ANNEX 10

STCW.7/CIRC.3

INTERNATIONAL CONVENTION ON STANDARDS OF TRAINING, CERTIFICATION AND WATCHKEEPING FOR SEAFARERS (STCW) 1978

Model training record book for candidates for certification as an officer in charge of an engineering watch or designated duty engineer

1. The Sub-Committee on Standards of Training and Watchkeeping (STW), at its twenty-eighth session, prepared the draft IMO Model training record book for candidates for certification as an officer in charge of an engineering watch or designated duty officer given at annex.

2 The STW Sub-Committee noted the draft text of the model training record book must be seen as a model only which has been developed as guidance to assist Parties in preparing their own training record book for use as part of an approved training programmer. The content of the model training record book follows the structure of the STCW Convention and the STCW Code. However, nothing prevents a Party from adopting its own format or specifying assignments in less or greater detail.

3. Assessment of the competence of the seafarers concerned is included in the model training record book. However, as the STW Sub-Committee could not reach consensus, the on-board assessment in relation to the training record books will be further considered at the twenty-ninth session of the STW Sub-Committee (January 1998).

4. Parties should be aware that it is their responsibility to ensure that instructors, supervisors and assessors are appropriately qualified as required by section A-I/6, paragraph 3 of the STCW Code and that they comply with the quality standards in section A-I/8 of the STCW Code.

ENCLOSURE [2]

ANNEX 10

MODEL TRAINING RECORD BOOK FOR CANDIDATES FOR CERTIFICATION AS OFFICER IN CHARGE OF AN ENGINEERING WATCH OR DESIGNATED DUTY ENGINEER

INTRODUCTION

1. This model Training Record Book is developed as guidance to assist Parties in developing their own training record book which may be used as part of an approved training programmer. The content of this book follows the structure of the STCW Convention given in section A-III/1 of the STCW Code. Nothing should prevent a Party from adopting its own format or spec specifying the assignments presented in section A-III/1 of the STCW Code in greater detail. Each company has responsibilities as outlined in regulation I/14 of the STCW Convention and section A-l/14 of the STCW Code.

2. This model Training Record Book details the practical training whether obtained onboard or ashore which should be completed during the sea-going phase leading to certification as Officer in Charge of an Engineering Watch or Designated Duty Engineer. It will serve both as a guide to the practical training which should be undertaken during the mandatory period of seagoing service and as a record of the satisfactory completion of that training.

3. Each trainee will require his/her own training record book and should be responsible for its safe keeping. Ship engineer officers and supervising engineer officers will also need to consult it to facilitate planning and organization of the training.

4. Those carrying out instruction or assessment activities[9] as part of an approved training programmer either on board or ashore should appreciate how and where the particular skill or ability being taught or assessed might best be conducted and how it relates to all other skills or abilities required to achieve competency at the operational level. Where assessment is used in this document, it refers solely to the assessment of the trainee's practical ability to carry out the tasks given in the Training Record Book as demonstrated. Types of assessment include:

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•Instructors and assessors shall be qualified in accordance with regulation '/6 of the STCW Convention and corresponding parts of the STCW Code

.1 Approved in-service experience;

.2 Approved training ship experience;

.3 Approved simulator training, where appropriate

.4 Approved laboratory equipment training;

.5 Approved fire-fighting training and experience as set out in STCW-Code section A-VI/3 of the STCW Code;

.6 Approved training and experience as set out in section A-VI/2, paragraphs 1 to 4 of the STCW Code

.7 Approved training as set out in section A-VI/4, paragraphs 1 to 3 of the STCW Code;

.8 Approved workshop skills training; and

.9 Approved practical experience and tests.

5. No on-board training or assessment should take place unless such activities can be carried out without interfering with the normal operation of the ship, jeopardizing safety of life at sea, or posing a risk of marine pollution. Instructors and/or assessors' should be able to devote their time and attention exclusively to the instruction and assessment activity at hand, or if unable to do so, should defer the activity until a more suitable time.

SCOPE

6. The aim of the practical training is for trainees to:

- gain experience in relevant aspects of shipboard activities as they occur on board the ship or ships on which the trainee is sailing;
- test and compare the knowledge acquired at school with the daily practice on board;
- consolidate and expand theoretical knowledge;
- build a practical basis to achieve the standards of competence in accordance with table A-III/1 of the STCW Code;
- build a practical basis to achieve the standards of competence in accordance with regulation VIII/2 and the corresponding sections of Parts A and B of the STCW Code relating to Basic principles to be observed in keeping an engineering watch;

- prepare for a future position on board.

OBJECTIVE

7.1 The trainees will acquire basic engineering skills and a practical awareness of the need to follow safe working practices. They will also be able to keep an engineering watch safely, in accordance with the relevant regulations and recommendations.

7.2 The aim of the Training Record Book is three fold, namely:

- directing the practical training, so the trainee is guided as to the objectives of the practical training period;

- giving guidance to the engineer officers regarding the development of the practical training to enable them to judge the progress and, if necessary, to make adjustments; and

- directing the training assessment so that the required training outcome can be proved and documented.

APPROVED PROGRAM OF ON-BOARD TRAINING

8.1 Candidates for certification under regulation III/1, are required to follow an approved program of on-board training. This programmer of onboard training is to form part of an overall programmer of education and training approved by the Party under whose authority the certificate or endorsement is to be issued. The programmer of on-board training is required to ensure that the candidate receives systematic practical training and experience which is closely supervised and monitored by qualified engineer officers and adequately documented in an approved training record book. The regulation requires that engineer officers supervising and monitoring and assessing the onboard training are appropriate qualified.*

8.2 Each general training activity specified in the approved training record book is required to have been completed by the candidate and supervised, monitored, assessed and documented as being satisfactory completed in accordance with the requirements and recommendations of the STCW Code.

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* See regulations 116, 1/8, and Ill/1 of the STCW Convention and the corresponding sections of parts A and B of the STCW Code.

SEA GOING PHASE TRAINING RECORD BOOK

Guidance for the Chief Engineer and Shipboard Training Officer

Guidance for on-board instructors.

1. Before giving instruction in a particular skill or ability for the purpose of initialing this training record book (TRB), the instructor should (a) be qualified under the relevant regulations to give such instruction, and (b) determine that the candidate is qualified on the basis of prior experience and/or training, to receive such instruction. The instructor should also review the TRB to identify what training the candidate has already completed, and what training remains to be conducted.

2. In designing an on-board training activity, the instructor should have clear, measurable, training objectives. These should be organized by reference to other related skills and abilities needed by the student to achieve the level of competence being pursued. The training objectives should be approved by the responsible person supervising the training and assessment program.

3. The instructor should conduct training only when the necessary equipment is operational and will be available throughout the training exercise.

4. The instructor should follow an outline, checklist, or training plan which organizes information and instructional activities in a logical and progressive manner.

5. Instructional activities should make effective use of available teaching media such as videotape, personal computers, and models.

6. The instructor should ensure the candidate has sufficient opportunities to observe the skill or ability being properly performed. When the skill or ability requires the use of certain shipboard equipment, the instructor should ensure that the candidate is given adequate opportunities for hands-on use of that equipment along with constructive comments directing the candidate to preferred or proper ways of using the equipment.

7. Instruction should include explanations of misuse or improper procedure; problems that may be encountered and proper corrective actions to take; and descriptions of important differences which may exist from ship to ship.

