ပြည်ထောင်စုသမ္မတ မြန်မာနိုင်ငံတော် အစိုးရ
ပို့ဆောင်ရေးဝန်ကြီးဌာန
ရေကြောင်းပို့ဆောင်ရေးညွှန်ကြားမှုဦးစီးဌာန

အမိန့်ကြော်ငြာစာအမှတ် ၆ / ၂၀၁၄

၁၃၇၆ ခုနှစ်၊ ပြာသိုလဆန်း ၁၀ ရက်
(၂၀၁၄ ခုနှစ်၊ ဒီဇင်ဘာလ ၃၀ ရက်)

ရေယာဉ်မှူးများ၊ ရေကြောင်းအရာရှိများနှင့် ရေကြောင်းအင်ဂျင်နီယာ အရာရှိများ၏ ကျွမ်းကျင်မှုလက်မှတ်များအတွက် စာမေးပွဲသင်ရိုးညွှန်းတမ်းများကို ဖြည့်စွက်သတ်မှတ်ခြင်း

၁။ ရေကြောင်းပို့ဆောင်ရေးညွှန်ကြားမှုဦးစီးဌာနသည် မြန်မာနိုင်ငံကုန်သည်သင်္ဘောအက်ဥပဒေ ပုဒ်မ ၂၉၄၊ ပုဒ်မခွဲ(ခ)နှင့် ရေယာဉ်မှူး၊ အရာရှိများနှင့် သင်္ဘောသားများ၏ ကျွမ်းကျင်မှုနှင့် တတ်ကျွမ်းမှုလက်မှတ်များ ထုတ်ပေးခြင်းဆိုင်ရာ နည်းဥပဒေများ၏ အခန်း (၄)ပါ ပြဋ္ဌာန်းချက်များ အရ အပ်နှင်းထားသော လုပ်ပိုင်ခွင့်ကို ကျင့်သုံး၍ ဤအမိန့်ကြော်ငြာစာကို ထုတ်ပြန်လိုက်သည်။

၂။ ရေယာဉ်မှူးများ၊ ရေကြောင်းအရာရှိများနှင့် ရေကြောင်းအင်ဂျင်နီယာ အရာရှိများ၏ အောက်ပါ ကျွမ်းကျင်မှုလက်မှတ်များအတွက် စာမေးပွဲ သင်ရိုးညွှန်းတမ်းများကို (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW), 1978 as amended including 2010 Minila Amendments) နှင့်အညီ ထုတ်ပြန်ထားသည့် အမိန့်ကြော်ငြာစာအမှတ် (၂/၂၀၁၄) ၏ နောက်ဆက်တွဲများတွင် ဖော်ပြထားသည့် နောက်ဆက်တွဲများအား ဖြည့်စွက် သတ်မှတ်လိုက်သည် -

(က) Bridiging Course for Existing 2nd Engineers who have failed in MOT 1st Class Part-B Old system examination ဆိုင်ရာသင်ရိုးညွှန်းတမ်း - **ANNEX (I)**

(ခ) Bridiging Course for Existing OEW who have failed in MOT 2nd Class Part-B Old system examination ဆိုင်ရာသင်ရိုးညွှန်းတမ်း - **ANNEX (J)**

(ဂ) Bridiging Course for Existing Junior Engineer who have failed in OEW Old system examination ဆိုင်ရာသင်ရိုးညွှန်းတမ်း - **ANNEX (K)**

(ပုံ)မောင်မောင်ဦး
ညွှန်ကြားရေးမှူးချုပ်
ရေကြောင်းပို့ဆောင်ရေးညွှန်ကြားမှုဦးစီးဌာန
ပို့ဆောင်ရေးဝန်ကြီးဌာန

စာအမှတ်၊ အမိန့်ကြော်ငြာစာ/ ရည၇/ ၈၂၈
ရက်စွဲ၊ ၂၀၁၄ ခုနှစ်၊ ဒီဇင်ဘာလ ၃၀ ရက်

ဖြန့်ဝေခြင်း

မြန်မာနိုင်ငံရေကြောင်းပညာတက္ကသိုလ်
မြန်မာနိုင်ငံ ကုန်သွယ်ရေကြောင်းကောလိပ်
ရေကြောင်းဘက်ဆိုင်ရာ သင်တန်းဌာနများ
ဦးဆောင်ညွှန်ကြားရေးမှူး
ပုံနှိပ်ရေးနှင့် စာအုပ်ထုတ်ဝေရေးလုပ်ငန်း
} မြန်မာနိုင်ငံ ပြန်တမ်းအပိုင်း (၁)တွင် ထည့်သွင်း ကြေငြာပေးပါရန် မေတ္တာရပ်ခံချက်ဖြင့် ပေးပို့ပါသည်။

