

Answers to questions

Chapter 1

1. $L = 203 \text{ m}$, $B = 32.58 \text{ m}$, displacement = 67 735 tonnes, lightweight = 12 735 tonnes.
2. Review chapter notes.
3. $L = 147.3 \text{ m}$, $B = 21.45 \text{ m}$, $C_B = 0.734$, $W = 19\,615 \text{ tonnes}$.
4. $L = 265.6 \text{ m}$, $B = 44.26 \text{ m}$, $T = 14.167 \text{ m}$.
5. (a) $L = 101.90 \text{ m}$, (b) $L = 127.39 \text{ m}$, (c) $L = 145.86 \text{ m}$.
6. $C_B = 0.575$ and also 0.575 (via global formula).

Chapter 2

Section 1

1. to 3. Review chapter notes.
4. 2900 tonnes.
5. 4350 tonnes.
6. Review chapter notes.

Section 2

1. to 4. Review chapter notes.
5. (a) 748 or 760 tonnes, with average = 754 tonnes, (b) Review chapter notes.

Section 3

1. Review chapter notes.
2. 465.
3. Diesel = 1275 tonnes, Steam Turbine machinery = 1085 tonnes.
4. 616 or 621 tonnes.
5. (a) 240 tonnes, (b) 80 tonnes.

Chapter 3

1. and 2. Review chapter notes.
3. $C_B = 0.703$.

4. Review chapter notes.
5. Grain = $20\,273\text{ m}^3$, Bale = $18\,246\text{ m}^3$.

Chapter 4

1. $K = 0.142, 0.125, 0.100, 0.075, 0.058, 0.050$.
2. $0.839, 0.843$.
3. (a) $0.782, 0.767, 0.748, 0.721$.
(b) $W = 50\,195$ tonnes, lightweight = $17\,356$ tonnes, deadweight = $33\,559$ tonnes.
4. Review chapter notes.
5. $W = 13\,251$ tonnes, $C_W = 0.813$, $C_B/C_W = 0.886$, $KB = 3.98\text{ m}$, $WPA = 1946\text{ m}^2$, $TPC = 19.95$ tonnes, $MCTC = 161.1\text{ tm/cm}$.
6. $0.813, 0.0551, 3.31, 162.5\text{ m}$.

Chapter 5

1. Model's ' f ' = 0.5002 , ship's ' f ' = 0.4225 .
2. 3389 m^2 .
3. 13.89 kt .
4. (a) $F_n = 0.248$, (b) review chapter notes.
5. Review chapter notes.
6. 33.45 N .
7. 81.63 kN .
8. $P_{NE} = 1364\text{ kW}$, $V = 13.28\text{ kt}$.

Chapter 6

1. Review chapter notes.
2. 16.5 kt .
3. (a) Review chapter notes, (b) $W_t = C_B/2 - 0.05$.
4. $V_s = 10.01\text{ kt}$, apparent slip = -11.1% , real slip = $+16.66\%$.

Chapter 7

1. to 4. Review chapter notes.
5. (a) $P_E = 4118$, $P_T = 4149$, $P_D = 6035$, $P_B = 6212$, $P_I = 7001$ (all in kW).
(b) 177 kW .

Chapter 8

1. $PC = 0.672$, $QPC = 0.727$.
2. 14.52 kt .
3. $63\,467$.
4. 21 kt .
5. 569 (very efficient design).
6. $14\,218\text{ kW}$.

Chapter 9

1. to 4. Review chapter notes.
5. $B_p = 15.29$, propeller efficiency = 68.7%, $\delta = 160$, $a = 0.844$, pitch = 5.04 m, diameter = 5.97 m.
6. $A_R = 30.6 \text{ m}^2$, $L = 4.25 \text{ m}$, $D = 7.20 \text{ m}$.
7. 500 kN.

Chapter 13

1. and 2. Review chapter notes.
3. (1) 17 kt, (11) 0.08, 0.29, 0.71, 0.94, 1.11, 1.38 (all going North).
4. 12.17, 11.98, 14.24, 14.01, 14.07, 13.85 (all in kt).

Chapter 14

1. Review chapter notes.
2. 67, 92, 109 tonnes.
3. Steam Turbine = $0.00480 \times P_S$, Diesel = $0.00432 \times P_B$.
4. 14 000, 20 000, 26 250 kW.

Chapter 15

1. 2.10 nm, 14 lengths, 17 min.
2. Review chapter notes.
3. Review chapter notes.
4. 0.57 nm ($\frac{1}{4} \times S$), 0.76 nm ($\frac{1}{3} \times S$), 5.70 nm ($2.5 \times$ deep water value).

Chapter 17

1. and 2. Review chapter notes.
3. 1.41 m at the bow.
4. 0.71 m at the bow.
5. (a) 0.89 m at the stern, (b) 1.78 m at the stern.
- 6., 7. and 8. Review chapter notes.
9. Bow = 0.40 m, stern = 0.84 m, mbs = 0.62 m, trim = 0.44 m by the stern.

Chapter 18

1. Review chapter notes.
2. $F_B = 351 \text{ m}$, $F_D = 54 \text{ m}$.
3. 29.7% or 4.46 kt.
4. 17% or 19 rpm.

Chapter 19

1. to 3. Review chapter notes.
4. 0.225.
5. Review chapter notes.

Chapter 20

1. Schlick's constant = 2.719×10^6 , Todd's constant = 103 924.
2. to 4. Review chapter notes.
5. $2NV = 73.04$ cycles/min, $2NH = 110$ cycles/min.
6. 70.85 cycles/min.
7. Review chapter notes.