



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



MID TERM EXAMINATION – QUESTION PAPER

INTRODUCTION TO NAVIGATION

- Answer all questions.
- Formulae & all intermediate steps taken in reaching your answer should be clearly shown.
- Total Marks : 100

Date: 13.03.2023 (Morning)
03 Hours

Pass mark 70%

Time allocated:

1.
 - i. Draw Plane Sailing Triangles for vessels heading NE and SW courses indicating Departure, D' lat., and D' long. Explain the formulas for calculating D' lat and D' long. (5 Marks)
 - ii. Given the starting position to be $20^{\circ} 11.0' N$ $072^{\circ} 52.0' W$, Course $032^{\circ}(T)$ and Distance 238 miles find the position arrived. (15 marks)
2. Sketch and Define the following Terrestrial References.
 - i. Latitude and Longitude.
 - ii. Meridians and the Prime Meridian.
 - iii. Equator and the Parallels of latitudes.
 - iv. Nautical Mile. (5 marks each)
3. With reference to chart work explain the following,
 - i methods used on board for position fixing. (10 Marks)
 - ii. Dead Reckoning and Observed positions. (6 marks)
 - iii Set and Drift of a current (6 Marks)
 - iv. List the information that can be obtained from a navigational chart? (8 marks)

4.

i. Whilst on a heading 315 degrees (T) a vessel encounters Gyro compass failure. Find the Standard Compass course to be steered if her deviation for above heading is 3 degrees east and variation indicated in the compass rose is 5 degrees west.

ii. Find the GMT, given LIT(East) 08h 9m 12s and LMT 14th 06h 12m 19s.

iii. A ship is to sail 8700 nm at an average speed of 16.5 knots. If she departs at 1030 hrs on 25th March, calculate her ETA at the destination?

(5 marks each)

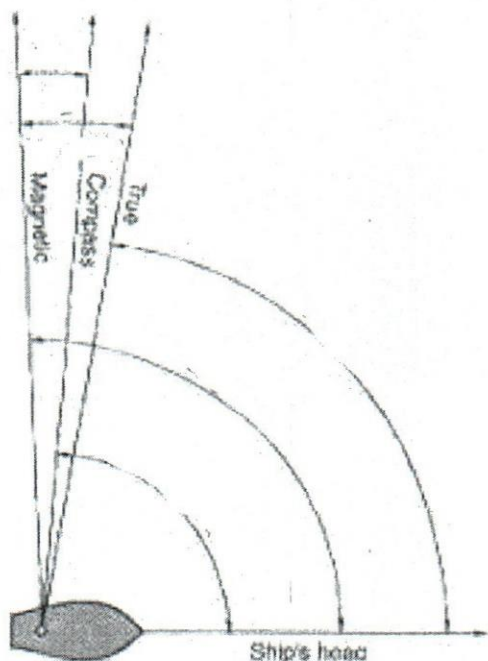
5.

i. What are the characteristics of a Mercator Chart.

ii. briefly Explain Larger and smaller scale charts.

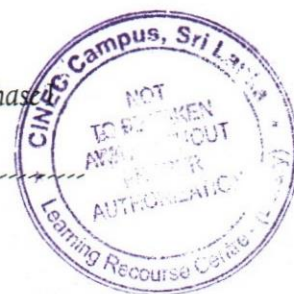
iii. Indicate the angles given in the diagram below.

(5 marks each)



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MID TERM EXAMINATION – QUESTION PAPER
COMMUNICATION

- Answer all questions.
- Total Marks: 100

Date: 10.03.2023 (Morning)
03 Hours

Pass mark 70%

Time allocated:

1. Show the following words in Morse code.

- (a). Bridge
- (b). Forward
- (c). Midshipman
- (d). Western
- (e). Sexton

(20 Marks)

2. Show in Morse code and draw the sketch of the flag indicating colours, of following numbers.

- (a). 1
- (b). 3
- (c). 5
- (d). 0
- (e). 8

(20 Marks)

3. While you are passing a small ship at sea, you observe following signals on that ship. What signals will be indicating a distressed ship?

