

# 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. Piping Systems - DRG 061

- (a) State the temperature setting for the L.T. jacket water entering the L.T. circulating pump. (2)
- (b) State the temperature setting for the H.T. jacket water entering the H.T. circulating pump. (2)
- (c) Describe the set points used to control the scavenge air supply temperature. (2)
- (d) State what the following symbols are:



### 2. Mechanical Assembly - DRG 062

- (a) On the elevation shown, state the discharge side. (2)
- (b) State what item 458 is and describe its function. (2)
- (c) State, with reasons, whether this pump requires a thrust arrangement. (2)
- (d) Describe, using drawing references, how the impeller is radially and axially located to ensure the correct running condition within the casing. (4)

[OVER

3. Ship's Construction Drawing - DRG 063

- (a) State the special service conditions the vessel is designed for. (2)
- (b) Describe how the approximate length of the vessel between perpendiculars can be ascertained from drawing. (3)
- (c) State the frame number at which the flat side of the hull starts. (2)
- (d) Sketch a cross section, with detailed dimensions, of a stringer located between frames 166-186. (3)

4. Hydraulic and Pneumatic System Drawings - DRG 064

- (a) State the function of the illustrated system. (2)
- (b) State the types of pump used in the illustrated system. (2)
- (c) Describe the main functions of the servo pump, when the illustrated system is fully operational. (2)
- (d) State what the following symbols indicate:



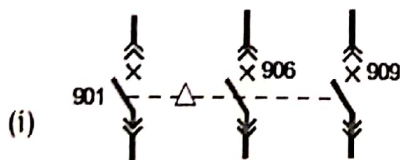
(2)



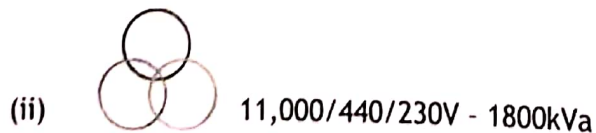
(2)

5. Electrical Power Systems and Control Drawings - DRG 065

- (a) State what the following items and describe their function:



(2)



(2)

- (b) Under normal conditions, the recommended configuration of the 690V switchboard is to run with breakers 454 and 353 in the open condition.

State, with reasons, the advantage of this configuration.

(3)

- (c) State the transformers that would be used if the vessel was in dry dock on shore power, and describe the services to which supply can be maintained, if transformer '5' can be back fed.

(3)