မိတ္တူကို-

ပို့ဆောင်ရေးဝန်ကြီးဌာန

ANNEX (I)

SYLLABUS FOR WRITTEN EXAMINATION OF MARINE ENGINEER OFFICER CLASS I
(Bridging Course)
CERTIFICATE OF COMPETENCY
(Under STCW Convention, Regulation III/2)

Function 1: Marine Engineering at the Management Level

1.1 Manage the operation of propulsion Plant Machinery

1.1.1 Manage the operation of steam plant

1.1.1.1 Marine Steam Boiler and associated auxiliaries

1.2 Plan and schedule operations *(Theoretical knowledge)*

1.2.1 Propulsive characteristics of diesel engines including speed, output and fuel consumption.

1.3 Operation, Surveillance, Performance Assessment and maintaining Safety of propulsion Plant and auxiliary machinery *(Practical knowledge)*

1.3.1 Start up and shut down main and auxiliary machinery, including associated system.

1.3.1.1 Fuel Injection

1.3.1.2 Starting and Reversing

1.3.1.3 Diesel Engine Emergency operation

1.3.1.4 Hydraulic power system

1.3.1.5 Types of auxiliary Boilers.

1.3.1.6 Boiler water levels.

1.3.1.7 Boiler Water Testing.

1.3.1.8 Boiler Water Treatment.

1.3.1.9 Boiler defects .

1.3.1.10 Evaporators

1.3.1.11 Thermal fluid heating system.

1.3.3 The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery

1.3.3.1 Diesel engines

1.3.3.2 Oil purifier

1.3.3.3 Refrigeration and air conditioning system.

1.3.3.4 Pumping and piping system.

1.3.5 Function and mechanism of automatic control for auxiliary machinery:

1.3.5.1 Cargo-handling equipment and deck machinery

Function 2: Electrical, Electronic and Control Engineering at the Management Level

2.1 Manage operation of electrical and electronics control *(Theoretical knowledge)*

2.1.1 Marine electro technology, electronics, power electronics, automatic control engineering and safety devices

2.1.1.1 Marine Electro-technology

2.1.1.2 Electronics, Power Electronics

2.1.1.3 Automatic Control Engineering and safety devices.

2.1.2 Design features and system configuration of automatic control equipment and safety devices

2.1.2.1 Main Engine

2.1.2.2 Generator and distribution system

2.1.2.3 Steam boiler

2.1.3 Design features and system configuration of operational control equipment for electrical motors.

2.1.3.1 Three Phase A.C. Motors

2.1.3.2 Three Phase Synchronous Motors

2.1.3.3 Effect of varying frequency and voltage of A.C. Motors

2.1.3.4 Motor control and protection

2.1.3.5 Insulated Gate Bipolar Transistor (IGBT) motor speed control .

2.1.3.7 Motor speed control by Thyristors

2.1.3.7 Three Phase Generators

2.1.3.8 Three Phase Transformers

2.1.3.9 Distribution

2.1.3.10 Emergency Power

2.1.4 Design features of high-voltage installations (Exclusive course)

2.1.4.1 Design features of high-voltage installations

2.1.5 Features of pneumatic and hydraulic control equipment

2.1.5.1 Hydraulic Control Equipments

2.1.5.2 Pneumatic Control Equipment

2.2 Manage trouble shooting restoration of electrical and electronic control equipment to operating condition (*Practical knowledge)*

