Name: _____

**MEA 443 WEATHER ANALYSIS AND FORECASTING, Fall 2011**
**Quiz 10, 3 November 2011**

1.) True/False. According to Schultz and Vaughan (2011),

___ a.) When occluded fronts form, cyclones are typically within a few mb of their lowest central pressure (maximum strength), and they typically weaken or remain steady in intensity after that point.

___ b.) Most occluded fronts exhibit the structure of "cold-type" occlusions; warm-type occlusions are rarely, if ever, observed.

___ c.) Contrary to conventional wisdom, occluded fronts are almost always accompanied by heavy precipitation.

___ d.) Occluded fronts *can* form even *without* a cold front catching up to a warm front in an extratropical cyclone.

___ 2.) Which of the following best describes an "instant occlusion"?

a.) When occluded fronts form in association with an explosively deepening cyclone, they can form very rapidly, hence the term "instant occlusion".

b.) When a disturbance in cold air approaches and interacts with a leading baroclinic zone, a cloud merger can occur that results in a quickly forming occluded structure.

c.) Cold-type occlusions move faster than warm-type occlusions, meaning that occluded front conditions can reach a given area quickly, an "instant occlusion".

d.) Actually, instant occlusions are a misnomer- they are basically the same thing as a regular warm- or cold-type occlusion.

3.) Consider the abbreviated form of the frontogenesis equation shown below (this is the form that GARP or GEMPAK calculates). Consider a rotated coordinate system with the y axis perpendicular to the frontal zone, pointing towards cold air, and the x axis parallel to the frontal zone.

Perform a scale analysis for the two terms on the right side of the equation for typical midlatitude frontal systems.

$$F = \underbrace{\left[\frac{\partial \theta}{\partial x}\left(\frac{\partial u}{\partial y}\right)\right]}_{Term\ A} + \underbrace{\left[\frac{\partial \theta}{\partial y}\left(\frac{\partial v}{\partial y}\right)\right]}_{Term\ B}$$

4.) True/False Cold-air damming

___ a.) A small Froude number is generally needed for a strong CAD event.

___ b.) An unstable atmosphere is conducive to high-impact CAD events

___ c.) CAD cannot be thought of as a “geostrophic adjustment process” because the flow in the cold dome is completely ageostrophic during CAD events.

___ d.) During a CAD event, it is possible to have cold advection without a backing wind profile.

___ e.) CAD is observed in any location where tall mountains are present, including equatorial locations in South America and Africa.

___ f.) The Froude number is named after the famous psychotherapist Sigmund Froude, who was interested in meteorology as well as psychology.

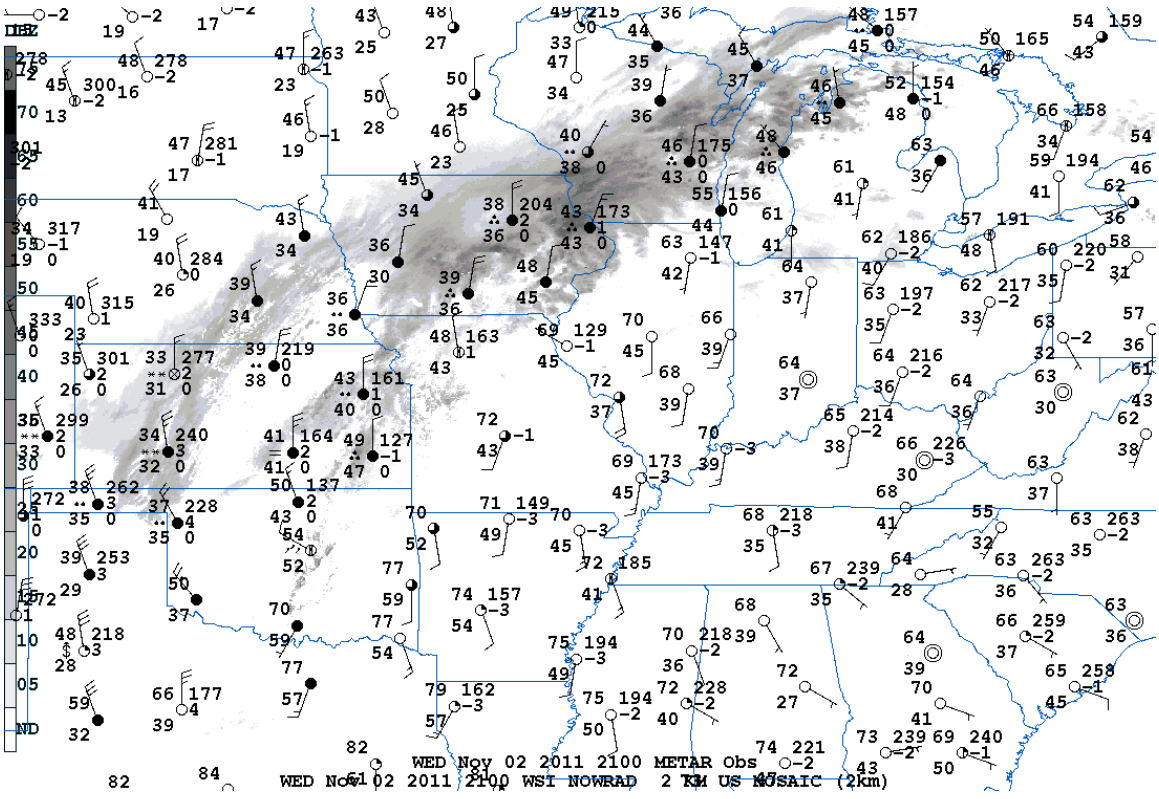
5.) Consider the surface map below. HPC has analyzed a cold frontal system somewhere on this domain at this time.

