

SECOND EXAM - Summer/2016

GEOGRAPHY 2202 - NATURAL HAZARDS

Name _____

PART I - DIAGRAMS (45 points)
NO OMISSIONS ON DIAGRAMS.

Cloud and Jet Stream Diagrams (16 points)

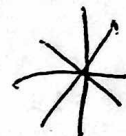
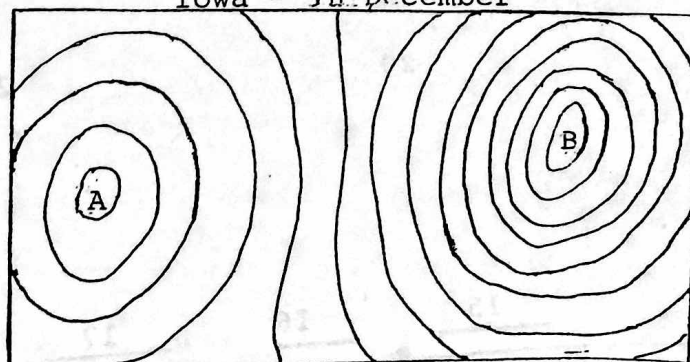
On the Cloud Diagrams and the Jet Stream Diagram you will find the diagrams for the questions below. CIRCLE THE CORRECT ANSWER.

1. Which Cloud Diagram, A, B, or C, would best show the characteristics of a self-perpetuating supercell thunderstorm?
2. At which location on the Jet Stream diagram would you most likely find cloud A, between a) 10 and d, b) 11 and e, or c) it doesn't "fit" anywhere.
3. On cloud diagram B draw a wall cloud at the location you would expect it to form.
4. On the Jet Stream diagram, if a thermally induced HI pressure area was located at 12, would a low or a high more likely exist at 10?
5. On the Jet Stream diagram, would the air at 'a' be a) converging, or b) diverging?
6. On the Jet Stream Diagram if a HI existed at 12 would the air be a) converging or b) diverging?
7. Of the three cloud diagrams, A, B, and C, which would you expect to display the least violence and be of the shortest duration?
8. At 29 on Cloud B diagram, is the process of a) evaporation, or b) condensation more likely taking place?

THERMALLY Induced Pressure Cell Diagram (9 points)

1. Would the wind be blowing a) into, or b) out of pressure cell B?
2. Which pressure cell, A or B, is more likely thermally induced.?
3. Are the winds blowing at a greater velocity in pressure cell A or B?
4. Would the winds in cell B more likely be a) rising, compressing, and cooling, b) descending, compressing, and warming, c) rising, expanding, and cooling, or d) descending, compressing, and cooling?
5. Would the winds in cell A be blowing in a a) clockwise direction, or b) in a counterclockwise direction in the northern hemisphere?
6. Instability, moisture, lousy weather, and low pressure are more closely associated with which cell, A or B?

