

**THE HONG KONG POLYTECHNIC UNIVERSITY****DEPARTMENT OF MARITIME STUDIES**

---

Course : Post experience Diploma in Ship Command  
Subject : Ship Technology 44545  
Class : PeDSC Part B  
Session : 1995/96  
Date : 12 June 1996  
Time allowed : 3 hours

---

Instructions : Attempt Questions 1, 2 and 3 and any four of  
to Candidates the remainder.

This paper has nine questions.  
Minimum pass marks 50%.

---

Available from : Figure Q  
Invigilator

---

Control

A1. (a) Draw the block diagram of a closed-loop control system with negative feedback. <sup>(monitored output)</sup>  
In your diagram you should label clearly the various operations and all the variables involved. (8 Marks)

(b) Explain all the variables. (12 Marks)

Ans. = Reed's Engineering Knowledge for Deck Officers (1995 Edition) P. 167-170

Ship Construction

A2. Enumerate the major items of ship structure/equipment which would be inspected during a Loadline Survey.  
Describe how you would prepare for the survey. (20 Marks)

Marine Engineering

A3. (a) Draw a schematic diagram of an auxiliary boiler coupled with exhaust gases heat exchanger arrangement.  
Show in the diagram the path taken by the feedwater as it enters the boiler through to its departure from the boiler steam outlet.  
Describe the operation of the system. (12 Marks)

(b) List the boiler mountings and state their functions. (8 Marks)

Control

B4. Fig. Q shows the cooling water system used in a marine diesel engine. Explain the type of control used in the system and the overall operation of the system.

(10 Marks)

Marine Engineering

B5. Describe, with the aid of a sketch, the principle of operation of a biological sewage treatment plant. State the precautions to be observed in operating the plant.

(10 Marks)

Marine Engineering

B6. A six-cylinder crosshead type engine, with stroke 1050 mm and bore 685 mm, delivers 2428 kW at mean effective pressure  $5.5 \times 10^5$  N to the propeller of a vessel. The propeller has a pitch of 6.2m and slip 8.25 percent. Determine the speed of the vessel.

(10 Marks)

Ship Construction

B7. List the main structural members of a ship's hull which provide :

- (a) longitudinal strength
- (b) transverse strength

(10 Marks)

Ship Maintenance

B8. Describe the causes and prevention of corrosion of bare steel in air.

(10 Marks)

Ship Maintenance

B9. Your vessel has just completed discharging a full cargo of bulk sulphur and is fixed to load a full cargo of steel products.

Describe, with reasons how you would prepare the holds prior to commencement of loading.

(10 Marks)

- End -

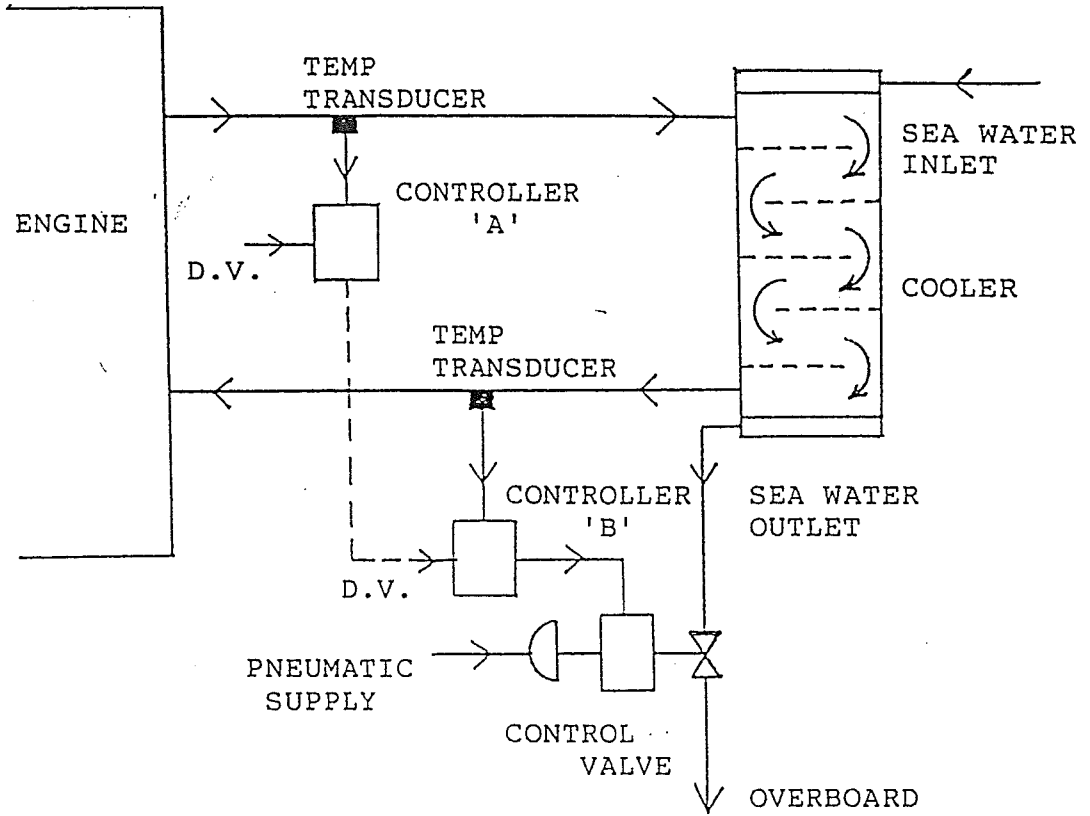


FIG. Q