CHAPTER 11

THUNDERSTORMS AND TORNADOES

MULTIPLE CHOICE QUESTIONS

1. A thunderstorm is considered to be a ______ weather system.
   a. synoptic-scale
   b. micro-scale
   c. meso-scale

2. By convention, the mature stage of the life cycle of a thunderstorm begins when
   a. an anvil top develops.
   b. the updraft develops.
   c. precipitation first reaches Earth’s surface.
   d. lightning and thunder occur.

3. Violent weather (hail, tornadoes) is most likely to occur during the ______ stage of the life cycle of a thunderstorm cell.
   a. towering cumulus
   b. mature
   c. dissipating

4. The anvil top of a thunderstorm cloud is likely to be a ______ cloud that is composed of ______.
   a. warm................supercooled water droplets
   b. cold...............liquid water droplets
   c. cirrus...............ice crystals
   d. altocumulus...............water droplets
   e. stratus...............drizzle

5. A gust front is associated with a(n)
   a. intense thunderstorm.
   b. land breeze.
   c. chinook wind.
   d. sea breeze.
   e. None of these is correct.

6. Appearance of a flat anvil top indicates that the developing thunderstorm cloud (cumulonimbus) has reached a(n) ______ portion of the atmosphere.
   a. unstable
   b. neutral
   c. conditionally stable
   d. extremely stable
7. The ______ of the life cycle of a thunderstorm cell is characterized by downdrafts only.
   a. dissipating stage
   b. mature stage
   c. towering cumulus stage

8. A mesoscale convective complex (MCC)
   a. is not associated with a front
   b. usually covers a large area
   c. is primarily a warm-season phenomenon
   d. All of the above are correct.
   e. None of the above is correct.

9. A squall line usually forms
   a. along a stationary front.
   b. in the cold air mass well behind a cold front.
   c. in the mT air along or ahead of a cold front.
   d. in the fog and cold air mass just north of a warm front.
   e. None of the above is correct.

10. An updraft that develops a rotational circulation is a distinguishing characteristic of a
    a. supercell thunderstorm.
    b. mammatus cloud.
    c. squall line.

11. Thunderstorm cells associated with a fast-moving, well-defined cold front
    a. may be severe.
    b. often occur as a squall line parallel to and ahead of the front.
    c. often form an elongated cluster parallel to the front.
    d. All of the above are correct.
    e. None of the above is correct.

12. Thunderstorm development is triggered by
    a. uplift along a well-defined cold front.
    b. converging surface winds.
    c. uplift of warm, humid air along mountain slopes.
    d. forced convection.
    e. Any of the above is correct.

13. In the United States, thunderstorms are most frequent in
    a. coastal California.
    b. central Florida.
    c. Wisconsin.
    e. the western Great Plains.
14. A feature sometimes present in thunderstorms that may prolong the mature stage is (are)
a. abundant ice nuclei at high altitudes.
b. an anvil top.
c. a cold downdraft.
d. precipitation.
e. a tilted updraft.

15. A supercell thunderstorm is most likely to develop in the ______ sector of a mature extratropical cyclone.
a. northwest  
b. southeast  
c. northeast  
d. southwest

16. As a general rule, the ______ the top of a cumulonimbus cloud, the more severe is the thunderstorm cell.
a. lower  
b. higher

17. A severe thunderstorm cell may be accompanied by
a. damaging surface winds.  
b. hail.  
c. heavy rainfall.  
d. frequent lightning.  
e. Any of these is correct.

18. Appearance of mammatus clouds ______ indicates a severe thunderstorm cell.
a. always  
b. sometimes  
c. never

19. A dryline
a. is a likely site for development of a severe thunderstorm cell.  
b. separates hot, dry air from warm, humid air.  
c. often occurs over Texas and Oklahoma.  
d. All of the above are correct.  
e. None of the above is correct.

20. On a clear day, the Earth’s surface carries ______ electrical charge.
a. a positive  
b. no  
c. a negative

21. Lightning is a brilliant flash of light associated with an electrical discharge
a. between clouds and Earth’s surface.  
b. within a cloud.
c. between clouds.
d. All of the above are correct.

22. Thunder is the consequence of
a. a tilted updraft.
b. hail formation.
c. clouds bumping into one another.
d. lightning.
e. the gust front.

23. Sound waves are considerably ______ than light waves so that thunder is heard ______ lightning is seen.
a. slower.............before
b. slower.............after
c. faster.............before
d. faster.............after

24. A downburst is designated a microburst or macroburst depending on
a. the distance impacted along the ground.
b. the location of the storm.
c. if rain is present.
d. All of the above are correct.
e. None of the above is correct.

25. Microbursts are particularly dangerous for aircraft on takeoff or landing because they trigger
a. lightning.
b. visibility-restricting rain.
c. large hailstones.
d. wind shear.
e. roll clouds.