(a). Following flags in this order

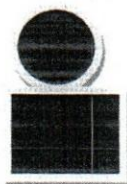


(Alphabetical Flag "N")



(Alphabetical flag "K")

(b). Following shapes in this order



(c). Some flames on deck



(20 Marks)

4.

(i). What is a distressed ship? What are the words to use at the start of a distress message?
(10 Marks)

(ii). Your ship's name is M/V "None such". Call sign "4CRD". Your ship in position Latitude 08 30 N, Longitude 76 25 E, outside Colombo harbor. At night your bow collided with a submerged container, and forward two holds are flooding. All attempts to stop flooding the ship have failed. Ship bow is submerged now.

(a). Are you sending a distress message? Or urgency message?

(b). Write down the message you are going to send or broadcast.
(10 Marks)

5. (i). What is a "EPIRB"? Explain, and give a brief description, how it is working to help distressed ship in an emergency.

(10 Marks)

(ii). When storing (Fixing) a EPIRB on board, what you should remember when selecting a suitable position?

(10 Marks)

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MID TERM EXAMINATION – QUESTION PAPER

GENERAL SHIP KNOWLEDGE

- Answer all questions.
- Total Marks: 100

Date: 10.03.2023 (Afternoon)
03 Hours

Pass mark 60%

Time allocated:

1.a. The TPC of a ship in SW is 30. Calculate her TPC in FW and DW of Rd 1.018.

(5 marks)

b. A ship's Stability data book gives her Load displacement to be 18000t and TPC to be 25. If she is now loading in DW of RD 1.018, by how much may her load line be immersed so that she would not be overloaded?

(15 marks)

2. a. What is FWA? Prove that; $\text{Change of draft} = \frac{(\text{Change of RD} \times \text{FWA})}{0.025}$

(5 marks)

b. A vessel of 12000t displacement arrives at the mouth of a river, drawing 10.0m in SW. How much cargo must she discharge so that her draft in an upriver port of RD 1.012 would be 10.0 m.

(15 marks)

3. a. What is

- Present Displacement
- Dead Weight aboard
- Load Displacement

(3 marks each)

b. A ship loads with following conditions. Calculate the maximum quantity of cargo that can be loaded so that she could depart at her permissible load line in salt water.

Light Displacement	60,000t
Cargo on board	110,000t
Ballast on board	15,000t
FW on board	11,000t
Fuel Oil on board	32,000 t
Load Displacement	270,000t

Consumption of FW prior to departure is expected to be 500t

(11 marks)

4. Following observations were made during a draft survey carried out:

Forward Port 9.39m Forward STBD 9.43
 Midship Port 10.18m Midship STBD 10.26m
 Aft Port 11.10m Aft STBD 11.22m.

Find a. Trim

b. Quarter mean Draft of the vessel

c. whether the vessel is Sagged or Hogged?

(15 marks)

5. a. A ship of 2600t displacement, KG 4.88m loads 4600 t of homogeneous cargo (KG 5.0m). Find how much deck cargo (KG 10.0m) may be loaded to obtain a final KG of 5.11 m.

(15 marks)

b. With suitable sketches describe the following terms;

i. Forward Perpendicular.

ii. Flare.

iii. Draft & Air draft.

(10 marks)

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EDUCATION & TRAINING COURSE: Navigation Cadet Training Program - Phase 1

COURSE CODE: ND-100P1 - BATCH 44

MID TERM EXAMINATION - QUESTION PAPER

RoR, WK & Bridge Equipment

- Answer all 06 questions.
- Total Marks: 120

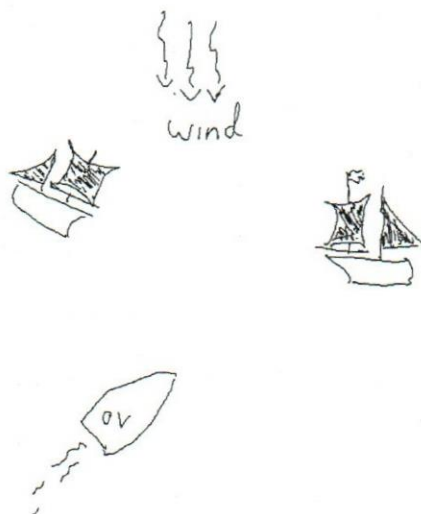
Date: 09.03.2023

Pass mark 70%

Time allocated: 03 Hours

1. "OV" is own vessel.

