

Question 1: Calculate the section modulus of the bulb section 160×10 attached to a plate with a thickness of 12 mm. (30 points)

Note that: $SM = I_{NA} / y_{max}$; $I_{NA} = \sum I_i + \sum A_i \times d_i^2$; $y_{NA} = \sum A_i \times y_i / \sum A_i$

Question 2: A view of part of a dry cargo ship whose main particulars are given below, is shown in Figure 2. Find the scantlings of the spotted structural members ?1, ?2, ?3 and ?4. (70 points)

$L = 100 + 5 \times n$ [metre]; $L/B = 7.0$; $B/T = 2.5$; $L/D = 11.0$; $c_B = 0.7$; $V_0 = 17$ knots.

Frame spacing (a) is 800 mm and the distance between solid (plate) floors is 2,4 metres. Unlimited service range will be considered. The steel used is the normal strength steel whose yield stress (R_{eH}) is 235 [N/mm²]. The normal stress due to longitudinal bending at bottom (σ_{LB}) is 120 [N/mm²]; (G/V) may be taken as 0,7.

Note that n is the last digit of your student identification number. For example: If your student ID is 160A2063, then $L = 100 + 5 \times 3 = 115$ [metres]. Please state other assumptions that you may need.

Figure 1

PROFİL	EBAT				KESİT ALANI	AĞIRLIK	YÜZEY ALANI	TARAFSIZ EKSENİN YERİ	TARAFSIZ EKSENE GÖRE MOMENT	
	b	s	c	r	F	G	U	e _x	I _x	W _x
	mm	mm	mm	mm	cm ²	kg/m	m ² /m	cm	cm ⁴	cm ³
		7			14,60	11,40	0,365	9,66	373,0	38,60
160	160	8	22	6	16,20	12,70	0,367	9,48	411,0	43,30
		9			17,80	14,00	0,369	8,36	448,0	47,00
		10			19,40	15,20	0,410	9,25	485,0	52,40

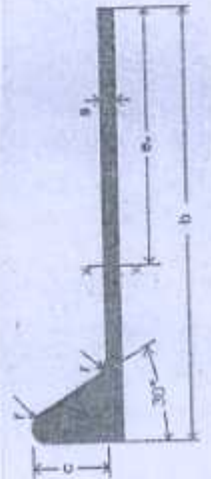


Figure 2