26. Thunderstorms that produce flash floods form in an atmosphere with ______ vertical wind shear and ______ moisture.
a. strong……abundant
b. strong……scarce
c. weak……abundant
d. weak……scarce

27. Hail is typically produced by thunderstorm cells that are characterized by
a. strong updrafts.
b. great vertical development.
c. an abundant supply of supercooled water droplets.
d. All of the above are correct.
e. None of the above is correct.

28. The most important force operating in a tornado is (the)
a. pressure gradient force.  
b. Coriolis Effect.  
c. gravity.  
d. friction.  
e. None of these is correct.

29. The Coriolis Effect is negligible in a tornado because  
a. tornadoes originate over the equator.  
b. the system is too small to be significantly affected by Earth's rotation.  
c. of surface roughness.  
d. All of the above are correct.  
e. None of the above is correct.

30. A characteristic of most tornadoes in the Northern Hemisphere is  
a. counterclockwise rotation as viewed from above.  
b. a track toward the east or northeast.  
c. association with a severe thunderstorm cell.  
d. All of the above are correct.  
e. None of the above is correct.

31. A funnel cloud is a tornadic circulation that  
a. remains aloft and does not touch the Earth's surface.  
b. has a very short path.  
c. does not cause much damage.  
d. occurs for a very brief period of time.

32. Typically, of all the tornadoes that occur each year in the United States, most are rated as ______ on the EF-scale.  
a. weak  
b. strong  
c. violent

33. Less than ______ of all thunderstorms produce tornadoes.  
a. 10%  
b. 25%  
c. 1%  
d. 5%

34. The Coriolis Effect is more important in a ______ than in a(n) ______.  
a. thunderstorm..........tornado  
b. tornado.............cyclone  
c. tornado.............anticyclone  
d. weak thunderstorm..........supercell  
e. weak thunderstorm..........mesocyclone

35. Over the course of a year which one of the following states will likely experience the most
tornadoes?
   a. Oregon
   b. Idaho
   c. Kansas
   d. Massachusetts
   e. Arizona

36. Tornado alley is
   a. Texas-Oklahoma-Kansas-Nebraska.
   b. Iowa-Illinois-Indiana-Massachusetts.
   d. Texas-Kansas-Iowa-Illinois.
   e. Florida-Georgia-South Carolina.

37. The troposphere is normally less stable in
   a. spring than in fall.
   b. fall than in spring.

38. Tornadoes are most likely to develop
   a. along the California coast.
   b. in the Rocky Mountain states.
   c. in the Appalachian mountains.
   d. in Illinois during winter.
   e. in Oklahoma during spring.

39. Tornadoes are most likely to occur in the ______ sector of an intense extra-tropical cyclone.
   a. northeast
   b. southeast
   c. southwest
   d. northwest

40. In the United States, tornadoes are most often triggered by
   a. extra-tropical cyclones.
   b. hurricanes.
   c. seasonal shifts of the ITCZ.
   d. lightning.
   e. anticyclones.

41. In the southern Great Plains, tornadoes are most likely to develop when
   a. dry Pacific air overlies a layer of maritime tropical air.
   b. maritime tropical air overlies a layer of dry Pacific air.
   c. maritime tropical air extends from the ground to the altitude of the polar front jet stream.
   d. the region is dominated by high pressure.
   e. None of the above is correct.

42. Condition needed for the development of a tornadic circulation within a thunderstorm:
a. strong updraft.
b. strong vertical shear in the horizontal wind.
c. development of a mesocyclone.
d. All of the above are correct.
e. None of the above is correct.

43. In the United States, the months of peak tornado activity are
b. March, April, and May.
c. April, May, and June.
d. May, June, and July.
e. June, July, and August.

44. During spring over North America, there is a general ______ progression of tornado occurrence.
a. northward
b. southward
c. westward

45. If you are indoors when a tornado approaches, the best precaution is to
a. lie down against an exposed outer wall.
b. stand near a window to see where the tornado is going.
c. go to the basement and get under a sturdy bench.
d. go to bed and pull the covers over your head.
e. make sure all the windows are open.

46. The most intense tornadoes are rated ______ on the EF-scale.
a. 5
b. 1
c. 0

47. A weak tornado is rated ______ on the EF-scale.
a. 0 or 1
b. 2 or 3
c. 4 or 5
d. 6 or 7

48. Of the nearly 1300 or so tornadoes that strike the United States each year, perhaps ______ will be rated EF5.
a. half
b. 90 percent
c. only 1
d. 40 to 50

49. A tornado vortex signature (TVS) is detected by weather radar operating in the __________ mode.
a. reflectivity
b. velocity (Doppler)
c. clear air

50. Virga is sometimes mistaken for a tornado because of its
a. rotation about a vertical axis.
b. association with a cumulonimbus cloud.
c. cylindrical or funnel shape.
d. All of the above are correct.
e. None of the above is correct.