Explain what could be expected, what would be your most suitable action, and why?



(20 marks)

2. With the aid of relevant sketches, explain the difference in theory and construction of a magnetic Compass and a Gyro Compass.

(20 marks)

3. With the aid of sketches, define the following navigation lights:

- Masthead light
- Port and starboard side lights
- Stern light
- Towing light
- All round light

(4 marks each)

4. Show in a 3-dimensional sketch the navigation lights and day signals of a power driven vessel of 62 M in length engaged in towing where the tow is 310 M.

(20 marks)

5. What do you understand by the terms?

- a. Close Quarters Situation
- b. Practice of good seamanship
- c. Navigate with extreme caution.
- d. Give way & stand on vessels.

(5 marks each)

6. a. With reference to a free gyro scope, explain what is meant by:

- i. Three degrees of freedom
- ii. Gyroscopic inertia
- iii. Precession
- iv. Tilt
- v. Drift

(2 marks each)

b. With the aid of necessary sketches, explain how you would convert a free gyro to a direction indicator.

(10 marks)

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MID TERM EXAMINATION – QUESTION PAPER
SEAMANSHIP THEORY

- Answer all questions.
- Total Marks: 100

Date: 09.03.2023

Pass mark 70%

Time allocated: 03 Hours

1. (i). Your ship is at sea and expected to experience heavy weather. List out 5 preparations on bridge, and 10 preparations on deck, you will take as getting ready to face the rough seas.

(ii). List out 3 equipments from which you can receive weather information and weather warnings while you are at sea.

(iii). What Changes you do to the steering on the bridge, what action you will take as precautionary action regarding steering?

(25 Marks)

2. (i). Why ships want to anchor? Give 4 good reasons why ships want to anchor.

(ii). Draw a sketch of an Admiralty stock anchor (AP) and name all parts. Which part is responsible to improve the stability (stop rotating the anchor while holding) of this anchor?

(iii). Draw the fourth joining shackle of an anchor cable, explain and indicate the colors of marking.

(25 Marks)

3. (i). Indicate how you carry out following orders from the pilot, received by you as the helmsman, while standing in front of the ships wheel.

(a). "Hard to starboard"

(b). "Ease to ten"

(c). "Nothing to port"

(ii). Explain the meaning of engine order "Finish with Engines" while on bridge maneuvering.

(iii). Due to various reasons, ships steering may go out of control from the wheel action. What action will you take, if you observe that you can't steer the ship on course advised by the pilot?

(25 Marks)

4. (i). After rigging of the pilot ladder for arriving pilot, always an officer should inspect it before use. If you were appointed to check the ladder, list out 6 important safety aspects you will check on ladder.

(ii). What important items should be kept ready at the access point on deck, from the pilot ladder for the safety of the pilot?

(iii) What is a Combination pilot ladder? Under what situation you have to use a Combination pilot ladder?

(25 Marks)



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EDUCATION & TRAINING COURSE : Navigation Cadet Training Program – Phase I
COURSE CODE : ND- 100P1 - BATCH 44

MID P-TERM EXAMINATION – QUESTION PAPER
OPERATIONAL SAFETY

- Answer all 06 questions.
- Total Marks: 120

Date: 08.03.2023

Pass mark 70%

Time allocated: 03 Hours

1. Give in introduction to dunnaging, how the floors are laid, when and its importance.
(20 marks)
2. How do you secure cargo to prevent them shifting or slipping.
(20 marks)
3. Discuss how you will make a reefer cargo hold ready to accept the cargo and survey? (20 marks)
4.
 - a. Why should cargo hold be ventilated when it occupies with cargo ?
 - b. Explain what you understand by the terms “cargo sweat” and “ ship sweat” ?
 - c. What is meant by hygroscopic cargo and non hygroscopic cargo
 - e. With the aid of a sketch, briefly explain a natural and a mechanical ventilation system installed in a tween deck cargo hold.
(5 marks each)
5. Write short notes on the following
 - 1) Handysize
 - 2) Handymax
 - 3) Panamax
 - 4) Suezmax
 - 5) Capesize
 - 6) Supper tanker
 - 7) ULCC
 - 8) VLCC
 - 9) Light Ship
 - 10) GT
 - 11) NT
 - 12) DWT
 - 13) Bail capacity
 - 14) Grain capacity