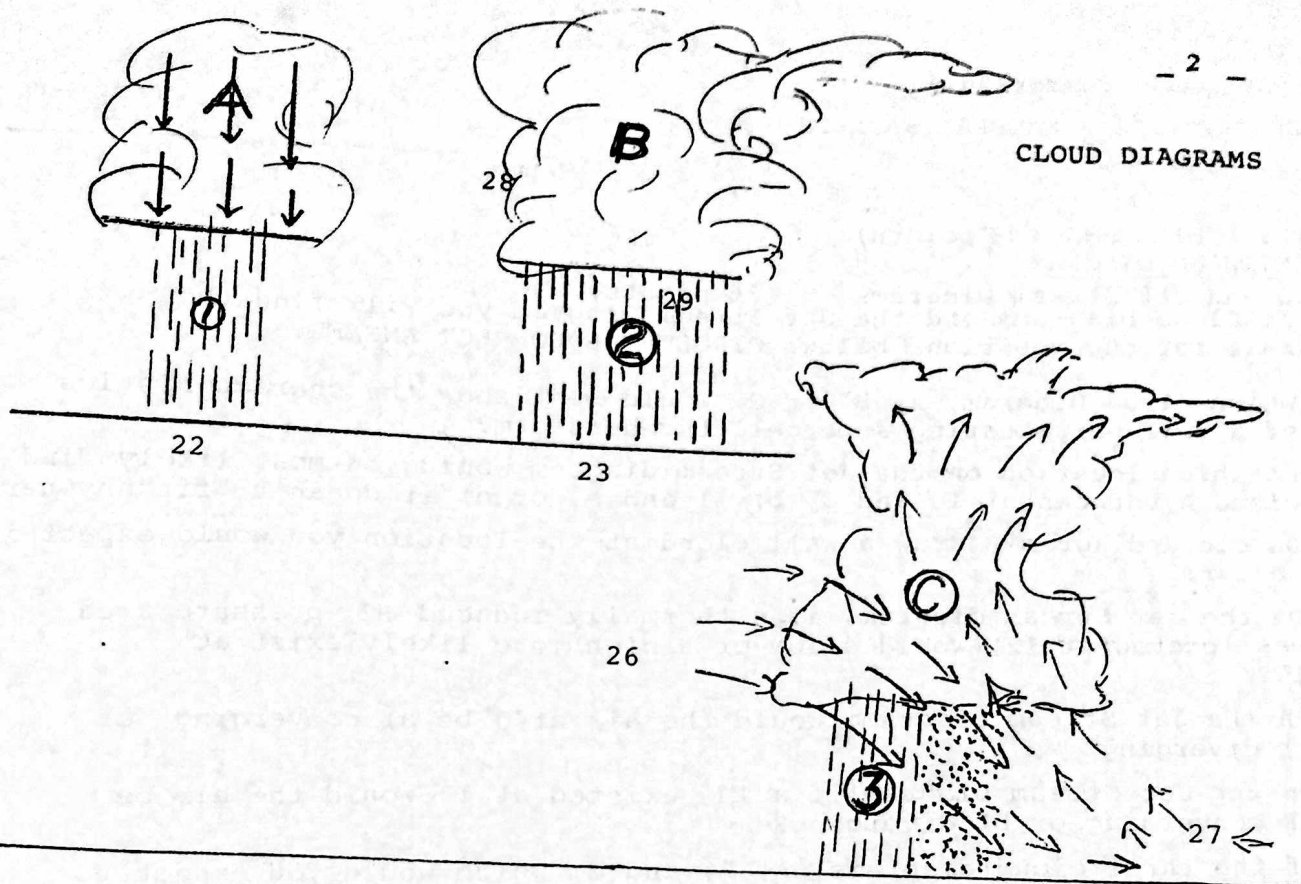
Iowa - in December



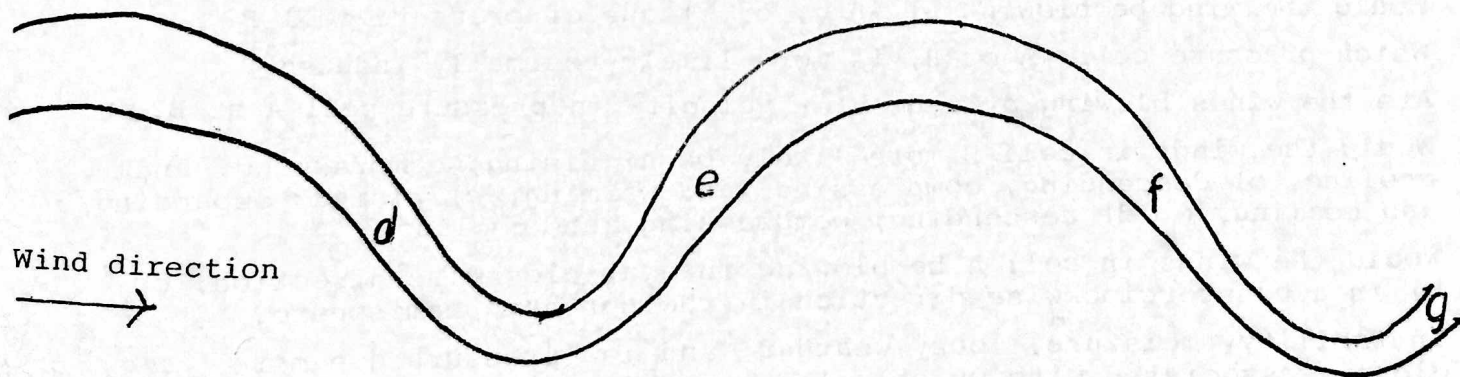
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CLOUD DIAGRAMS



