 1 mile off her starboard quarter on a bearing of  $135^{\circ}$  relative to his ships head . Own vessels maximum speed is 14 knots

- Obtain:
- a) The course to steer to rendezvous.
  - b) The time taken to reach the on station position
  - c) The bearing at which you would expect to sight the vessel if the visibility is 5 miles.

**14.** On the voyage from Durban to Karachi, whilst own vessel is in position  $05^{\circ}42'S$   $045^{\circ}36'E$ , it receives a request of assistance from another vessel in position  $01^{\circ}54'N$   $052^{\circ}12'E$ . The vessel in need of assistance is steering a steady course towards landfall position  $04^{\circ}05'S$   $039^{\circ}43'E$  off Mombasa. It is also maintaining a best speed of 12.0 knots.  
(a) Calculate the course being steered by the vessel in need of assistance,  
(b) determine the course own vessel needs to steer to rendezvous with the other vessel as soon as possible  
(c) Calculate the time remaining to make the rendezvous,

## Search and Rescue

**01.** At 1600, two vessel are engaged on a parallel track search on a course of  $160^{\circ}T$  and a speed of 12 kts. The assisting vessel was 2nm to the port beam of OSC. Because of the improved conditions of visibility, the assisting vessel is advised to take up a new station 6nm on the port beam of the OSC vessel.

Assuming that the alterations are instantaneously effective, find the course and speed of the assisting vessel to take up the new station at the earliest time, whilst maintaining the same relative bearing from the OSC vessel. The Maximum speed of the assisting vessel is 15 kts. Find the time when the assisting vessel would be on the advised stations.

- 02.** At 1100, two vessels are engaged in a parallel track search on a course of  $150^{\circ}T$  at 10kts, during a search and rescue operations. The assisting vessel is 3nm on the port beam of OSC vessel and has a maximum speed of 13kts. The assisting vessel is advised to shift to a new position of 3.5nm due West of OSC's vessel with immediate effect. Find the course the assisting vessel must take in order to complete the maneuver in the shortest time, assuming any alteration is instantaneously effective.

Find the time when the assisting vessel : i) will be on the new station, ii). Will be seen if the visibility was 2 miles, iii). Will be astern of the OSC's vessel,  
At what distances will the assisting vessel pass of the OSC's vessel?

## Intercept

- 01.** In condition of restricted visibility, a support vessel is steering a course of  $130^{\circ}T$  at 15 kts. It has a radar contact, which is later confirmed as being a vessel in distress, heading for port of refuge. The radar observations are as follows –

| Time | Bearing         | Range |
|------|-----------------|-------|
| 1310 | $220^{\circ}$   | 11.8' |
| 1319 | $230.5^{\circ}$ | 9.6'  |
| 1328 | $247^{\circ}$   | 7.8'  |

The support vessel is advised to intercept and escort to port maintaining station 1 nm to the stbd beam of the distress vessel. Assuming that any alterations are instantaneously effective and the distress vessel maintains its course and speed, Find – i) Course to steer at a mac speed of 20 kts, at 1337 to intercept and take station 1 nm on the stbd beam of the distress vessel, ii) Time of taking station as advised, iii) the Course and Speed required to maintain station.  
Tidal stream is slack and the wind is calm throughout.



## Tides Questions:

01. Find the height of a light House at Port Patrick charted as 37 meters at 2130 hrs on 21<sup>st</sup> Jun,
02. The height of a light house at Dungeness (ATT 87) is charted as 40m. What height would you use when taking a vertical sextant angle at 1800 GMT on June 8<sup>th</sup>.
03. On May 22<sup>nd</sup>, Margate Port Entrance, find the earliest time after 1400hrs that a ship drawing 3.2m can cross a sand bar charted 0.5m with 0.5m UKC.
04. Find the height of tide at 1830 hrs on the 22<sup>nd</sup> July, at Port of Bristol,
05. Find the time at which the afternoon tide at Yekatehininskiy fell to 2m on 31 Dec,
06. A vessel at anchor off Folkestone ( ATT 88 ) obtained a sounding of 12.8m at 1400 GMT on July , find the charted depth in this position,
07. Find the correction to apply to the lead line at Gogha Sound ( ATT 389 ) at 1600 BST on 23<sup>rd</sup> May,
08. Find the GMT after which there will be 10.0 meters of water over a shoal charted as dredge to 7.4 meters at Foynes Island ( ATT Vol.1 716 ) on a rising tide on the morning of 12<sup>th</sup> Feb,
09. Find the GMT after which there will be 6.0 meters of water over a shoal charted as 2.0 meters off Port Talbot Foynes Island ( ATT Vol.1 510 ) on a rising tide on the morning of 11<sup>th</sup> Dec,
10. Find the time at which there will no longer be 3.0 meters of water over a docksill having a drying height of 0.5m on the afternoon and evening tide (falling) at St. Nazaire ( ATT 1664 ) on 14<sup>th</sup> June,
11. What is the clearance below ba bridge charted as 22 meters on a ship with a masthead 20m above the water line at Newburgh ( ATT 23 ) at 1900 on April
12. A vessel of 8.0m mean draft wanted to pass over a shoal patch of 8.3m with 0.5m safety margin in the AM tide on 2<sup>nd</sup> Feb, on the approach to Port Patrick. What is the earliest time at which she could do that ?

