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CINEC CAMPUS (PVT) LTD.
Faculty of Maritime Sciences
Department of Navigation
EDUCATION & TRAINING COURSE :Navigation Cadet Training Program – Phase I
COURSE CODE : ND- 0100 PI , BATCH – 046, 046FC

FINAL EXAMINATION – QUESTION PAPER

INTRODUCTION TO NAVIGATION

- *Answer all questions.*
- *Total Marks: 100*

Date: 09.04.2024 *Pass mark 70%* *Time allocated: 2.5 Hours*

1. i. Explain with an aid of a sketch,
   a. Variation (5 marks)
   b. Deviation (5 marks)
   c. Compass North (5 marks)

   ii. True Course = 001°, Deviation 3° E, Variation 2° W, find the Compass Course (5 marks)

2. i. Draw **Plane sailing triangles** for vessels heading NE & SW courses indicating Departure, D'lat & Distance. (6 marks)

   ii. Where the distance between two places exceed more than 600 NM it is recommended that the calculation done by Mercator sailing. State **Mercator sailing** formula. (4 marks)

   iii. Find course and distance between position A (25° 30′ N, 080° 00′ E) and position B (35° 00′ N, 090° 30′ E) by using **Mercator sailing** method. (10 marks)

3 a) A vessel steering 230 (T) with an average speed of 20 kts, observed St. Foreland light 270(T) at 1900 hrs. Two hours later the same lt observed 330(T). Find her positions at 2100 and 1900 hrs using Running Fix method. (15 marks)

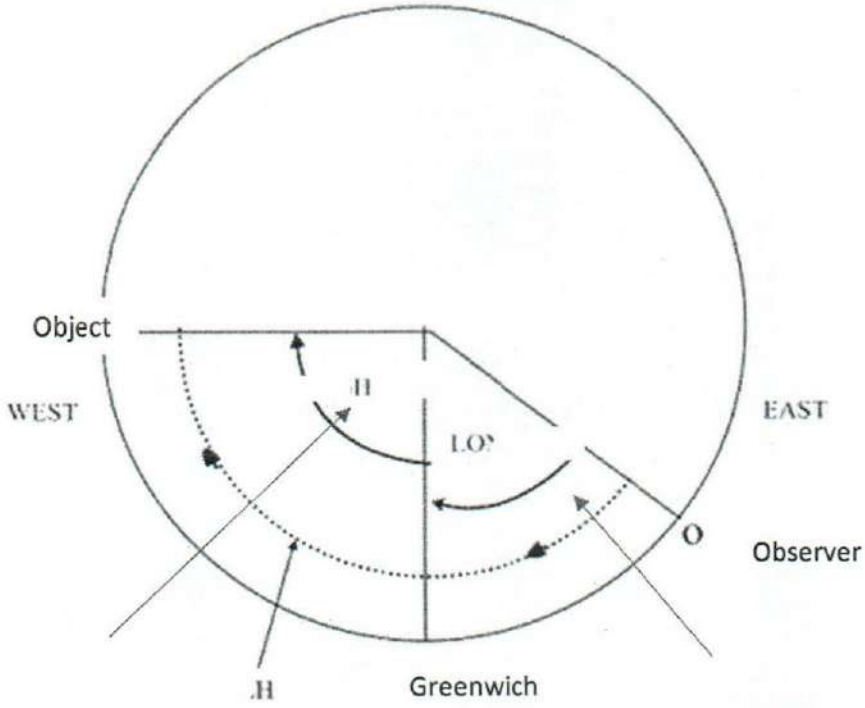
   b) To plot ship's position 2 or more line of positions (LOPs) are used. List five such LOPs. (05 marks)

4 a) A vessel steering 050 (T) with a speed of 15 kts, Royal Sovereign Lt vessel bore 350 (T) at a range of 8.0 miles. Two hours later Dungeness lt bore 000 (T) at a range of 16 miles.

   i. Plot the Dead Reckoning and Observed positions.

   ii. Find the Set, Drift, and the Rate of current, experienced by the ship during her passage. (20 marks)

5 i. Mark LHA, GHA, Longitude in the following drawing.



