

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

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

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

**040-36 - ENGINEERING, DRAWING AND SHIP SYSTEMS**

**WEDNESDAY, 28 MARCH 2018**

**1315 - 1615 hrs**

Examination paper inserts:

DRG - 023  
DRG - 024  
DRG - 025  
DRG - 026  
DRG - 037

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



## ENGINEERING, DRAWING AND SHIP SYSTEMS

Attempt ALL questions

Marks for each part question are shown in brackets

### Section A

#### 1. Piping Systems - DRG 024

- (a) State what the valves marked F/C have in common, and what might F/C indicate. (2)
- (b) State on which drawing you would find the system for the emergency bilge suction. (2)
- (c) State the method normally used to pump out cargo hold bilges. (2)
- (d) State the methods available for pumping out engine room bilges. (4)

#### 2. Mechanical Assembly - DRG 026

- (a) State the item number of the safety valve plug. (2)
- (b) Describe the mechanism which adjusts the relief valve opening pressure. (4)
- (c) State and describe the possible materials used for the construction of item 201. (2)
- (d) State and describe the function of item 103. (2)

#### 3. Ship's Construction Drawing - DRG 025

- (a) State the specification of the plate used for the port and starboard longitudinal stiffener which runs between frames 21 and 30. (2)
- (b) Describe the edge preparation for the main engine longitudinal girders, No.1 and No.2. (2)
- (c) State the increase in thickness of the deck plating in way of the main engine. (2)
- (d) State the width and thickness of the transverse plate section which runs between main engine girders No.1 and No.2. (2)
- (e) State the length of plate section under the main engine. (2)

4. Hydraulic and Pneumatic System Drawings - DRG. 023

(a) State and describe the function of EACH of the following:

(i) item 'C' in winch and windlass units 1,2 and 3; (2)

(ii) items 'f' in unit 6; (2)

(iii) item '22'; (2)

(iv) item 'a' in unit 1. (2)

(b) In the configuration shown, state the connections to port 'P' in solenoid 8. (2)

5. Electrical Power Systems and Control Drawings - DRG 037

(a) Describe the device and the function of EACH of the following symbols:

(i)



(2)

(ii)



(2)

(iii)



(2)

(b) Describe the different supply sources for the 24 v consumers. (2)

(c) State what the dotted line between the supply breakers to the emergency switchboard represents. (2)

## Section B

### 6. Drawing 023.

- (a) Describe the normal operation of hydraulic pumps 1 and 2, detailing the equipment supplied by each pump, including flow paths. (15)
- (b) Explain the function of the changeover valves, detailing how and when each of them would be used. (10)