a.) Sketch the most likely location of the frontal zone, using proper symbols.

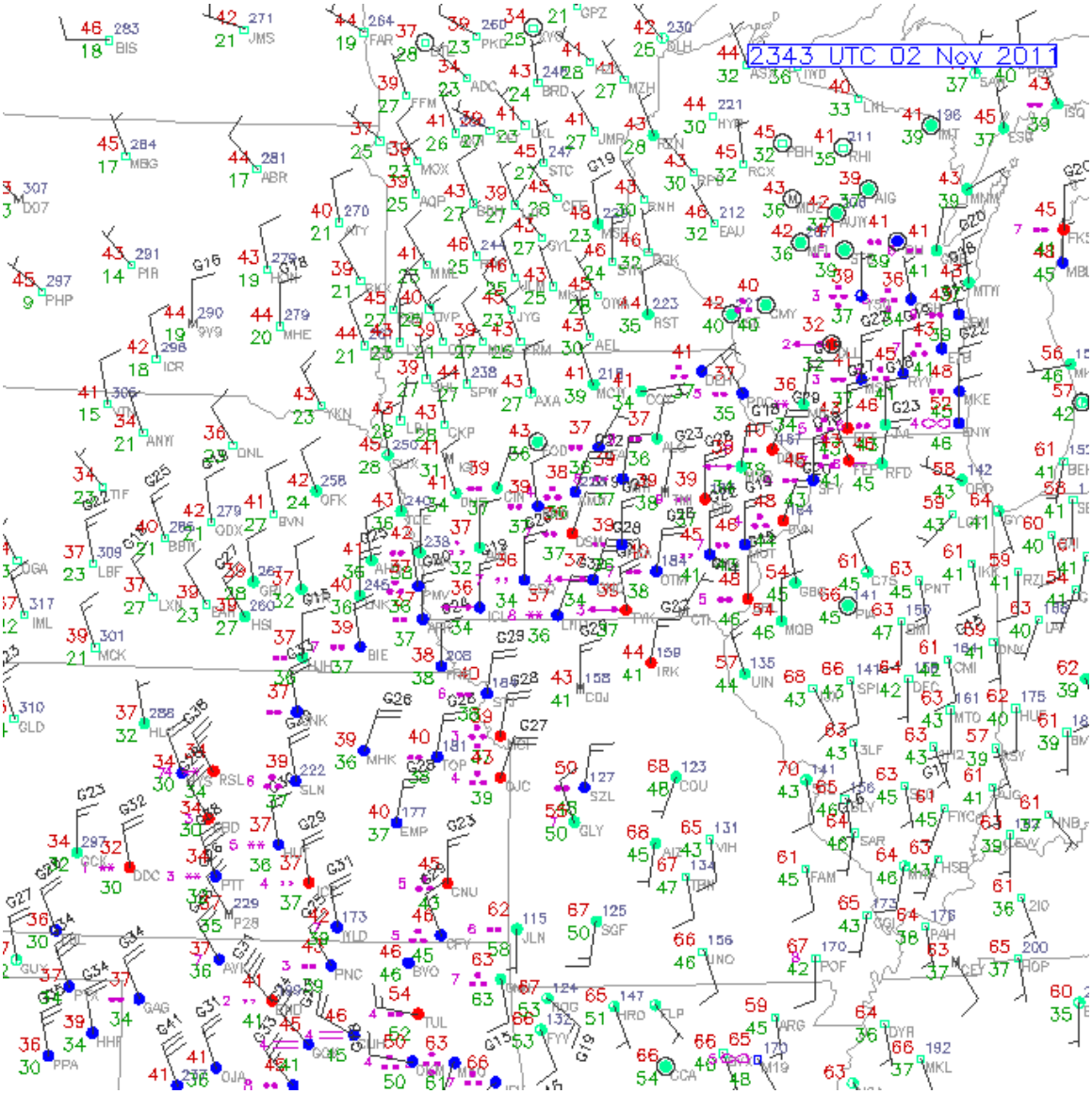
___ b.) Based on the information available, how would you classify this cold front?

i.) katafront ii.) anafront

iii.) hybrid kata/anafront iv.) indistinguishable or unable to determine




6.) Based on the data above, is confluence or shearing the dominant frontogenesis mechanism at this time over the central portion of the diagram? _____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