

PHYSICS DEPARTMENT

MET 1010

Midterm Exam 2

March, 2014

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) 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. The dry adiabatic lapse rate is _____ than the moist adiabatic lapse rate.
 - (1) always greater
 - (2) always smaller
 - (3) sometimes greater
 - (4) sometimes smaller
 - (5) never greater

2. Which cloud type would most likely form in absolutely stable air?
 - (1) stratus
 - (2) cumulonimbus
 - (3) cumulus congestus
 - (4) altocumulus
 - (5) lenticular

3. A temperature inversion represents an extremely stable atmosphere because air that rises into the inversion will eventually become _____ and _____ dense than the surrounding air.
 - (1) colder, more
 - (2) warmer, more
 - (3) colder, less
 - (4) warmer, less
 - (5) warmer, equally

4. In a conditionally unstable atmosphere, the environmental lapse rate will be _____ than the moist adiabatic rate and _____ than the dry adiabatic rate.
 - (1) greater, less
 - (2) greater, greater
 - (3) less, greater
 - (4) less, less
 - (5) —

5. What two sets of conditions, working together, will make the atmosphere the most unstable?
 - (1) warm the surface and cool the air aloft
 - (2) cool the surface and cool the air aloft
 - (3) cool the surface and warm the air aloft
 - (4) warm the surface and warm the air aloft
 - (5) —

6. This question and the next refer to the following weather data:
 The air temperature at the ground is 20°C; the dry adiabatic lapse rate is 10°C/1000 m;
 the moist adiabatic lapse rate is 6°C/1000 m; and the environmental lapse rate is 8°C/1000 m.
 What would be the outside temperature measured by a thermometer at an altitude of 1000 m?
 - (1) 12°C
 - (2) 10°C
 - (3) 14°C
 - (4) 26°C
 - (5) 24°C

7. What can you say about the stability of the atmosphere under these conditions?

- (1) The atmosphere is conditionally unstable
- (2) The atmosphere is absolutely unstable
- (3) The atmosphere is absolutely stable
- (4) The atmosphere is neutrally stable for unsaturated air
- (5) The atmosphere is neutrally stable for saturated air

8. Which type of precipitation would most likely form when the surface air temperature is below freezing and the air temperature decreases as you move upward away from the ground?

- (1) snow
- (2) freezing rain
- (3) rain
- (4) sleet
- (5) —

9. Rain which falls from a cloud but evaporates before reaching the ground is referred to as:

- (1) virga
- (2) sleet
- (3) freezing rain
- (4) dry rain
- (5) acid rain

10. A small rain drop has a _____ curvature and evaporates _____ than a large rain drop.

- (1) bigger, faster
- (2) bigger, more slowly
- (3) smaller, faster
- (4) smaller, more slowly
- (5) —

11. In most cases a precipitation in the atmosphere starts as

- (1) snow
- (2) rain
- (3) hail
- (4) sleet
- (5) freezing rain

12. The terminal velocity of a small rain drop is _____ the terminal velocity of a large rain drop.

- (1) smaller than
- (2) larger than
- (3) same as
- (4) —
- (5) —

13. The most efficient way for a rain drop to grow is through:

- (1) collision-coalescence
- (2) condensation
- (3) evaporation
- (4) deposition
- (5) sublimation

14. Suppose that you are a pilot who is flying from warm air into cold air. In the cold air, even though your altimeter (based on pressure measurements) is still indicating the same altitude as it did in the warm air, you would be flying:

- (1) lower than you were before
- (2) faster than you were before
- (3) slower than you were before
- (4) at the same altitude as you were before
- (5) higher than you were before

15. In the vertical direction, the pressure gradient force in the atmosphere points _____ and the gravity force points _____.

- (1) upward, downward
- (2) upward, upward
- (3) downward, downward
- (4) downward, upward
- (5) —

16. In the Northern Hemisphere, if directly above you at 10,000 feet the wind is blowing from west to east, then it is a good bet that at 10,000 feet, the center of highest pressure is _____ of you.