8. The instructor should periodically use a reliable means of assessment to determine that candidate is in fact making progress toward the objectives stated for the instructional activity.

9. When the instructor is inexperienced, arrangements should be made for his or her early training activities to be monitored by the person responsible for supervising the training and assessment program, with the aim of ensuring that training activities are conducted in the most effective manner possible.

Guidance for on-board assessors/designated examiners

10. Before assessing the performance of a particular skill or ability for the purpose of initialing this TRB, the assessor should (a) be qualified under the relevant regulations to perform the assessment; and (b) determine that the candidate is qualified on the basis of prior experience and/or training, to be assessed. The assessor should also review the TRB to identify what training and assessment the candidate has already completed, and what training or assessment remains to be conducted.

11. In designing an on-board assessment activity, the assessor should have clear, measurable, assessment objectives. These should be organized by reference to other related skills and abilities needed by the student to achieve the level of competence being pursued. The training objectives should be approved by the person responsible for supervising the training and assessment program.

12. The following guidelines are taken from section B-II/1 of the STCW Code for the conduct of assessment and should be taken into account:

.1 The scope of knowledge is implicit in the concept of competence. Assessment of competence should, therefore, encompass more than the immediate technical requirements of the job, the skills and tasks to be performed, and should reflect the broader aspects needed to meet the full expectations of competent performance as a ship's officer. This includes relevant knowledge, theory principles, and cognitive skills which, to varying degrees, underpin all levels of competence. It also encompasses proficiency in what to do, how and when to do it, and why it should be done. Properly applied, this will help to ensure that a candidate can:

.1.1 work competently in different ships and across a range of circumstances;

.1.2 anticipate, prepare for, and deal with contingencies; and

.1.3 adapt to new and changing requirements.

.2 The criteria for evaluating competence (column 4 of table A-III/1 of the STCW Code) identify primarily in outcome terms the essential aspects of competent performance. They are expressed so that assessment of a candidate's performance can be made against them and should be adequately documented in the training record book.

.3 Evaluation of competence is the process of:

.3.1 collecting sufficient valid and reliable evidence about the candidate's knowledge, understanding and proficiency to accomplish the tasks, duties and responsibilities listed in column 1 of table A-III/1; and

.3.2 judging that evidence against the criteria specified in the standard.

.4 The arrangements for evaluating competence should be designed to take account of

different methods of assessment which can provide different types of evidence about the candidate’s competence, e.g.:

.4.1 direct observation of work activities (including seagoing service);

.4.2 skills/proficiency/competency tests;

.4.3 projects and assignments;

.4.4 evidence from previous experience; and

.4.5 written, oral and computer-based questioning techniques.

One or more of the first four methods listed should be used to provide evidence of ability, in addition to appropriate questioning techniques to provide evidence of supporting knowledge and understanding.

13. Before conducting the assessment, the assessor should --

.1 familiarize him or herself with the assessment criteria [in column 4 of the relevant tables in section A-III/1 of the STCW Code] to ensure that the assessment activities will be effective and comprehensive;

.2 develop scenarios which involve a sequence of events that require the candidate to exercise good judgment in a realistic amount of time; that include distracters (such as equipment malfunctions) which test the candidate's ability to react properly to abnormal or emergency circumstances; and that require the candidate to make effective use of all relevant and available human resources, hardware and information.

.3 ensure the necessary equipment is operational and will be available throughout the assessment activity;

.4 be able to articulate the parameters or thresholds which will, under the circumstances, represent an acceptable level of performance;

.5 clearly explain to the candidate the purpose of the activity and the steps he or she is to take during the demonstration of the skill or ability;

.6 ensure that the candidate (a) can concentrate on the task(s) at hand; (b) will not receive unauthorized assistance during the assessment process; and (c) is not in a position to "learn the test" by watching the performance of other candidates;

.7 inform the candidate as to the scope and depth of knowledge to be assessed, the length of time allowed for the demonstration, and the effect of failing to perform part of the demonstration properly; and establish the candidate's willingness to be assessed under the

circumstances presented.

14. The assessor should continuously observe the candidate during performance of the skill or ability and should only note in the training record book when the performance is acceptable. In the event the candidate does not perform a critical phase of the assessment exercise at an acceptable level of proficiency, assessment should be suspended and should not be conducted until further instruction is provided.

15. Successful or acceptable performance should be based on the candidate's proved ability to safely perform:

.1 the assigned tasks in accordance with competency criteria identified in the training record book;

.2 such tasks in a manner which demonstrates that the required level of skill, knowledge and ability was never in serious doubt; and

.3 such tasks in a manner which demonstrates sound and professional judgment.

16. Unsuccessful or unacceptable performance may be based on the candidate's failure to prove his or her ability in accordance with paragraph 14, or because the candidate otherwise performs improperly in the judgment of the assessor, based on events such as the following:

.1 an action, or lack of action, by the candidate which required corrective action or intervention by the assessor to prevent injury, damage, or the development of a hazardous condition;

.2 the candidate failed to use proper procedures (including appropriate communication procedures);

.3 the candidate failed to take prompt corrective action when required.

17. Normally, a single demonstration of skill immediately following instruction should not be relied upon as the sole basis for judging competence.

18. When the assessor is inexperienced, arrangements should be made for his or her early assessment activities to be monitored by the person responsible for the training and assessment program, with the aim of ensuring that assessment activities are conducted in the most effective manner possible.

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MODEL TRAINING RECORD BOOK FOR CANDIDATES FOR CERTIFICATION AS OFFICERS IN CHARGE OF AN ENGINEERING WATCH OR DESIGNATED DUTY ENGINEERS

Subject Outline

1 Marine engineering

2 Electrical, electronic and control engineering

3 Maintenance and repair

4 Controlling the operation of the ship and care for persons on board

Personal History

Photo

Full Name _____

Permanent Address _____

_____

_____

_____

_____

_____

Date of Birth

_____

Seaman's Registration Number _____

Training College _____

_____

_____

Shipping Companies undertaking training and their addresses _____

_____

_____

_____

_____

_____

Government Administration Department issuing the Training and Assessment Record Book _____

Date of Issue _____

ENGINEER OFFICER IN CHARGE OF A WATCH:

SHIP DATA

SHIP REFERENCE NUMBER _____

SHIP NAME MV_____ CALL SIGN_____

General Data

Port of registry	_____
Gross registered tons	_____
Net registered tons	_____
Deadwight	_____
Load displacement	_____
Cargo	_____
Length Overall (m)	_____
Beam (m)	_____
Summer Draft loaded (m)	_____
Service speed (knots)	_____
Shaft power (kW)	_____
Propellers	_____
Service r.p.m.	_____
Bunker capacity	_____
Daily fuel consumption	_____
Fuel type and viscosity	_____

Emergency gear	No.	Capacity
Lifeboats		
Rafts		
Fire-fighting pumps		

SHIP SERVICE RECORD

SHIP REF. NO.	NAME OF SHIP/PORT OF REGISTRY	SERVICE PERIOD				SIGNATURE OF MASTER
		Dates		Service		
		Joining	Leaving	m	d	

SUPERVISING ENGINEER REVIEW OF TRAINING PROGRESS

Ship	Comments	Name of Shipboard Training Officer	Initials	Date

CHIEF ENGINEER'S INSPECTION OF RECORD BOOK

Ship	Comments	Name of Master	Chief Engineer's Initials	Date	Ship's Official Stamp