(5 marks)

ii. 3. At 1000 GMT on 5th March 1992, the chronometer was 01m 20s fast. Find the chron time at 1000 GMT on 27th April if the daily rate was 3s losing. (5 marks)

At $09^h\ 59^m\ 40^s$ (GMT) on 05th of March 1992 an observation of sun was made in DR position 26^0 27' N, 010^0 27' W. Calculate LHA & Declination of the sun. (10 marks)

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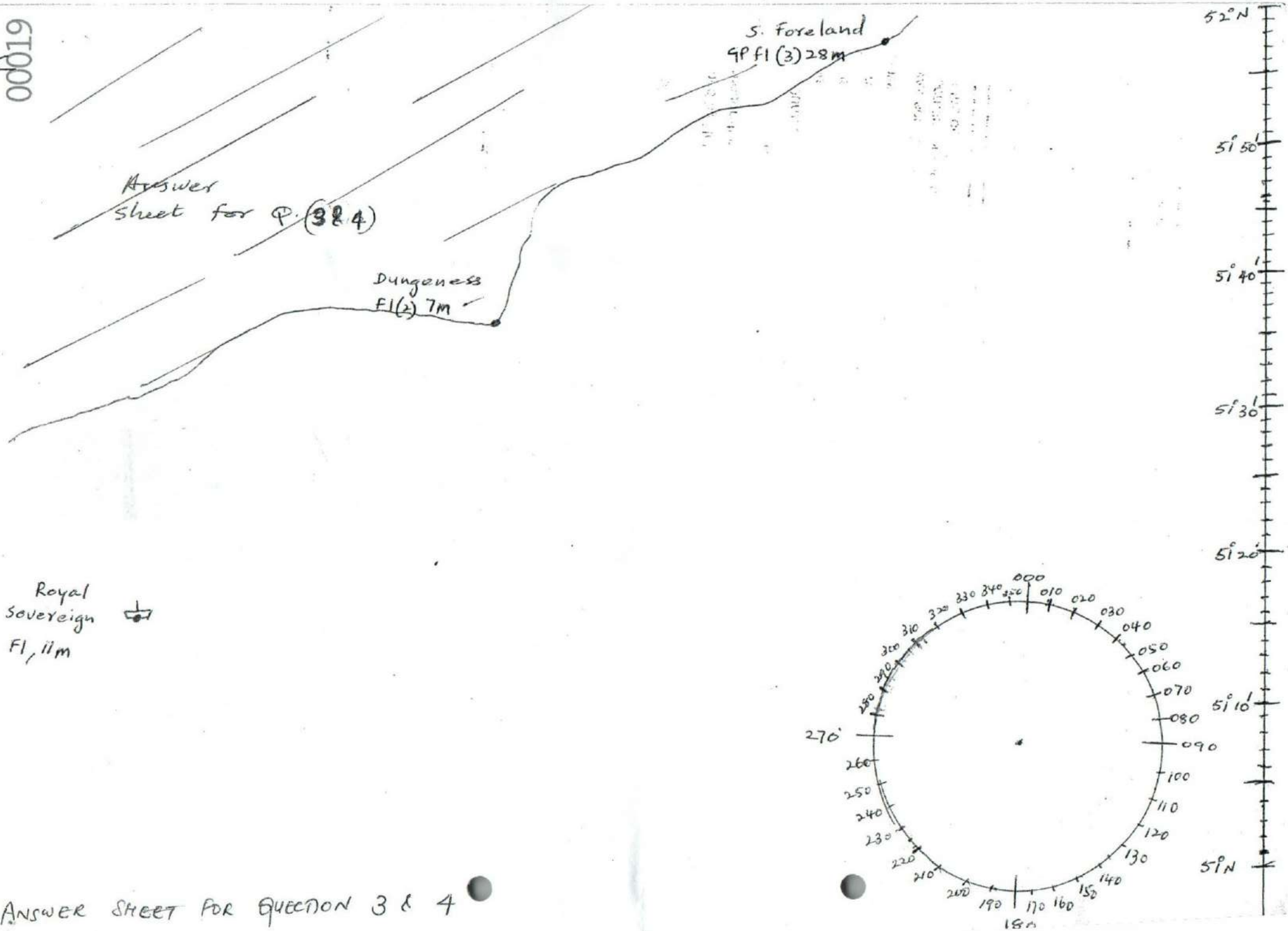