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

17. On an upper-level chart the wind tends to blow:

- (1) parallel to the isobars or contours.
- (2) in the direction of the Coriolis force.
- (3) in the direction of the pressure gradient force.
- (4) at an angle between 10 and 30 to the contours and towards low pressure.
- (5) at an angle between 10 and 30 to the contours and towards high pressure.

18. The term “cyclonic flow” refers to:

- (1) wind around a low pressure center.
- (2) clockwise wind in the Northern Hemisphere.
- (3) counterclockwise wind in the Southern Hemisphere.
- (4) wind around a high pressure center.
- (5) straight-line wind parallel to the isobars.

19. The Coriolis effect is a result of:

- (1) the rotation of the Earth.
- (2) the pressure gradient force.
- (3) the day/night temperature contrast.
- (4) the gravitational force exerted by the Moon as it orbits the Earth.
- (5) the poles being colder than the equator.

20. The pressure gradient force is directed from high to low pressure:

- (1) at all places on Earth.
- (2) only at the equator.
- (3) at all places on Earth except for the equator.
- (4) only in the Northern Hemisphere.
- (5) only in the Southern Hemisphere.

21. Surface wind around a high pressure is _____ in the Northern Hemisphere and _____ in the Southern Hemisphere.

- (1) diverging, diverging (2) converging, converging (3) diverging, converging (4) converging, diverging (5) —

22. Which of the following forces impacts the strength of the horizontal winds?

- (1) pressure gradient force (2) Coriolis force (3) centripetal force (4) gravity force (5) all of these

23. Which of the following statements is not an assumption of the single-cell model?

- (1) The Earth rotates once in 24 hours.
- (2) The Earth is covered with a global ocean.
- (3) The Earth experiences no seasonal variations.
- (4) The sun always shines directly over the equator.
- (5) —

24. The Ekman Spiral describes:

- (1) the turning of the ocean currents with depth.
- (2) the air flow around and towards a center of low pressure.
- (3) strong winds that result in tornadoes.
- (4) the air flow around and away from a region of high pressure.
- (5) the wind-flow pattern in a jet stream.

25. The single-cell model of the general circulation of the atmosphere predicts surface winds from the _____ in the Northern Hemisphere and surface winds from the _____ in the Southern Hemisphere.

- (1) north, south
- (2) north, north
- (3) south, north
- (4) south, south
- (5) west, west

26. In terms of the three-cell model, the regions of strong convergence of the surface winds are found at:

- (1) the equator and the polar front
- (2) the subtropical highs
- (3) the polar highs
- (4) the regions of major deserts
- (5) —

27. At the subtropical highs, the air is _____ and results in a _____ climate.

- (1) subsiding, dry
- (2) subsiding, wet
- (3) rising, dry
- (4) rising, wet
- (5) —

28. According to the three-cell model, the prevailing surface winds in Washington, DC are blowing from the _____ .

- (1) southwest
- (2) southeast
- (3) northwest
- (4) northeast
- (5) south

29. At sunset one can see a rainbow if looking to the _____ .

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

30. Which of the following phenomena indicates the presence of ice crystals in the air?

- (1) sundogs
- (2) sun pillars
- (3) moon halo
- (4) sun arcs
- (5) all of these

31. At sunset the sun appears orange because of _____ of solar light.

- (1) Rayleigh scattering
- (2) geometric scattering
- (3) Mie scattering
- (4) full internal reflection
- (5) refraction

32. If the Earth had no atmosphere, the color of the sky would have been:

- (1) black
- (2) red
- (3) blue
- (4) white
- (5) yellow

33. A wet-looking road surface on a clear, hot, dry day is an example of:

- (1) an inferior mirage.
- (2) a superior mirage.
- (3) light scattering
- (4) reflection of light.
- (5) —

THE FOLLOWING QUESTIONS, NUMBERED IN THE ORDER OF THEIR APPEARANCE ON THE ABOVE LIST, HAVE BEEN FLAGGED AS CONTINUATION QUESTIONS: 7