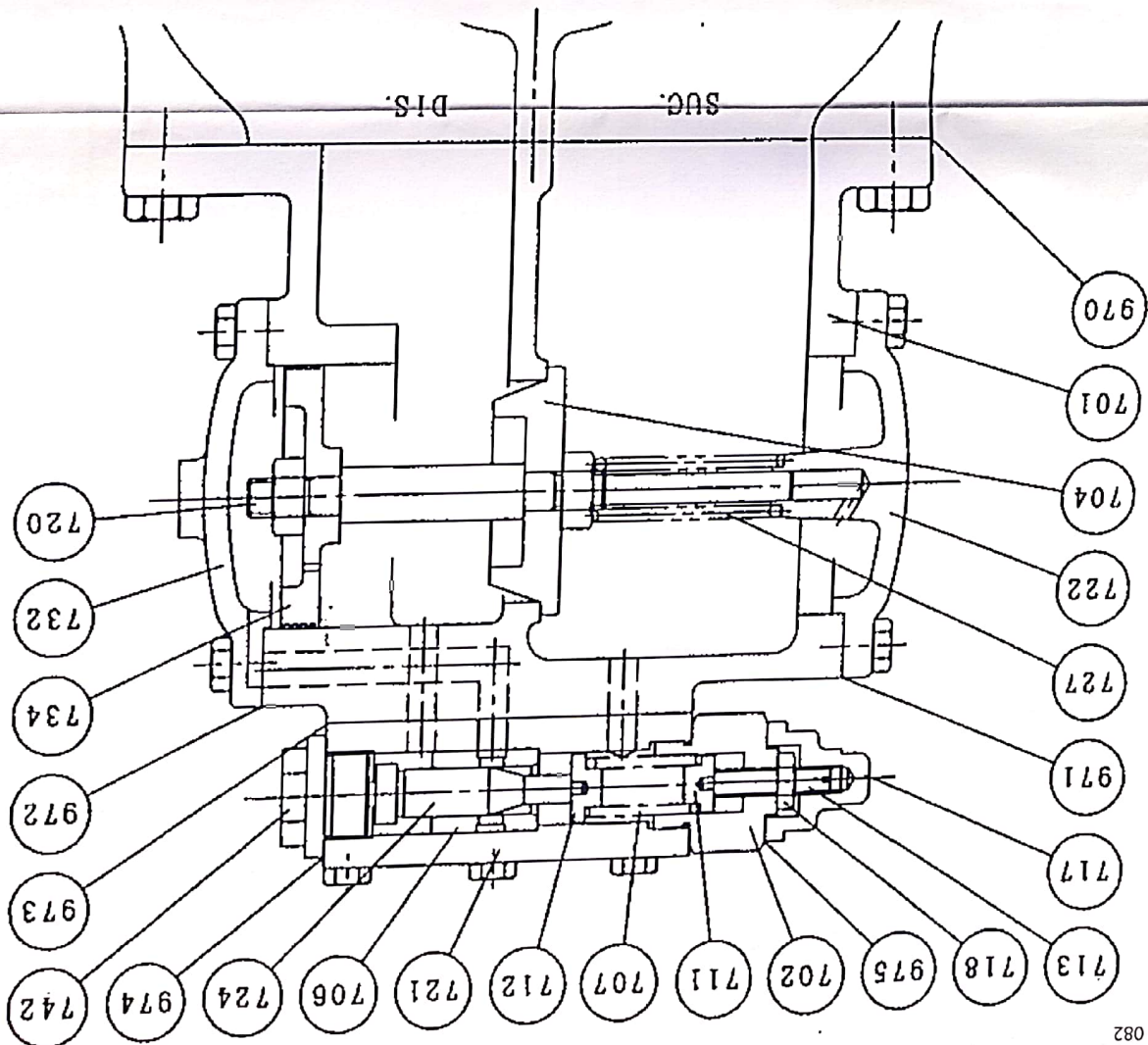
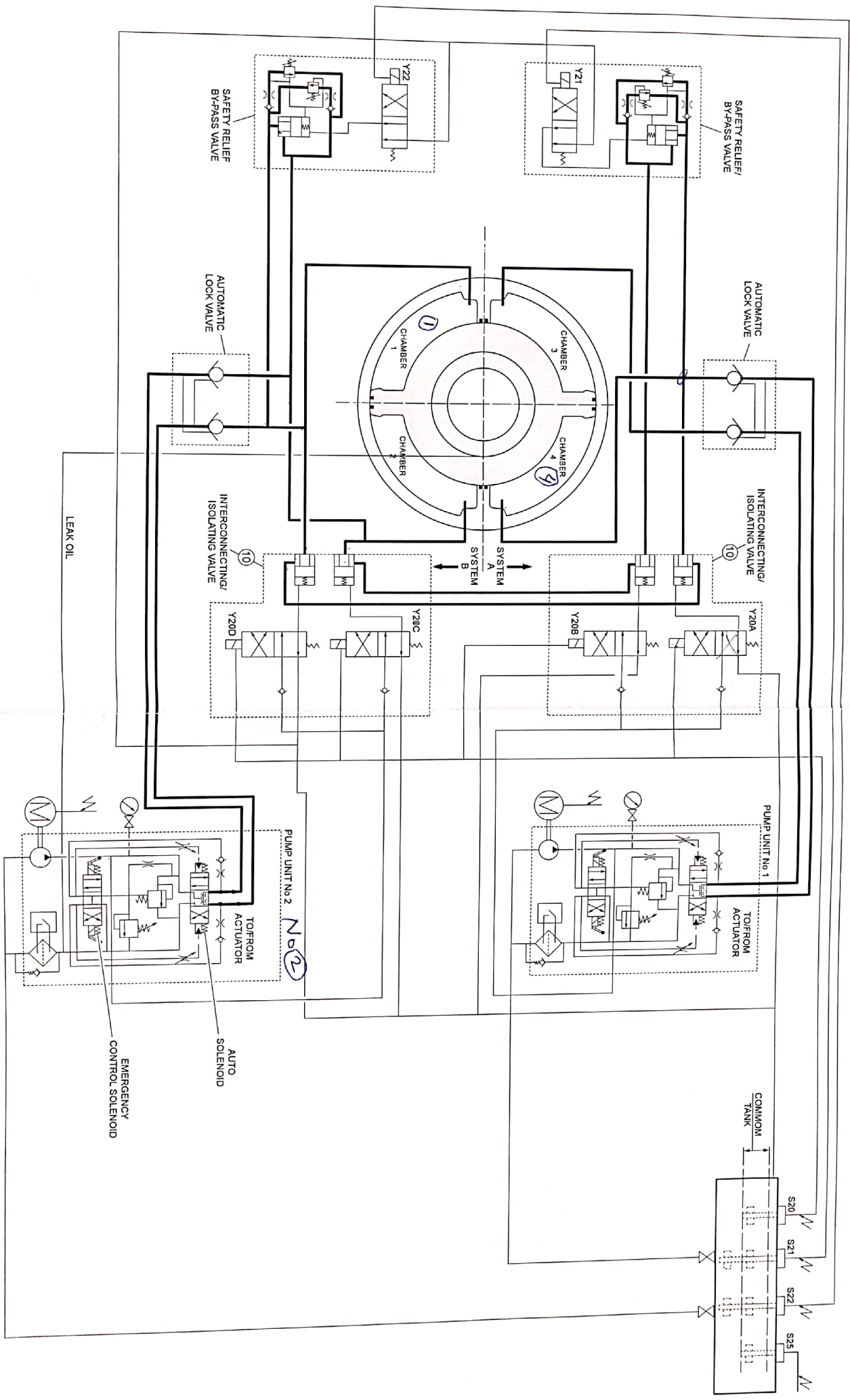
