CHAPTER 13

WEATHER ANALYSIS AND FORECASTING

MULTIPLE CHOICE QUESTIONS

1. The atmosphere is a continuous fluid that envelops the globe, so that weather observation, analysis, and forecasting _________ require international cooperation.
   a. do not
   *b. do

2. A World Meteorological Center is located at
   a. near Washington, D.C.
   b. Moscow, Russia.
   c. Melbourne, Australia.
   *d. All of these are correct.
   e. None of these is correct.

3. In the U.S., the National Centers for Environmental Prediction include
   a. the Ocean Prediction Center.
   b. the Climate Prediction Center.
   c. the Space Weather Prediction Center
   d. the Storm Prediction Center.
   *e. All of these are correct.

4. Weather forecasting requires
   a. acquisition of weather data representing the present state of the atmosphere.
   b. depiction of observational data on weather maps and charts.
   c. analysis of weather data and prediction.
   d. dissemination of weather information and forecasts to users.
   *e. All of the above are correct.

5. Weather stations gather data for
   a. preparation of weather maps and forecasts.
   b. exchange of weather information with other nations.
   c. use by aviation.
   d. climatic purposes.
   *e. All of the above are correct.

6. At 0900 UTC, it is ______ Eastern Standard Time (EST) in New York City.
   a. midnight
   *b. 4 a.m.
   c. 9 a.m.
   d. 2 p.m.
e. None of these is correct.

7. At 1200 UTC, it is ______ Central Standard Time (CST) in Houston, TX.
   a. midnight
   b. 6 p.m.
   *c. 6 a.m.
   d. noon
   e. 7 a.m.

8. The National Data Buoy Center
   a. maintains a network of automated weather stations in coastal and offshore locations.
   b. plays an important role in the analysis and forecasting of tropical cyclones.
   c. operates weather stations attached to moored buoys in the Great Lakes.
   *d. All of these are correct.
   e. None of these is correct.

9. Universal Coordinated Time (UTC) is the world standard time for weather observations. It is measured at a longitude of
   *a. 0 degrees.
   b. 45 degrees W.
   c. 90 degrees W.
   d. 180 degrees W.
   e. 90 degrees E.

10. As part of its modernization program, the old manual system of weather observations at National Weather Service Forecast Offices was replaced by
    a. AWIPS
    *b. ASOS
    c. NDBC

11. As part of its modernization program, the National Weather Service has
    a. installed radar systems that operate in both the reflectivity and velocity (Doppler) mode.
    b. replaced manually-operated weather stations with automated systems (ASOS).
    c. installed AWIPS work stations.
    *d. All of the above are correct.
    e. None of the above is correct.

12. The principal function of the NWS Cooperative Observer Network is to record daily precipitation and temperatures for ________ purposes.
    a. hydrologic
    b. agricultural
    c. climatic
    *d. All of the above are correct.
    e. None of the above is correct.

13. Weather stations in the NWS Cooperative Observer Network provide weather data primarily
for
a. weather forecasting.
b. aviation.
c. hydrologic, agricultural, and climatic purposes.
d. television weather broadcasts.
e. NOAA weather radio broadcasts.

14. A radio-equipped instrument used to monitor conditions in the troposphere and lower stratosphere that is carried aloft by a balloon is
*a. a radiosonde
b. a dropwindsonde
c. ASOS

15. Radiosondes provide continuous vertical profiles (soundings) of
a. temperature.
b. dewpoint.
c. air pressure.
d. All of these are correct.
e. None of these is correct.

16. By international agreement, radiosonde balloons are launched everywhere at the same time at
_________ intervals.
a. one-hour
b. six-hour
c. 12-hour
*d. two-hour
e. 24-hour

17. Adjustment of air pressure observations to sea level is intended to remove the influence of
_______ on barometer readings.
a. temperature
b. wind speed
c. humidity
d. station elevation
*e. wind convergence

18. Symbols and station models used in weather maps
*a. are the same throughout the world.
b. vary by location.
c. must be written in English.

19. Isobars represent lines of equal
a. dewpoint.
b. temperature.
c. elevation.
d. pressure.
20. Lines of equal temperature plotted on a weather map are called
*a. isotherms.
b. isobars.
c. contours of elevation.
d. isohyets.
e. None of these is correct.

