

CERTIFICATES OF COMPETENCY FOR ENGINEERS (YACHT)

**EXAMINATIONS ADMINISTERED BY THE
SCOTTISH QUALIFICATIONS AUTHORITY
ON BEHALF OF THE
MARITIME AND COASTGUARD AGENCY**

STCW 95 CHIEF ENGINEER (REG. III/3) – “YACHT 4”

**057-02 OPERATIONAL PROCEDURES, BASIC HOTEL SERVICES
AND SHIP CONSTRUCTION**

FRIDAY, 18 JANUARY 2008

1400 - 1600 hrs

Examination paper inserts:

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Notes for the guidance of candidates:

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| <ol style="list-style-type: none">1. Non-programmable calculators may be used.2. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer. |
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Materials to be supplied by examination centres

Candidate's examination workbook

OPERATIONAL PROCEDURES AND BASIC HOTEL SERVICES

Attempt ALL questions

Marks for each question are shown in brackets

1. With reference to the International Safety Management code, describe EACH of the following:
 - (a) the Safety Management System (SMS); (5)
The established operational procedures of a vessel that ensure the protection of personal, property and the environment. These procedures are designed for the compliance of ISM codes and audited to ensure proper workings by a Designated ISM Provider. (5)
 - (b) the role of the Designated Person (DP).
To control and coordinate the flow of information to and from the vessel with the ships management systems. To monitor all safety equipment on the vessel
2. State FIVE items that, according to STCW 95, the relieving officer shall be informed of by the officer in charge of the engineering watch prior to taking over the engineering watch. (10)
 1. Standing orders of the day
 2. Nature of all work being performed and hazards that pertain as a result
 3. Level and conditions of bilges, tanks
 4. Any special requirements for sanitary systems:eg black water being pumped overboard, are we in a special area?
 5. Time and condition of Engine room log. Running condition of machinery.
3. With reference to maintenance systems:
 - (a) state the purpose of scheduled maintenance; (4)
To improve efficiency and decreases downtime. Ensures safe operation of a vessel. Improves cost effectiveness. Decreases freight costs.
 - (b) explain why unscheduled maintenance may be required even if a scheduled maintenance system is in operation; (4)
in spite of best laid plans there always is the inspected breakdowns. Add normal conditions can case down time. (2)
 - (c) state why breakdowns should be kept to a minimum.
Breakdowns should be kept to a minimum to increase cost efficiency, to increase reliability and to decrease safety concerns associated with a ship at sea
4. Describe, with the aid of a sketch, a single stage Oily Water Separator designed to meet MARPOL Annex I requirements. (10)
Page 10 of Doc (343) or page 57 on Doc (533) Op Procedures
5. With reference to refrigeration systems:
 - (a) state the THREE basic laws of refrigeration; (6)
 1. All liquids when evaporating take heat from their surroundings

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2. The temperature that a liquid will boil relates directly to the pressure exerted on the substance (2)
3. Any vapour or gas can compress back to a liquid if suitably compressed and cooled. (2)
- (b) state the location and method of re-setting of EACH of the following:
- Doc (343) page 231
- (i) the High Pressure cut out;
Should be located on the discharge side of the compressor. If sufficient cooling is not provided, the high pressure gas will not condense into a liquid and the pressure could build up to a point of damaging the system components. The high pressure cut out should be manually resettable.
- (ii) the Low Pressure cut out.
The low pressure cut-out should be located just before the suction side of the compressor. This is generally the lowest pressure experienced on the closed system. It will automatically reset when the pressure of the system returns to above set point pressure
6. (a) State TWO methods of producing fresh water on board an ocean going vessel. (2)
Reverse Osmosis and Flash Evaporation. (2)
- (b) List TWO methods of killing the bacteria which may be present in potable water. (3)
Chlorine and Silver-Ion (UV Sterilization as a back-up)
- (c) Explain the reasons for adding hydrated lime to water produced on board an ocean going vessel. (3)
To prevent staining due to copper plumbing installed in the ship.
- (d) Outline the procedure to be followed before a fresh water tank is brought back into service.
Procedures for tank cleaning: super chlorine 50 parts per million for 8 hours Do this 3 times. Then drain it though every piping and taps connected to that tank. Then fill it up again with 0.2 parts per million.
Tank cleaning should be carried out according to the Code of Safe Working Practices dealing with hazardous chemicals and confined spaces
- Empty it
Clean it (coat it with an approved tank coating)
Fill it (400cc per metric tonne, ensuring 50ppm)
Allow water to flow through all outlets
Let sit for 24 hours
7. List the TEN items which are required to be recorded on a bunker receipt to comply with MARPOL Annex VI. (10)
1. IMO Number
 2. Total Sulfar Content of Fuel
 3. Name of Vessel
 4. Start/Stop Time of Fueling
 5. Date of Fuel Bunker
 6. Quantity
 7. Name of Supplier
 8. Location of Fuel Transfer

9. Signed Declarations attesting to the fuel quality conforms with MARPOL Regulations
10. Signature of Chief Engineer
8. (a) Identify the following type of fire extinguisher, stating the type of fire it can be used on:
- (i) all red; (1)
WATER – AB Fires
 - (ii) red with cream area or band; (1)
FOAM -- ABC Fires
 - (iii) red with blue area or band; (1)
Powder -- ABC
 - (iv) red with black area or band. (1)
CO2 --
- (b) Sketch a rate of rise fire detector, explaining how it works. (6)
General Knowledge book under fire fighting (Fire Detectors)
9. (a) List THREE methods of roll stabilisation, stating an advantage and disadvantage of EACH. (9)
- BILGE KEELS**
- Advantages (1)
- cheap and efficient
 - no moving parts.
 - Not an active system.
- Disadvantages
- Extends the projected area of the hull
 - increases drag
- Anti-Roll Tank,**
- Advantages
- Simple Design
 - No risk of pollution from shaft seals
- Disadvantages
- Increase Center of Gravity,
 - Takes up internal cargo space
- Fin Stabilizer**
- Advantage
- Active Stabilizer
 - Can be used at low speed
- Disadvantage
- High maintenance
 - Increased chance of pollution from seals
- (b) State the difference between pitching and rolling.
Pitching occurs in a longitudinal direction
Rolling occurs in a transverse direction
10. Sketch the device which allows a cable to pass through a watertight bulkhead, labelling the MAIN components. (10)
Engineering General Knowledge Ships construction, watertight bulkhead.