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"

056-02 AUXILIARY EQUIPMENT

FRIDAY, 3 OCTOBER 2008

1400 - 1600 hrs

Examination paper inserts:

Worksheet Q4

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 colleges:

Candidate's examination workbook

AUXILIARY EQUIPMENT

Attempt ALL questions

Marks for each question are shown in brackets

1. With reference to butterfly valves:

(a) describe their construction; the butterfly is disk shaped with a center axis leading to the top. A rubber seal sits on the inside of the body to seal aginst the butterfly when closed in parrel. At right angle the valve is open. (5)

(5)

(b) state the advantages and disadvantages when compared to a gate valve. They can be used as a regulating valve, fast an easy to open. Easy to taken apart and repair. It is less proned to seezing. The butterfly doesn't need as much head room above for operation like a butterfly valve. Butterfly valve are cheaper than a gate valve. More suface area for marine growth to grow.

(c) Does not allow full bow flow, does not allow a perfect seal.

2. With reference to positive displacement pumps:

(a) describe, with the aid of a sketch, the operation of a pulsation damper; stops any pulse from the pumping action. The tank is filled with air and absorbs any pulse from the pump page 59 notes (6)

(4)

(b) explain why some positive displacement pump types do not require pulsation dampers. Gear type posstive pumps don't need dampers because they are positive pressure pumpingIt is for a interuped flow and not pluse flow.

3. With reference to a fully automatic, water cooled starting air compressor:

(a) state the alarms that should be fitted; (4)

(b) Low oil preassure
(c) High lube oil temperature
(d) High jacket water temperature
(e) Low jacket water preassure (3)

(f) explain how damage from overpressure is prevented in EACH of the following; (3)

(i) intercoolers; fusible plug is fitted there

(ii) water jackets. The busting disc is fitted,

4. The dogs of a shell door are opened and closed using a manually operated hydraulic cylinder.

Using Worksheet Q4, sketch a system diagram for the cylinder operation, using standard hydraulic symbols. (10)

5. With reference to steering gears, explain the meaning of EACH of the following:

(a) 100% redundancy; Have the backup system the same size and design and capacity to the one using for normal operating. (5)

(5)

(b) single failure criteria. No single failure is going to put you out of action if you have a backup system the same size and design and capacity.

6. Sketch an arrangement for the aft seal of an oil lubricated stern tube bearing. (10)

7. With reference to main transmission couplings, describe the principle of operation of EACH of the following:

(a) Friction clutch; pressure is supplied by compressed air or hydraulically and the arrangement provides pressure for engagement and release pressure to allow disengagement. Of the clutch plates (5)

(5)

(b) fluid coupling. - Flexible type coupling

8. Sketch a Direct-On-Line starter for a small, three phase, a.c. motor, labelling all components. Page 423 on notes (10)

9. With reference to electrical generation and distribution systems, explain EACH of the following:

(4)

(a) why an insulated neutral is preferred to an earthed neutral; earth neutral will fault will trip out house services and systems. An isolated ground fault will not trip out house services because it is isolated from a common ground to the vessel. (6)

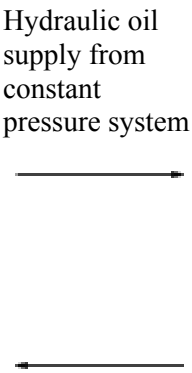
(b) how essential circuits are protected should main bus-bar overload occur. Essential circuits are protected use perfferlentral trips so safety systems and emergency system don't trip first. perfferlentral trips Are usually setup with different time delays
Steering gear motors do not have overload circut. Should an overload occur the emergency generator is set to come on.

10. With reference to load sharing of ac generators:

(a) state the meaning of the term *speed droop*; is when the generator is manually govern by a set speed and isn't control by an automatic governor or AVR. (3)

(b) explain the effect of running generators in parallel with different speed droop settings. The one with the least droop will take up the load from the other generator. (7)

(This Worksheet must be returned with your answer book)



Candidate's Name ……Examination Centre ……