ANSWER SHEET FOR QUESTION 3 & 4

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MID EXAMINATION –QUESTION PAPER

GENERAL SHIP KNOWLEDGE

- Answer all 5 questions.
- Total Marks: 100

Date: 08.04.2024 Pass mark 60% Time allocated: 2.5 Hours

1) Define the following terms with suitable sketches.
   i. Camber
   ii. Rise of Floor
   iii. After perpendicular
   iv. Rake (Keel and stem)
   v. Coefficient of waterplane area (Cw)

(20 marks)

a. Define what Dock Water Allowance is?

A ship floating in SW at a draft of 8.0m is 220m long and 32m wide at the waterline. If her Block Coefficient (Cb) is 0.80 and her TPC in SW is 55, find the draft of the vessel when she enters into Dock water of RD 1.005.

(20 marks)

3). a. Define i) Load Displacement.

ii) Dead Weight Aboard.

b. A ship is loading at a port with the following conditions. Calculate the maximum quantity of cargo that can be loaded so that she can depart at her permissible load line.

Light Displacement	63000 t
Cargo onboard	33000 t
Ballast Water onboard	12500 t

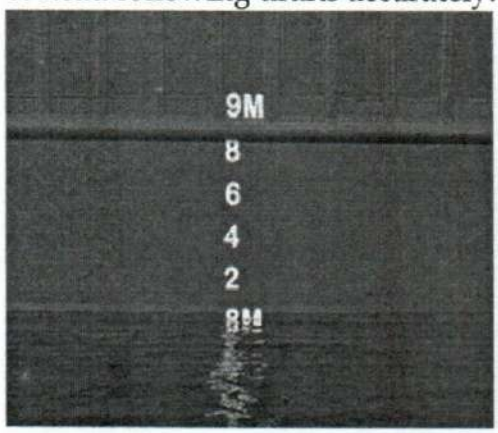
FW onboard	4200 t
Fuel oil onboard	12000 t
Lube oil on board	3000 t
Load Displacement	188000 t

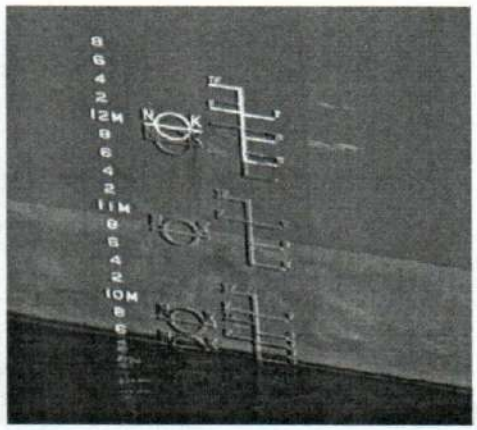
Consumption of Fresh water, fuel oil, lube oil prior to departure is expected to be 2500 t.

(20Marks)

2) a. Draw the Starboard side Load line and Plimsoll marks with dimensions. (10 marks)

b. Read following drafts accurately.





(5 marks)

c. briefly explain what i. air draft ii. Summer Draft is. (5 marks)

4). What is TPC? Prove TPC = A/100 x density of water displaced. (Where, A is the Area of Water plane.)

A ship is floating at a draft of 8.2m in DW of RD 1.010. If her TPC in SW is 40, find how much cargo she can load to bring her draft in DW to 8.4m.

