

**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, 16 DECEMBER 2020**

**1315 - 1615 hrs**

Materials to be supplied by examination centres

Candidate's examination workbook

Graph paper

Examination Paper Inserts

DRG - 086

DRG - 087

DRG - 088

DRG - 089

DRG - 090

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 - 086
  - (a) Using drawing references, state what pumps can be used for lowering ER bilge wells. (2)
  - (b) Describe the possible discharge alternatives for the Bilge p/p x 2.5 m<sup>3</sup>. (3)
  - (c) Describe how the system is used to pump engine room bilges overboard, using the emulsion unit. (5)
  
2. DRG - 087
  - (a) State with reasons which port is the discharge. (2)
  - (b) State the type of fit of item 112 is on the shaft. (2)
  - (c) State the type of shaft seal used. (2)
  - (d) State what we learn from section A-A. (2)
  - (e) State what we learn from section B-B. (2)
  
3. DRG - 088
  - (a) State the frame number at which the flat side of the hull starts. (2)
  - (b) State the ford loaded draft of the vessel. (2)
  - (c) State the length of the plate section which runs aft from slightly ford of the bow thrust tunnel. (2)
  - (d) State the thickness of the thickest section of plate visible on the shear strake. (2)
  - (e) State the approximate maximum sounding of No. 2 SWBT (s). (2)

[OVER

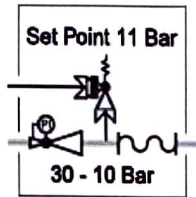
4. DRG - 089

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

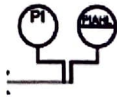
(i) (2)



(ii) (2)



(iii) (2)



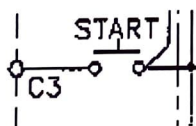
(b) State the valves which enable crossover of the air supply to the main bottles. (2)

(c) State the means for filling the emergency start air receivers. (2)

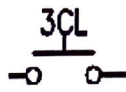
5. DRG - 090

(a) State the following items and describe their specific function in the illustrated circuit.

(i) (2)



(ii) (2)



(iii) (2)



(b) Using drawing references, describe the sequence of actions that follow when the item illustrated in part (a) (ii) above is pushed. (4)