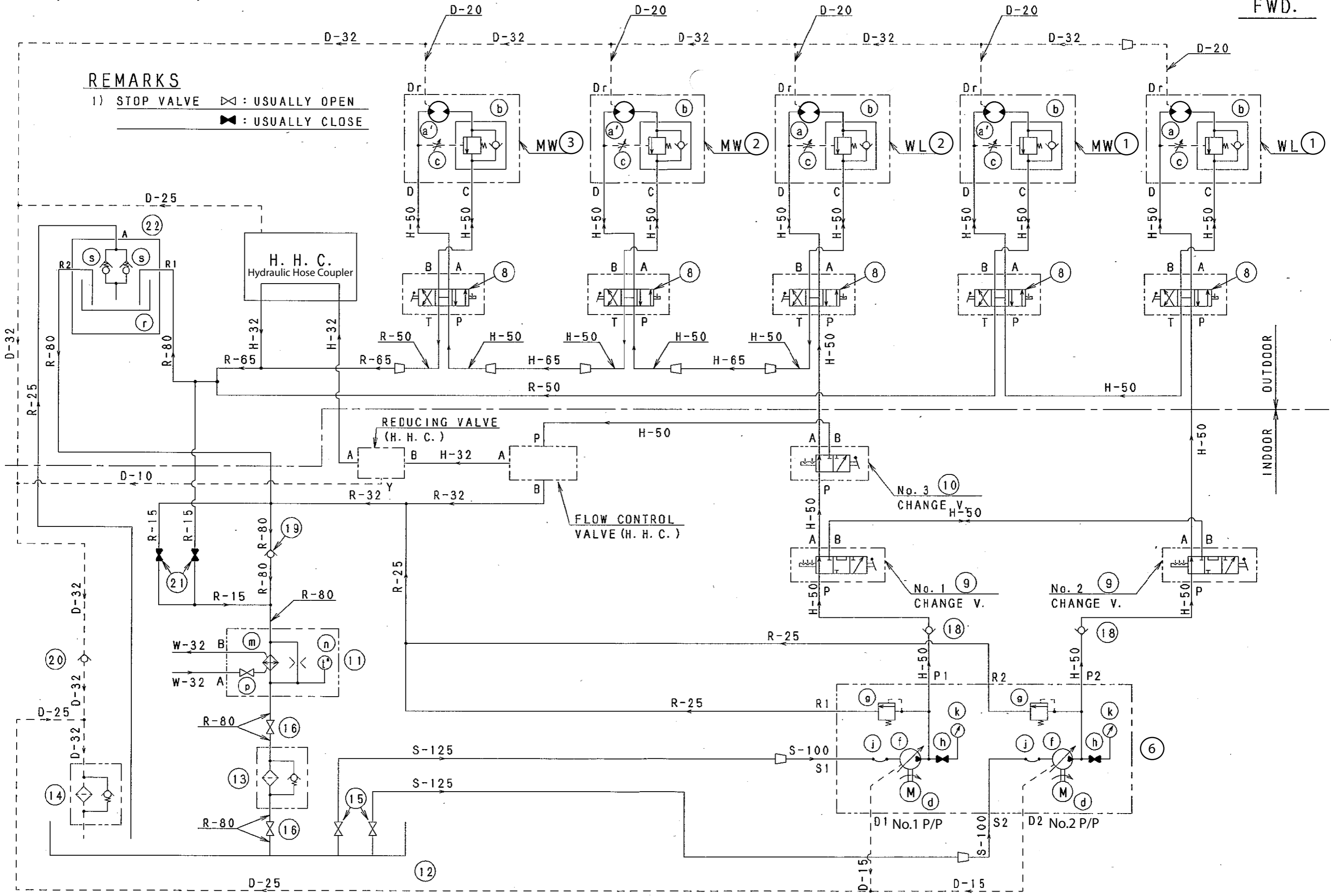
### 7. Drawing 026.

The illustrated pump was allowed to run dry, and no longer functions properly.

- (a) Describe the procedure for stripping the pump for inspection. (15)
- (b) Describe, with reasons, the areas to be inspected for damage, what types of damage may be found and what components may require replacement. (10)