## Section B

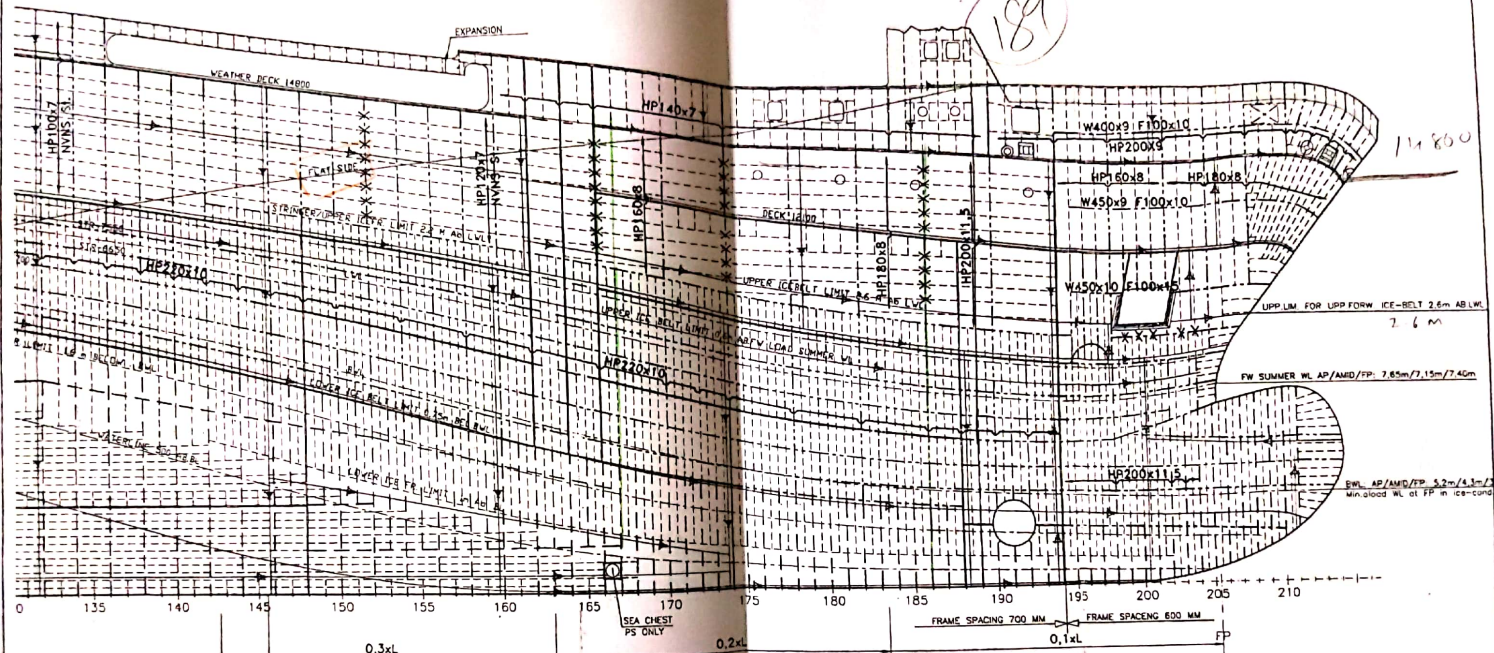
### 6. Piping Systems - DRG 061

- (a) Describe, using drawing references and temperatures where appropriate, the cooling water flow path from the L.T. circulating pump discharge, until its return at the pump suction. (10)
- (b) Describe, using drawing references and temperatures where appropriate, the cooling water flow path from the H.T. circulating pump discharge, until its return at the pump suction. (15)

