



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



FINAL RE-REPEAT EXAMINATION – QUESTIONPAPER
GENERAL SHIP KNOWLEDGE

- Answer all questions
- Total Marks 100
- Diagrams should be shown wherever possible

Date: 13.11.2023

Pass mark 60%

Time allocated: 3 Hours

01. Explain the following terms used in Ship Stability. (Use diagrams and formulae where appropriate)

- i. TPC
- ii. Righting Moment
- iii. Deadweight available
- iv. Transverse Metacentre
- v. Metacentric Height
- vi. Block Co-efficient
- vii. FWA

(30 marks)

02. a) What is Metacentric height and its relationship with GZ.?

- b) Ship of 12000t displacement is heeled by 6 degrees. If her Righting lever is then 0.1 m, find the moment of Statical stability. If her KM is 8.2 m, find her KG.

(15 marks)

03. On a ship of 2000t displacement and KG 3.66m, loads 1500t (KG 5.5 m), 3500t (KG 4.60), and takes 1520t of bunkers (KG 0.60). She discharges 2000t of cargo (KG 2.44m), 500t of cargo is shifted up through a distance of 8m and consumes 900t of bunkers (KG.0.40m).

Find the KG at the end of the voyage.

(15 marks)

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

Forward Port 8.39m Forward STBD 8.43
 Midship Port 9.18m Midship STBD 9.26m
 Aft Port 10.10m Aft STBD 10.22m

Find the Trim and the Quarter mean Draft of the vessel and whether the vessel is Sagged or Hogged? (10 marks)

05. What is
 i) Load Displacement
 ii) Dead Weight

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.

Light Displacement	50,000t
Cargo on board	70,000t
Ballast on board	10,000t
FW on board	8,000t
Load Displacement	170,000t

Consumption of FW prior to departure is expected to be 200t

(15 marks)

06. With the help of terms listed below describe Stable, Neutral and Unstable Equilibriums of a ship.

COG, COB, Keel, Transverse Metacentre(M), Angle of heel, COB & COG after heeling, Metacentric Height (GM), Righting Lever(GZ)

(15 marks)



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EDUCATION & TRAINING COURSE: NAVIGATION OFFICER CADET TRAINING COURSE - PHASE I
COURSE CODE: ND-0100 PI



FINAL RE-REPEAT 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: 13.11.2023

Pass mark 70%

Time allocated: 3.0 Hours

- 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)
- On 13th sept 1992, in DR Position $23^{\circ} 21' S$ $047^{\circ} 18' W$ at GMT 13h 10m 22S the observed azimuth of the Sun was 046° (C). Find the error of the compass. If the variation was $3.0^{\circ} W$, calculate the deviation of the Compass. (15 marks)
- 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)
- 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)				ENGLAND	
For Summer Time add ONE hour in non-shaded areas				LAT 50°21'	
MAY		JUNE		TIMES AND HEIGHTS	
Time	m	Time	m	Time	m
1	0426 1.6	16	0424 2.0	1	0045 4.1
	1112 3.7		1055 3.5		0654 1.4
SU	1657 1.9	TH	1651 2.2	W	1336 3.9
	2335 3.9		2313 3.7		1923 1.6
2	0556 1.8	17	0540 2.1	2	0157 4.1
	1245 3.7		1215 3.4		0800 1.3
M	1840 1.9	TU	1813 2.2	TH	1439 4.1
					2027 1.4
3	0114 3.9	18	0033 3.7	3	0259 4.2
	0731 1.6		0656 1.9		0859 1.1
TU	1433 3.8	W	1341 3.6	F	1535 4.2
	2003 1.6		1925 2.0		2123 1.2
4	0235 4.2	19	0155 3.8	4	0355 4.3
	0840 1.2		0759 1.6		0952 1.0
W	1518 4.1	TH	1442 3.8	SA	1624 4.4
	2105 1.2		2024 1.7		2215 1.0
5	0336 4.4	20	0256 4.0	5	0446 4.4
	0936 0.9		0854 1.3		1041 0.9
TH	1612 4.4	F	1535 4.0	SU	1710 4.5
	2158 0.9		2117 1.4		2302 0.9
6	0428 4.6	21	0350 4.2	6	0530 4.4
	1025 0.6		0945 1.1		1124 0.9
F	1658 4.6	SA	1623 4.3	M	1750 4.6
	2246 0.6		2207 1.1		2344 0.9
				7	0611 4.4
					1203 0.9
					TU 1825 4.6
				22	0557 4.1
					1146 0.9
					W 1820 4.1

B

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EDUCATION & TRAINING COURSE: Navigation Cadet Training Program – Phase I
 COURSE CODE: ND-0100 PI