- 15) Standing rigging
- 16) Running riggings
- 17) Deck fittings
- 18) Goose neck
- 19) Summer displacement
- 20) Stowage factor

(1 mark each)

6. Sketch a complete load line marking on the starboard side of a ship indicating it's dimensions based on the following information.

Summer draft = 10 M
FWA = 160 mm
Ships Length 150 M
Freeboard 7 M

(20 marks)



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COURSE CODE: ND- 0100 PI

FINAL EXAMINATION – QUESTION PAPER

METEOROLOGY

- Answer all questions.
- Questions number 1 (one) is compulsory
- Total Marks: 100

Date: 08.03.2023

Pass mark 60%

Time allocated: 03 Hours

- What is the purpose of aneroid Barometer? Draw a sketch and briefly explain the working principle of a aneroid barometer. (20 Marks)
 - What are the two main types of Anemometers, and what are the two main differences? (10 Marks)
- Name the Main Layers of the atmosphere with a rough sketch, and give a brief description about Troposphere. (15 Marks)
 - What is "Insolation"? (15 Marks)
- Briefly outline the Hydrological cycle of the atmosphere, with key elements. (10 Marks)
 - Explain 3 factors affecting the evaporation of water vapour into atmosphere. (10 Marks)
- Give a brief description on dew point temperature. How the atmosphere around you will reach it's dew point? (10 Marks)
 - how is Dew formed on grass and low-lying objects in a cold night? Explain. (10 Marks)



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EDUCATION & TRAINING COURSE : Navigation Cadet Training Program – Phase I
COURSE CODE : ND-100PI - BATCH 042/043

FINAL REPEAT EXAMINATION – QUESTION PAPER
OPERATIONAL SAFETY

- * Ensure clear numbering and identifying of the answer to the respective question.
- * All questions should be answered.

Total Marks: 100

Date: 14.02.2023

Pass mark 70%

Time allocated: 03 Hours

Define the following basis explanatory notes:

1)

- a) Stress
- b) strain
- c) Breaking Stress
- d) Proof Load
- e) Safe working load (SWL)

(20 Marks)

2)

- a) Angle of repose
- b) Moisture content
- c) Moisture migration
- d) TML
- e) Liquification of bulk cargo

(20 Marks)

3) With the aid of suitable sketches, indicate the following:

- 1) Fore-body
- 2) After-body
- 3) Parallel middle-body
- 4) Entrance
- 5) Run

- 6) Shoulder
- 7) Length Between Perpendiculars (LBP or L)
- 8) Beam
- 9) Draft
- 10) Depth

- 11) Length Overall (LOA)
- 12) Length on Waterline (LWL)
- 13) Freeboard
- 14) Sheer
- 15) Camber

- 16) Tumblehome
- 17) Flare
- 18) Rise of floor
- 19) Dead-rise
- 20) Rake

- 21) Cut-up
- 22) Baseline
- 23) Plimsol mark on port side
- 24) Bulbous bow
- 25) Trnaom stern

- 26) Docking plug
- 27) Goose neck
- 28) Derrick head block
- 29) Cargo block
- 30) Heal block

(20 Marks)

4) With the aid of a sketch, show a basic "fixed firer Detection and Extinguishing Installation System" of a General cargo vessel with brief explanatory notes.

(20 marks)

5) Explain in full the following with special emphasis to container ships:

- a. Vision plan
- b. Load Density plan
- c. Ice accretion
- d. Lashing gear

Precautions to be observed when working with containers.

