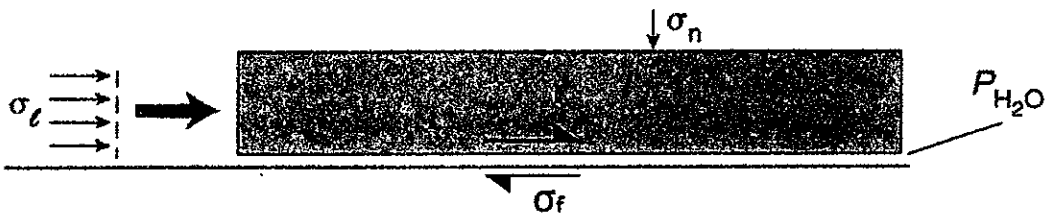
國立臺灣大學 113 學年度碩士班招生考試試題

1. Explain the following terms (40%)
(1) Metamorphic core complex; (2) Parallel fold and similar fold; (3) Trishear; (4) Strike-slip duplexes; (5) Salt diapir; (6) Simple shear and pure shear; (7) Deviatoric stress and differential stress; (8) Coulomb fracture criterion; (9) Restraining stepover and releasing stepover; (10) Lineament and lineation

2. Hubbert and Rubey resolved the issue in mechanical paradox of fold-thrust belts from 1959, where they emphasized the importance of pore pressure in the basal thrust zone. Calculate the minimum pore fluid pressure or pore fluid factor along the basal thrust zone which allows the thrust sheet moving in a long distance without crushing the thrust sheet based on the following figure (Assumption: when applied stress in the block is larger than the uniaxial compressive strength of sandstone). Assume block dimension is 100 km * 10 km * 5 km, block density is 2700 kg/m^3. The coefficient of friction on the fault (basal detachment) μ_b =0.8 (obeys Byerlee's law). Uniaxial compressive strength is 50 MPa (sandstone). (10 %)



3. Explain what is Critical Taper or Critical Wedge Model? How it could be used in orogenic wedge. (10%)

4. Draw and explain the different types of extension connected with an orogenic cycle. (10%)

5. Draw and discuss the types of geological structures that may develop under pure shear strain conditions caused by northwest-southeast horizontal compressional stress using the concept of strain ellipses, and explain the corresponding orientations of these structures. (10%)

6. Draw and provide detailed explanations for the variations in cumulative slip and stress over time in the earthquake recurrence models, including the perfect model, time-predictable model, and slip-predictable model. (10%)

7. Explain three geological structures that can be used to determine the relative movement direction of rock masses on both sides of a fault. (10%)

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