

PHYSICS DEPARTMENT

MET 1010

Midterm Exam 2

October 29, 2008

Name (print): _____

Signature: _____

*On my honor, I have neither given nor received unauthorized aid on this examination.***YOUR TEST NUMBER IS THE 5-DIGIT NUMBER AT THE TOP OF EACH PAGE.**

- (1) Please print your name and your UF ID number and sign the top of this page and the answer sheet.
- (2) **Code your test number on your answer sheet (use lines 76–80 on the answer sheet for the 5-digit number).**
- (3) This is a closed book exam and books, calculators or any other materials are NOT allowed during the exam.
- (4) Identify the number of the choice that best completes the statement or answers the question.
- (5) Blacken the circle of your intended answer completely, using a #2 pencil or blue or black ink. Do not make any stray marks or the answer sheet may not read properly.
- (6) Do all scratch work anywhere on this printout that you like. At the end of the test, this exam printout is to be turned in. No credit will be given without both answer sheet and printout.

There are 33 multiple choice questions. All questions are worth 3 points, so the maximum number of points on this test is 99. If more than one answer is marked, no credit will be given for that question, even if one of the marked answers is correct. There is no penalty for wrong answers, so it is better to guess an answer than to leave it blank. Good Luck!

1. A cool, summertime wind that blows from sea to land is called a:
 - (1) land breeze
 - (2) trade wind
 - (3) night breeze
 - (4) sea breeze
 - (5) offshore wind

2. The rate of the earth's rotation determines the strength of the:
 - (1) —
 - (2) pressure gradient force
 - (3) gravitational force
 - (4) Coriolis force
 - (5) frictional force

3. Which of the following forces does not have a direct effect on horizontal wind motions?
 - (1) frictional force
 - (2) pressure gradient force
 - (3) gravitational force
 - (4) —
 - (5) Coriolis force

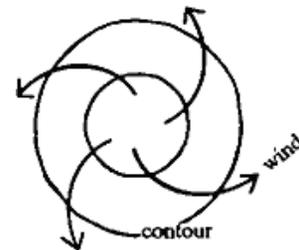
4. A mountain breeze occurs _____.
 - (1) during the day
 - (2) —
 - (3) —
 - (4) —
 - (5) at night

5. A wind rose describes
 - (1) —
 - (2) observed wind speed and direction on a surface map
 - (3) the amount of mechanical turbulence impacting a specific area
 - (4) the percent of time the wind blows from different directions
 - (5) the wind direction at one particular time

6. This and the following two questions refer to the pressure map to the right. The circular contours on the map represent isobars, while the arrows indicate observed wind direction.

The figure depicts _____ winds.

- (1) —
- (2) upper-air
- (3) surface-level
- (4) —
- (5) —



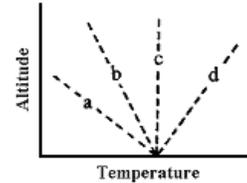
7. Refer to the previous question. In the figure, the winds are blowing around a central area of _____
- (1) — (2) low pressure (3) — (4) high pressure (5) —
8. Refer to the previous two questions. The figure depicts weather conditions in the
- (1) southern hemisphere (2) — (3) — (4) northern hemisphere (5) —
9. The Ekman Spiral describes:
- (1) the air flow out of a region of high pressure
 (2) —
 (3) turbulent winds leading to the formation of a dust devil
 (4) the turning of water current with depth
 (5) the air flow into a center of low pressure
10. In terms of the single cell model of the general circulation of the atmosphere, the prevailing surface wind in Gainesville (30°N latitude) should be from the
- (1) — (2) west (3) south (4) north (5) east
11. If a mountain range runs north-south, and the prevailing surface winds are easterly, the climate on the eastern slopes of the mountains would be _____ and the climate on the western slopes would be _____ .
- (1) relatively cool and dry; relatively warm and wet
 (2) relatively cool and wet; relatively warm and dry
 (3) —
 (4) relatively warm and dry; relatively cool and wet
 (5) relatively warm and wet; relatively cool and dry
12. Virga _____ before reaching the ground, while fallstreaks _____ before reaching the ground.
- (1) evaporates, sublimate
 (2) —
 (3) evaporates, condense
 (4) condenses, evaporate
 (5) condenses, condense
13. Which of the following is not a way of producing clouds?
- (1) convergence of surface air
 (2) —
 (3) divergence of surface air
 (4) warming the surface of the earth
 (5) lifting air along a topographic barrier
14. The world's deserts are found at 30° latitude because:
- (1) of the sinking air of the subtropical highs
 (2) of the convergence of the prevailing westerlies and the Northeast Trades
 (3) the intertropical convergence zone is located there
 (4) of the sinking air of the polar front
 (5) —