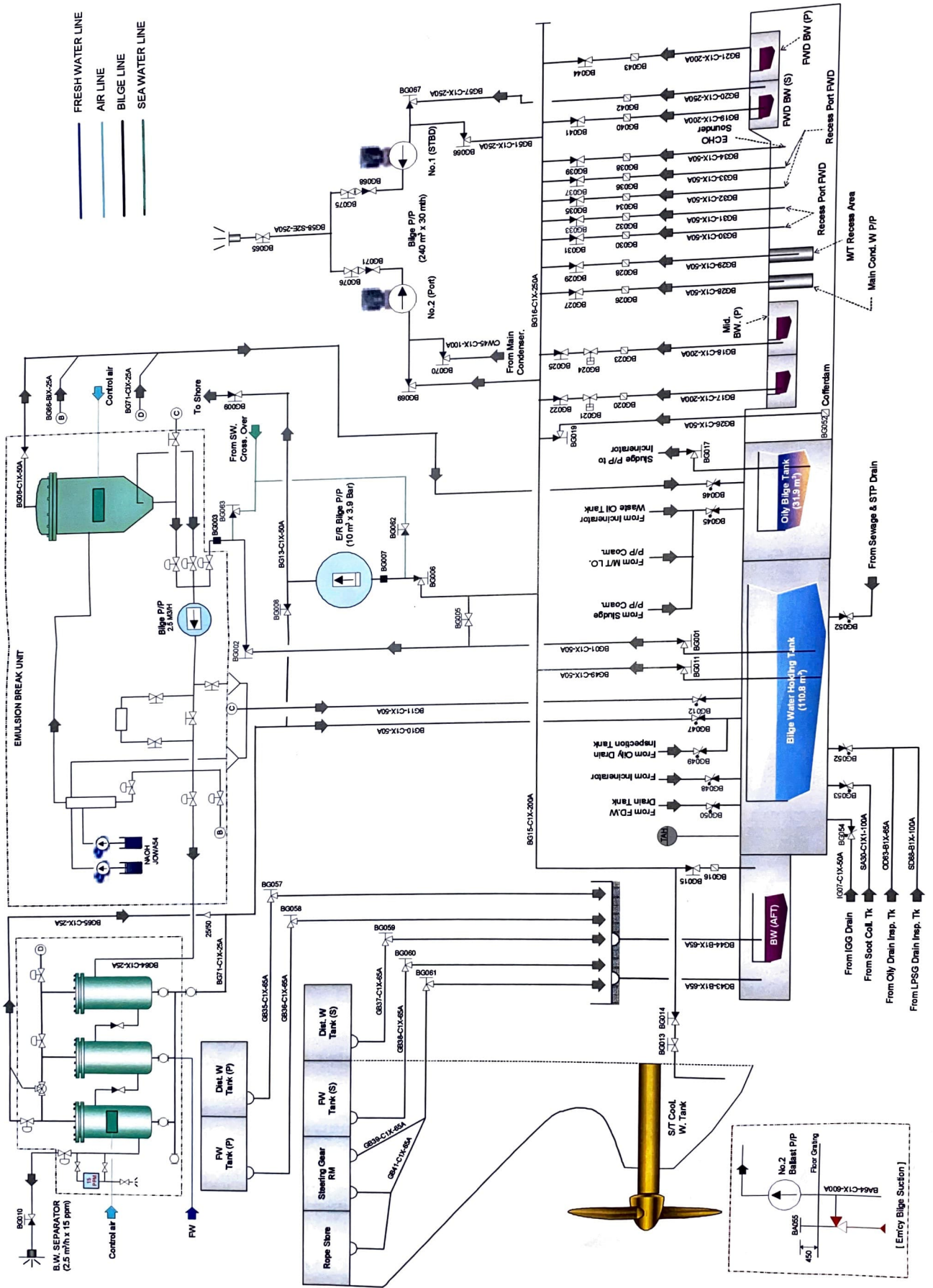
**Section B**

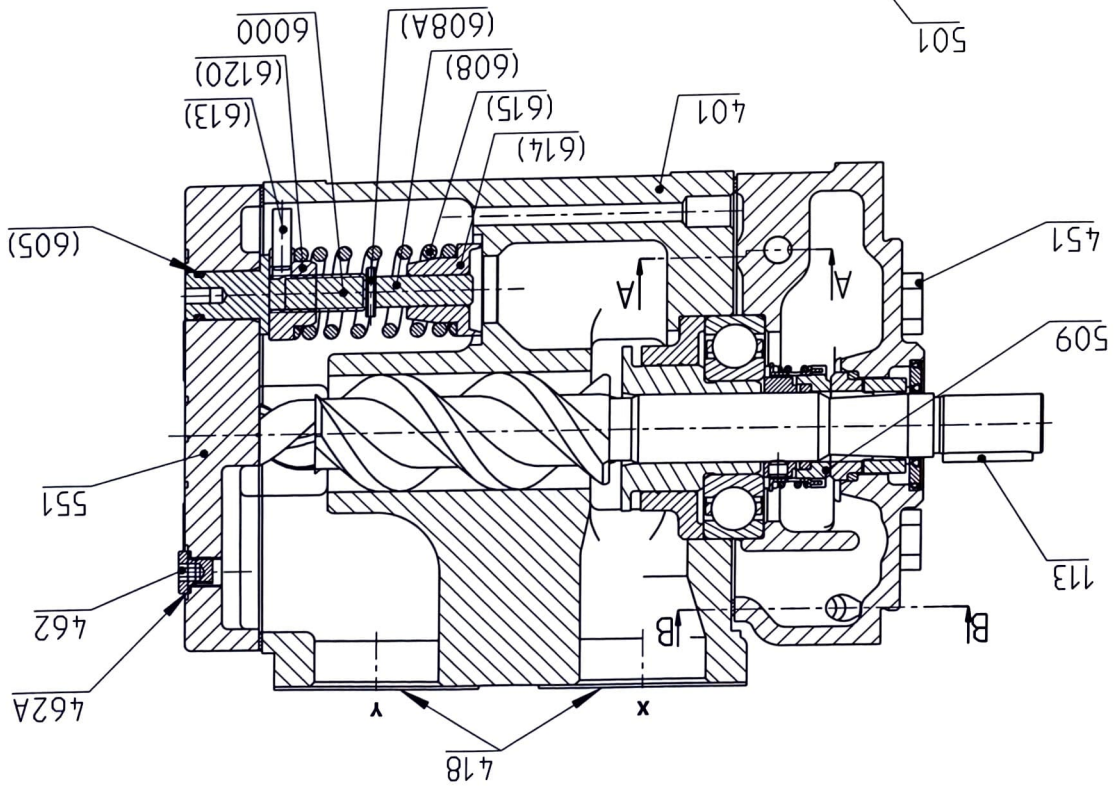
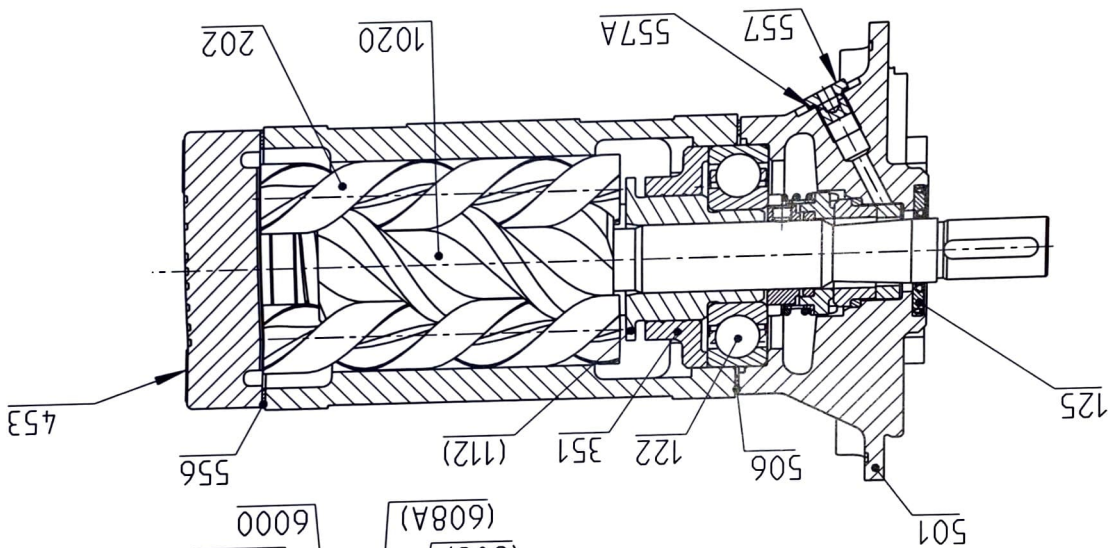
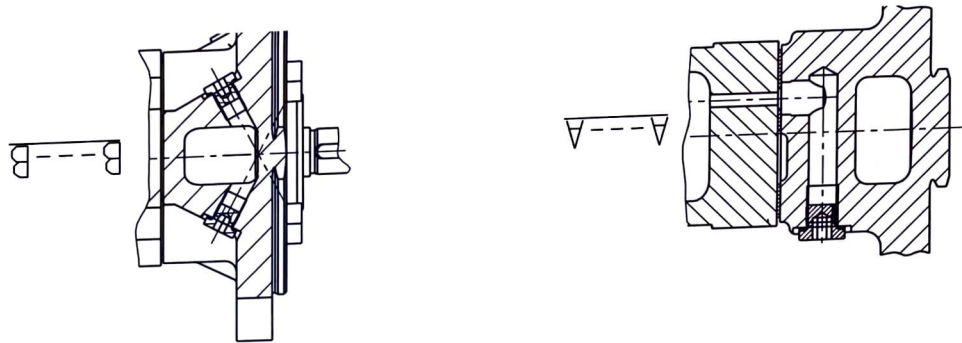
**6. DRG - 087**

- (a) Using drawing references, describe how to replace the mechanical seal on the pump assembly. (6)
- (b) Using drawing references, describe how the relief valve setting is adjusted. (6)
- (c) Using drawing references, describe how to disassemble and inspect the pump assembly, including replacement of consumable parts. (13)