2.2.1 Trouble shooting of electrical and electronic control equipment

2.2.1.1 Electrical Safety

2.2.1.2 Test Equipment

2.2.1.3 Interpretation of Circuit Symbols

2.2.1.4 Logical six step troubleshooting procedure

2.2.1.5 Generation

2.2.1.6 Prime Mover Electrical Controls

2.2.1.7 Main Air Circuit Breaker

2.2.1.8 rotection of Generators

2.2.1.9 Electrical Distribution Systems

2.2.1.10 Motors

2.2.1.11 Electrical Survey Requirements

2.2.1.12 Calibrate & Adjust Transmitters & Controllers

2.2.1.13 Control System Fault Finding

2.2.2 Function test of electrical, electronic control equipment and safety devices

2.2.2.1 Function test of electrical, electronic control equipment and safety devices

2.2.3 Trouble shooting of monitoring systems

2.2.3.1 Test and calibrations of sensors and transducers of monitoring system

2.2.4 Software version control

2.2.4.1 Programmable logic controllers (PLC).

2.2.4.2 Microcontrollers

2.2.4.3 Digital Techniques

Function 3: Maintenance and Repair at the Management Level

3.1 Detect and identify the cause of machinery malfunctions and correct faults (*Practical knowledge)*

3.1.1 Inspection and adjustment of equipment

3.1.1.1 Inspection and adjustment of equipment

3.1.2 Non-destructive examination

3.1.2.1 Different types of non-destructive examination

3.2 Ensure safe working practices (*Practical knowledge)*

3.2.1 Safe Working

Function 4: Maintenance and Repair at the Management Level

4.1 Control trim, stability and stress

4.1.1 IMO recommendations concerning ship stability

4.1.1.1 IMO recommendations concerning ship stability

4.2 Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and protection of the marine environment

4.2.1 Knowledge of relevant international maritime law embodied in international agreements and convention

4.2.1.1 United Nations Convention on the Law of Sea 1982(UNCLOS)

4.2.1.2 Treaties, conventions, protocols, rules and regulations

4.2.1.3 International Maritime Organisation (IMO)

4.2.1.4 List of IMO Conventions

4.2.1.5 Introduction to International Labour Organization (ILO)

4.2.1.6 World Health Organization (WHO)

4.2.1.7 Authorities and Regulations

4.2.2 Certificates and other documents to be carried on board ships by international conventions, how they may be obtained and period of their legal vallidity

4.2.2.1 List of Certificates and documents to be carried on board ships as per SOLAS Annex 1, how they are obtained and their period of validity

4.2.2.2 Additional certificates and documents required on board ship

4.2.3 Responsibilities under the relevant requirements of the international convention on load lines

4.2.3.1 International Convention on Load Lines

4.2.4 Responsibilities under the relevant requirements of the international convention for the safety of life at sea

4.2.4.1 International Convention for the Safety of Life at Sea–Brief description of following chapters

4.2.4.2 Obligation to carry out periodical surveys and maintain validity of following certificates.

4.2.4.3 Obligation to maintain following Records

4.2.4.4 Obligation and rights of master navigation, storms

4.2.5 Responsibilities under the relevant requirements of the international convention for the prevention of pollution from ships.

4.2.5.1 Annex I – Oil

4.2.5.2 Annex II– Noxious Liquid Substances in Bulk

4.2.5.3 Annex III – Harmful substances carried in packaged form

4.2.5.4 Annex IV – Sewage

4.2.5.5 Annex V – Garbage

4.2.5.6 Annex VI – Air Pollution

4.2.6 Maritime declarations of health and the requirements of the international health regulations.

4.2.6.1 WHO's International Health Regulations 2005 (IHR)

4.2.6.2 International Medical Guide for Ship (IMGS) and recommendations for

the ship's medicine chest and equipment

4.2.6.3 International Maritime Organization's Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)

4.2.6.4 WHO's Guidelines for Drinking-water quality.

4.2.7 Responsibilities under international instruments affecting the safety of the ship, passengers, crew or cargo

4.2.7.1 ILO's Maritime Labour Convention 2006 (MLC 2006)

4.2.7.2 International Convention on Salvage,1989 – Lloyd's Standard Form of Salvage Agreement (LOF, 2000).

4.2.7.3 Marine Insurance, General Average and P & I Club

4.2.8 Methods and aids to prevent pollution of the environment by ships

4.2.8.1 Effects of marine oil spills

4.2.8.2 Regulations for prevention of oil pollution as per Annex I of MARPOL 73/78

4.2.8.3 Regulations for control of pollution from Noxious liquid substances carried in bulk as per Annex II of MARPOL 73/78

4.2.8.4 Regulations for the Prevention of Pollution by Harmful substances carried by sea in packaged form as per Annex III of MARPOL 73/78

4.2.8.5 Requirements covering the carriage of dangerous goods by sea as per Chapter VII of the SOLAS Convention

4.2.8.6 Regulations for the Prevention of Pollution by Sewage from from Ships as per Annex IV of MARPOL 73/78

4.5.8.7 Regulations for the Prevention of Pollution by Garbage from Ships as per Annex V of MARPOL 73/78

4.2.8.8 Regulations for the Prevention of Air Pollution as per Annex VI of MARPOL 73/78

4.2.8.9 International Convention for the Control and Management of Ship's Ballast Water and Sediment

4.2.8.10 Anti-fouling paints

4.2.8.11 Noise

ANNEX (J)