COMPANY TRAINING OFFICER'S INSPECTION OF RECORD BOOK

Company Name	Comments	Name of Company Training Officer	Initials	Date

SAFETY FAMILIARIZATION

Ship Ref. No.						
Task/Duty	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**
Be able to: Communicate with other persons on board on elementary safety matters						
Understand safety information symbols, signs and alarm signal						
Know what to do if: A person falls overboard Fire or smoke is detected The fire or abandon ship alarm is sounded						
Be able to: Identify muster and embarkation stations and emergency escape routes						
Locate and don life jackets						
Raise the alarm and have a basic knowledge of the use of portable fire extinguishers						
Take immediate action upon encountering an accident or other medical emergency before seeking further medical assistance on board						
Close and open the fire, weathertight and watertight doors fitted in the particular ship, other than those for hull openings						

SHIPBOARD FAMILIARIZATION*

Ship Ref. No						
Task/Duty	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**
Watchkeeping procedures and arrangements: Visit engine room and other work areas						
Get acquainted with main and auxiliary engines and other engine equipment and displays						
Activate, under supervision, equipment to be used in routine duties						
Safety and emergency procedures: Read and demonstrate an understanding of your Company's Fire and Safety Regulations						
Demonstrate recognition of the alarm signals for: **FIRE** **EMERGENCY** **ABANDON SHIP**						
Locate medical and first aid equipment						
Locate fire-fighting equipment: alarm activating points, alarm hells, extinguishers, hydrants, fire axes and hoses						
Locate: Rocket line throwing apparatus						
Distress rockets, flares and other pyrotechnics						

Breathing apparatus and fire-fighter's outfits, etc						
Locate and explain how to operate emergency deck stop mechanism for main engines, including other emergency stop valves						

Ship Ref. No						
Task/Duty	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**	**Officer's Initials/Date**
Safety and emergency procedures (continued): Locate $C0_2$ or halon bottle room, **and** control valves for smothering apparatus in **pump** rooms, cargo tanks and holds						
Locate and explain the operation of the emergency pump						
Environmental protection: Get acquainted with :the procedure for handling garbage, rubbish and other wastes						
the use of garbage compactor or other equipment as appropriate						
Insert Boat and Fire Muster Stations and other** details in the **appropriate space, ask the Shipboard Training Officer 10 sign in the space provided						
Ship's Name						
Boat Muster Station						
Fire Muster Station						
Shipboard Training Officer						
Shipboard Training Officer						
Date						

III- PROPULSION PLANT

a-1 Technical details - diesel propulsion plant

Main engine

- make, type and building year
- principal dimensions: cylinder bore
  piston stroke
- ratio crank length/connecting rod length
- construction
- output
- number of cylinders
- reversible or non-reversible
- 2 or 4-stroke process
- scavenging system
- supercharging system
- trunkpiston or crosshead construction
- direct or indirect injection
- number of inlet and outlet valves
- highest and lowest number of revolutions
- kind of fuel
- compression pressure
- maximum combustion pressure
- lube oil pressure behind last bearing
- specific fuel consumption
- method of starting

Coupling/reduction gearing

- make, type and building year of coupling or reduction gearing
- type of coupling (plate/hydraulic, reversible, etc.)
- type of reduction gearing
- reduction rate
- type of toothing
- operation of coupling

Remarks

Review by supervising engineer

_____ _____
(Initials) (Date)

a-2 Technical details - steam propulsion plant

Main turbine

- manufacture, type year built
- type of turbine, drive system
- type and number of stages HP turbine
- type and number of stages LP turbine
- number of RPM (HP and LP)
- power out put
- inlet steam pressure
- inlet steam temperature
- extractions steam pressure
- reheat steam pressure and temperature
- exhaust steam pressure
- exhaust steam temperature
- type of governor and trip mechanisms

Reduction gear assembly

- manufacture, type, year built
- reduction ratio
- type of teeth
- name each type of gear of assembly

Main boiler

- Manufacture, type, year built
- steam generating capacity
- steam pressure/temperature
- combustion control system/burner management system
- feed water control system
- superheat steam temperature control
- type of desuperheater
- type of economizer/airheater
- soot blower arrangement
- safety value arrangement
- list of boiler mounting and internals
- fuel system (number of pumps and heaters)
- air register
- fuel atomizer system

Remarks: Review by supervising engineer

____ ____

(Initials) (Date)

III - PROPULSION PLANT (cont'd)

a -3 Technical details - general

Thrust block

- type
- separate or built-in

Shafting

- components
  - maximum revolution/minute
  - type of stem tube and gland
  - type and number of bearings

Propeller

- make, type
- fixed/controllable pitch/contra rotation
- number of blades
- right/left handed
- pitch

Thrusters (Bow and/or Stern)

- number
- location
- make, type, year of construction
- type of drive
- maximum electrical power consumption
- maximum output power
- steering gear
- manufacture, type, year built
- pump, ram arrangements
- follow up arrangements
- emergency arrangements

Remarks: Review by supervising engineer

_____ _____
(Initials) (Date)

III- PROPULSION PLANT

b-1 Assignment Diesel propulsion plant

Describe, based on a short outline of the main engine and associated auxiliary systems, as an operational entity, the possibility for control from control room and bridge console.

Also mention possible emergency devices and their control.

Describe the actions to be taken to maintain the main engine in good operational condition.

Please include:

- the cylinder pressures
- power output
- exhaust gas temperatures of each cylinder as well as temperatures before and after supercharger exhaust and air cooler temperatures and pressure
- cooling and lubricating system details
- type of fuel injection
- fuel temperature and viscosity

Review by supervising engineer

Number of pages of assignment……

_____ _____
(Initials) (Date)

Ill- PROPULSION PLANT

b-2 Assignment steam plant

Describe, based on a short outline, the main steam and water cycle and associated auxiliary system found on board your vessel as an operational entity for the possibility of control from a control room and bridge console.

Also include emergency devices and their control.

Describe the actions to be taken to maintain the main boiler and turbine in good operational condition.

Please include operating parameters for:

- condensate system (i.e. condenser, pump, heater)
- air ejector/pump
- feedwater system (i.e. deaerator, feed pump)
- combustion air heaters
- main and auxiliary piping system
- combustion control system
  - fuel oil system
  - lube oil system
  - sea water cooling system
- evaporator/condenser system

Review by supervising engineer

_____ _____
(Initials) (Date)

Number of pages of assignment:

IV - AUXILIARY SYSTEMS

a Technical details

A	Prime movers of generators	
Diesel engine	-	number on board
	-	manufacture, type and building year
	-	power output
	-	number of revolutions
	-	two or four-stroke process
	-	type of scavenging and turbo charging
	-	type of fuel
	-	engine starting equipment
	-	maximum compression pressure
	-	maximum combustion pressure
	-	specific fuel consumption
	-	governor and trip details
Turbine	-	manufacture, type and building year
	-	type, of turbine(s)
	-	number of stages
	-	reduction gear
	-	number of revolutions
	-	power output
	-	live steam pressure
	-	quality of steam
	-	exhaust steam pressure
	-	governor and trip details
Emergency diesel generator	-	manufacture, type and building year
	-	two four-stroke process
	-	power output
	-	way of starting
	-	number of revolutions
	-	government details

