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, 15 FEBRUARY 2008

1400 - 1600 hrs

Examination paper inserts:

Notes for the guidance of candidates:

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.

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. Outline the FOUR duties of workers as laid down in the Code of Safe Working Practices for Merchant Seamen. (10)

1. Take responsibility for their own health and safety and that of others on board
2. Co-operate with anyone else carrying out health and safety duties
3. Report any identified hazards immediately to authorized personal
4. Make proper use of plant and machinery, and treat any hazard to health and safety with due caution

2. With reference to watchkeeping duties:

(a) list the documentation to be referred to for details of watchkeeping duties and responsibilities; (3)

- The vessels Standing Orders
- Log Book Updates (2)
- Status Board
- STCW 95 regulations (5)
- SMS

(b) state TWO cases in which a watch should not be handed over to a relieving engineer;

- If the relieving watch standard is deemed unfit to carry out watch duties effectively
- A transfer of bunkers is underway

(c) list FIVE alarms which should be tested on a regular basis.

1. High Bilge Level Alarm
2. Fire Alarms
3. Smoke Detectors
4. Low Lube Oil Pressure
5. Steering Gear Power Unit Failure Alarm
6. Day Tank Level
7. Slop Tank

3. With reference to maintenance and maintenance systems:

1. state SIX reasons for keeping records; (6)

1. To improve efficiency of the vessels operation
2. To reduce downtime (4)
3. To reduce cost
4. To improve safety at sea
5. To reduce freight costs for shipping of spares
6. To allow for financial pre-planning to pay for spare parts

1. explain the advantages of an approved maintenance system.

Ensures that your maintenance system is in compliance with the classificaiton society that governs the vessel management. This avoids opening systems multiple times.

4. With reference to Oil Record Books carried on yachts:

(a) list the operations which require an entry in the *Oil Record Book (part 1) Machinery Space Operations*; (9)

1. Bunkering
2. Fuel Oil (1)
3. Lube Oil
4. Sludge Tank
5. Ballasting Tanks
6. Position of ship, start and stop time ballasting
7. Quantity of ballast if tanks are not cleaned
8. Position of ship at start of cleaning
9. Position of ship at start of ballasting

1. Ballasting or Cleaning of Oil Fuel Tanks
2. Discharge of Dirty Water or Ballasting Water from Oil Fuel Tanks Reffered to above
3. Collection and Disposal of Oily Sludge
4. Non-automatic Discharge Overboard or Disposal otherwise of water which has collected in the machinery spaces
5. Automatic Discharge Overboard or Disposal otherwise of water collected in the machinery spaces
6. Condition of oil discharge monitoring equipment and control systems
7. Accidental or exceptional discharge of oil
8. Bunkering of fuel or lubricating oil
9. Additional Operational Procedures or Remarks

(b) state the size of vessel which have to carry an Oil Record Book.

UK Vessels over 80GRT must carry a Oil Record Book
Any Vessel over 400GRT must carry an Oil Record Book
Oil Tanks/Noxious Chemical Tanks over 150GRT must carry an Oil Record Book

5. (a) State the MARPOL Annex number which deals with the disposal of sewage. (1)

(b) With reference to the Annex stated in Q5(a), state the rules for EACH of the following:

Annex 5

(i) when the sewage is untreated; (2)

12miles offshore and underway 4knots

(ii) when the sewage is comminuted and disinfected. (2)

Between 4 and 12miles, underway 4knots

(c) Explain why the final discharge from an approved sewage treatment plant is chlorinated before discharge. (2)

To reduce any harmful bacteria that may still be present in the effluent

(d) Explain how chlorination is carried out and monitored. (2)

Chlorine is injected to the discharge via discharge pump. Sample 2meters from injection point using a recognized chlorine test strip. (1)

(e) State the correct chlorine content of the final discharge.

5ppm

6. Sketch an indirect expansion, chilled water air conditioning plant, labelling the MAIN components. (10)

7. With reference to spirally wound membrane reverse osmosis plants:

(a) describe the sea water pre-treatment process before the water enters the membrane modules; (6)

- Enter the sea strainer
- LP Pump
- Sand Filter (3)
- Series of Micron Filters as per Manufacture Recs:
- 30Micron
- 10Micron (1)
- 5Micron
- HP Pump

(b) describe how the purity of the permeate is measured, where the measurement is obtained and what happens if the purity falls below the acceptable level;

Permeate is measured post membrane treatment and is connected to a three way solenoid operated valve. If the salinity content is above acceptable levels, the three way valve diverts the permeate overboard.

(c) state the limits of impurity in the permeate when produced to World Health Organisation Standards.

8. Sketch a passive tank stabilisation system, explaining how it works. (10)

9. With reference to LPG installations:

(a) explain the risks associated with its use; (4)

LPG is a dense gas, heavier than air. A leak in the system can find it's way to the lowest part of a ships structure. The gas sulphur smell added to the composition to help human (2) detection. Unfortunately, when a human senses the presence it is often too late. A leak sniffer should equipped with it's use. There is a high risk of explosion with it's use due to it's density properties. A bubble tester should be installed inline to allow the observations (4) of gas flow.

(b) state where the cylinders should be stowed;

The cylinder should be stowed in an outdoor container with a 'drain' fitted to the storage container. This drain should direct the flow of any gas leakage over the side of the vessel, in a manner such that the leakage will not make it's way back to the

(c) state the safety device which must be fitted in a compartment containing an LPG burning device, describing its position in the compartment.

Sniffer alarm and a bubble tester

10. (a) State the meaning of EACH of the following terms in relation to a vessel's size:

(i) Gross Tonnage; (2)

Total Internal Volume - Exceptions

(ii) Net Tonnage; (1)

Volume of Cargo that can be carried

(iii) Lightweight; (2)

Measures the actual weight of a ship with no fuel, cargo, passagers, or stores... but with machinery (2)

(iv) Deadweight;

Carrying Capacity + Fuel + Crew + Machinery (2)

(v) Displacement.

Mass of water displaced (1)

(b) State the relationship between Lightweight, Deadweight and Displacement.