

STCW 1974, as amended, Regulation II: Written Assessment Syllabus for Bahamas Deck Officer Certificate of Competency:

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OICNW Unlimited Navigation Syllabus

1. Stages of making a passage plan

- a) Explains appraisal, planning, execution and monitoring of a passage plan

2. Following a passage plan

- a) Describes the procedure for monitoring and executing a passage plan
- b) Identifies charted objects suitable for position fixing
- c) Identifies chart symbols and abbreviations
- d) Explains the procedure for monitoring the progress of the vessel on a pre-planned track
- e) Explains the precautions to be taken when making a landfall

3. Routeing instructions and guidelines

- a) Describes content and use of *IMO Ships Routeing Guide*
- b) Interprets *International Regulations for the Prevention of Collision at Sea* Rule 10
- c) Explains use of *Admiralty chart 5500, Mariners Routeing Guide*

4. Adjusts vessels course and speed to take account of passage plan requirements

- a) Plots the position of the vessel on a chart using latitude and longitude, or position lines derived from charted objects or from celestial observations including running fix and horizontal angles
- b) Determines the effect of current/tidal stream by construction on a chart
- c) Determines the effect of wind on ship's track

- d) Applies leeway to find course to steer
- e) Determines course to steer to counteract current/tidal stream by construction on a chart
- f) Determines speed made good by measurement on the chart and calculates ETA
- g) Determines speed required to make ETA at a passage plan way point by measurement on the chart
- h) Applies magnetic and/or gyro compass errors to convert True to Compass and vice versa for ship's head and bearings
- i) Calculates adjustments to course for a change in magnetic or gyro compass error

5. Plane and Parallel Sailing

- a) Explains the relationship between Departure and D Long
- b) Converts Departure to D Long and vice versa
- c) Calculates course and distance by plane sailing formula
- d) Calculates course and distance using parallel sailing formula
- e) Calculates ETA

6. Meridional parts, DMP and Mercator sailing formula

- a) Describes the navigational properties of a Mercator Chart
- b) Calculates course and distance between waypoints using Mercator Sailing formula
- c) Calculates ETA at given waypoint, including the use of time zones

7. Bridge watchkeeping procedures

- a) Demonstrates a knowledge of current national and international regulations and guidelines for bridge watchkeeping procedures
- b) Describes criteria and procedure for calling the Master when in doubt of ship's position
- c) Specifies checks to navigation equipment
- d) Calculates Compass Error by Azimuth/Amplitude

8. Communications between Bridge and Machinery Spaces

- a) Describes routine and emergency communication procedures including use of telegraphs, instruments, Bridge Control Systems and other communication systems
- b) Explains the need to record orders, communications and information
- c) Explains reasons for giving Bridge and Engine Room notice of reductions in speed

9. Navigation in the proximity of ice

- a) Lists signs indicating the proximity of ice
- b) Describes methods of avoiding or reducing ice accumulation and accretion
- c) Explains obligation to report ice and ice accretion

10. Cause of tides and definitions

- a) States the cause of spring tides
- b) States the cause of neap tides
- c) Defines chart datum, height of tide, MHWS, MLWS, MHWN, MLWN, range of tide, drying height, height of charted objects

11. Finding the tidal information at standard ports - Worldwide

- a) Finds the height and time of high water using tide tables
- b) Finds the height and time of low water using tide tables
- c) Calculates the height of tide at a given time using tide tables and tidal curves
- d) Calculates the time the tide will reach a given height using tide tables and tidal curves
- e) Discusses the reliability of tidal predictions
- f) Calculates the correction of soundings to chart datum

12. Finding the tidal information at secondary ports - Worldwide

- a) Calculates the height and time of high water using tide tables
- b) Calculates the height and time of low water using tide tables
- c) Calculates the height of tide at a given time using tide tables and tidal curves
- d) Calculates the time the tide will reach a given height using tide tables and tidal curves

Notes

- 1. Formula sheets will be provided to candidates for the assessment

OICNW Unlimited Stability and Operations Syllabus

1. Hydrostatics

- a) Defines mass, volume, density, relative density, Archimedes principle, FWA, DWA, TPC
- b) Determines TPC and displacement at varying draughts using hydrostatic tables
- c) Calculates small and large changes in displacement making appropriate use of either TPC or displacement tables
- d) Defines Waterline length, LBP, Freeboard, Waterplane Area, c_w , and C_B
- e) Calculates the weight to load or discharge to obtain given small changes in draught or freeboard
- f) Explains the reasons for loadlines and loadline zones
- g) Calculates weight to load or discharge in relation to loadline dimensions, appropriate marks, TPC, FWA and DWA