Continuation technical details

B Fuel system		
Fuel transfer pumps	-	number on board
	-	type
	-	capacity
Fuels	-	available types
Tanks -	-	capacity fuel storage tank(s)
	-	capacity settling tank(s)
	-	capacity day tank(s)
	-	capacity sludge tank(s)
Fuel cleaning system	-	make and year of manufacture
	-	number of purifiers
	-	type of purifiers
	-	capacity of purifiers
	-	number of clarifiers
	-	type of clarifiers
	-	capacity of clarifiers
Fuel heater	-	type
Viscosity controller	-	type
Fuel blending system	-	type
	-	capacity
C Lubricating oil system		
Main lub-oil pumps	-	number on board
	-	type
	-	capacity
Lub oil purifiers	-	number on board
	-	type

Continuation technical details

D	**Fresh-water system**	
Fresh water evaporator	-	number on board
	-	type
	-	heating medium
E	**Refrigerating plant for cargo and refrigerated spaces**	
Cargo		
Refrigerated holds	-	number on board
	-	volume of each hold
	-	working principle
Compressors	-	number on board
	-	working principle
	-	make, type and year of construction
	-	power consumption
	-	refrigerant (primary and/or secondary)
	-	cooling agent
	-	cooling capacity
	-	capacity control
Provision		
Chill box	-	number on board
	-	working principle
	-	temperature
	-	way of cooling
Freeze box	-	number on board
	-	working principle
	-	temperature

Continuation technical details

Compressors	-	number on board
	-	working principle
	-	manufacturer, type and year of construction
	-	power consumption
	-	refrigerant (primary and\or secondary)
	-	cooling agent
	-	cooling capacity
F Starting, control and general air systems		
Starting air compressors	-	number on board
	-	working principle
	-	manufacturer, type and year of construction
	-	capacity
	-	working pressure
	-	stage cooling temperatures
General air compressors	-	number on board
	-	working principle
	-	manufacturer, type indication, year of construction
	-	capacity
	-	working pressure
Control air compressors	-	number on board
	-	working principle
	-	manufacturer, type indication , year of construction
	-	capacity
	-	working pressure
	-	type of cooling
Associated air system equipment	-	filters
	-	dryers
	-	reducers
	-	gauging
	-	pressure vessels
	-	relieving devices
	-	starting air valves
	-	starting air motor
G Auxiliary boilers		
Oil-fired steam boilers and system	-	number on board
	-	working principle
	-	manufacturer, type, year of construction
	-	working pressure
	-	safety devices, alarms and controls
	-	capacity
	-	burner management
	-	combustion control

Oil-fired thermal	-	number on board
Oil heater	-	working principle
	-	manufacturer, year of construction
	-	type
	-	working pressure
	-	capacity
	-	control systems
Exhaust gas steam boilers **Oil heater**	-	number on board
	-	working principle
	-	manufacturer, year of construction
	-	capacity
	-	control systems
Hydraulic systems	-	pumps
	-	pipe and hoses
	-	filters
	-	Strainers
	-	high pressure vessels
	-	reducers
	-	valves
	-	relieving devices
	-	control systems
Cooling water system	-	fresh water cooling system
	-	sea water cooling system

Remarks: **Review by supervising engineer**

……
(**Initials**) (**Date**)

b Assignment

Almost all ships are equipped with a heat generating plant. This plant may consist of:

.1 an oil-fired steam boiler

.2 an oil-fired thermal oil heater

.3 an exhaust gas boiler combined with the boiler sub 1

.4 an exhaust gas boiler combined with the heater sub 2

.5 an exhaust gas heater combined with heater sub 2

The steam as produced by a plant sub 1 or 3 may- except for heating purposes - may also be used for driving pumps and generators.

Give a description based on a diagram of the design, operation and control of plants mentioned above sub 1 through 5. The following items should be dealt with:

a) the circuit of the generated steam or heated oil

b) preparation to be made before the plant is put into operation. For the plants sub 3 and 4 right order to be kept: first the oil-fired boiler, next the exhaust gas boiler

c) putting it into operation and the required checks during firing-up for both oil-fired and exhaust gas boilers

d) checks and boiler control during operation

e) automatic control for starting up and shutting down the exhaust gas boiler and oil-fired boiler

f) safety-devices of the plant; mandatory safety requirements

g) starting up, running and shutting down an existing turbo-generator

h) the testing and treatment of boiler and feed water

i) the specific checks and safety measures in case of thermal oil being used

j) condensate system

k) evaporation system

Review by supervising engineer

Number of pages of assignment:……

…… ……
(Initials) (Date)

V - ELECTRICAL PLANT

a Technical details-main, Auxiliary, Emergency, Distribution Panels, Switch Gear

Generators

voltage

- number on board
- manufacturers and years of construction
- voltage
- frequency
- apparent power
- power and service factor
- method of cooling generator

Shaft generators

- number on board
- manufacturer, year of construction
- voltage
- frequency
- apparent power
- power and service factor
- method of drive
- maximum and minimum permissible revolutions of the driving engine
- method of frequency and voltage control

Emergency generator

- …..on board
- manufacturer, type, year of construction
- apparent power
- power and service factor
- method of drive

Continuation technical details

Converters and rectifiers

- number on board
- working principle
- incoming and outgoing voltage
- incoming and outgoing current
- consumed and produced power

Transformers

- number on board
- working principle
- purpose
- primary and secondary voltage and current
- apparent power

Battery sets

- number on board
- working principle (primary and secondary)
- voltage
- maintenance procedures
- ventilation requirements
- battery charger

Remarks: persons	Review by supervising _____ _____ (Initials) (Date)

CHAPTER VIII-ELECTRICAL INSTALLATION

The assignment for this subject is to be carried out in a very detailed manner. Knowledge is basically obtained from instruction manuals. However, the necessary skills often underdeveloped. I t is desirable that the ship's management is able to find opportunities to involve trainees, as much as possible, in solving problems in this field.

b Assignment

The electrical supply to the main switch board is accomplished by generators. The ship's supply is distributed from the main switch board.

1 Describe, on the basis of a diagram, how two generators are switched on to the ship's mains. Indicate how these generators work in parallel mode.

2 In a case where the ship is equipped with a shaft generator, the parallel operation of the shaft generator and a diesel generator is to be described.

Indicate in both cases how the generators are protected and how load-sharing is accomplished. Some safety devices have a time-delay. Mention these and explain why a time-delay is needed. How are these safety devices tested?

In case two generators are running in parallel and the total load than the maximum permissible load of one generator, then indicate in what way a total power supply shutdown is prevented, if one of the generators shuts down due to a prime mover failure. In case of a main generator failure the electrical supply is partly taken over by the emergency generator or a battery set via switchboard. Describe:

a how the emergency generator is started; and'

b how the battery set switched on.

Which machinery and devices are required to be connected to both the main and the emergency switchboard and why? Indicate how the emergency generator is prevented from overloading due to too much equipment being connected to the emergency switchboard. Which safety devices are fitted at the emergency switchboard and why?

Is there a switch connection between the emergency and main switchboard?

