

# Appendix 5 Syllabus for AMSA Oral Examination, Certificates of Competency, Engineer Class 2

## Engineer Class 2 oral examination syllabus

### Boilers

- Water gauge
- Local
- Remote
- Manhole doors
- Feed check V/Vs
- Blowdown V/Vs
- Safety Valves
- Operations
- Furnace purging
- Uptake fires
- Superheater fires
- Raising steam
- Shutting down, lay up
- Water testing
- Water hammer
- Priming and foaming
- Construction arrangement
- Automatic controls
- Survey
- Combustion
- Associated Systems & Equipment
- Construction
- Combustion
- Timing
- Lubrication
- Alignment
- Automation
- Clutches
- Gear boxes
- Vibration dampers
- Thrust bearing
- Turbo chargers
- Diesel electric
- Survey
- Diesel alternators
- Water treatment

### Diesel Propulsion

- Operation
- Crankcase explosion
- Scavenge fires
- Air line explosion
- Manoeuvring
- Emergency
- Warming through
- Shutting down
- Parameters
- Fuel consumption
- Combustion
- Associated Systems & Equipment
- Slow, Medium and High speed
- Manoeuvring controls
- Protection devices

### Steam Propulsion

- Operation
- Warming through
- Shutting down
- Manoeuvring
- Emergency
- Parameters
- Turbines
- Protection devices
- Thrust bearing
- Gland steam
- Flex coupling
- Manoeuvring V/V
- Automation
- Protection devices
- Lubrication
- Impulse, reaction
- Gear boxes
- Alignment
- Survey
- Turbo electric
- Turbo alternators

- Operation and construction
- Associated Systems & Equipment

### **Water Treatment**

- Evaporators
- Distillers
- Ion exchange
- Reverse osmosis
- Testing
- Chemicals

### **Feed Systems**

- Arrangement
- Feed pumps
- Deaerators and heaters
- Air ejector
- Ext pumps
- Condenser
- Water testing
- Auto controls
- Corrosion

### **Steering Gear & Rudders**

- Emergency Operation
- Construction
- Control
- Lubrication
- Survey

### **Air Compressors**

- Safety devices
- Compressor
- Receiver
- Air line
- Operation
- Lubrication
- Starting air
- Service and control air
- Receivers
- Automation
- Survey

### **Fire**

- Prevention
- Extinction
- Hoses, extinguishers
- BA sets
- Procedures
- Fixed installations
- Detection
- Sensors, systems
- UMS requirements
- Structural fire protection

### **Pumping Systems**

- Fire main
- Oily water separator
- Bunkering
- Bilge and ballast systems
- Salt water system
- Fresh water cooling
- Sewage plant
- Fuel oil system
- Diesel oil system
- Inert gas system
- Lubricating oil system
- Cargo system
- Sanitary system
- Purifiers, clarifiers
- Heaters
- Pumps: positive displacement, etc

### **Refrigeration Systems**

- Safety
- Direct and indirect expansion
- Air conditioning
- Compressors

### **Materials**

- Properties
- Destructive & non-destructive
- Testing

## **Propellers & Thrusters**

- Fixed pitch
- Attachment
- Survey
- Controllable pitch
- Operating system
- Attachment
- Survey
- Stern tube bearing
- Screw shafts
- Cross thrusters
- Fixed and CP prop
- Voith Schneider, etc
- DP systems

## **Dry Docking**

- Supply of fire fighting water
- Supply of electrical power
- Stability
- Measurement of wear, down, clearances
- Measurement of alignment
- Certificates of survey
- Annual
- Safety Equipment
- Safety Construction
- Load Line
- Classification
- Ships Structure
- Corrosion, erosion
- Cavitation
- Mechanical damage  
Cleaning, protection

## **Tanks**

- Safety precautions
- Entering
- Pressure testing
- Survey

## **Stability**

- Free surface
- Damage control

## **Electricity**

- Emergency generators
- Operation
- Construction
- Statutory requirements
- Testing
- Fault detection
- AC generators
- Operation
- Construction
- Control equipment
- Fault detection
- Protection devices
- DC generators  
as per AC
- Distribution
- Isolation
- Electric shock
- Protection devices
- Fault detection
- Main switchboard
- Emergency switchboard
- Distribution boards
- Flame proof
- Drip proof
- Intrinsically safe
- Transformers
- Two wire
- Non-earthed and earthed neutral  
Motors
- AC: single and three phase

## **Deck Machinery**

- Davits
- Winches
- Windlass
- Cranes
- Derricks
- Hatches
- Other

## **Automation & Control**

- Bridge control
- UMS
- Fault detection

- Requirement
- Transfer from manual to auto
- Measuring devices
- Testing
- Calibration
- Survey

### **Machinery Records**

- Oil Record Book
- Log books
- Trend recording
- Official records
- Combustion analysis
- Condition monitoring

### **Maritime Law**

- MARPOL, International Convention for the Safety of Life at Sea (SOLAS)
- International Ship Management (ISM) Code
- Marine Orders
- Other

### **Management**

- Training of Engine-room staff
- Management and organisation of Emergency Response staff/dept