SYLLABUS FOR WRITTEN EXAMINATION OF MARINE ENGINEER OFFICER CLASS II *(Bridging Course)* CERTIFICATE OF COMPETENCY (Under STCW Convention, Regulation III/2)

FUNCTION 1: Marine Engineering at the Management Level

1.1 Manage the operation of propulsion Plant Machinery

1.1.1 Technical Communications for design

1.1.2 Manage the operation of steam plant

1.1.2.1 Marine Steam Boiler and associated auxiliaries

1.2 Plan and schedule operations *(Theoretical knowledge)*

1.2.1 Thermodynamics and heat transmission.

1.2.2 Mechanics and hydromechanics.

1.3 Operation, Surveillance, Performance Assessment and maintaining Safety of propulsion Plant and auxiliary machinery *(Practical knowledge)*

1.3.1 Start up and shut down main and auxiliary machinery, including associated system.

1.3.1.1 Fuel Injection

1.3.1.2 Starting and Reversing

1.3.1.3 Diesel Engine Emergency operation

1.3.1.4 Hydraulic power system

1.3.1.5 Types of auxiliary Boilers.

1.3.1.6 Boiler water levels.

1.3.1.7 Boiler Water Testing.

1.3.1.8 Boiler defects .

1.3.1.9 Evaporators

1.3.1.10 Thermal fluid heating system.

1.3.2 The efficient operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery

1.3.2.1 Diesel engines

1.3.3 Functions and mechanism of automatic control for main engine

1.3.4 Function and mechanism of automatic control for auxiliary machinery:

1.3.4.1 Oil purifier

1.3.4.2 Refrigeration and air conditioning system.

1.3.4.3 Cargo-handling equipment and deck machinery

FUNCTION 2: Electrical, Electronic and Control Engineering at the Management Level

2.1 Manage operation of electrical and electronics control *(Theoretical knowledge)*

2.1.1 Marine electro technology, electronics, power electronics, automatic control engineering and safety devices

2.1.1.1 Marine Electro-technology

2.1.1.2 Electronics, Power Electronics

2.1.1.3 Automatic Control Engineering and safety devices.

2.1.2 Design features and system configuration of automatic control equipment and safety devices

2.1.2.1 General Requirements

2.1.2.2 Main Engine

2.1.2.3 Generator and distribution system

2.1.2.4 Steam boiler

2.1.3 Design features and system configuration of operational control equipment for electrical motors.

2.1.3.1 Three Phase A.C. Motors

2.1.3.2 Three Phase Synchronous Motors

2.1.3.3 Effect of varying frequency and voltage of A.C. Motors

2.1.3.4 Motor control and protection

2.1.3.5 Insulated Gate Bipolar Transistor (IGBT) motor speed control .

2.1.3.6 Motor speed control by Thyristors

2.1.3.7 Three Phase Generators

2.1.3.8 Three Phase Transformers

2.1.3.9 Distribution

2.1.3.10 Emergency Power

2.1.4 Design features of high-voltage installations (Exclusive course)

2.1.4.1 Design features of high-voltage installations

2.1.5 Features of pneumatic and hydraulic control equipment

2.1.5.1 Hydraulic Control Equipments

2.1.5.2 Pneumatic Control Equipment

2.2 Manage trouble shooting restoration of electrical and electronic control equipment to operating condition (*Practical knowledge)*