(20 Marks)

5). a. With the aid of sketches describes the following types of vessels.
i. Container
ii. Bulk

(12 marks)

b. Explain what COB and COG means. (08 marks)

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MID EXAMINATION – QUESTION PAPER

METORLOGY

- Answer all questions.
- Total Marks: 100

Date: 08.04.2024 Pass mark 60% Time allocated: 3 Hours

01.

a. Draw and name the components of an Aneroid Barometer. (15marks)

b. You are in a bridge of 20m height from the sea level and your barometer reading is 1015mb. What is the correct reading that you going to log down on the bridge log book After applying Height Correction . (5marks)

02.

a. Name the four means of heat transformation to the Earth's atmosphere and the Earth, by the Sun. (12 Marks)

b. Briefly explain the following terms with regards to Precipitation. (8 Marks)

i. Rain

ii. Drizzle

iii. Sleet

iv. Snow

03.

a. Explain the four Methods of clouds formation, (12 marks)

b. Explain what causes clouds? (8 marks)

04.

a. Briefly explain the following terms (15 marks)

1. Condensation
2. Troposphere
3. Stratosphere
4. Insolation
5. Specific Heat

b. Explain what is latent heat? (5 marks)

05.

a. Briefly explain the following terms (8 marks)

1. Evaporation
2. Saturation
3. Atmosphere
4. Cloud

b. Explain what is Hydrological Cycle? (12 marks)

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MID TERM EXAMINATION –QUESTION PAPER
ROR, WK & BRIDGE EQUIPMENT

- *Answer all questions.*
- *Total Marks: 120*

Date: 05.04.2024 *Pass mark 70%* *Time allocated: 03 hrs*

1. a)
Define and illustrate the following lights showing the arc of visibility of each.

i. Mast-Head Light
ii. Side Light
iii. Stern Light
iv. All round light (02 marks each)

b) Define below terms in accordance with the international COLRegs

i. Vessel
ii. Not Under Command
iii. Fishing Vessel
iv. Restricted in her ability to maneuver.
v. In sight of one another
vi. Constrained by her draft (02 marks each)

2.

a) Explain the most suitable actions upon (own vessel) meeting below situations, in compliance with COLREGS.

Consider that all situations observed a risk of collision, in clear visibility and with sufficient sea room.

Quote under which rule the actions being taken. (03 marks each)

i.

PDV,
Target Vessel : spd 15.0 kts
Course : 270 (T)

PDV (power driven vessel)

Own Vessel : spd 10.0 kts
Course : 000 (T)

ii.

PDV,
Target Vessel : spd 15.0 kts
Course : 090 (T)

PDV

Own Vessel : spd 10.0 kts
Course : 000 (T)

iii.

PDV

Target Vessel : spd 12.0 kts
Course : 000 (T)

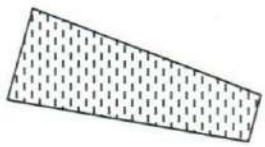
PDV

Own Vessel : spd 15.0 kts
Course : 000 (T)

iv.

CBD (constrained by her draught)

Other Vessel : spd 8.0 kts
Course : 110 (T)



PDV

Own Vessel : spd 11.0 kts
Course : 000 (T)

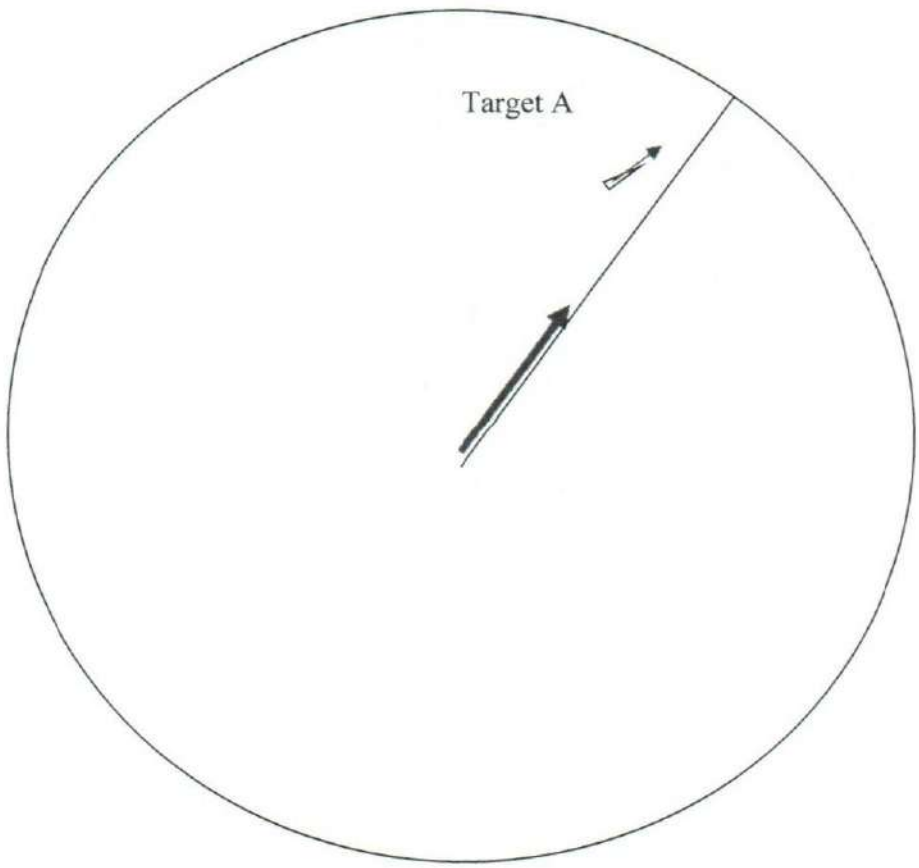
v.