2. Statical Stability at small angles

- a) Defines centre of gravity, centre of buoyancy, initial transverse metacentre and initial metacentric height (GM)
- b) Calculates righting moments given GM and displacement
- c) Explains stable, neutral and unstable equilibrium
- d) Explains the relationship between equilibrium and the angle of loll
- e) Identifies from a given GZ curve; range of stability, initial GM, max GZ, angle of vanishing stability, angle of deck edge immersion, angle of loll and angle of list
- f) Explains the difference between typical GZ curves for stiff and tender vessels
- g) Sketches typical GZ curves for vessels at an angle of list or loll

3. Transverse Stability

- a) Calculates shift of G, vertically and horizontally after loading/discharging/shifting a weight
- b) Calculates final KG or GM by moments about the keel after loading/discharging/shifting weights including appropriate Free Surface Correction
- c) Calculates distance of G horizontally from the centreline by moments about the centreline after loading/discharging/shifting weights
- d) Calculates the effect on stability of loading or discharging a weight using ships' gear
- e) Calculates the angle of list resulting from 3 a), 3b), 3c) and 3d)

- f) Explains the difference between list and loll and methods of correction
- g) Explains the consequences and dangers of a free surface
- h) Explains that the free surface effect can be expressed as virtual rise of G or as a free surface moment
- i) Describes the effects on free surface of longitudinal subdivision of a tank

4. Longitudinal Stability

- a) Defines LCF, LCG, LCB, AP, Trim, Trimming Moment and MCTC
- b) Calculates the effect on draughts of loading, discharging and shifting weights longitudinally by taking moments about the AP

5. Maintaining a Deck Watch (alongside or at anchor).

- a) Explains the duties of the deck watch with respect to security, safety, moorings and cargo operations
- b) Explains the procedures for entry to enclosed spaces and permit to work systems
- c) Explains the emergency procedures in the event of fire or accident
- d) Describes the preparation of the vessel for sea and adverse weather with respect to watertight integrity and security of cargo
- e) Describes how safe means of access to a vessel is achieved
- f) Describes the methods available to ensure safe movement onboard ship

6. Pollution prevention

- a) Describes the precautions and procedures required to ensure vessel operations, including bunkering and garbage disposal, do not pollute the environment
- b) Explains the procedures for handling hazardous substances onboard

7. Legislation

- a) Outlines the operational requirements of the annexes to MARPOL and liability for non-conformance
- b) Outlines the principles and purpose of the ISM and ISPS Code
- c) Describes the legal status and purpose of Bahamas Information Bulletin, COSWP.

Notes

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Chief Mate Navigation syllabus

1. Publications required for passage planning

- a) Lists and outlines the contents of nautical publications required for passage planning

2. Selection of the appropriate route for a given passage

- a) Explains the factors to be taken into account when determining an appropriate route for a given passage including Loadline, Oceanographic and Climatological factors
- b) Demonstrates the use of a gnomonic chart in conjunction with a mercator chart for voyage planning
- c) Explains and outlines the advantages and dis-advantages of Weather Routeing
- d) Determines the appropriate Great Circle, Composite or Rhumb line track for a given ocean crossing
- e) Calculates courses, distances, vertices and way points for Great Circle, Composite and Rhumb line tracks
- f) Calculates the height of tide for a given time and the time the tide will be a required height for Worldwide Standard and Secondary Ports
- g) Solves tidal problems with respect to Underkeel Clearance, Air Draft and Neaping situations
- h) Calculates the tidal stream flow at any time from tidal stream tables
- i) Describes the factors to be considered when making a landfall
- j) Explains the objectives of ship routeing schemes
- k) Explains the requirements when navigating in or near Traffic Separation Schemes
- l) Explains the precautions to be taken when navigating in or near the vicinity of offshore installations, safety zones and safety fairways