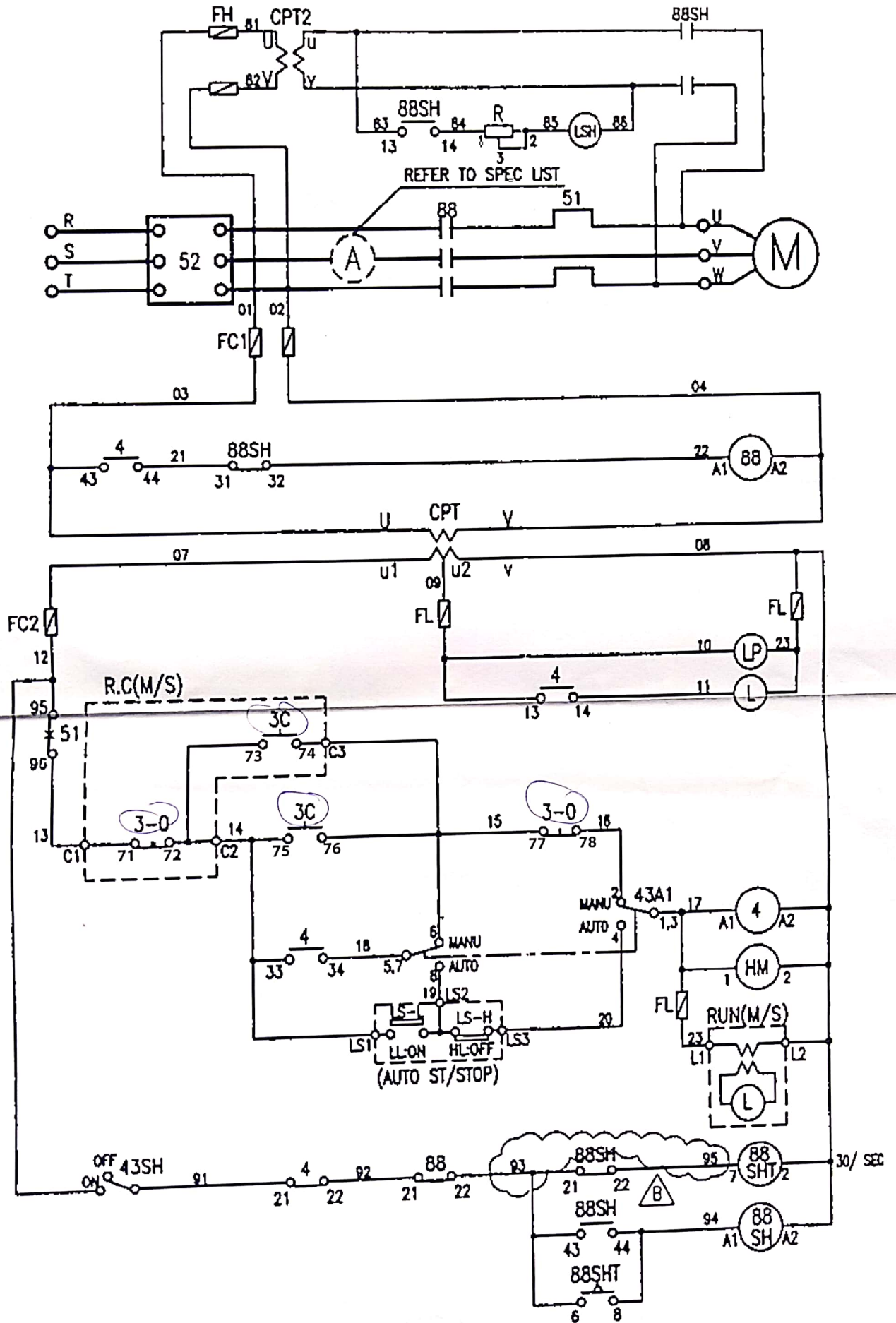