Fishing Vessel	
Target Vessel	: spd 6.0 kts
Course	: 145 (T)

PDV	
Target Vessel	: spd 12.0 kts
Course	: 000 (T)

b. Explain the most suitable actions to be taken by **both vessels** encountering the below situation in **Restricted Visibility/ open sea . (RADAR Screen of own vessel shown below)**

(5 Marks)



3.

a.) Explain how you will prepare to comply with COLREGS when approaching restricted visibility.
(3 Marks)

b.) Answer the following MCQ questions. (01 mark each)

i) In the "Collision Regulations", the word "breadth" in relation to a vessel, means:

a. breadth on the main deck
b. greatest breadth
c. moulded breadth
d. breadth at the load waterline

ii) In the "Collision Regulations", the word "length" in relation to a vessel, means:

a. length between perpendiculars
b. waterline length
c. register length
d. length overall

iii) In the "Collision Regulations", the word "underway" in relation to a vessel, means:

a. being towed.
b. not attached to the sea bottom or shore.
c. drifting.
d. less than the required speed.

iv) It is prohibited to anchor in a traffic separation scheme.

a) TRUE 2) FALSE

v) When joining a traffic separation scheme from sides, a vessel shall:

a. do so at right angles to the general direction of traffic flow
b. seek permission to do so from all other vessel in the vicinity
c. do so only in a case of an emergency or to engage in fishing within the zone
d. do so at as small an angle as possible as nearly as practical

vi) Risk of collision exists when an approaching vessel has:

a. an increasing range and bearing
b. a steady bearing and decreasing range
c. a steady range and increasing bearing
d. a decreasing bearing

vii) Risk of collision is considered to exist if:

a. a special circumstance situation is apparent
b. two vessels are nearby
c. there is doubt that a risk of collision exists
d. another vessel has a constant range and steady bearing

viii) The passage of vessels which can safely navigate only within a narrow channel shall not be impeded by vessels whose length is less than:

a. 10 metres
b. 20 metres
c. 100 metres
d. 50 metres

ix) Which of the vessels listed below shall avoid impeding the safe passage of a vessel constrained by her draft?

a. a fishing vessel
b. a sailing vessel
c. power driven vessel
d. all of above

x) A Seaplane should be keep well clear of a

a. vessel engaged in fishing
b. sailing vessel
c. power driven vessel
d. all of the choices

xi) You are making way in restricted visibility when you hear the sound of a fog signal forward of your beam. You are required to reduce speed to:

a. a moderate speed commensurate with conditions
b. the minimum where your vessel can be kept on course
c. half speed if proceeding at a higher speed
d. a safe speed in relation stopping distance

xii) The minimum visibility range of a stern light on vessels of 12 mtrs or more but less than 50 mtrs in length is:

a. 3 miles
b. 2 miles
c. 4 miles
d. 1 mile

xiii) A vessel shall not enter an inshore traffic zone at any time, is this statement ;

a) TRUE 2) FALSE

xiv) A power driven vessel overtaking should take permission from the vessel being overtaken at open sea., is this statement ;

a) TRUE b) FALSE

xv) A fishing vessel should keep clear vessel NUC, is this statement ;

a) TRUE b) FALSE

xvi) In determining a safe speed, which one of below should not be considered.