**7. DRG - 088**

- (a) State what is visible immediately aft of the fore peak bulkhead below the second deck. (5)
- (b) Describe the structural information visible on the drawing which will aid you plan a repair to an indentation which is approximately 3000 mm x 3000 mm and 600 mm deep located 23 metres aft from the bulbous bow at a draft of 12 metres. (10)
- (c) Describe the structural information visible on the drawing which will help you plan a repair to a tear in the ship side which runs from frame 130 to 137 at about 11 metres draft. (10)

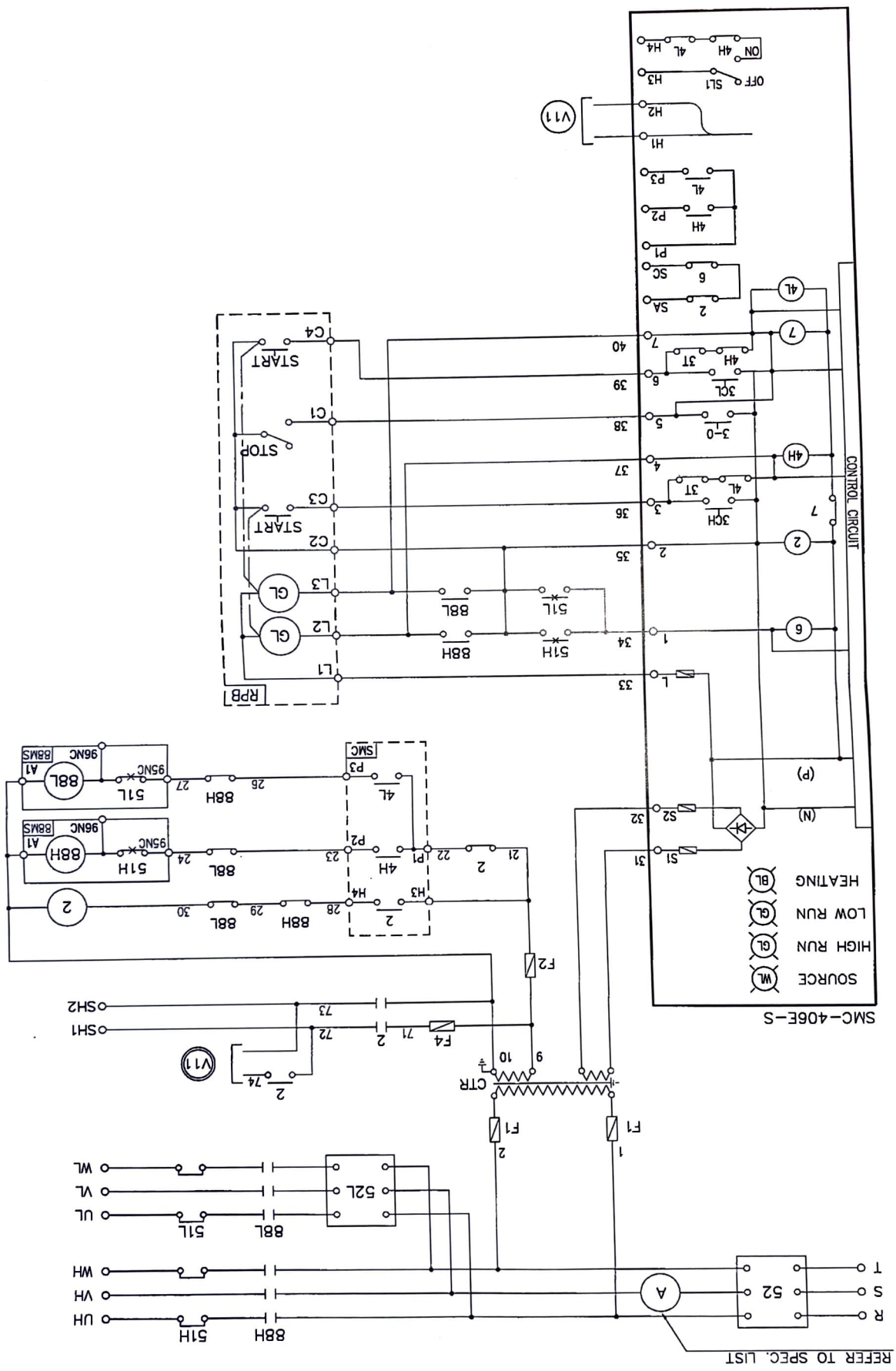












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