

## Physics Problems:- October-2010

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- Q1. A thin non-extensible thread of length  $l$  is joined end to end and placed carefully over a horizontal soap film of surface tension  $\sigma$ . If the film bounded by the contour of the thread is punctured then what is the tension acquired by the thread at equilibrium?
- Q2. A certain fuse wire starts melting when a current  $I_0$  passes through it. If the radius of the wire is increased by a factor of  $\eta$  then what is the maximum safe current that can be passed through the wire? Assume identical ambient conditions in both cases.
- Q3. As shown in the figure a massive rod is held horizontal with one end just on the corner of a rough table. When the rod is released it is observed that the end on the table starts slipping after the rod undergoes an angular displacement of  $\theta_0$ . What is the coefficient of friction between the table and the rod?
- Q4. The equivalent resistance between the points A and B for the arrangement shown in the figure can be shown to be  $aR/b$  where each resistor has a resistance  $R$  and  $a, b$  are integers. Find  $(a - b)$ .