Describe how the electrical supply is started up again after (whether or not fictitious) a power failure has occurred.

engineers	Review by supervising …….. ……. (Initials) (Date)
Number of pages of assignment:……	

VI-CARGO HANDLING AND STOWAGE

a Technical details

Cargo pumps (where appropriate)

- number on board
- manufacturer, year of construction
- working principle
- capacity
- maximum working pressure
- method of drive
- method and location of control and monitors

Ballast pumps

- number on board
- manufacturer, year of construction
- working principle
- capacity
- maximum working pressure
- method of drive
- method and location of control and monitors

Stripping pumps

- number on board
- manufacturer, year of construction
- working principle
- capacity
- maximum working pressure
- method of drive
- method and location of control and monitors

Insert gas plant

- working principle
- capacity
- method and location of controls and monitors

Tank wash installation

- working principle
- capacity
- cleaning solvent

Remarks:	Review by supervising engineer …… …….. (Initials) (Date)

b Assignment

Make a report about cargo handling and stowage, concerning a part of the voyage in which there is a port of loading, a section of the voyage and a port of unloading. In the report the following subjects should be dealt with:

- information-exchange between shore and ship concerning the cargo, such as booking, shore preparation, stevedoring, special requirements
- preparing the ship for cargo carriage
- considerations leading to the chosen way of stowage, taking into account stability, trim, the occurrence of longitudinal stresses and potential for damage control
- loading the ship or part of it together with its interesting aspects; the stowage plan and possible annexes, including stability and trim calculations
- the use of cargo handling equipment
- the care of the cargo during the voyage
- making preparation for and the actual unloading of the cargo
- measures to be taken in connection with safety of crew, cargo and environment
- possible financial and legal aspects such as ship's involvement in settlement of claims. Notice of readiness, time sheet.

Review by supervising engineer

Number of pages of assignment:……

……. …….
(Initials) (Date)

VII-AUTOMATIC TECHNOLOGY

a Technical details

General

Answering the following questions depends a great deal on how the machinery inside and outside the engine room is automatied: centralized by means of one or more computers, or decentralized with separate controllers, or a combination of both.

For all the parameters to be controlled which are listed separately below, the following characteristics should be mentioned (the entire control system need not to be described):

General	-	whether it concerns a control, adjustment or alarm system
	-	its location and from where it is operated
	-	how is the measured signal fed to the computer
Centrally controlled	-	how does the computer interfere in the process and with what means
	-	sort and type of sensors, A/D and D/A conversion
	-	the measuring principle
Decentrally controlled	-	make and type of measuring transduce or sensor
	-	make and type of controller used
	-	make and type of correcting unit (e.g. control valves)
	-	make and type of positioners
	-	medium used for transmitting the measuring and control signals

Centralized automation

- make and type of computer(s)
- part of the system controlled by the computer
- size and division of computer memory
- way of input and output of signals (D/A and D/A conversion)
- possibility for emergency operation
- emergency voltage control

Controlled parameters

number of revolutions

- main engine(s)
- auxiliary engine
- auxiliary turbine
- bow/stern thruster(s)

Continuation technical details

Angle

- automatic pilot
- heel/automatic trim system
- heel/stabilizers

Temperatures

- cylinder cooling-water/hot cooling-water circuit
- piston cooling-water/cooling oil
- lubricating oil
- secondary cooling-water circuit
- seawater circulating system
- incinerator
- cargo refrigerating plant
- provisions refrigerating plant
- air treatment system
- oil-fired thermal oil boiler
- exhaust gas thermal oil boiler

Pressures

- starting air
- control air
- general air
- whistle air
- lub oil main engine
- control oil main engine
- lub oil pressure auxiliary engines
- hydraulic oil for hull gates and valves
- steering engine oil
- oil-fired boiler
- exhaust gas boiler

Continuation technical details

Physical properties

- viscosity of fuel main engine
- quality of condensate
- oxygen content in inert spaces
- tank atmosphere
- exhaust gases of oil-fired boiler

Levels

- bilge water
- ballast tanks
- fuel tanks
- boiler water
- lub oil main engine
- steering engine oil

Remote control

- hatches
- side parts
- fuel tank valves
- watertight doors
- rudder

b Assignment

Choose and describe a separate control loop (somewhere) on board of the ship, like viscosity control, automatic pilot, a self-tension winch, a temperature, speed or pressure control. Such as:

- watertight sliding doors
- bow ports, sidedoors
- self-tension winches
- thrusters, cranes
- steering gear

Explain the operation of the equipment used.

To be expanded

Seen by supervisor

……. …….
(Initials) (Date)

Number of pages of assignment

a Technical details

A Fire extinguishing system	
Fire pumps	- number on board - working principle - method of drive - capacity - pressure - location on board - operating positions
Emergency fire pump	- working principle - capacity - method of drive - location on board - operating positions
Fixed fire-fighting installation(s)	- working principle - protected space(s) - operating positions
Sprinkler installation	- working principle - protected space(s)
Fire detection system	- number on board - protected space(s)
Hydrants	- number on board
International shore connection	- number on board - location
Control systems	- location (s)

Continuation technical details

B Bilge pumping arrangement	
Bilge ejector	- number on board - location - capacity
Bilge pumps	- number on board - location - working principle - capacity - operating positions
C Life saving equipment	
Lifeboats	- number on board - working principle
Inflatable rafts	- number on board - manufacturer - number of persons
Rescue boats	- working principle - number of persons
Launching appliances	- number on board - working principle
Lifebuoys	- number on board - working principle
Lifejackets	- number on board - working principle - location
Immersion suits	- number on board - working principle

Continuation technical details

D Environmental protection

Sewage treatment plant	- working principle - capacity
Bilge water treatment	- working principle - capacity - system of control - number of PPM of the effluent
Incinerator plant	- working principle - capacity - substances to be burnt - required fuel - maximum working temperature
Ballast water monitor	- working principle - system of control

Remarks:	**Review by supervising engineer** …….. …….. **(Initials) (Date)**

b Assignment

Repairs and maintenance tasks have to be carried out in consultation with the supervisor. When the trainee takes part in repair or maintenance work, then the report should contain the following points for emphasis:

1. reason for the repairs or the maintenance work

2. preparatory work

3. actual work, disassembly, etc.

4. condition of the opened device/machinery

5. measurements to be carried out and the results thereof

6. assembly of the component or the entire device/machinery

7. making it operational again and testing it

8. final conclusion about the possible cause and consequences; the question of who is guilty to be left out of consideration

9. possible theoretical considerations as a basis for the findings

The extend of the repair and maintenance tasks should (preferably) be such that the above-mentioned points can be included in the report, as far as possible accompanied by repair sketches and drawings used.