FINAL EXAMINATION – REPEAT QUESTION PAPER
OPERATIONAL SAFETY

- Answer all questions.
- Total Marks: 150

Date: 06.10.2023

Pass mark 150%

Time allocated: 02.5 Hours

1. i. Define what is an "enclosed space"
 ii. Discuss how you would plan and prepare a welding work task under tank top of the upper wing tank. (30 marks)
2. Last cargo was cement in bulk, and the cargo hold now clean, dry and ready to receive the next parcel of cargo.
 Your Chief officer tells you at 10 PM at night to check the cargo hold and it's preparedness to receive a parcel of sugar in bulk. (20 marks)
3. Draw a three dimensional sketch of a ship and indicate 40 parts with names. (20 marks)
4. With the aid of a sketch, show a basic "fixed firer Detection and Extinguishing system" of a General cargo vessel with brief explanatory notes. (10 marks)
5. List down 5 types of ships with brief notes related to their use type of cargo trade (10 marks)
6. Define following
 - a. Handysize
 - b. Handymax
 - c. Panamax
 - d. Suezmax
 - e. Capesize
 - f. Supper tanker
 - g. ULCC
 - h. VLCC
 - i. Light Ship
 - j. GT
 - k. NT
 - l. DWT

(60 marks)



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

FINAL EXAMINATION – REPEAT QUESTION PAPER
General Ship Knowledge

- Answer all questions.
- Total Marks: 100

Date: Oct 2023

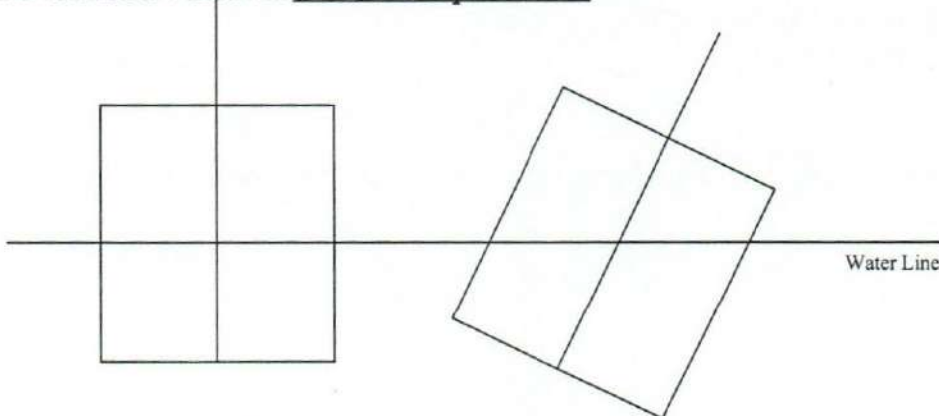
Pass mark 60%

Time allocated: 2.5 Hours

05, OCT, 2023

1. i. Mark the following references of a Stable vessel given below when she is upright and after heeled by an external influence.
COG, COB, Keel, Transverse Metacenter(M), Angle of heel, COB & COG after heeling, Metacentric Height (GM), Righting Lever (GZ) .

- ii. Describe a vessel in Unstable Equilibrium.



- iii. Explain what is Righting Lever and Righting moment (25 marks)

2. a. Define what DWA is and prove $\text{Change of draft} = \text{Change of RD} / 0.025 \times \text{FWA}$

b. A vessel floats in SW with her length and breadth of the Water plane area 150m and 30 m . If her Co-efficient of fineness of the water plane is 0.7 and her displacement is 27000 t find the change of draft expected when she goes in to the dock water of 1.018 density.

(20 marks)

3. a. Explain what Free Surface effect is?

b. The stability particulars of a ship indicate that, for her present condition, her $W=5532$ t, $KM=8.7$ m, 'i' (moment of inertia) of no 3 Double Bottom Tank about its center line= 1428 m⁴. If No DB is 3 is partly full of DO of RD 0.88, and the ship's KG is 8.5 m, calculate her FSC and Fluid GM. ($\text{FSC} = \text{FSM} / W$)

(20 marks)

4. With an aid of sketches explain the following terms.

- a) Forward Perpendicular.
- b) Camber
- c) Water Plane Coefficient
- d) Block Coefficient
- e) Flare

(20 Marks)

5. Draw a cross section of a Cargo Hold Bilge system and describe how it operates.

(15 marks)



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

COURSE CODE : ND- 0100 PI



FINAL EXAMINATION – REPEAT QUESTION PAPER

COMMUNICATION

- Answer all questions.
- Total Marks: 100

Date: 05.10.2023

Pass mark 70%

Time allocated: 02.5 Hours

1. Draw the following flags and state their meaning

- | | |
|--------------|------------|
| a). Zulu | f) Bravo |
| b). Hotel | g) Quebec |
| c). November | h) Uniform |
| d). Golf | i) Kilo |
| e). Oscar | j) Lima |

(30 Marks)

2. a) Write down the Morse signals symbols for following words.

- | | |
|----------------|-------------|
| i) Fire | ii) Abandon |
| iii) Watch | iv) Symbol |
| v) Maneuvering | |

b) i) what is the distress signal send by Morse symbols?

ii) What is the General call (to attract attention) signal send by Morse symbols

(20 Marks)

3. a) Name the parts of the GMDSS equipment package

b) State the VHF & MF voice distress frequencies

c) State distress signal, urgency signal and safety signal.