JET STREAM DIAGRAM



19

20

21

13

14

15

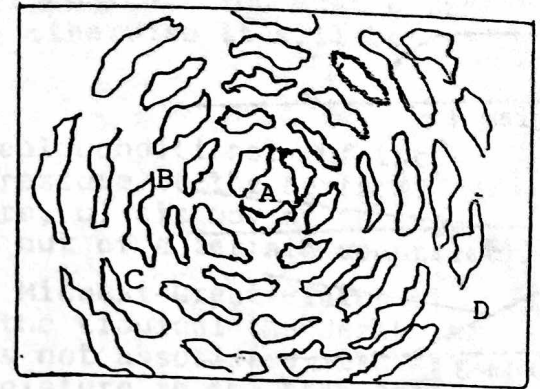
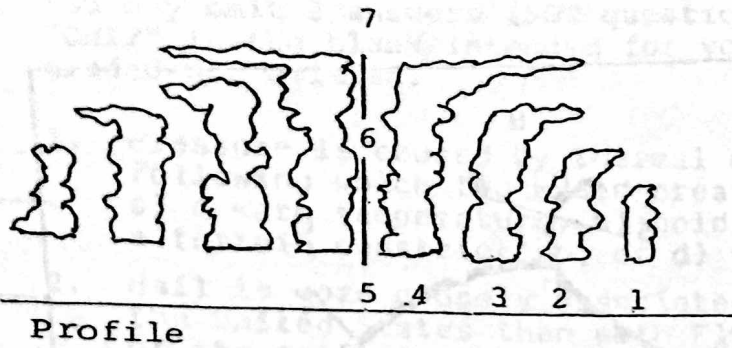
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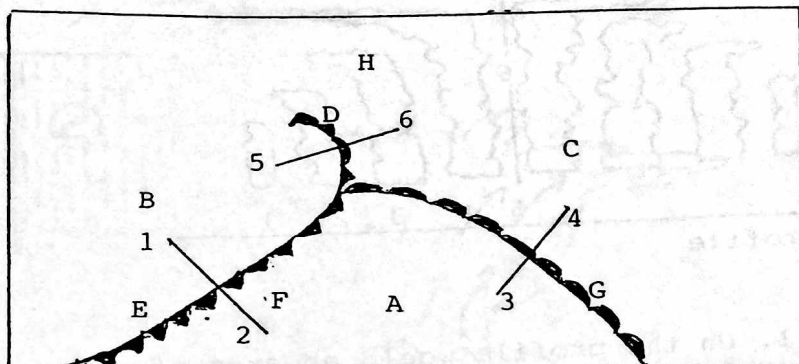
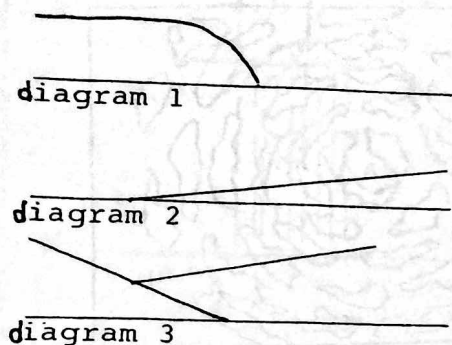
Hurricane Diagrams (12 points)



- ☒ 1. On the profile would an area of no precipitation and clear skies be located at 1, 2, 3, 4, or 5?
- ☐ 2. On the profile would the winds be blowing at the greatest velocity in the vicinity of 2, 3, 4, or 1?
- ☐ 3. On the satellite view are the winds at A a) rising, or b) descending?
- ☐ 4. On the satellite view would the lowest pressure be located at A, B, C, or D?
- ☐ 5. On the satellite view would the winds be blowing a) in a clockwise direction, or b) in a counter-clockwise direction in the northern hemisphere?
- ☐ 6. On the satellite view put an "X" in the quadrant having the strongest winds.

NO OMITTS ON THIS DIAGRAM

Mid-latitude cyclone diagram (8 points)



- ___ 1. Place the number of the diagram (1, 2, or 3) that best represents the profile of conditions along line 1-2 on the cyclone diagram.
- ___ 2. Ditto for line 3-4.
- ___ 3. Ditto for line 5-6.
- ___ 4. What sector would contain the coldest air, A, B, or C?
- ___ 5. Air mass designated "mTg" would more likely be located at A, H, or C?
- ___ 6. If a squall line were present it would more likely be located near A, B, C, H, or F?
- ___ 7. Drizzle, showers of long duration, non-violent weather is more closely associated with weather near the front at G, the front at E, or the front at D?
- ___ 8. Occluded Front would best represent the cyclone near E, G, or D?
- ___ 9. What would be the three-letter air mass designation for the air at B?