3. Passage plan adjustments to allow for emergency situations

- a) Explains the procedures to be followed in the event of
 - i) engine failure
 - ii) steering gear failure
 - iii) malfunction of navigational equipment
 - iv) onset of adverse weather
- b) Explains the hazards and procedures to be followed when navigating in the vicinity of a tropical revolving storm

- c) Explains the hazards and procedures to be followed when navigating in or near ice
- d) Calculates the adjustments to course and/or speed in order to rendezvous with another vessel for SAR, safety or operational purposes

4. Position fixing methods

- a) Describes the most appropriate position fixing methods to be utilised in various Navigational circumstances
- b) Discusses the factors that determine the appropriate interval between fixes
- c) Explains terrestrial position fixing methods for coastal passages including the use of radar
- d) Describes the use of systems for the continuous monitoring of position including parallel indexing techniques
- e) Calculates the direction of a position line and a position through which it passes from a single solar, stellar or planetary observation
- f) Calculates the most probable position from position lines obtained from simultaneous stellar observations
- g) Outlines the principal and operation of electronic charts
- h) Outlines the principal and operation of electronic navigational aids and position fixing systems

5. The accuracy and reliability of various position fixing methods

- a) Assesses the accuracy and reliability of both celestial and terrestrial fixes, including cocked hats, with respect to both random and systematic errors
- b) Calculates the gyro compass error from a solar, stellar or planetary observation
- c) Calculates the deviation of the magnetic compass from a solar, stellar or planetary observation
- d) Details the precautions to be observed when using continuous monitoring systems including parallel indexing
- e) Explains the limitations and precautions to be taken when using electronic charts
- f) Explains the limitations and precautions to be taken when using electronic navigational aids and position fixing systems

6. The statutory and international requirements regarding navigation, navigational equipment and the qualifications and fitness of watchkeeping personnel

- a) Describes the requirements of current National and International Regulations navigation and collision avoidance, radio and navigation

equipment

- b) Outlines the requirements of current Bahamas and IMO guidelines with respect to navigation and collision avoidance, radio and navigation equipment
- c) Describes the requirements of the ISM Code with respect to navigation and collision avoidance, radio and navigation equipment

7. Bridge Procedures for both Routine and Emergency Situations

- a) Explains the principles to be observed in maintaining a safe navigational watch
- b) Describes the factors to be considered when determining the composition of a Bridge Team
- c) Explains the organisational requirements with respect to the Bridge Team to allow for varying navigational situations and taking into account fatigue of personnel
- d) Explains the requirements and procedures to be included in standing and night orders
- e) Explains the bridge procedures to be followed
 - i) prior to arrival in Port
 - ii) before sailing
 - iii) approaching areas of high traffic density or navigational hazards
 - iv) when navigating in reduced visibility
 - v) when handing over the navigational watch
 - vi) daily whilst at sea
- f) Details the information to be exchanged between the Master and Pilot in accordance with current guidance
- g) Explains the requirements to ensure the adequacy of an engineering watch at different stages of a passage
- h) Outlines the considerations to be taken when leading or participating in Search and Rescue operations
- i) Explains the procedures when working with Helicopters and small craft
- j) Analyses and determines appropriate action based upon information from a systematic radar plot of several concurrent targets

Notes

- 1. Formula sheets will be provided to candidates for the examination

Chief Mate II/2 (unlimited) Stability and Structure

1. Stability information carried on board ship. The inclining experiment

- a) Explains the use of stability information to be carried on board ship
- b) Explains the purpose of the inclining experiment
- c) Identifies the occasions when the inclining experiment must be undertaken
- d) Describes the procedure and precautions to be taken before and during the inclining experiment
- e) Calculates the lightship KG and determines the lightship displacement for specified inclining experiment conditions
- f) Explains why a vessel's lightship displacement and KG will change over a period of time

2. Application of 'Free Surface Effect'

- a) Describes Free Surface Effect (FSE) as a virtual loss of GM and relates it to the Free Surface Correction (FSC)
- b) Calculates FSC given rectangular area tank dimensions and tank liquid density
- c) Describes the effect on FSC of longitudinal sub-divisions in tanks
- d) Calculates FSC given Free Surface Moment (FSM)
- e) Applies FSC or FSM to all calculations as necessary

3. The effect on vessel's centre of gravity of loading, discharging, weights. Final list. Requirements to bring vessel upright