REMARKS

- 1) STOP VALVE : USUALLY OPEN
- : USUALLY CLOSE



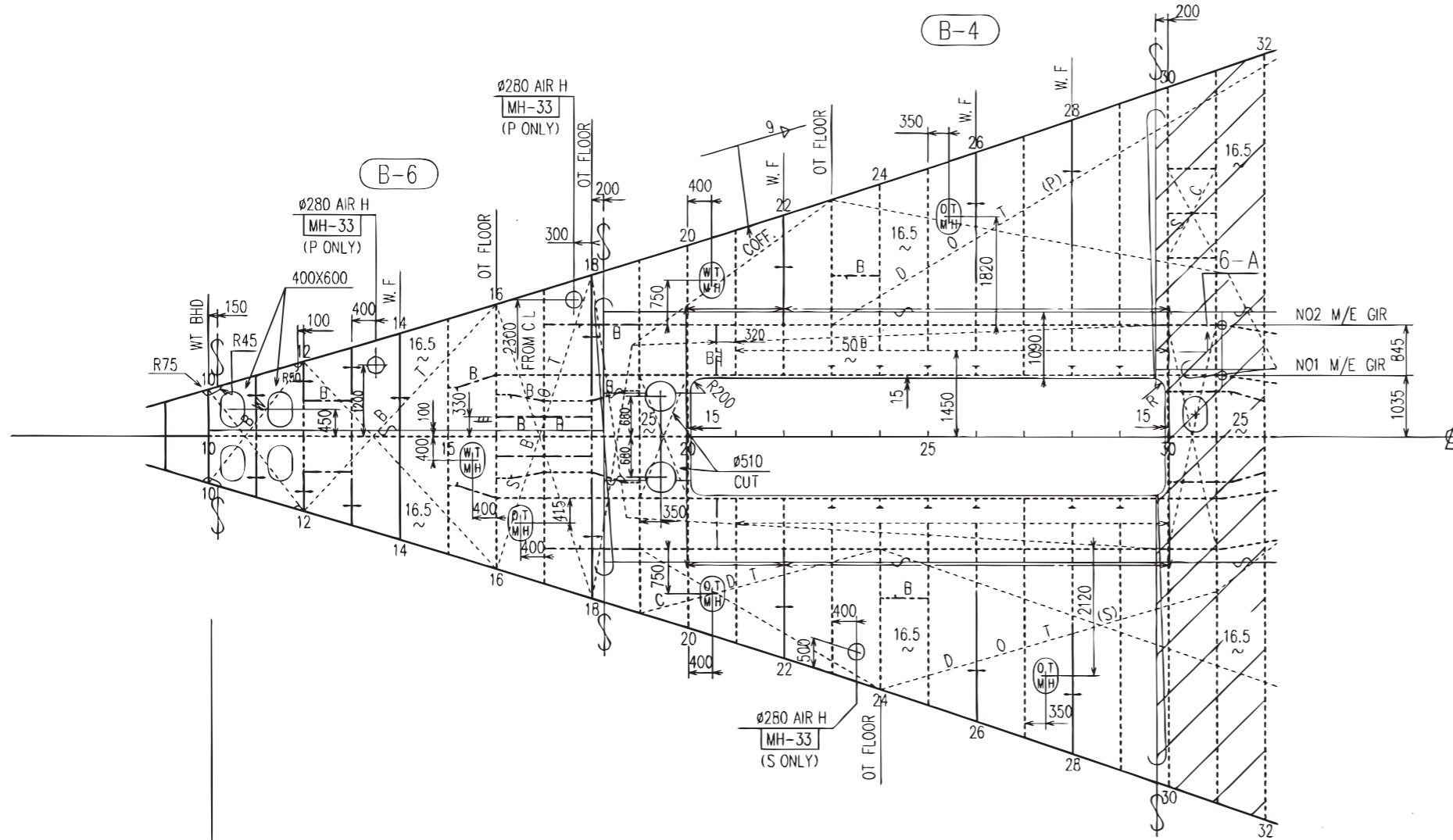


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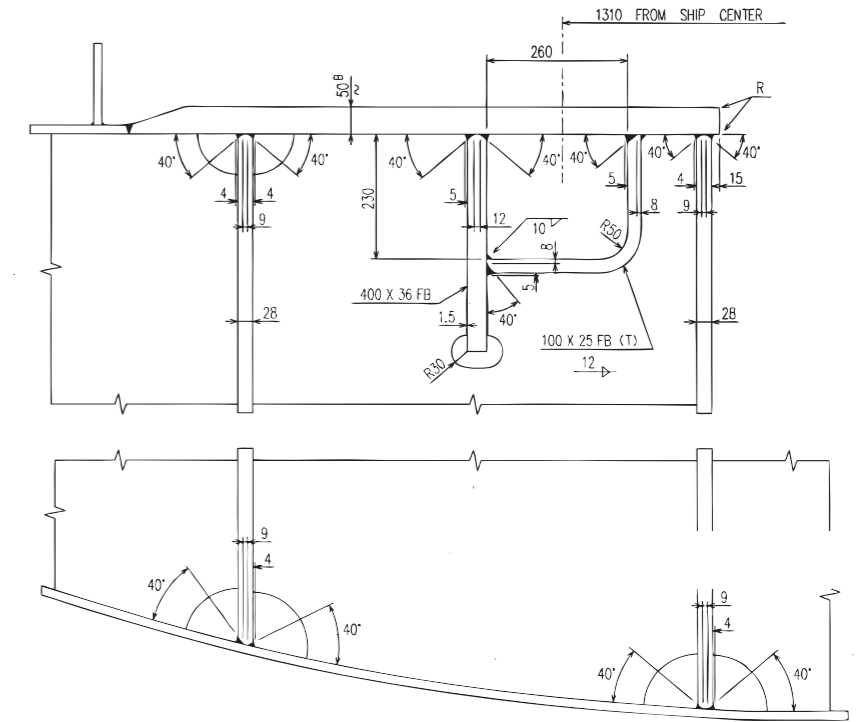
2730 ABOVE BL

WT & O T M H 600 X 400 MH-31

MARK CARLING 150 X 12 FB (C~C) 4.5 ENDS 7.5  
(BOTH ENDS SCALLOP R35)



720	FRAME SPACE	800
	CENT. GIR	16
	NO. 1 ENG. GIR	16
	NO. 2 ENG. GIR	16
	SOLID FLOOR	UNDER M/E 22 AT CENT 16 OTHERS 13
	W.T FLOOR	16



DET. OF ENG. FOUNDATION (1/25)  
(FR 21 ~ 29 SEC)