YOU MAY OMIT ONE ANSWER ON THIS DIAGRAM

PART II - FILL-IN (32 points)

You may omit 2 answers (NOT questions) of your choice. You must write "OMIT" in the blank intended for your answer, otherwise it will be graded-not omitted.

- ___1. Pressure is caused by thermal or mechanical conditions. Of the following which two would create a low pressure at the surface?
a) a warm temperature, b) cold temperature, c) air moving through a terrain constriction, or d) air moving out of a terrain constriction?
- ___2. Hail is more closely associated with the Midwest-Great Plains of the United States than with Florida and the tropical thunderstorms. Of the following, the main reason hail is not associated with tropical thunderstorms is a) lack of sufficient moisture in the tropical storm, b) lack of sufficient warmth in the storm to create up-drafts, c) lack of sufficient height in the tropical storm to pass the freezing line, or d) lack of instability in the tropical storm?
- ___3. Drought is associated with lack of precipitation. If a mountain mass is at right angles to wind flow, would drought be more likely on the a) leeward side of the mountain or b) windward side of the mountain?
- ___4. A drought would tend to cause the greatest problems in a a) developed nation with irrigation technology, b) a developed nation depending on dry farming techniques, c) a developing nation with irrigation technology, or d) a developing nation depending on dry farming techniques (no irrigation)?
- ___5. The dew point of a parcel of air refers a) to its elevation above the surface, b) the pressure at the center of the low, c) the temperature at which condensation will occur, or d) the elevation at which ice crystals will form?
- ___6. The relatively high occurrence of violent weather in the mid-west United States is a result of which two of the following: a) the high moisture content of the air, b) the contact between moist tropical air and cold continental air, c) no Jet Stream aloft, or d) the absence of mountain ranges perpendicular to air flow?
- ___7. The death toll from a hurricane in a developing nation such as Bangladesh is associated primarily with a) collapse of structures, b) rising water associated with the storm surge of the ocean, c) lightening in the thunderstorms, or d) the force of the high winds?
- ___8. Snow blizzards are considered a hazard in developed nations primarily because of a) the possible flooding that may occur when the snow melts, b) the effect of heavy snow on crops and animals, c) the associated cold temperatures, or d) the disruption of transportation and communication?
- ___9. A century ago smog was less of a problem in Los Angeles and Denver than it is today because a) accurate instruments to measure the severity of the problem were not available, b) man was putting fewer pollutants into the atmosphere, c) inversions were less well developed then, or d) the air patterns were different then?
- ___10. In a static inversion (the Denver type of inversion) the two most effective methods of destruction are a) cooling the ground, b) heating the ground, c) strong winds, or d) condensing moisture?

11. As hurricanes recurve from their original east to west track and head back east in the mid-latitude oceans poleward of 30° , they tend to weaken and die even if they stay out at sea. The primary cause of their death when moving over the mid-latitude oceans is: a) interference with the Jet Stream, b) cooling of the water, c) too strong a coreolis effect, or d) increased friction in the mid-latitudes?
12. Fall winds (chinook, Santa Anna, etc.,) always warm as they descend the lee side of a mountain. The cause of the warming is a) heating by the sun of lower elevation air, b) passage over a warmer surface, c) compression of the air, or d) evaporation of water?
13. The dew point of a parcel of air refers to a) its elevation above the surface, b) the temperature at which condensation will occur, c) the pressure at the center of the low, or d) the elevation at which ice crystals will form?
14. When a hurricane approaches a coastal area the damage from the storm surge is greater if it occurs a) at low tide, b) at high tide, or c) the tide makes no difference?
15. Of all the atmospheric hazards we have discussed which two cause the greatest loss of life L(greatest number of deaths) per year in the U.S., a) hurricanes, b) lightening, c) tornadoes, d) hail, e) fog, or f) blizzards?
16. In the tornado film(that you saw in class)it showed several reactions to the tornado by the people there. These reactions included a) closing their businesses and leaving town, b) saving what they could and rebuilding, c) rebuilding but left in emotional chaos, and d) rebuilding their house but not their business. If it had been you which of the choices would you have made?
17. IN the film several suggestions were made regarding your actions when you saw a tornado coming. These suggestions included: a) going to the basement, b) staying inside to avoid the flying debris, c) getting in your car and outrunning the tornado, d) stopping and getting under an underpass if you are caught out in your car, or e) closing all your windows to keep the atmospheric pressure equalized? Which two did they recommend?
18. The hurricane film discussed several things the NWS (National Weather Service) had tried to weaken the power of the storm including a) trying to stop the flow of air into the stratosphere, b) trying silver iodide crystals for 20 years without a lot of success, c) trying to push the Bermuda High south to force the hurricane into a different path, or d) a and b only, or e) none of the above?
19. When a hurricane is approaching a given area the authorities can a) can warn the residents only, b) they can now force them to evacuate, or c) can join the hurricane party since they can't force them to leave?
20. Evaporation is a) a heating process, b) a cooling process, or c) a new shaving cream for sensative skin?