- a) Calculates the final position of vessel's centre of gravity relative to the keel and centreline taking into account loaded, discharged and shifted weights
- b) Calculates the resultant list
- c) Calculates the minimum GM required prior to loading/discharging/shifting weights to limit the maximum list

4. Stability during drydocking. Using real ship stability information

- a) Explains the virtual loss of metacentric height during dry-docking and the requirements to ensure adequate stability
- b) Calculates the virtual loss of metacentric height and hence effective GM during drydocking
- c) Determines the maximum trim at which a vessel can enter drydock to maintain a specified GM
- d) Calculates the draught at which the vessel takes the blocks fore and aft
- e) Describes the practical measures that can be taken to improve stability prior to drydocking if it is found to be inadequate

- f) Explains why it is beneficial to have a small stern trim when entering drydock

5. Increase in draught due to list / heel. Angle of heel when turning

- a) Explains increase in draught due to list / heel
- b) Calculates increase in draught due to list / heel
- c) Explains angle of heel due to turning and the effect on stability
- d) Calculates angle of heel due to turning

6. The effect of loading, discharging, shifting weights on trim, draught and stability. Using real ship stability information

- a) Defines 'Centre of Flotation' with respect to waterplane area
- b) Defines 'Longitudinal Centre of Flotation' (LCF) with respect to the after perpendicular and explains change in LCF with change in draft
- c) Defines 'True Mean Draught' (TMD)
- d) Calculates TMD
- e) Calculates final draughts and effective GM for various conditions of loading
- f) Calculates where to load / discharge a weight to produce a required trim or draught aft
- g) Calculates the weight to load / discharge at a given position to produce a required trim or draught aft
- h) Calculates final draughts when vessel moves from one water density to a different water density
- i) Calculates the maximum cargo to discharge to pass safely under a bridge
- j) Calculates the minimum ballast to load to safely pass under a bridge
- k) Calculates the final draughts in i) and j)

7. Draught survey

- a) Calculates the correction to the observed forward and after draughts to forward perpendicular and after perpendicular respectively
- b) Calculates the correction to the observed midship draught to amidship
- c) Calculates the correction of the amidship draught for hull deflection
- d) Calculates the correction of the amidship draught to True Mean draught (TMD) when CF not amidship
- e) Calculates the correction for the position of the CF if trimmed hydrostatics are not supplied

8. Curves of righting levers (GZ), using real ship stability information. Determine compliance with 'Intact Stability' requirements of the current loadline regulations

- a) Constructs a curve of righting levers (GZ), for a given condition
- b) Defines 'righting moment' (moment of statical stability) and 'dynamical stability'
- c) Extracts stability information from a curve of righting levers (GZ)
- d) Calculates appropriate areas under a curve of righting levers (GZ), using Simpson's rules
- e) Assesses whether vessel complies with the 'Intact Stability' requirements of the current loadline regulations

9. Simplified Stability. Using real ship stability information

- a) Describes the appropriate use of 'Simplified stability' information.
- b) Assesses whether a vessel complies with 'Maximum permissible KG' requirements for a given condition

10. Angle of loll and effective GM at angle of loll

- a) Describes the stability at an angle of loll and shows the existence of an effective GM
- b) Calculates the angle of loll for vessel with a negative initial GM
- c) Calculates the effective GM at an angle of loll
- d) Describes the dangers to a vessel with an angle of loll
- e) Distinguishes between an angle of loll and an angle of list
- f) Describes the correct procedure for correcting an angle of loll

11. Factors affecting a curve of righting levers (GZ)

- a) Describes the effects of variations in beam and freeboard on the curve of righting levers (GZ)
- b) Describes the effect of trim on KN values and resultant curve of righting levers (GZ)
- c) Describes the terms 'fixed trim' and 'free trim' with respect to KN values and resultant curve of righting levers (GZ)
- d) Explains the effects of being in a seaway on the curve of righting levers (GZ)
- e) Outlines the conditions for a vessel to be in the stiff or tender condition and describes the effects on the curve of righting levers (GZ)
- f) Describes the use of ballast / bunkers to ensure adequate stability throughout the voyage
- g) Describes icing allowances

- h) Describes the changes in stability which may take place on a voyage
- i) Explains the effects on the curve of righting levers (GZ) of the changes described in h)
- j) Explains the effects of an angle of list on the curve of righting levers (GZ)
- k) Explains the effects of an angle of loll on the curve of righting levers (GZ)
- l) Explains the effects of a zero initial GM on the curve of righting levers (GZ)