Review by supervising engineer

…….. ……..
(Initials) (Date)

Number of pages of assignments:……

Aeng2

Function: **Marine engineering at the operational level**

Competence 1: **Use of appropriate tool for fabrication and repair operations typically performed on ships**

No.1	**TASKS**	**CRITERIA FOR SATISFACTORY PERFORMANCE**	**Ship Ref. No.**	**Assignment Completed**					
			Date	Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.1	Reorganize characteristics and limitations of materials used in construction and repair onboard	Identification of important parameters for fabrication of ship related components is appropriate							
1.2	Select and use special tools for work on specific machinery and equipment i.e. pumps, purifiers, reducers	Correct hand and machine tools, tools are chosen and used in accordance with instructions, manuals and good workmanship							
1.3	Select and use appropriate material	The selected material is suitable for the part(s) to be fabricated or repaired							
1.4	Use machine tools and equipment for fabrication and repair	Use of equipment and machine tools is appropriate and safe and fabrication is to designated tolerances							

Function: **Marine engineering at the operational level**

Competence 2: Use of hand tools and measuring equipment for dismantling, maintenance, repair and assembly of shipboard plant and equipment

No.2	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assessment completed					
			Da	Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
2.1	Select and use hand tools for dismanting, inspecting, repairing and reassembling equipment	Hand tools are properly selected and used for adjustments and calibrations and for dismantling and re-assembling of machinery and equipment							
2.2	Select and use general and special measuring equipment	The selected measuring instruments used for adjustments, calibrations, repair and maintenance of machinery and equipment are relevant for the task, correct measures are taken and checked for compliance with stated tolerances							
2.3	Locate and use relevant manuals and interpret drawings, diagrams, sketches and instructions	The instructions, drawings and diagrams relevant for the job are quickly identified and properly used							

Function: **Marine engineering at the operational level**

Competence 3: **Use of hand tools, electrical and electronic measuring and test equipment for locating and repairing faults and malfunctions**

No.3	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
3.1	Locate and interpret relevant manuals	The selected manuals, drawings and diagrams are appropriate and quickly located							
3.2	Select test and measuring equipment	Section of test and measuring equipment is appropriate							
3.3	Use and interpret test and measuring equipment reading	Use of test and measuring equipment is appropriate and interpretation of results is accurate							
3.4	Evaluate the necessity for taking corrective action with or without assistance	Selection of proper equipment and procedures for the conduct of repair and maintenance is in accordance with manuals and good practices							
3.5	Repair faults and correct malfunctions	The situation is assessed correctly and the action taken acceptable. Commissioning and performance testing of equipment and systems brought back into service after repair is in accordance with manual and good practices							

Function: **Marine engineering at the appropriate level**

Competence: **Maintain a safe engineering watch**

No.4	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	a Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.1	List or orally explain the reasons an officer in charge of the engineering watch shall not hand over the watch to the relieving officer	Explanation is consistent with requirements in section A-VIII/2, paragraph 56, of the STCW Code							
4.2	Explain the starting orders and special instructions of the chief engineer officer relating to the operation of the ships systems and machinery	Explanation is satisfactory to the assessor							
4.3	Explain the nature of all work being performed on machinery and systems, the personnel involved, and potential hazards	Explanation is satisfactory to the assessor							

Function: **Marine engineering at the operational level**

Competence 4: Maintain a safe engineering watch

No.4	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.4	Determine the level and, where applicable, the condition of water or residues in bilge, ballast tanks, slop tanks, reserve tanks, fresh water tanks, sewage tanks and any special requirements for use or disposal of the contents thereof	Explanation is consistent with requirements in section A-VIII/2, paragraph 56, of the STCW Code							
4.5	Determine the condition and level of fuel in the reserve tanks, settling tank, day tank, and other fuel storage facilities	Determination are correct							
4.6	Determine any special requirements relating to sewage system disposals and the acceptable alternative for such disposals for the duration of the voyage	Ability to correctly explain acceptable alternatives for sewage system disposals							

Function: **Marine engineering at the operational level**

Competence 4: Maintain a safe engineering watch

No.4	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	A Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.7	Determine the condition and mode of operation of the various main and auxiliary systems, including the electrical power distribution system	Determinations are correct							
4.8	Determine, where applicable, the condition of monitoring and control console equipment, and which equipment is being operated manually	Determination are correct							
4.9	Describe potential adverse conditions that could result from bad weather, ice, contaminated water, or shallow water	Descriptions are complete and accurate							

Function: **Marine engineering at the operational level**

Competence 4: **Maintain a safe engineering watch**

No.4	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
			Date	Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.10	Determine, where applicable, the condition and mode of operation of automatic boiler controls such as flame safeguard control system, limit control system, combustion control system, fuel supply control system, and other equipment related to the operation of steam boilers and explain the function of each	Correct determination and satisfactory explanation							
4.11	Determine any special modes of operation dictated by equipment failure or adverse ships conditions and describe how various how various equipment failures or adverse ship condition could potentially dictate special modes of operation	Correct determination and satisfactory explanation							

Function: **Marine Engineering at the operational level**

Competence 4: **Maintain a safe engineering watch**

No.4	**TASKS**	**CRITERIA FOR SATISFACTORY PERFORMANCE**	**Ship Ref. No.**	**Assignment Completed**					
			Date	Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.17	Identify all escape routes from the machinery spaces	All escape routes are properly identified							
4.18	Describe the various engine-room alarm systems and distinguish between the various alarms, especially the fire-extinguishing media alarm	Description is accurate							
4.19	Operate the propulsion equipment in response to needs for changes in direction or speed	Capability for operation is satisfactory							

Function: **Marine engineering at the operational level**

Competence 4: Maintain a safe engineering watch

No.4	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
			Date	Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.20	Determine and describe all preventive maintenance, damage control, or repair operations to be performed during the engineering watch. Describe how all machinery to be worked on is isolated, bypassed, or adjusted. Record all work carried out on the watch	Determinations are complete; descriptions are satisfactory; and work performed is properly recorded							
4.21	Inspect the machinery in the charge of the officer in charge of the engineering watch. Describe the condition of all such machinery	Condition is accurately described							

Function: **Marine engineering at the operational level**

Competence 4: **Maintain a safe engineering watch**

No.4	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed						
			Date	Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.22	Make rounds of the machinery and steering-gear spaces for the purpose of observing and reporting equipment malfunctions or breakdowns and performing under direction routine adjustments, required upkeep, and other necessary tasks. Describe potential malfunctions and breakdowns	Performance and disemption are satisfactory and accurate							
4.23	Describe actions that would be necessary in case of damage resulting from equipment breakdown, fire, flooding, rupture, collision, grounding, or other causes in order to contain the effects	Descriptions are satisfactory							

Function: **Marine engineering at the operational level**

Competence 4: Maintain a safe engineering watch

No.4	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
			Date		Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.24	Record all events related to the main and auxiliary machinery which have occurred during the engineering watch	Records are suitable							
4.25	Describe special watchkeeper precautions to be taken under adverse conditions in rough seas, restricted visibility, coastal and congested waters, and at anchor	Descriptions are satisfactory							
4.26	Describe the procedures for taking over the engineering watch in port	Description includes the requirements of section A-VIII/2, part 4-2, of the STCW Code							
4.27	Describe the procedures for performing the engineering watch in port	Description includes the requirements of section A-VIII/2, part 4-4, of the STCW Code							

Function: **Marine engineering at the operational level**

Competence 5: **Use of English in written and oral form**

No.5	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed						
			Date	Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
5.1	Use engineering publications operational manuals and fault finding instructions written in English	The publications and manuals relevant to the engineering duties are correctly interpreted							
5.2	Fill in standard engineering reports and forms in English	All reports and forms relevant to the engineering duties are correctly filled							
5.3	Communicate with members of the watch, in a multilingual crew, in safety related duties	All orders and information related to Watchkeeping duties are correctly understood and acted upon those concerned							

Function: **Marine engineering at the operational level**

Competence 6: Operate main and auxiliary machinery and associated control systems

