

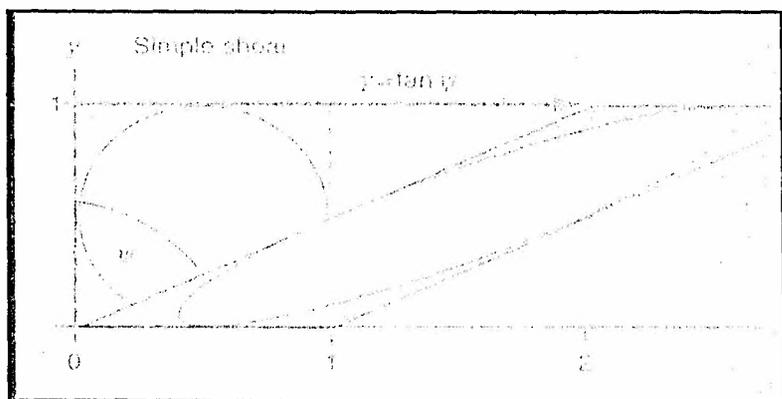
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ES3101: Advanced Structural Geology
Midsem Exam
Full Marks: 25
20th Sept, 2018

Name :
ID#

Please provide precise and succinct answers to the questions. Please also provide sketches, wherever possible, to share your thoughts with me. Good luck!

1. TRUE or FALSE. Please justify your answers with sketches/succinct arguments. (8)
 - (a) The larger the angular discordance in an angular unconformity the greater is the missing time.
 - (b) Estimating the orientation of maximum principal strain axis from an $R_f - \phi$ plot is not possible.
 - (c) For equal contribution of pure and simple-shear, the kinematic vorticity number (W_k) = 0.5
 - (d) A horizontal Sill and a vertical Dike indicate similar orientations of σ_1
2. If material lines can not rotate from lengthening to shortening field during progressive deformation, then how can you explain the occurrence of folded boudins in deformed rocks? (2)
3. Please write a deformation matrix for the following deformation. Is it possible to arrive at the same finite deformed state from a pure shear stress? Based on this thought experiment, what would you conclude? (2+1+2)



4. Please write the relationships among the three principal stress axes for a pure-shear stress. Draw the corresponding Mohr circle. What is the value of normal stress on the planes of highest shear stress? Please also write the corresponding 3X3 stress matrix. (0.5+1+0.5+1)

3. Assume the following plot is a Flinn Plot marking the quantified strain from different clasts of a conglomerate. Please mark the following on the plot.

- (i) (a) Axes of the plot, (b) Constrictional strain field, (c) Flattening strain field, (d) simple shear, (e) pure Shear (2.5)
- (ii) Mark the relatively more competent clasts in this rock. (0.5)
- (iii) How would you interpret these data? (2)
- (iv) What are the limitations of this plot? (2)

