

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, 18 OCTOBER 2023

1315 - 1615 hrs

Materials to be supplied by examination centres

Candidate's examination workbook
Graph paper

Examination Paper Inserts

DRG - 140
DRG - 141
DRG - 142
DRG - 143
DRG - 144

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.



ENGINEERING, SYSTEMS AND SHIP'S DRAWINGS

Attempt ALL questions

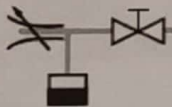
Marks for each part question are shown in brackets.

Section A

1 DRG.140

State what the following items are and describe their function in the illustrated system.

(a)



(2)

(b)



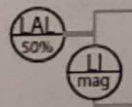
(2)

(c)



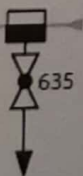
(2)

(d)



(2)

(e)



(2)

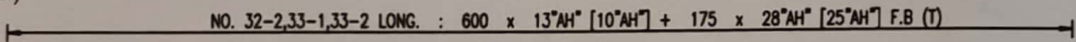
[OVER

2. DRG. 141

- (a) State which side is the discharge on section A- -A on the supplied illustration. (2)
- (b) State the function of the expanded illustration items 103, 104 and 105. (2)
- (c) State which flange is visible in section B---B on the supplied illustration. (2)
- (d) Describe how the drive screw is axially located in the pump casing. (4)

3. DRG.142

State what the following items indicate on the attached illustration.

- (a)  (2)

- (b)  (2)

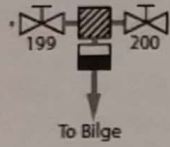
- (c)  (2)

- (d) State the approximate loaded draught of the vessel and describe how this was ascertained. (2)
- (e) State the length of the plate section that runs across frame number 92 and describe how this was ascertained. (2)

4. DRG.143

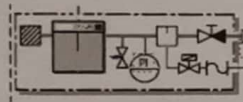
State what the following items are and describe their function in the illustrated system.

(a)



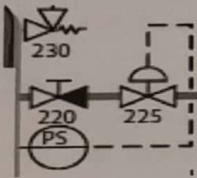
(2)

(b)



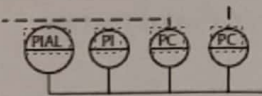
(2)

(c)



(2)

(d)



(2)

(e) Deck operations are consuming a large volume of working air which is causing the compressors to start and stop frequently.

Using drawing references, describe what change in configuration could be made to maintain required service air to the deck, whilst ensuring the large air consumption on deck will not affect the safe operation of the vessel.

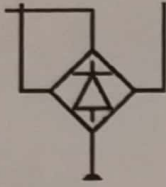
(2)

[OVER

5. DRG. 144

State what the following items are and describe their function in the illustrated system.

(a)



(2)

(b)



(2)

(c) Using drawing references, describe the action and sequence of actions that occur in the illustrated circuit when starting the motor in Fwd direction.

(6)

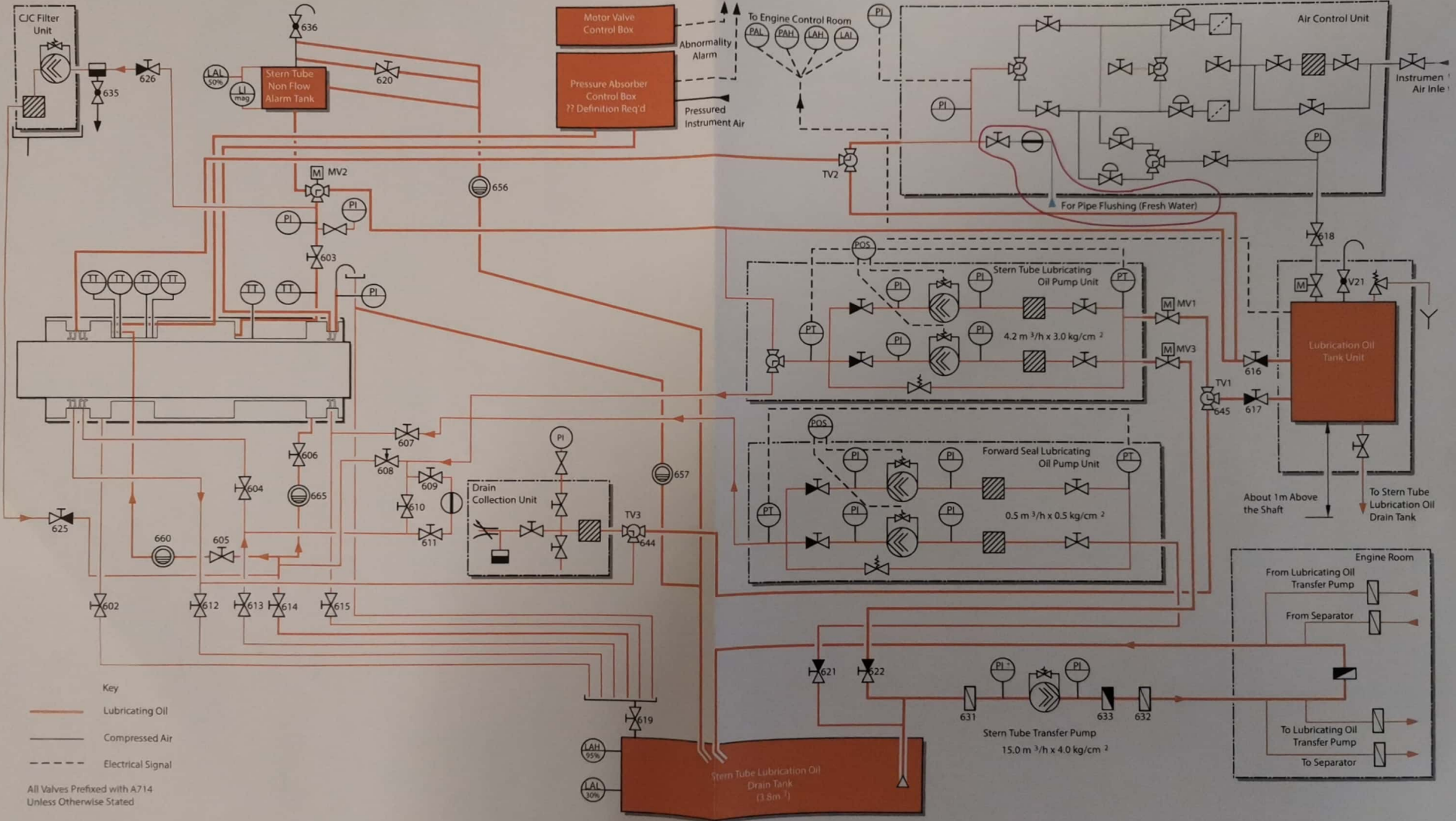
Section B

6. DRG.140

- (a) The illustrated system is designed to run using the 'Lubrication Oil Tank Unit'. Using drawing references, describe the flow paths of oil and air during normal operation. (15)
- (b) Describe the change in configuration required when there is an aft seal problem and you wish to alter the configuration to an oil filled overflow system. (10)

7. DRG.141

- (a) Describe using drawing references, the dismantling of the illustrated pump for maintenance, detailing what parts required cleaning and what parts required inspection for wear, including the location and type of wear that may be evident. (13)
- (b) Identify using drawing references the parts that would be replaced and using drawing references describe the assembly procedure, including any adjustments that may be required. (12)



Including standard relief valve.
Internal return.

509 (509F) (509B) (509A) (509C) (509D) (509E)