15. The winter monsoon in eastern and southern Asia is characterized by:

- (1) wet weather and winds blowing from sea to land
- (2) dry weather and winds blowing from land to sea
- (3) —
- (4) wet weather and winds blowing from land to sea
- (5) dry weather and winds blowing from sea to land

16. Which of the environmental lapse rates below indicates the most unstable atmosphere?

- (1) a
- (2) —
- (3) d
- (4) c
- (5) b



17. 20. Suppose you are in the Northern Hemisphere and the winds aloft are geostrophic and blowing from the north. The low pressure aloft is located to the:

- (1) —
- (2) west
- (3) east
- (4) north
- (5) south

18. In terms of the three-cell model of the general circulation of the atmosphere, the large thermally driven convection cell that is driven by convective “hot” towers along the equator is the:

- (1) Ekman spiral
- (2) polar cell
- (3) —
- (4) Hadley cell
- (5) Ferrel cell

19. If a parcel of unsaturated air with a temperature of 20°C quickly rises from the surface to an altitude of 2000 m, its temperature at this altitude would be about:

- (1) 14°C
- (2) 0°C
- (3) 20°C
- (4) 10°C
- (5) 8°C

20. If an air parcel is given a small push upward and it continues to move upward on its own accord, the atmosphere is said to be:

- (1) adiabatic
- (2) —
- (3) unstable
- (4) neutral
- (5) stable

21. A true blizzard is characterized by:

- (1) blowing snow.
- (2) reduced visibility.
- (3) all of these
- (4) low temperatures.
- (5) strong winds.

22. A wind blowing at a constant speed parallel to straight line isobars with the pressure gradient force (PGF) and the Coriolis force in balance is called a:

- (1) gradient wind
- (2) —
- (3) geostrophic wind
- (4) zonal wind
- (5) meridional wind

23. Suppose a very cold parcel of air at 5.5 km (18,000 feet) is compared to a similar (but warm) parcel of air at sea level. Which of the following would be true?

- (1) The parcel at sea level has higher pressure and higher density.
- (2) The parcel at sea level has lower pressure and lower density.
- (3) —
- (4) The parcel at sea level has lower pressure and higher density.
- (5) The parcel at sea level has higher pressure and lower density.

24. A raindrop or partially melted snowflake that freezes into a pellet of ice in a deep subfreezing layer of air near the surface is called:
- (1) — (2) freezing rain (3) snow (4) rain (5) sleet
25. The pressure gradient force is directed from higher pressure toward lower pressure:
- (1) only at the equator
(2) at all places on earth except for the equator
(3) only in the Southern Hemisphere
(4) at all places on earth
(5) only in the Northern Hemisphere
26. What two sets of conditions, working together, will make the atmosphere the most stable?
- (1) warm the surface and warm the air aloft
(2) —
(3) cool the surface and warm the air aloft
(4) warm the surface and cool the air aloft
(5) cool the surface and cool the air aloft
27. Which below best describes the solute effect?
- (1) keeps ice crystals from sublimating at temperatures above 32°F.
(2) evaporation of cloud droplets and growth of ice crystals in a cold cloud
(3) water droplets dissolve hygroscopic nuclei and condensation can occur at relative humidities less than 100 percent
(4) keeps water droplets from freezing at temperatures below 32°F.
(5) removal of salty pollutants from the atmosphere by cloud droplets
28. The difference between the "moist" and "dry" adiabatic rates is due to:
- (1) the fact that latent heat is released by a rising parcel of saturated air
(2) the fact that moist air weighs less than dry air
(3) the fact that an unsaturated air parcel expands more rapidly than a saturated air parcel
(4) the fact that moist air is heavier than dry air
(5) the fact that saturated air is always unstable
29. In terms of the three-cell model of the general circulation of the atmosphere, areas of surface low pressure should be found at:
- (1) the equator and 30° latitude
(2) 30° latitude and the poles
(3) the equator and 60° latitude
(4) 30° latitude and 60° latitude
(5) the equator and the poles
30. In terms of the three-cell model of the atmosphere, the prevailing surface winds in Chicago, Illinois (latitude 42°N) should be from the _____ .
- (1) southwest (2) northeast (3) northwest (4) — (5) southeast

31. If you observe large raindrops hitting the ground, you could probably say that the cloud overhead was _____ and had _____ updrafts.

- (1) thick, weak (2) — (3) thick, strong (4) thin, strong (5) thin, weak

32. Which statement below best describes the curvature effect?

- (1) small droplets evaporate more quickly than large droplets
(2) small droplets collide and coalesce more easily than larger droplets
(3) large cloud droplets fall faster than small droplets
(4) ice crystals in a cloud grow at the expense of water droplets
(5) the saturation vapor pressure above a water surface is greater than the saturation vapor pressure above an ice surface

33. A rising parcel of air

- (1) compresses and cools (2) — (3) expands and cools (4) compresses and warms up (5) expands and warms up