(20 marks)



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EDUCATION & TRAINING COURSE: Navigation Cadet Training Program – Phase I

COURSE CODE: ND-100 P1 - BATCH 042/043

FINAL REPEAT EXAMINATION – QUESTION PAPER

INTRODUCTION TO NAVIGATION

All questions should be answered.

Total Marks: 100

Date: 14.02.2023

Pass mark 70%

Time allocated: 03 Hours

1). 1. Define the below with aids of sketches.

- | | |
|-------------------------|-----------------------------|
| i. Greenwich Hour Angle | v. G.P. of a Celestial body |
| ii. Local Hour Angle | vi. Equinoctial |
| iii. Declination | vii. Ecliptic |
| iv. Siderial Hour Angle | viii. First point of Aries |

(04 marks each)

2). On 13th sept 1992, in DR Position $23^{\circ} 21' S$ $047^{\circ} 18' W$ the observed azimuth of the Sun was 046° (C) when the chronometer showed 01h 08m 10s Chronometer time. If Chronometer error was 02m 12 s slow and variation was $3.0^{\circ} W$, calculate the deviation of the Compass.

(15 marks)

3). On 20th January 1992, in DR $54^{\circ} 20' S$ $046^{\circ} 27' W$, the bearing of Sun set found to be 234° (C). Find the LMT of Sunset and the Compass Error by Amplitude method. If variation was $3.0^{\circ} W$, find the deviation of the compass.

(10 marks)

4). Find by Mercator Sailing, the course and distance from $70^{\circ} 20' N$ $010^{\circ} 22' W$ to $52^{\circ} 50' N$ $009^{\circ} 45' E$.

(15 marks)

5). (A) i. What is meant by DR and Observed position?

(10 marks)

ii. What is Set, Drift and the Rate of a Current?

(10 marks)

(B) Indicated below is the Tidal information of a major port in England.

i. What is meant by Neap and Spring Tides? Indicate the arrows (A and B) showing Neap and Spring Tides separately.

ii. Explain, how the depth of water of this major port is calculated at any given time?

(08 marks)

A

TIME ZONE (UT)

For Summer Time add ONE
hour in non-shaded areas

MAY		JUNE	
Time	m	Time	m
1	0426 1.6	16	0424 2.0
	1112 3.7		1055 3.5
SU	1657 1.9	17	1651 2.2
MO	2335 3.9		2313 3.7
2	0556 1.8	17	0540 2.1
	1245 3.7		1215 3.4
M	1840 1.9	TU	1813 2.2
3	0114 3.9	18	0033 3.7
	0731 1.6		0656 1.9
TU	1413 3.8	W	1341 3.6
	2003 1.6		1925 2.0
4	0235 4.2	19	0155 3.8
	0840 1.2		0759 1.6
W	1518 4.1	TH	1442 3.8
	2105 1.2		2024 1.7
5	0336 4.4	20	0256 4.0
	0936 0.9		0854 1.3
TH	1612 4.4	F	1535 4.0
	2158 0.9		2117 1.4
6	0428 4.6	21	0350 4.2
	1025 0.6		0945 1.1
F	1658 4.6	SA	1623 4.3
	2246 0.6		2207 1.1
		6	0530 4.4
			1124 0.9
		M	1750 4.6
			2344 0.9
		7	0611 4.4
			1203 0.9
		TU	1825 4.6

ENGLAND

LAT 50°21'

TIMES AND HEIGHTS

JUNE	
Time	m
1	0045 4.1
	0654 1.4
W	1336 3.9
	1923 1.6
2	0157 4.1
	0800 1.3
TH	1439 4.1
	2027 1.4
3	0259 4.2
	0859 1.1
F	1535 4.2
	2123 1.2
4	0355 4.3
	0952 1.0
SA	1624 4.4
	2215 1.0
5	0446 4.4
	1041 0.9
SU	1710 4.5
	2302 0.9
6	0530 4.4
	1124 0.9
M	1750 4.6
	2344 0.9
7	0611 4.4
	1203 0.9
TU	1825 4.6

B