2.2.1 Trouble shooting of electrical and electronic control equipment

2.2.1.1 Electrical Safety

2.2.1.2 Test Equipment

2.2.1.3 Interpretation of Circuit Symbols

2.2.1.4 Logical six step troubleshooting procedure

2.2.1.5 Generation

2.2.1.6 Prime Mover Electrical Controls

2.2.1.7 Main Air Circuit Breaker

2.2.1.8 Protection of Generators

2.2.1.9 Electrical Distribution Systems

2.2.1.10 Motors

2.2.1.11 Electrical Survey Requirements

2.2.1.12 Calibrate & Adjust Transmitters & Controllers

2.2.1.13 Control System Fault Finding

2.2.2 Function test of electrical, electronic control equipment and safety devices

2.2.2.1 Function test of electrical, electronic control equipment and safety devices

2.2.3 Trouble shooting of monitoring systems

2.2.3.1 Test and calibrations of sensors and transducers of monitoring system

2.2.4 Software version control

2.2.4.1 Programmable logic controllers (PLC).

2.2.4.2 Microcontrollers

2.2.4.3 Digital Techniques

FUNCTION 3. Maintenance and Repair at the Management Level

3.1 Manage safe and efficient maintenance and repair procedures

3.1.2 Manage safe and effective maintenance and repair procedure ***(Practical knowledge)***

3.1.2.1 Manage safe and effective maintenance and repair procedures

3.2 Detect and identify the cause of machinery malfunctions and correct faults (*Practical knowledge)*

3.2.2 Inspection and adjustment of equipment

3.2.2.1 Inspection and adjustment of equipment relevant to 3.1.1

3.2.3 Non-destructive examination

3.2.3.1 Different types of non-destructive examination

3.3 Ensure safe working practices (*Practical knowledge)*

3.3.1 Safe Working

FUNCTION 4. Maintenance and Repair at the Management Level

4.1 Control trim, stability and stress

4.1.1 Fundamental principles of ship construction and the theories affecting trim and stability and measures necessary to preserve trim and stability.

4.2 Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and protection of the marine environment

4.2.2 Certificates and other documents to be carried on board ships by international conventions, how they may be obtained and period of their legal validity

4.2.2.1 List of Certificates and documents to be carried on board ships as per SOLAS Annex 1, how they are obtained and their period of validity

4.2.2.2 Additional certificates and documents required on board ship

4.2.3 Responsibilities under the relevant requirements of the international convention on load lines

4.2.3.1 International Convention on Load Lines

4.2.4 Responsibilities under the relevant requirements of the international convention for the safety of life at sea

4.2.5 Responsibilities under the relevant requirements of the international convention for the prevention of pollution from ships.

4.2.5.1 Annex I – Oil

4.2.5.2 Annex II– Noxious Liquid Substances in Bulk

4.2.5.3 Annex III – Harmful substances carried in packaged form

4.2.5.4 Annex IV – Sewage

4.2.5.5 Annex V – Garbage

4.2.5.6 Annex VI – Air Pollution

4.2.6 Maritime declarations of health and the requirements of the international health regulations.

4.2.6.1 WHO's International Health Regulations 2005 (IHR)

4.2.6.2 International Medical Guide for Ship (IMGS) and recommendations for the ship's medicine chest and equipment

4.2.6.3 International Maritime Organization's Medical First Aid Guide for Use in Accidents involving Dangerous Goods (MFAG)

4.2.6.4 WHO's Guidelines for Drinking-water quality.

4.2.7 Responsibilities under international instruments affecting the safety of the ship, passengers, crew or cargo

4.2.7.1 ILO's Maritime Labour Convention 2006 (MLC 2006)

4.2.7.2 Marine Insurance, General Average and P & I Club

4.2.8 Methods and aids to prevent pollution of the environment by ships

4.2.8.1 Sources of Marine pollution

4.2.8.2 Effects of marine oil spills

4.2.8.3 Regulations for prevention of oil pollution as per Annex I of MARPOL 73/78

4.2.8.4 Regulations for control of pollution from Noxious liquid substances carried in bulk as per Annex II of MARPOL 73/78

4.2.8.5 Regulations for the Prevention of Pollution by Harmful substances carried by sea in packaged form as per Annex III of MARPOL 73/78

4.2.8.6 Requirements covering the carriage of dangerous goods by sea as per Chapter VII of the SOLAS Convention

4.2.8.7 Regulations for the Prevention of Pollution by Sewage from Ships as per Annex IV of MARPOL 73/78

4.5.8.8 Regulations for the Prevention of Pollution by Garbage from Ships as per Annex V of MARPOL 73/78

4.2.8.9 Regulations for the Prevention of Air Pollution as per Annex VI of MARPOL 73/78

4.2.8.10 International Convention for the Control and Management of Ship's Ballast Water and Sediment

4.2.8.11 Anti-fouling paints

4.2.8.12 Noise

ANNEX (K)

SYLLABUS FOR WRITTEN EXAMINATION OF MARINE ENGINEER OFFICER CLASS III *(Bridging Course)* CERTIFICATE OF COMPETENCY (Under STCW Convention, Regulation III/2)

Function 1 : Marine engineering at the operational level

Subject 1. Marine Engineering Knowledge (General) and

Subject 2. Marine Engineering Knowledge (Motor)