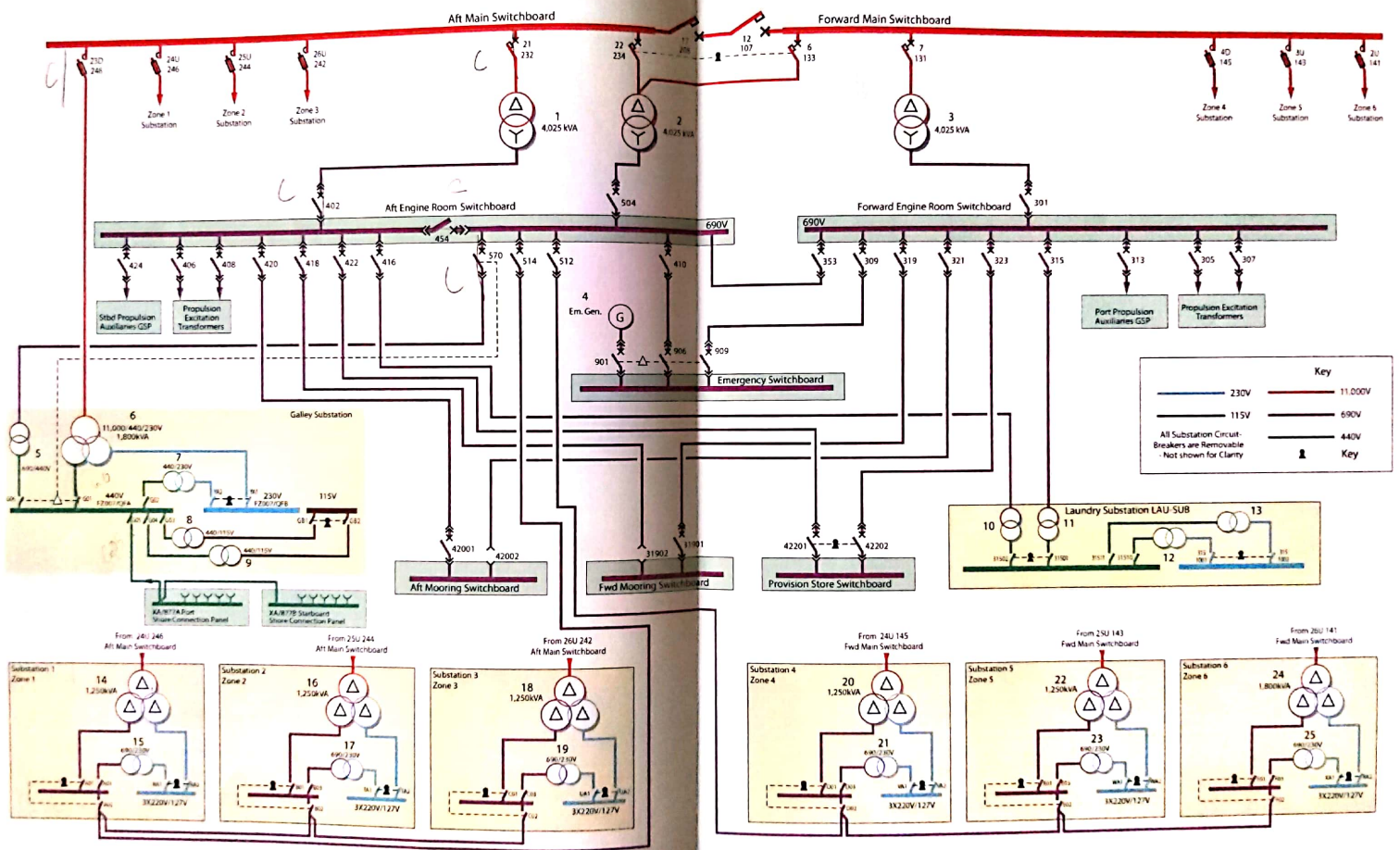
### 7. Hydraulic and Pneumatic System Drawings - DRG. 064

- (a) Using drawing references, describe the oil flow paths from the running pumps, when the system is operational. (15)
- (b) (i) State the functions the emergency gear pump is capable of actuating. (3)
- (ii) Describe, using drawing references, when and how it is used. (2)
- (c) State what the accumulator gear pump pressure is used for and describe what happens to the accumulator pressure when the main system is running. (5)

