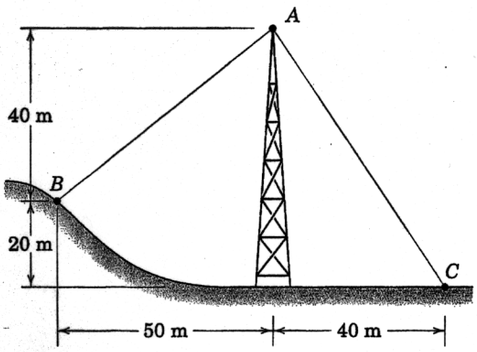
TAM 202 HW #1

2/25 The guy cables AB and AC are attached to the top of the transmission tower. The tension in cable AC is 8 kN. Determine the required tension T in cable AB such that the net effect of the two cable tensions is a downward force at point A. Determine the magnitude R of this downward force.

Ans. $T = 5.68$ kN, $R = 10.21$ kN



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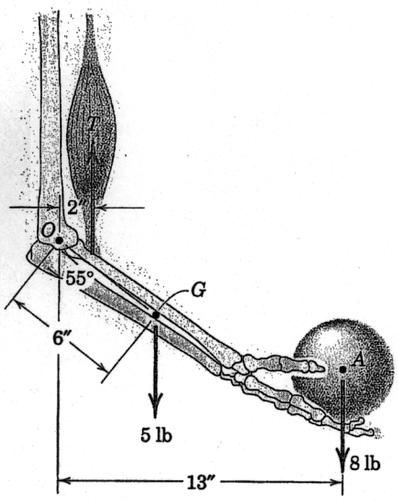
2/35 Elements of the lower arm are shown in the figure. The weight of the forearm is 5 lb with mass center at G. Determine the combined moment about the elbow pivot O of the weights of the forearm and the sphere. What must the biceps tension force be so that the overall moment about O is zero?

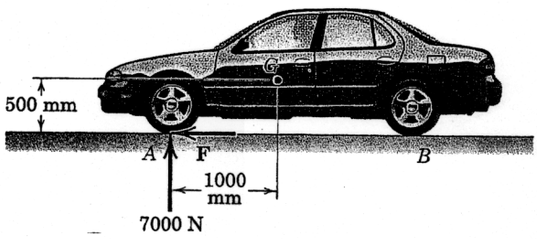
Ans. $M_O = 128.6$ lb-in. CW, $T = 64.3$ lb



Problem 2/35

2/71 The combined drive wheels of a front-wheel-drive automobile are acted on by a 7000-N normal reaction force and a friction force $\mathbf{F}$, both of which are exerted by the road surface. If it is known that the resultant of these two forces makes a 15° angle with the vertical, determine the equivalent force–couple system at the car mass center G. Treat this as a two-dimensional problem.

Ans. $R = 7250$ N
$M_G = 7940$ N·m CW



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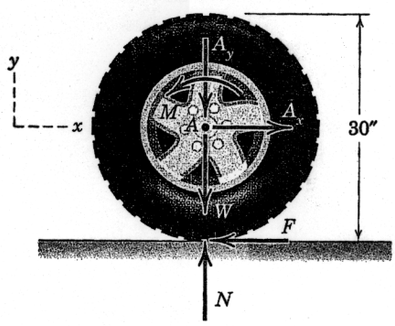
2/89 The rolling rear wheel of a front-wheel-drive automobile which is accelerating to the right is subjected to the five forces and one moment shown. The forces $A_x = 60$ lb and $A_y = 500$ lb are forces transmitted from the axle to the wheel, $F = 40$ lb is the friction force exerted by the road surface on the tire, $N = 600$ lb is the normal reaction force exerted by the road surface, and $W = 100$ lb is the weight of the wheel/tire unit. The couple $M = 2$ lb-ft is the bearing friction moment. Determine and locate the resultant of the system.

Ans. $\mathbf{R} = 20\mathbf{i}$ lb, $d = 2.40$ ft above A



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