# OTHERS

01. Write down the standing orders for a vessel passing through an area of expected 'ice concentration'.  
explain the hazards and procedure to be followed when navigating in or near ice.
02. Write down the standing orders for a vessel navigating in restricted visibility.
03.
  - a. outline the stated IMO objectives of Traffic Separation and routing schemes.
  - b. state with reasons the manning levels to be observed on the bridge when a vessel  
transits a Traffic Separation Scheme with heavy traffic.
04. Outline meteorological/climatological hazards that may be encountered by vessel ( High latitude )
05. Outline main categories of information found on planning charts (Mallaca Strait, Dover strait)
06. Explain how Co Tidal / Co Range charts can be used by deep draught vessels transiting the dover straits
07. Outline six factors to be considered when choosing a vessel to act as on scene commander (OSC) during search and rescue operations
08. Describe the preparations that should be made on the bridge whilst en-route to the search area.
09. Outline the factors that must be taken into account when selecting a search pattern for SAR operations at sea.
10. For vessel operating in pack ice – outline 5 factors that should be taken into account when maintaining a navigational plot of vessel's position.
11. details the information to be exchanged between the master and pilot in accordance with current guidance.
12. explain the bridge procedure to be followed
  - a) prior to arrival in the port

- b) before sailing
  - c) Approaching area of high density or navigational hazards.
  - d) When navigating in reduced visibility.
  - e) When handing over navigational watch.
  - f) Daily whilst at sea.
13. explain the requirements and procedures to be included in standing and night orders
  14. describe the factor to be considered when determining the composition of bridge team.
  15. explain the precaution to be taken when navigating in or near the vicinity of offshore installation, safety zones and safety fairways.
  16. explain the requirement when navigating in or near traffic separation schemes.
  17. describe the factor to be considered when making a land fall.
  18. explain and outline the advantage and disadvantage of weather routing.
  19. explain the factor to be taken into account when determining an appropriate route for a given passage including load line, oceanography and climatological factor.
  20. What are the actions of the Master in case of the incompetency of the pilot?
21. Enroute, Master receives a request from MRCC to participate in a search and rescue operation.
    - (a) State FIVE factors to be considered when choosing a vessel to act as on scene co-ordinator (OSC) during search and rescue operations.
    - (b) Describe the preparations and decisions to be made by the Master, whilst the vessel is proceeding to the search area.
    - (c) State FIVE factors that need to be taken into account when selecting a search pattern for SAR operations at sea.
  22. Master/ Pilot interface is an important aspect of safe navigation within the mandatory pilotage waters.
    - (a) State the specific responsibilities of EACH of the following when operating together as a bridge team:
      - (i) Master;
      - (ii) Pilot;
      - (iii) OOW:

(b) State the additional responsibilities of the OOW, when the Master is not present on the bridge during pilotage

(c) With reference to Master/Pilot information exchange, list FIVE items that should immediately be provided prior to commencement of pilotage:

- (i) from the Master to the Pilot;
- (ii) from the Pilot to the Master.

23. a) Several publications contain guidance to Masters on determining the composition of the Bridge team under varying operational conditions.

Outline TEN factors that should be considered by the Master when determining appropriate manning levels necessary on the bridge.

b) Describe FIVE items of information that the Pilot should tell the Master, when proceeding up river to the berth.

c) Describe the navigational hazard when navigating in ICE area & what use of Navigational aid can be made to overcome those hazard?

24. a) Several publications contain guidance to Masters on determining the composition of the Bridge team under varying operational conditions.

Outline TEN factors that should be considered by the Master when determining appropriate manning levels necessary on the bridge.

b) Describe FIVE items of information that the Pilot should tell the Master, when proceeding up river to the berth.

25. The vessel arrives in Istanbul and anchors to await a pilot, prior to transiting the Bosphorus on the northbound passage to Odessa. The Bosphorus is covered by a Traffic Separation Scheme for its entire length and in places the passage is extremely narrow (only 8 cables wide from shore to shore). The passage is also very shallow in places with numerous banks, shoals and wrecks. It is also dangerous due to the fact that there are strong currents, sharp bends and frequent close quarters situations during the transit.

(a) Describe the preparations to be made on the bridge prior to undertaking such a passage.

(b) Discuss THREE factors that the master must take into consideration regarding the manoeuvrability of the vessel during the transit.

(c) Outline the precautions that should be taken in the event of an engine or steering gear failure

26. A new port has been open up for trade

a) list the information which a mariner should consider.

b) state the name of the agency to which the report should be sent.

27. What is abnormal wind? state favorable conditions for their formation, general locality of the occurrence, publications to be consulted for their warning information and cautions necessary for the master of a vessel when they are likely to be occurred.