12. The effect on the curve of righting levers (GZ) of shift of cargo and wind heeling moments

- a) Constructs a curve of righting levers (GZ) taking into account shift of cargo/solid ballast and describe the effects on the vessel's stability
- b) Explains the precautions to be observed when attempting to correct a large angle of list
- c) Explains how wind heeling moments are calculated
- d) Constructs a curve of righting moments taking into account wind heeling moments and describes the effect on the vessel's stability
- e) Describes the minimum stability requirements taking into account wind heeling moments as specified in current Load Line – Instructions for the Guidance of Surveyors
- f) Determines that a ship's loaded condition complies with the minimum stability requirements specified in e)

13. Use of the current IMO Grain Rules to determine if the vessel complies with the specified stability criteria. Real ship stability information to be used

- a) Calculates, the 'grain heeling moments' for a specified loading condition
- b) Determines from the 'grain heeling moment' calculated in a) whether the vessel complies with the stability requirements by comparison with the 'maximum permissible heeling moments'
- c) Calculates the approximate angle of heel in b)
- d) Constructs graphs of a righting arm curve and heeling arm curve
- e) Assesses whether a grain laden vessel complies with the 'minimum stability requirements' specified in the *IMO Grain Rules*
- f) Discusses factors to be taken into account to minimise grain heeling moments

14. Rolling, pitching, parametric and synchronous rolling

- a) Describes rolling and pitching
- b) Defines rolling period
- c) Explains factors affecting rolling period
- d) Describes synchronous rolling and the associated dangers

- e) Describes actions to be taken by ship's officer in event of synchronous rolling

15. The effect of damage and flooding on stability

- a) Calculates, for a box shaped vessel, the effect on draught, trim, list, freeboard and metacentric height if the following compartments are bilged:
 - i) Symmetrical amidships compartment with permeability
 - ii) Symmetrical amidships compartment with watertight flat below initial waterline with permeability
 - iii) Symmetrical amidships compartment with watertight flat above the initial waterline with permeability
 - iv) Extreme end compartment with 100% permeability
 - v) Extreme end compartment with watertight flat below the initial waterline with 100% permeability
 - vi) Amidships compartment off the centreline with 100% permeability
- b) Describes countermeasures which may be taken in event of flooding

16. Damage stability requirements for passenger vessels and Type A and B vessels

- a) Defines 'bulkhead deck', 'margin line', 'floodable length', 'permissible length', 'factor of sub-division' for passenger vessels
- b) Describes sub-division loadlines for passenger vessels
- c) Identifies 'assumed damage' for passenger vessels
- d) Identifies 'assumed flooding' for passenger vessels
- e) Identifies 'minimum damage stability requirements' for passenger vessels
- f) Identifies additional criteria required by the 'Stockholm agreement 1996' in determining compliance for passenger ship damage stability and represents its effect on a curve of righting levers
- g) Identifies damage stability flooding criteria for Type A, B-60, B-100 vessels
- h) Identifies minimum equilibrium stability condition after flooding for vessels specified in g)

17. Loadline terminology and definitions for new builds

- a) Defines Type A, B, B-60, and B-100 vessels

18. Conditions of assignment of loadlines

- a) Describes 'conditions of assignment' for vessels specified in 17a)
- b) Describes 'tabular freeboard' with respect to vessels specified in 17a)
- c) Explains the corrections to be applied to tabular freeboard to obtain 'statutory assigned freeboard'

19. Assignment of special loadlines e.g. 'timber loadlines'

- a) Describes the special factors affecting the assignment of timber loadlines
- b) Describes the intact stability requirements for vessels assigned timber loadlines

20. Requirements and Codes relating to the stability of specialised vessels

- a) Identifies the stability problems associated with RORO vessels, offshore supply vessels and vessels when towing

21. The preparations required for surveys

- a) Lists surveys required by the loadline rules for a vessel to maintain a valid loadline certificate
- b) Lists the items surveyed at a loadline survey and describes the nature of the survey for each item

Notes

1. Longitudinal stability calculations are to be based on taking moments about the After Perpendicular and using formula;
Trim = Displacement x (LCB~LCG) / MCTC
2. Formula sheets will be provided to candidates for the examination