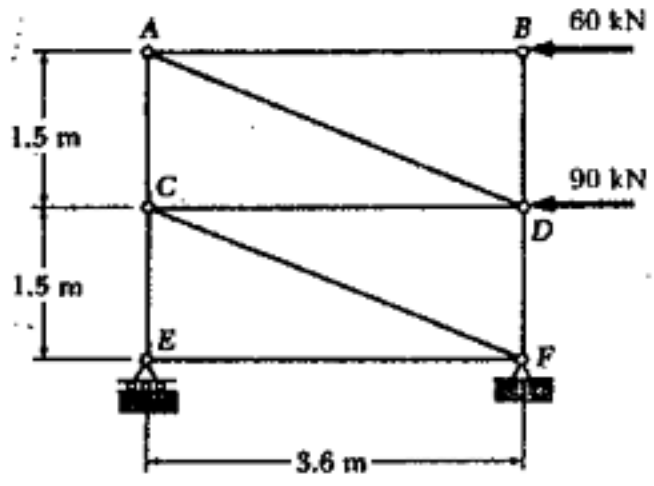
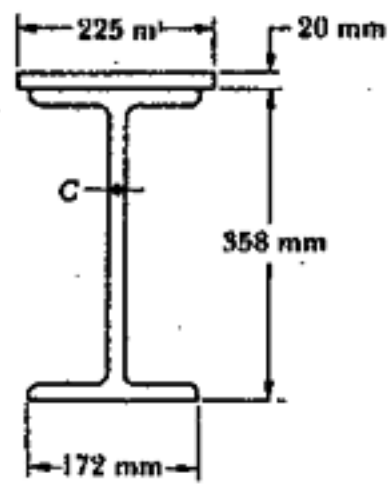
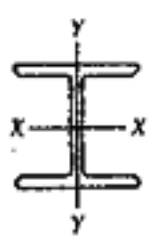
1. Describe or define following terms.
   a. (5%) Two-force body
   b. (5%) Coefficient of static friction
   c. (5%) Parallel-axis theorem for moment of inertia
   d. (5%) Principle of virtual work
2. (10%) Determine the force in each member of the truss shown below. State whether each member is in tension or compression.



3. (10%) The strength of a W360x57 rolled-steel (the sectional properties can be found by referring the table below) beam is increased by attaching a 225x20 mm plate to its upper flange as shown. Determine the moment of inertia of the composite section with respect to an axis through its centroid C and parallel to the plate.



		Designation	Area mm^2	Depth mm	Width mm	Axis X-X I_x $10^6 mm^4$	Axis X-X k_x mm	Axis X-X y mm	Axis Y-Y I_y $10^6 mm^4$	Axis Y-Y k_y mm	Axis Y-Y x mm
W Shapes (Wide-Flange Shapes)		W460 × 113†	14400	463	280	554	196.3		63.3	66.3	
		W410 × 85	10800	417	181	316	170.7		17.94	40.6	
		W360 × 57	7230	358	172	160.2	149.4		11.11	39.4	
		W200 × 46.1	5890	203	203	45.8	88.1		15.44	51.3	

(背面仍有題目,請繼續作答)

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Part II (60%) 動力部份

1. The blocks in Fig II. 1 are in contact as they slide down the inclined plane. The masses of the blocks are $m_B = 25$ kg and $m_S = 20$ kg, and the friction coefficients between the blocks and the plane are 0.5 for S and 0.1 for B. Determine the force between the blocks and find their common acceleration. (15%)

2. Two gymnasts A and B, each of weight W, hold onto the left side of a rope that passes over a light pulley to a counterweight C of weight 2W. (See Fig II. 2) Initially the gymnast A is at depth d below B. He climbs the rope to join gymnast B. Determine the displacement of the counterweight C at the end of the climb. (15%)

3. Cylinders B_1 and B_2 in Fig II. 3 have a radius of 10 in. each and roll on the respective planes. Bar B_3 has length 48 in. and is pinned to the centers of the cylinders. The center G of B_1 has velocity $\vec{v}_G = -10t \rightarrow$ in./sec. If the time at the instant shown is $t = 5$ sec, find α_2 and α_3 at that instant. (15%)

4. Force P is applied to a plate that rests on a smooth surface (see Fig II. 4) Find the largest force P for which the pipe will not slip on the plate. (15%)

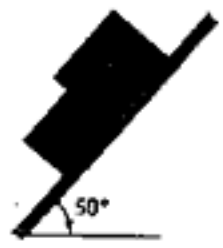

Fig. II. 1

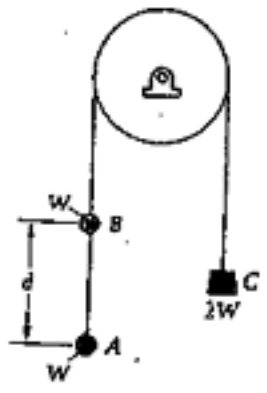

Fig. II. 2

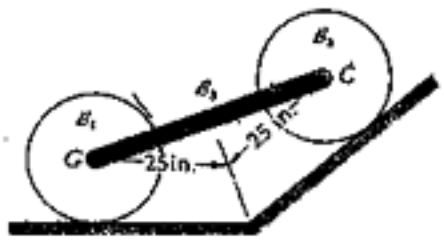

Fig II. 3

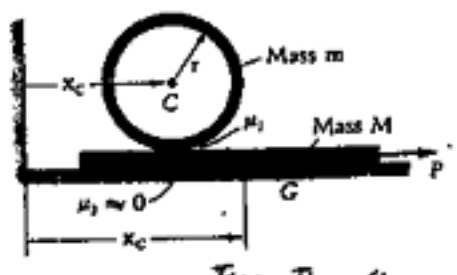

Fig. II. 4

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