امتیاز هر سوال 5 نمره میباشد.

1- Calculate the force required in direct extrusion of 1100-O aluminum from a diameter of 6 in. to 2 in. Assume that the redundant work is 30% of the ideal work of deformation, and the friction work is 25% of the total work of deformation.

2- Derive an analytical expression for the die pressure in wire drawing, without friction or redundant work, as a function of the instantaneous diameter in the deformation zone?

3- A material with a true-stress-true-strain curve $\sigma = 10000\varepsilon^{0.3}$ is used in wire drawing. Assuming that the friction and redundant work compose a total of 50% of the ideal work of deformation, calculate the maximum reduction in cross-sectional area per pass that is possible.

4- In drawing a strain-hardening material with n = 0.25 what should be the percentage of friction plus redundant work, in terms of ideal work, so that the maximum reduction per pass is 63%?