No.6	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Ddate	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
6.1	Prepare main machinery for departure	All checks and actions are carried out in accordance with laid down instructions and all auxiliary and control systems are functioning properly. All relevant checks and actions are recorded							
6.2	Prepare and test the steering gear for departure	All checks and actions are carried out in accordance with laid down instructions and all control systems are functioning properly. All relevant checks and actions are recorded							
6.3	Prepare auxiliary machinery for operation	All checks and actions are carried out in accordance with laid down instructions and all auxiliary and control systems are functioning properly. All relevant checks and actions are recorded							
6.4	Operate steam boilers, including combustion control and burner management systems	The equipment is operated in accordance with instructions and good practice. All instruments are monitored, necessary adjustments made and required actions taken on and properly recorded							
6.5	Check steam boiler water level	Water level is checked in accordance with instruction manual and good practice and necessary action is taken when water level is abnormal							
6.6	Locate common faults in machinery and plants, in engine room boiler room and steering gear room and	The causes of machinery malfunctions are promptly identified and action is taken to ensure the overall safety of the ship and the plant having regard to the prevailing							

	take action necessary to prevent damage	circumstances and conditions							

Function: **Marine engineering at the operational level**

Competence 7: **Operate pumping systems and associated control systems**

No.7	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
			Date		Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
7.1	Operate bilge and ballast pumping systems	The operations are carried out in accordance with established rules and procedures. The marine environment is in no way polluted by improper operation or negligence							
7.2	Operate fuel pumping systems	The operations are carried out in accordance with established rules and procedures. The marine environment is in no way polluted by improper operation or negligence							
7.3	Operate cargo pumping systems (liquid cargo ship)	The operations are carried out in accordance with established rules and procedures. The marine environment is in no way polluted by improper operation or negligence							
7.4	Perform routine pumping operations	Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations and avoid pollution of the marine environment							

Function: **Electrical, electronic and control engineering**

Competence 1: Operate alternators, generators and control systems

No.	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
			Date		Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.1	Locate and use relevant manuals, drawings, diagrams and instructions	The instructions and manuals relevant for safe and efficient operations are quickly identified and properly used							
1.2	Prepare for starting, coupling (connecting)and change over alternators or generators	Operations are planned in accordance with established procedures and instructions							
1.3	Start, couple and change over alternators or generators	The operations are carried out as planned and all machinery and equipment are functioning satisfactorily							
1.4	Location of common faults and action to prevent damage	The causes of malfunction are promptly identified and actions are designed to ensure the overall safety of the ship and the plant having regard to the prevailing circumstances and conditions							
1.5	Identify ship's electrical distribution system	Diagrammatic sketch from generator to final breaker panels, including circuit breakers trips, transformers, fuses, supply voltages, shore connections and emergency switchboard connection							

Function: **Electrical, electronic and control engineering**

Competence 1; Operate alternators, generators and control system

No.	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
			Date		Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.6	Locate all electronic control equipment as found in ship's spaces	The list include control function description manufacture, power supply operating voltage							
1.7	Identify all ship's electronic monitoring equipment	List should include function, location manufacture, power supply and operating voltage							
1.8	Describe main engine throttle control system	Sketch should include block diagram of major components and explanation of operation including alternate means of controlling throttle							
1.9	Describe electronic steering gear control system	Sketch should include block diagram of major components and explanation of operation including alternate means of controlling steering							
1.6	Describe ships internal communication system	Sketch should include block diagram of major components and explanation of operation							

Function: **Electrical, electronic and control engineering**

Competence 2: **Maintain alternators, generators and control systems**

No.2	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
			Date		Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
2.0	Carry out routine testing and maintenance on electrical components	Items include circuit breakers, trips motor starters, controllers, generators, lights, batteries alarm systems. Submit report of results							

Acon2F
Function: **Controlling the operation of the ship and care for persons on board at the operational level**

Competence: **Ensure compliance with pollution prevention requirements (STCW Code, Table A-III/1)**

No.1	**TASKS**	**CRITERIA FOR SATISFACTORY PERFORMANCE**	**Ship Ref. No.**	**Assignment Completed**					
			Date		Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.1	Ensure that procedures are agreed and observed and all scuppers are blocked before bunkering	The operations are fully observed, all scuppers are blocked and pipes and hoses inspected before bunkering takes place.							
1.2	During relevant drills initiate immediate investigation to detect the source of pollution	All available resources are utilized to detect the source and the master or appropriate authorities are informed							
1.3	During relevant drills stop or prevent leakage and spills of harmful liquids and solids substances	The situation is thoroughly assessed and the actions taken are well organized and exercised with due consideration taken to the extent of the pollution							
1.4	Have all tanks and compartments sounded if any damage is suspected	The soundings are readily available and the results immediately reported to the master							
1.5	Carry out bilge, ballast and bunkering operations	All operations are carried out in accordance with MARPOL and due regard paid to Shipboard Oil Pollution Emergency Plan (SOPEP)							

Function: **Controlling the operation of the ship and care for persons on board at the operational level**

Competence: **Maintain seaworthiness of the ship (STCW Code, Table A-III/1)**

No.	TASKS Monitor stowage and securing of cargoes	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
2.1	Inspect hull and hull openings, compartments, hatch covers, equipment and complement and take action if any defects are detected	The inspection is properly carried out, due regards paid to the prevailing circumstances and areas where defects are most likely to occur. Any defect is immediately reported and recorded and the suggested or executed action adequate for the situation							
2.2	Ensure that all loose objects are securely fastened to avoid damage	Inspection is carried out al regular intervals and more frequently in heavy weather or if other incidents occur. Heavy or otherwise dangerous objects are given the highest priority and good seamanship exercised.							
2.3	Arrange for regular control measures to ensure watertight integrity.	Peaks, bilge, tanks and other compartments are sounded regularly, the results recorded and any irregularities reported and examined further.							
2.4	Calculate stability, trim and stresses using stability trim, and stress tables, diagrams and stress calculating equipment.	Ensure that stability conditions comply with the IMO intact stability criteria under all conditions of loading							
2.5	During relevant drills take actions to ensure and maintain the watertight integrity of	Actions to ensure and maintain the watertight integrity of the ship are in accordance with accepted practice.							

	the ship.								

Function: **Controlling the operation of the ship and care for persons on board at the operational level**

Competence: **Prevent, control and fight fires on board (STCW Code, Tables A-III/1)**

No.	TASKS Prevent fires on board	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
3.1	Operate fire and smoke detecting equipment.	The equipment is tested and operated in accordance with manufacturer's manuals and ship-specific instructions.							
3.2	Ensure that all persons on watch are able to detect and correct hazardous situations and actions and keep the ship clean and tidy	Watch personnel make regular inspections in areas exposed to ignition. Easily inflammable material is put in safe places and the watch demonstrate an attitude of alertness and readiness to respond to fires.							
3.3	Make the watch locate and use fire-fighting appliances and emergency escape routes and sound alarm	Every person on watch can use portable or otherwise adequate fire-extinguishers for small fires, demonstrate ability to find emergency escape routes and raise the alarm							

Function: **Controlling the operation of the ship and care for persons on board at the operational level**

Competence: **Prevent, control and fight fires on board (STCW Code, Tables A-III/1)**

No.	TASKS Prevent fires on board	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
4.1	Locate fire-stations and demonstrate proper use of fixed installations and other fire-fighting appliances and agents.	All stations are located and the most suitable one in the event of a fire. Proper equipment and extinguishing agents selected for the various materials on fire.							
4.2	Locate and use fire-protective equipment (fireman's outfit, including, breathing apparatus).	The equipment is quickly donned and used in a way that no accidents are likely to occur.							
4.3	Demonstrate ability to act in accordance with the fire-fighting plan during fire-drills.	During debriefing after an exercise or a real fire extinguishing action the reasons for each action taken, including the priority in which they were taken, are explained and accepted as the most appropriate.							
4.4	During relevant drills carry out rescue operations wearing breathing apparatus.	The breathing apparatus is tested and used in accordance with manufacturers manual and the operation is successful.							