- ____ 21. The normal path for a tornado in the U.S. is usually from
a) northwest to southeast, b) southwest to northeast,
c) southeast to northwest, or d) northeast to southwest?
- ____ 22. Will a thunderstorm tend to be more severe and have a longer
duration if the axis of the storm is a) if the axis is tilted,
b) if the axis is perpendicular to the ground, c) makes no
difference whether the axis is tilted or perpendicular?
- ____ 23. Winds blow whenever there are a) cold temperatures, b) pressure
inequalities in the atmosphere, or c) the earth rotates on its
axis?
- ____ 24. The fuel for all violent thunderstorms and hurricanes is -
_____.
- ____ 25. To form a hurricane requires four favorable environmental
conditions which include a) a small vertical wind shear,
b) an equatorial location latitudinally, c) a cold ocean current,
or d) an unstable atmosphere and/or e) a strong presence of the
Bermuda High?
- ____ 26. A mid-latitude cyclone is formed by a) thunderstorms on the west
side of an occluded front, b) frontal systems in association with
the Jet Stream, c) a lot of hot air, or d) cyclonic circulation
around a sub-tropical high?
- ____ 27. Of the various atmospheric hazards we have discussed which two would
cause the most widespread damage to crops, a) lightning, b) hail,
c) tornadoes, d) snow blizzards, e) chinooks (fall winds),
f) fog/smog or g) drought?
- ____ 28. Stable air is not a factor in which one of the following, a) inter-
tropical convergence Zone, b) surface inversions, c) mixing for
pollutant dispersion, or d) mid-latitude cyclones?
- ____ 29. The majority of human deaths from weather phenomena are a result
of a) tornadoes and hail, b) tornadoes, c) smog, d) heat waves
and blizzards, or e) frontal passage?
- ____ 30. Which hazard are you most afraid of? Which hazards have you been
in? List below.

(over)

PART III - True-False (YOU MAY OMIT ONE T-F QUESTION OF YOUR CHOICE, HOWEVER YOU MUST INDICATE WHICH QUESTION YOU ARE OMITTING.) (15 points)

- T F 1. The declining death toll from tornadoes in the U.S. is due to a better warning system.
- T F 2. Hurricanes always spin in a clockwise direction in the northern hemisphere.
- T F 3. Areas of the most frequent thunderstorm development are also the regions of greatest hail frequency.
- T F 4. Hurricanes tend to remain strong as long as the storm remains over a warm land surface.
- T F 5. The fuel (energy source) for hurricanes and thunderstorms is the latent heat released when evaporation occurs.
- T F 6. The eye of a hurricane is characterized by low pressures and a lack of precipitation.
- T F 7. Denver's most prolonged and deepest inversions tend to occur in association with snow covered surfaces and high surface winds.
- T F 8. Thermally induced high pressure cells tend to develop over cold land surfaces.
- T F 9. Horizontal winds tend to blow out of a low into a high in the southern hemisphere.
- T F 10. The change of a liquid into a gas (evaporation) exerts a cooling effect on the atmosphere.
- T F 11. Atmospheric pressure increases with elevation above the earth's surface.
- T F 12. Wind is a result of horizontal differences in air pressure.
- T F 13. Tornadoes produce the highest velocity winds experienced on the earth.
- T F 14. The closer together the isobars the stronger the wind.
- T F 15. Fog is a cloud sitting on the ground.
- T F 16. A drought will always cause a high death toll from famine.