NO.	NAME	MATERIAL		QTY	NO.	NAME	MATERIAL		QTY	NO.	NAME	SERVICE		MODEL
		SYMBOL	NAME OF MATERIAL				SYMBOL	NAME OF MATERIAL						
701	SAFETY V. BOX	PCD400	DUCTILE CAST IRON	1	732	SAFETY V. COVER	PCD400	DUCTILE CAST IRON	1	702	SAFETY V. COVER	SS400	MILD STEEL	
702	SAFETY V. COVER	SS400	MILD STEEL	1	734	PISTON VALVE	S45C	CARBON STEEL	1	704	SAFETY VALVE	S45C	CARBON STEEL	
704	SAFETY VALVE	S45C	CARBON STEEL	1	742	SAFETY V. COVER	SS400	MILD STEEL	1	706	SAFETY V. SEAT	CAC402	BRONZE	
706	SAFETY V. SEAT	CAC402	BRONZE	1	970	GASKET	-	PAPER	1	707	SAFETY V. SPRING	SWPA	PIANO WIRE	
707	SAFETY V. SPRING	SWPA	PIANO WIRE	1	971	GASKET	-	PAPER	1	711	SPRING CARRIER	SS400	MILD STEEL	
711	SPRING CARRIER	SS400	MILD STEEL	1	972	GASKET	-	PAPER	1	712	SPRING CARRIER	SS400	MILD STEEL	
712	SPRING CARRIER	SS400	MILD STEEL	1	973	GASKET	-	PAPER	1	713	ADJUST SCREW	SS400	MILD STEEL	
713	ADJUST SCREW	SS400	MILD STEEL	1	974	GASKET	-	PAPER	2	717	SAFETY V. CAP	SS400	MILD STEEL	
717	SAFETY V. CAP	SS400	MILD STEEL	1	975	GASKET	-	PAPER	1	718	LOCK NUT	SS400	MILD STEEL	
718	LOCK NUT	SS400	MILD STEEL	1						720	PISTON ROD	S45C	CARBON STEEL	
720	PISTON ROD	S45C	CARBON STEEL	1						721	SAFETY V. BOX	SS400	MILD STEEL	
721	SAFETY V. BOX	SS400	MILD STEEL	1						722	SAFETY V. COVER	PCD400	DUCTILE CAST IRON	
722	SAFETY V. COVER	PCD400	DUCTILE CAST IRON	1						724	SAFETY VALVE	SUS410	STAINLESS STEEL	
724	SAFETY VALVE	SUS410	STAINLESS STEEL	1						727	SAFETY V. SPRING	SWPA	PIANO WIRE	
727	SAFETY V. SPRING	SWPA	PIANO WIRE	1										