Function: **Controlling the operation of the ship and care for persons on board at the operational level**

Competence: **Prevent, control and fight fires on board (STCW Code, Tables A-III/1)**

No.	TASKS Operate life-saving appliances	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
5.1	Organize abandon ship drills	On sounding the alarm all persons meet at the designated life-boat station wearing life jackets or immersion suits and carry out their duties on request.							
5.2	Demonstrate the ability to organize and supervise the launching, handling and recovery of life boat.	Correct orders for embarkation, launching, immediately clearing the ship's side, safely handling the boat under motor, oars or sail as appropriate, and safe boat recovery.							
5.3	Demonstrate the ability to organize and supervise the launching or throwing overboard a liferaft, and manoeuvre it clear of ship's side.	The duties for the persons designated for the raft are clearly allocated and orders efficiently executed							
5.4	Demonstrate proper use of radio life-saving appliances, satellite, EPIRPS and SARTs.	Equipment is operated in accordance with manufacturer's instruction.							
5.5	Ensure that all survival craft launching equipment on board is functioning.	Equipment is maintained in accordance with manufacturer's instructions and regulatory requirements.							
5.6	Ensure rations on board survival craft are adequate.	Food and water are sufficient for the survival craft designated complements.							
5.7	Ensure that equipment on board survival craft	Equipment such as pyrotechnics, signaling equipment, all meet							

	is adequate.	regulatory requirements.							

Function: **Controlling the operation of the ship and care for persons on board at the operational level**

Competence: **Apply medical first aid on board (STCW Code, Table A-III/1)**

No.	TASKS Apply medical first aid on board	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
6.1	During relevant drills stop excessive bleeding, ensure breathing and put casualties in proper position.	The actions demonstrated are in compliance with accepted recommendations given in international medical first aid guidance.							
6.2	During relevant drills detect sign of shock and heat stroke and act accordingly	The treatment recommended or given is adequate. Ability to request Radio Medico for advice is demonstrated.							
6.3	During relevant drills treat burns, scalds, fractures and hypothermia	Recommended guidelines for proper actions are explained and the basic principles for avoiding hypotherminal are demonstrated.							
6.4	During relevant drills, locate and access shipboard medicine and equipment.	Ability to access the medical cabinet in a timely way.							

Function: **Controlling the operation of the ship and care for persons on board at the operational level**

Competence: **Monitor compliance with legislation requirements (STCW Code, Table A-III/1)**

No.	TASKS Monitor compliance with legislation	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
7.1	State where laws, rules and regulations concerning ship operation and pollution prevention are available	The statement given is correct and includes relevant bodies or organizations which may be contacted to attain special information or guidance which is not easily accessible							
7.2	Use legislation to ascertain due approach to solve questions encountered during onboard operations.	Legislative requirements relating to safety of life at sea and protection of the marine environment are correctly identified.							

Function: **Maintenance and repair at the operational level**

Competence: **Maintain marine engineering systems including control systems**

No.	TASKS Monitor compliance with legislation	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.1	Locate and use relevant manuals and interpret drawings, sketches and instructions	The instructions and drawings relevant for the job are quickly identified and properly used.							
1.2	Select and use special tools for work on machinery and equipment.	Correct tools are chosen and used without causing any damage to machinery or equipment							
1.3	Use machine tools and equipment for fabrication and repair.	The selected material is suitable for the parts to be fabricated and the work is carried out within the designed tolerances.							
1.4	Ensure safety for all persons working on plant or equipment	Isolation, dismantling and re-assembly of plant and equipment is in accordance with accepted practices and procedures to ensure safety or operations.							
1.5	Undertake the following maintenance and repair to the main engine								

Function: **Maintenance and repair at the operational level**

Competence: **Maintain marine engineering systems including control systems**

No.	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.5.1	Use turning gear, place notices, record and take all safety precautions.	Take all safety precautions and display notice that turning gear is engaged. Obtain bridge clearance before turning engine.							
1.5.2	Carry out a crank case inspection and make a written report.	Work is carried out with manufacturers recommendations or acceptable practices.							
1.5.3	Take crankshaft deflection readings	Work is carried out with manufacturers recommendation or acceptable practices.							
1.5.4	Inspect, check condition, wear and clearances, overhaul and test: 1. fuel injection valves 2. air start valves 3. relief valves 4. exhaust valves 5. fuel pumps	Work is carried out according to the instructions of the manufacturer's manual and the necessary safety criteria.							

Function: **Maintenance and repair at the operational level**

Competence: **Maintain marine engineering systems including control systems**

No.	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.5.5	Replace and/or overhaul the following components, checking and adjusting clearances where appropriate: 1. large bore or trunk pistons 2. cylinder heads 3. turbochargers 4. top end bearings 5. bottom end bearings 6. main bearing 7. piston-rod scraper rings 8. cross head guides 9. tie bolts 10. holding down bolts and chocks	Work is carried out according to the instructions of the manufacturers manual and the necessary safety criteria. The clearances are correctly adjusted.							
1.6	Undertake the following maintenance and repair to the auxiliary boiler.								

No.	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.6.1	Take a boiler out of service. Isolate Blow a boiler down. Open up a boiler	Task is carried out in accordance with the manufacturer's instructions and accepted practices. Necessary safety criteria are taken care of.							
1.6.2	Examine a boiler, reporting on its conditions: 1. internally 2. externally	Task is carried out in accordance with the manufacturer's instructions and accepted practices. Necessary safety criteria are taken care of.							
1.6.3	Inspect water gauge fittings and check that passages, cocks and valves are clear.	Task is carried out in accordance with the manufacturer's instructions and accepted practices. Necessary safety criteria are taken care of							
1.6.4	Open up and inspect: 1. safety valves 2. feed check valves	Task is carried out in accordance with the manufacturer's instructions and accepted practices. Necessary safety criteria are taken care of							

No.	TASKS	CRITERIA FOR SATISFACTORY PERFORMANCE	Ship Ref. No.	Assignment Completed					
				Date	Confirmed by qualified instructor	Date	Confirmed by qualified assessor	Type of Assessment	Remarks
1.7	Undertake the following maintenance and repair to deck machinery and survival equipment								
1.7.1	Carry out routine maintenance on: 1. anchor windlass 2. cargo winches 3. cargo cranes 4. mooring winches 5. capstans 6. survival craft and launching gear 7. hatch covers	The work is carried out in accordance with the instructions of the manufacturer's manual and necessary safety precautions							
1.7.2	Steering gear: 1. make routine check and test on system during voyage 2. check level of hydraulic fluid and purge air from the system as appropriate	Perform in accordance with manufacturer's recommendations. Follow manufacturer's recommendations or acceptable engineering practice.							