a. The state of visibility;
b. The traffic density including concentrations of fishing vessels

or any other vessels.

a. The number, location and movement of vessels detected by radar;
b. Charter's advised speed.

xvi) Which one of the following does not belongs in the procedure for avoiding a risk of collision

a. Be positive, made in ample time and with due regard to the observance of good seamanship.
b. Any alteration of course and/or speed to avoid collision shall, if the circumstances of the case admit, be large enough to be readily apparent to another vessel observing visually or by radar.
c. If there is sufficient sea-room, alteration of course and speed may be the most effective action to avoid a close-quarters situation.
d. Action taken to avoid collision with another vessel shall be such as to result in passing at a safe distance.

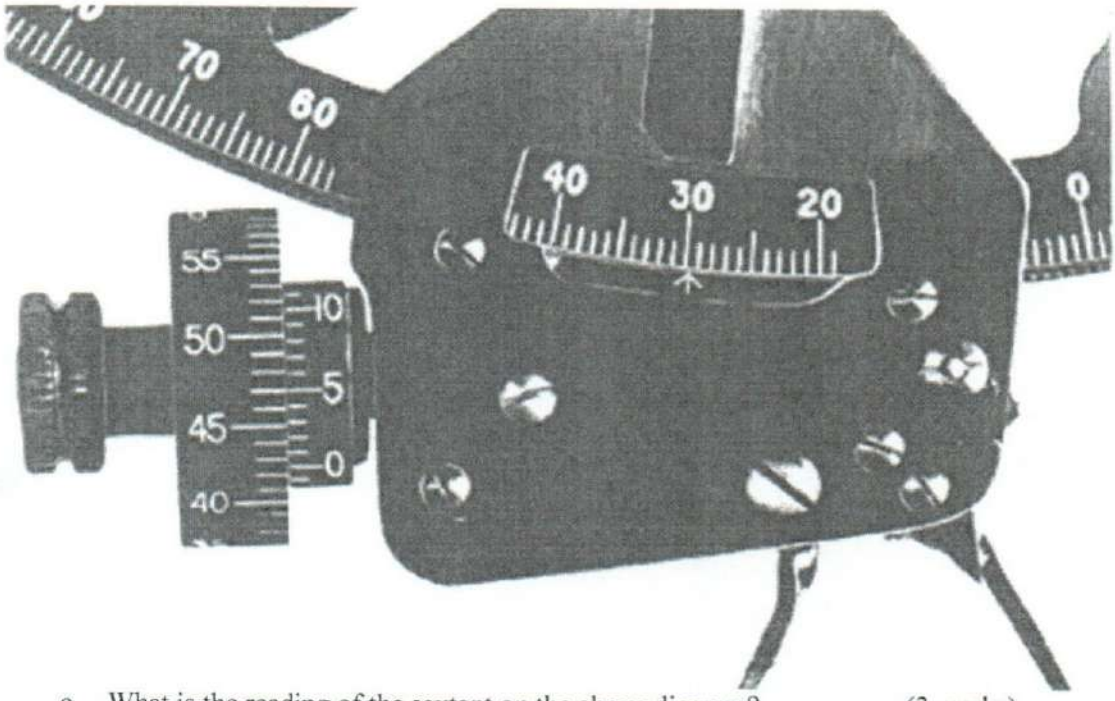
4. The Global Positioning System (GPS) is a space-based global satellite navigation system that provides reliable location and time information in all weather.

a. Name the segments of GPS system with an aid of sketch (5 marks)
b. What are the details observing from the GPS as an OOW? (5 marks)
c. What are the factors affecting the accuracy of GPS? (5 marks)
d. What is the purpose of Differential GPS? (5 marks)

5. Sextant is a handheld instrument used to measure the angles between the lines of sights directed at the two points, by bringing them in to coincide at the eye of the observer.

a. Explain the basic principle of the sextant with an aid of a sketch. (8 marks)

b. Name the main errors of sextant & briefly explain how to correct them (9 marks)



c. What is the reading of the sextant on the above diagram? (3 marks)

