

King Saud University
College of Engineering
Industrial Engineering Department

Manufacturing Process I, IE252, Mid Term Exam. #2

Date: Tuesday 21/Dec/2010 – 15/1/1432H

Time: 60 Min

Student Name: _____

ID: _____

Question 1: *(answer only 4 points only, 1.5 Marks each)*

6 MARKS

- a) What is the main difference between cohesion and adhesion joining techniques, give one example for each type?
- b) Complete the following, to achieve a satisfactory joining process based on coalescence of cohesion or adhesion, two basic requirements must be fulfilled,
 - 1) The surfaces involved must be
 - 2) The surfaces involved must be
- c) What is the main difference between MIG and TIG welding process, sketch the two process?
- d) Drive the blank diameter equation for cub has cub base of “ d ” and cub height of “ h ” ?
- e) What we mean by maximum reduction of area in rod drawing process, illustrates your answer using equation and sketch”.

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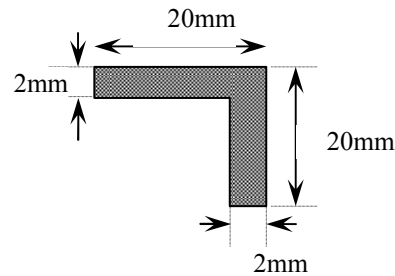
Question 2: (6 Marks)

Given the following sheet metal blanks pieces, shear stress is 330 N/mm^2 and sheet metal thickness 3 mm and 40% punch penetration, calculates :

- a) Max punch load (Ton). 2Marks
- b) Work required to shear the given sections J. 1Marks
- c) If punch load is limited to 5 Ton, calculates punch shear depth and punch shear angle required for the case shown below? 3Marks

Given $P_{\max} = (\text{metal thickness})(\text{perimeter})(\text{ultimate shear stress})$

Work Done = Max punch load x % Penetration x Thickness = $P_{\max}(p)t$



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Question 3:(8 Marks)

Calculate the extrusion ratio for direct extrusion process of a square cross-section rod having dimensions of 10x10 mm. Given billet diameter 100 mm and material follows the relationship $\bar{\sigma} = 100\bar{\epsilon}^{0.1} \text{ N/mm}^2$, deformation efficiency $\eta=75\%$.

- a) What is the effective strain?
- b) If the billet length is 500 mm, what is the final length of the rod?
- c) What is the required power, when the extruded product speed is 3 m/s.
- d) If the power cost is 3 SR/KW.Hr what is the production cost of producing 100 bars having 6 meter length each from the same cross-section?

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