DRG. 082





**CERTIFICATES OF COMPETENCY IN THE MERCHANT NAVY
MARINE ENGINEER OFFICER**

STCW 78 as amended MANAGEMENT ENGINEER REG. III/2 (UNLIMITED)

040-36 - ENGINEERING, SYSTEMS AND SHIP'S DRAWINGS

WEDNESDAY, 21 OCTOBER 2020

1315 - 1615 hrs

Materials to be supplied by examination centres

Candidate's examination workbook Graph paper

Examination Paper Inserts

DRG - 081 DRG - 082 DRG - 083 DRG - 084 DRG - 085

Notes for the guidance of candidates:

1. Examinations administered by SQA on behalf of the Maritime & Coastguard Agency
2. Candidates are required to obtain 50% of the total marks allocated to this paper to gain a pass **AND** also obtain a minimum 40% in Sections A and B of the paper.
3. Non-programmable calculators may be used.
4. All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer.



Maritime &
Coastguard
Agency



ENGINEERING, SYSTEMS AND SHIP'S DRAWINGS

Attempt ALL questions

Marks for each part question are shown in brackets

All formulae used must be stated and the method of working and ALL intermediate steps must be made clear in the answer

Section A

1. DRG - 081

(a) State what the following items are and describe their function.



(b) Using valve numbers as location references, describe how you can determine the fuel consumption of the generator engines when on HFO and MDO. (4)

2. DRG - 082

- (a) State the function of the illustrated assembly. (2)
- (b) Using drawing references, describe the procedure for adjusting the operational set point of the illustrated assembly. (2)
- (c) Using drawing references, describe how fluid pressures are exerted on the assembly to fulfil it's function. (6)

3. DRG - 083 (2)
- (a) State the height between the steering gear deck and the sunken deck. (2)
- (b) State the frame number around which the flat side of the hull starts. (2)
- (c) State the length of the longest plate section visible aft of the engine room bulkhead. (2)
- (d) State the approximate length of the vessel, explaining how this was ascertained. (2)
- (e) State how the stern configuration and number of propellers can be determined from the plan. (2)

4. DRG - 084

- (a) State the following items and describe their function. (2)



$$\frac{23 \times 700}{0.03}$$

- (b) Describe how the rudder is held in a stationary position when no actuating signal is being received by any solenoid. (2)
- (c) Describe the oil flow path from one of the hydraulic pumps when the rudder is stationary. (4)

5. DRG - 085 083

- (a) Using drawing references identify the local and remote start and stop buttons. (2)
- (b) State the function of the circuit and a typical application. (2)
- (c) Using drawing references, describe the sequence of actions that occur if the circuit is left in automatic mode and '43SH' is switched on. (6)

Section B

6. DRG - 081

HFO Isolate No 2 Gen

(a) With the vessel operating entirely on HFO, using drawing references, describe the procedure for isolating number 2 generator fuel system to allow maintenance to be carried out. (9)

(b) With the vessel operating entirely on HFO, using drawing references, describe the procedure for changing over the fuel system to MDO in preparation for entry into an emission control area. (16)

HFO - Change over to MDO

7. DRG - 084

(a) Using drawing references, describe the oil flow paths to illustrate how the system reacts, when the rudder is subjected to an impact load which causes a sharp rise in pressure in chambers 1 and 4. (6)

(b) With both pump units in service, using drawing references, describe the sequence of actions that occur if the system starts losing hydraulic oil. (8)

(c) With both pump units operational it is reported that the rudder is operating slower than normal in both directions.

State what actions you would take to help analyse the cause of the fault and using drawing references describe with reasons what faults could cause the slow operation. (11)