6. The term RADAR was coined in 1940 by the U.S. Navy is an acronym for radio detection and ranging., answer the following questions with regards to RADAR.

a. What are the main purposes of radar? (3 marks)

b. Explain radar start up procedure briefly (7 marks)

c. What is the purpose of VRM? (3 marks)

d. Explain Sea stabilization and Ground stabilization modes (7 marks)

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MID-TERM EXAMINATION – QUESTION PAPER

OPERATIONAL SAFETY

- *Answer all questions.*
- *Total Marks: 100*

Date: 05.04.2024 *Pass mark 60%* *Time allocated: 03 Hours*

1. a) With an introduction to each, discus 10 types of cargo and their behaviour and care to be given while on transportation by ship.

(10 Marks)

b) What is meant by breakbulk loading and its pros & cons?

(10Marks)

2. With the aid of a sketch, show a basic "fixed fire Detection and Extinguishing system" of a general cargo vessel with brief explanatory notes.

(20 Marks)

3. Explain why and how cargoes in especially breakbulk needs separation & segregation?

(20 Marks)

4. You have been entrusted with the task for a thorough and complete check the load readiness to grain clean standards of your ship's cargo holds after a discharge of sulfur in bulk and for an intake of sugar in full load.

Describe how would proceed.

(20 Marks)

5. With the aid of suitable sketches, indicate the following:

1) Fore-body & After-body
2) Parallel middle-body
3) Entrance & Run
4) Shoulders (FWD & AFT)
5) Length Between Perpendiculars (LBP or LPP)
6) Beam
7) Draft & Freeboard
8) Depth

9) Length Overall (LOA)
10) Length on Waterline (LWL)
11) Sheer
12) Camber:
13) Tumblehome
14) Flare
15) Rise of floor
16) Dead -rise
17) Rake
18) Cut-up
19) Baseline
20) Cut Away

(20 Marks)

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MID EXAMINATION – QUESTION PAPER

COMMUNICATION

- *Answer all questions.*
- *Total Marks: 100*

Date: 04.04.2024 *Pass mark 70%* *Time allocated: 3 Hours*

1. Draw the sketch of the flag indicating colors, of following letters and state the meaning of flags as per International Code of Signals.
   a) A
   b) C
   c) N
   d) Answering Pendent (20 Marks)

2. Show the following words in Morse Code
   a) Distress
   b) Captain
   c) Medical
   d) Emergency
   e) Bridge (20 Marks)

3. State the Radiotelephone Signals for Distress, Urgency and Safety and briefly explain them. (15 Marks)

4. a) Explain the use of substitute flags. (10 Marks)
   b) You are required to fly the following flags, indicate the order (No need to sketch them) how you would display?

i.	ii.	iii.
M	D	Y
M	G	2
2	7	2
8	7	K

(15 Marks)

5. Describe the purpose of International Code of signals. (20 Marks)

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MID EXAMINATION –QUESTION PAPER

SEAMANSHIP THEORY

- *Answer all questions.*
- *Total Marks: 100*

Date: 04.04.2024 *Pass mark 70%* *Time allocated: 2 Hours*

01)

a) Explain the construction of a pilot ladder with a diagram. (10 marks).

b) How to rig a pilot ladder safely. (10 marks).

02) a) Explain the construction of a natural fibre rope with an aid of a sketch . (10 marks).

b) Explain the constructions of a Steel wire rope with an aid of a sketch. (10 marks).

03) When you receive following "Helm orders" what will be your action. (02 marks each)

1. Port 10.
2. Wheel Hard a port.
3. Ease to 20.
4. Meet her.
5. Steady as she goes.
6. Meet her or Check her.
7. Nothing to Stbd.
8. Steady on 060 (T)
9. Mind your helm/ rudder.
10. Finish with the wheel.

04). Box a compass and name the points.(20 marks)

05). Describe the Risk involved while carrying out following work and how to mitigate the risk.

a). De-rusting on main deck. (05 marks)

b). Working with chemicals. (05 marks)

c). Working aloft. (05 marks)

d). painting on ship side. (05 marks)