1.1 **Maintain a safe Engineering Watch**

1.1.1 Thorough knowledge of Principles to be observed in keeping an engineering watch, including:

1.1.1.1 principles to be observed in an engineering watch

1.1.1.2 standards/regulations for watchkeeping

1.1.1.3 the importance, ordinance and arrangements of watchkeeping

1.1.2 Safety and emergency procedures; change-over of remote/automatic to local control of all systems

1.1.3 Safety precautions to be observed during a watch and immediate actions to be taken

1.1.4 Engine room resource management

1.2 Use English in written and oral forms

1.2.1 The English language to enable the officer to perform engineering duties and to use engineering publication

1.3 Use internal communication systems

1.3.1 Operation of all internal communication systems on board

1.4 Operate Main and Auxiliary Machinery and Associated Control Systems

1.4.1 Basic construction and operation principles of machinery systems

1.4.2 Safety and emergency procedures for operation of propulsion plant machinery including control systems

1.5 Operate fuel, lubrication, ballast and *other pumping systems and IMO Reference* associated control systems

1.5.1 Operational characteristics of pumps and piping systems including control systems

1.5.2 Operation of pumping systems

1.5.3 Oily water separator / Similar equipment requirements and operation

Function 2 : Electrical, electronic and control engineering at the operational level

2.1 Operate electrical, electronic and control Systems

2.1.1 Basic electrical engineering

2.1.2 Basic electronic

2.1.3 Basic control engineering

2.2 Maintenance and repair of electrical and electronic equipment

2.2.1 Safety requirements for working on electrical systems

2.2.2 Maintenance and repair

2.2.3 Detection of electric malfunction and measures to prevent damage

2.2.4 Construction and operation of electrical testing and measuring equipment

2.2.5 Function and performance test and configuration

2.2.6 Electrical and simple electric diagrams

Function 3: Maintenance and repair at the operational level

3.1 Appropriate use of hand tools, machine tools and measuring instruments for fabrication and repair on board

3.1.1 Methods for carrying out safe emergency/temporary repairs

3.1.5 Safety measures to ensure a safe working environment and for using hand tools, machine tools and measuring instrument

3.1.6 Use of hand tools, machine tools and measuring instrument

3.1.7 Use of various types of sealants and packing

3.2 Maintenance and repair of shipboard Machinery and equipment

3.2.1 Safety measures to be taken for repair and maintenance, the safe isolation of shipboard machinery and equipment

3.2.1 Appropriate basic mechanical knowledge and skills

3.2.2 Maintenance and repair including dismantling, adjustment and reassembling of machinery and equipment

3.2.3 The use of appropriate specialized tools and measuring instrument

3.2.4 Design characteristics and selection of materials in construction of equipment

3.2.5 Interpretation of piping, hydraulic and pneumatic diagrams

Function 4: Controlling the operation of the ship and care for persons on board at the operational level

4.1 Ensure Compliance with pollution prevention requirements

4.1.1 The precautions to be taken to prevent pollution of the marine environment

4.1.2 Anti-pollution procedures and all associated equipment

4.1.3 Importance of proactive measures to protect the marine environment

4.2 Monitor compliance with legislative requirements

4.2.1 Basic working knowledge of the relevant IMO conventions concerning safety of life at sea and protection of the marine environment

Subject 1: Naval Architecture and ship construction

4.1 Maintain seaworthiness of the ship

4.1.1 Ship Stability (41)

4.1.2 Ship construction

4.1.3 Load Lines and Draught Marks

4.2 Prevent, control and fight fires on board

4.2.1 Ability to organize fire drills

4.2.2 Knowledge of classes and chemistry of fire

4.2.3 Knowledge of fire-fighting systems

4.2.4 Action to be taken in the event of fire, including fires involving oil systems

4.3 Operate life-saving appliances

4.3.1 Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids.

4.4 Apply medical first aid on board ship

4.4.1 Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship

4.5 Application of leadership and team working skills

4.5.1 Working knowledge of shipboard personnel management and training

4.5.2 Knowledge of related international maritime conventions and national legislation 3

4.5.3 Ability to apply task and workload management

4.5.4 Knowledge and ability to apply effective resource management

4.5.5 Knowledge and ability to apply decision-making technique

Appendix 5 : Industrial Chemistry

Subject 1. Marine Engineering Knowledge (General)

5.1 Chemical Fundamentals

5.2 Acidity/Alkalinity

5.3 Corrosion

5.4 Water Testing and Treatment

5.5 Introduction to Fuels and Lubricants