

Class : First

Subject: Engineering Mechanics

Examiner : Dr. Qusay K. Al-awsi

Dr. Yasser Ahmed

Lecturer Raad hameed



Time : 3 hours

Date: 10 / 06 / 2014

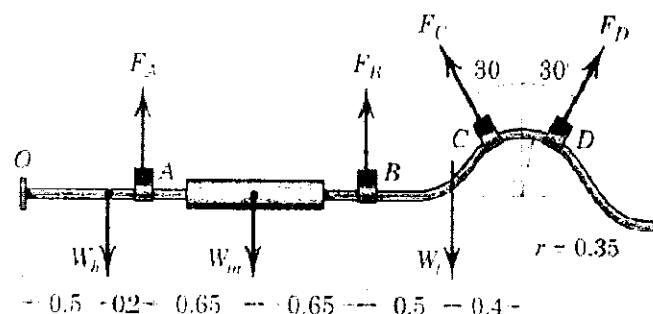
Note: Answer only five questions

Name:

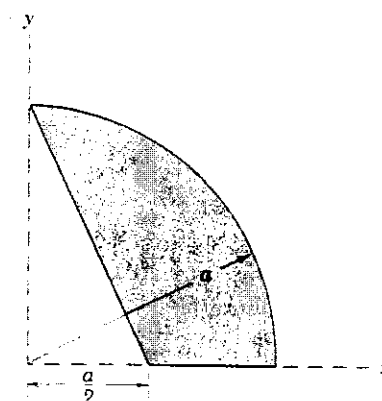
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Q1: An exhaust system for pickup truck is shown in figure. The weights  $W_h$ ,  $W_m$  and  $W_t$  of the head pipe, muffler, and tailpipe are 10, 100, and 50 N, respectively, and act at the indicated points. If the exhaust pipe hanger at point A is adjusted so that its tension  $F_A$  is 50 N, determine the required forces in the hangers at points B, C and D so that the force couple system at point O is zero.



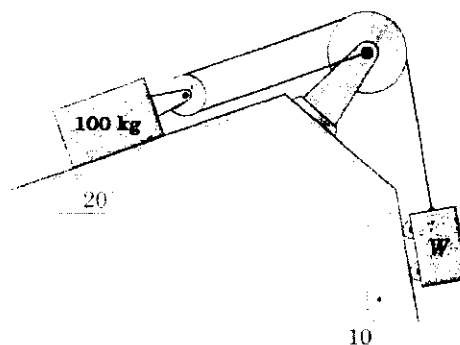
Q2: Determine the X and Y coordinate of the centroid of the shaded area



Q3 : Determine the range of weights  $W$  for which the 100 kg block is in equilibrium. All wheels and pulleys have negligible friction.

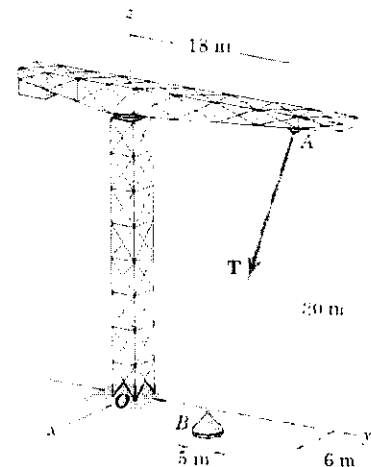
$$\mu_s = 0.3$$

$$\mu_k = 0.25$$



Q4: The motion of object with equation  $s = \frac{1}{3} t^3 - 2t^2 - 6$ . Find the acceleration at time ( $t = 0, 2, 4$ )

Q5: In Picking up a load from position B, a cable tension  $T$  of magnitude 24 kN is developed. Calculate the moment which  $T$  produces about the base O of the construction crane.



Q6: Determine the resultant  $R$  of the three tension forces acting on the eye bolt. Find the magnitude of  $R$  and the angle  $\theta_x$  which  $R$  makes with the positive  $x$ -axis