(20 marks)

4. a) State 10 distress signals used or exhibited onboard ships as per COLREG Annex iv.

b) Explain the use of substitute flags

c). Write down short notes on Admiralty List of Radio Signals (ALRS)

(30 Marks)

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COURSE CODE: ND-0100 PI



FINAL EXAMINATION – REPEAT QUESTION PAPER
SEAMANSHIP THEORY

- Answer any 05 questions.
- Total marks 100

Date: 04.10.2023

Pass mark 70%

Time allocated: 3 Hours

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) With the aid of a diagram, illustrate how the following mooring lines are arranged while a vessel is at a berth;
 - a) Head ropes
 - b) Forward breast rope
 - c) Forward spring rope
 - d) Stern ropes
 - e) Stern spring rope
 - f) Stern breast rope(20 marks)
- 2) Explain in detail how to prepare a corroded steel surface for painting. (20 marks)
- 3) Write short notes on the following;
 - a) Safe working load
 - b) Breaking stress
 - c) Pilot ladder
 - d) Derrick
 - e) Fenders(04 marks each)
- 4) Explain in detail the safe procedure of handling of mooring ropes. (20 marks)
- 5) With the aid of a diagram explain the specifications of a pilot ladder. (20 marks)
- 6) (a) Draw a sketch of a stockless anchor and name the parts. (14 marks)
(b) Define the following anchor terminology
 - a) Anchor Cock-a-bill
 - b) Anchor Aweigh
 - c) Anchor Dragging(02 marks each)



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FINAL EXAMINATION – REPEAT QUESTION PAPER

WATCH KEEPING, RULES OF THE ROAD & BRIDGE EQUIPMENT

- Answer all questions.
- Total Marks: 120

Date: ~~06-10-2023~~

03-10-2023

Pass mark 120%

Time allocated: 02.5 Hours

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

1. A) Introduce the following and discuss the differences between them

AIS and LRIT

B) Prove that the altitude obtained in a sextant is half the angles between mirrors.

(20 marks)

2. With the aid of a basic sketch, explain the purpose, requirement, functions, operations and construction of a Rate of turn Indicator.

(20 marks)

3. Write short introductory notes on the following:

- a) Hand-held Lead Line
- b) ECDIS
- c) VDR
- d) GMDSS

(20 marks)

4. With a brief introduction to each, discuss the messages given in the following rules of International Regulations for Preventing Collusion At Sea?

- a. 36 (Signals to attract attention)
- b. 15 (Crossing Situation)
- c. 2 (Responsibility)
- d. 9 (Narrow Channels)
- e. 13 (Overtaking)
- f. 1 (Application)

(20 marks)

5. Preferably with a basic 3D Sketch, show the following vessel when seen by at night.

- a) Power driven vessel underway
- b) Vessel not under command making way
- c) Vessel constrained by draft making way
- d) Vessel restricted in her ability to maneuver making way

(20 marks)

6. List the purpose of following buoys

- 1) Lateral Marks
- 2) Cardinal Marks
- 3) Isolated Danger Marks
- 4) Safe Water Marks
- 5) Special Marks

(20 marks)



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EDUCATION & TRAINING COURSE: Navigation Officer Cadet Training Course - Phase 1
COURSE CODE: ND-0100 P1 - BATCH



FINAL REPEAT EXAMINATION - REPEAT 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:

Pass mark 70%

Time allocated: 3 Hours

1. i. With the aid of sketches define and explain Declination, GHA, First point of Aries, SHA, and LHA of a body.

(15 marks)

ii. Sketch and Define the following Terrestrial References;

Latitude, Longitude, Prime meridian, Equator.

(10 marks)

2. i) Draw Plane Sailing Triangles for vessels heading SE and NW courses indicating

Departure, D' lat., and D' long. Explain the formulas for calculating D' lat. and D' long.

ii. Where the distance exceeds 600 M, it is recommended that the calculation be done by Mercator sailing.

Find the rhumb line course and distance by using Mercator sailing from starting position $02^{\circ} 12.0'S$ $160^{\circ} 18.0' W$ to final position $10^{\circ} 19.0' N$ $140^{\circ} 40.0' W$.

(20 marks)

3. On 02nd Sept 1992, in DR $40^{\circ} 28' N$ $064^{\circ} 20' E$, the rising Sun bore 090° (C) . Find the LMT of sunrise and the Compass Error by Amplitude method. If variation was 1.0° E, find the deviation of the compass.

(15 marks)

4. On 29th Nov 1992, at ship in DR $26^{\circ} 27' N$ $130^{\circ} 27' W$ at GMT 17 hours 47 minutes 49 seconds, azimuth of the sun was 130° (C). Find the compass error.

(20 marks)

5. a. Briefly explain the followings

i. Dead Reckoning Position (DR) and Observed Position

ii. Course Made Good and Speed made good.

(10 marks)

b. A ship is to sail 15800 nm at an average speed of 15.0 knots. Find the Steaming time. If she departs at 10h 00m GMT on 5th May, calculate her ETA in GMT and in Local time if the arrival port is in 090° E longitude?

(10 marks)