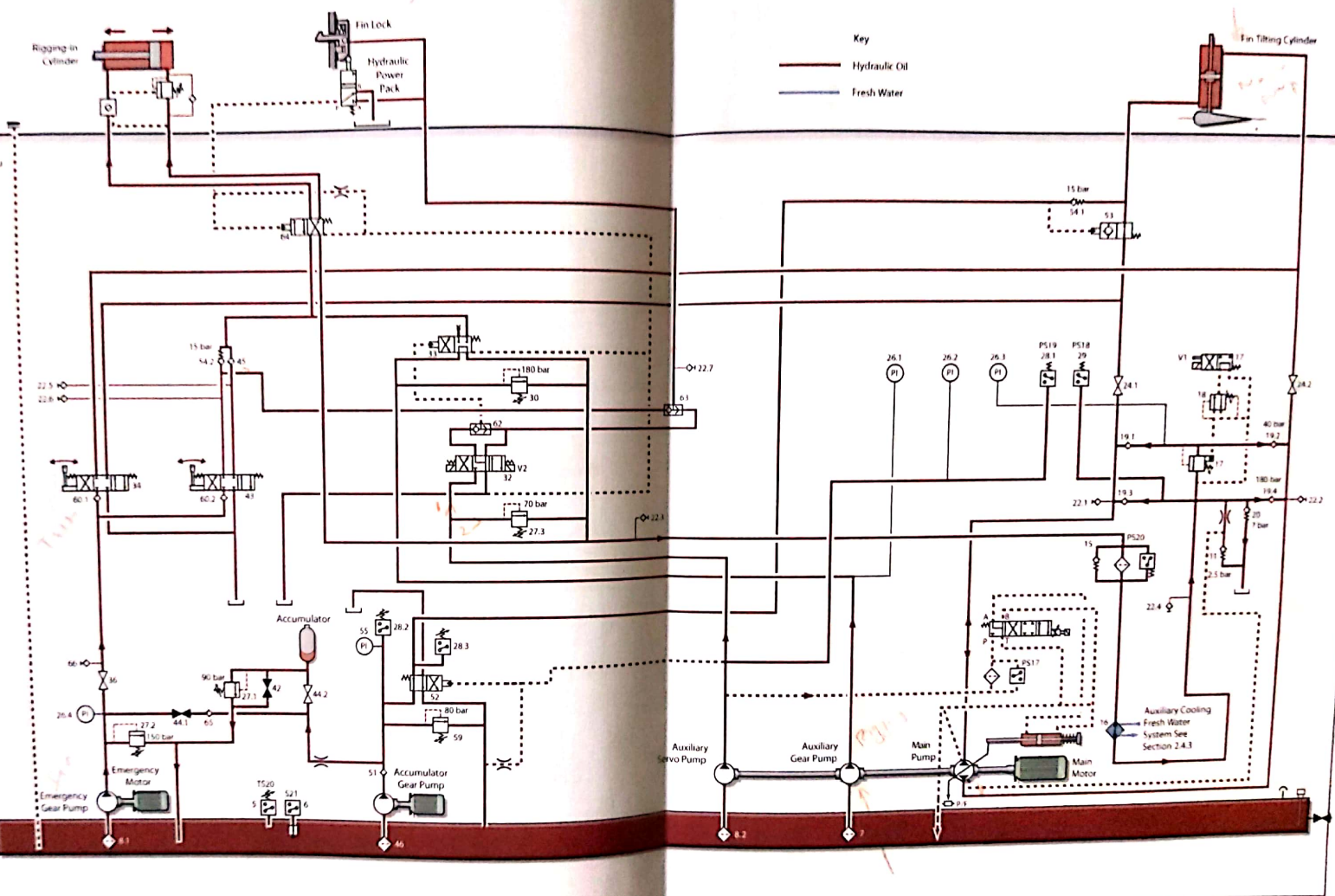
DRG 063



HING	p=3415 kN/m <sup>2</sup>	ICE-STRINGER	p=2561 kN/m <sup>2</sup>	p=3104 kN/m <sup>2</sup>	ICE-STRINGER	p=2716 kN/m <sup>2</sup>
RINGER	p=3104 kN/m <sup>2</sup>	WEB FRAME	p=1707 kN/m <sup>2</sup>	p=2561 kN/m <sup>2</sup>	WEB FRAME	p=1723 kN/m <sup>2</sup>
W400x9 FL100x15	STRINGER: W400x9 FL100x15 AB. M. DK	STRINGER: W500x12 FL150x20	W300x11 FL100x15	W500x11 FL150x20 (AFT #194)	STRINGER: W500x10 FL100x15	W500x10 FL100x15
W.FR: W600x10 FL150x15	STRINGER: W500x9 FL100x15 BELOW M. DK	W.FR: W600x14 FL180x20	W.FR. (M.DK-5700): W500x11 FL150x20 (AFT #194)	W.FR. (BEL.5700): W350x10 FL150x20 (AFT #194)	W.FR. (M.DK-TW.DK.): W500x10 FL150x15	W500x9 FL150x15
WEB PL8 F200x20/300x20	WEB PL8 FL 150x15	WEB PL8 FL 100x15	W450x9 FL 100x15	W500x9 FL 150x15	W.FR. (TW.DK.-W.DK.): W400x9 FL100x15	W.FR. (W.DK-BR.DK.): W350x9 FL100x15







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