21. Isobars
a. never cross one another.
b. may be parallel to one another.
c. by convention are drawn at 4-mb intervals on a surface weather map.
d. join locations reporting the same barometer reading (after reduction to sea level).
*e. All of the above are correct.

22. On a surface weather map, where isobars are closely spaced winds are likely to be relatively
a. weak or calm.
b. strong.
*e.

23. The percentage of the atmosphere's mass that is located above the 700-millibar level:
*a. 70%
b. 30%
c. 50%
d. 10%
e. 100%

24. The percentage of the atmosphere’s mass that is located below the 500-millibar level:
a. 70%
b. 30%
c. 50%
*e. 50%
d. 10%
e. 100%

25. About ______ percent of the atmosphere's mass is located below the 300-millibar level.
a. 30
* b. 70
c. 80
d. 33

26. Horizontal winds ______ parallel the height contours at the 500-mb level.
a. never
b. sometimes
*c. generally

27. In winter, a cold 500-mb trough tends to develop over
28. An anticyclone that appears on a 500-mb map occupies a column of relatively
a. cold air.
*b. warm air.

29. Air pressure falls __________ with altitude in a column of cold air than a column of warm
air.
*a. more rapidly
b. more slowly

30. Simultaneous advection of warm air into upper-air ridges and advection of cold air into
upper-air troughs favors
a. zonal air flow.
b. fair weather.
c. improving weather.
*d. meridional air flow.
e. None of these is correct.

31. Differences in altitude of the 500-mb surface from one place to another can be explained
primarily by differences in mean ______ of the air below the 500-mb surface.
a. humidity
*b. temperature
c. wind speed
d. wind direction
e. None of these is correct.

32. The geostrophic or gradient wind is observed at the __________ -mb level.
a. 1000
b. 950
*c. 500
*d. None of the above is correct.

33. At the 500-mb level, the air column under a __________ is warmer than the air column
under a __________.
a. trough……ridge
*b. ridge……trough

34. An upper-air trough may be linked to a surface
a. warm-core cyclone.
b. cold-core cyclone.
c. warm-core anticyclone.
d. cold-core anticyclone.
e. None of these is correct.
35. The scale of atmospheric circulation that is most important in forecasting tomorrow's weather is
a. mesoscale.
b. microscale.
*c. synoptic-scale.
d. planetary-scale.

36. Numerical models have been used to successfully predict
a. the weather of the next 24-hours.
b. the coastal region to be affected by a hurricane storm surge.
c. the onset of El Niño.
*d. All of the above are correct.
e. None of the above is correct.

37. Special NWS forecast centers have responsibility for
a. predicting the track of tropical cyclones.
b. issuing hurricane watches and warnings.
c. issuing tornado and severe thunderstorm watches.
d. issuing river, reservoir, and flood forecasts.
*e. All of the above are correct.

38. Meteorologists have been using computer models to help forecast the weather since the
a. 1930s.
b. 1940s.
*c. 1950s.

39. The decline in weather forecast skill with lengthening forecast period is due to
a. input of inaccurate observational data into numerical models.
b. missing observational data, especially over the ocean.
c. imprecise numerical models of the Earth-atmosphere system.
*d. All of the above are correct.

40. Scientists at the Space Weather Prediction Center monitor the
a. aurora.
b. solar wind.
c. progression of the solar cycle.
*d. All of the above are correct.
e. None of the above is correct.

41. The first communications system that made possible weather analysis and forecasting was
*a. the telegraph.
b. the telephone.
c. radio.
d. satellites.

42. The track and intensity forecast period for tropical cyclones covers periods up to
43. The SLOSH model can be used to accurately predict
   a. the amount of rainfall.
   b. the maximum wind speed at landfall.
   *c. the height of the storm surge in specific coastal areas.
   d. the likely location of tornadoes.
   e. None of these is correct.

44. Forecasting the track of a hurricane is based on
   a. records of tracks of similar hurricanes of the past.
   b. numerical models of the atmosphere.
   c. the experience of the forecaster.
   *d. Some combination of the above.
   e. None of the above is correct.

45. A linkage between weather changes occurring in widely separated regions of the globe:
   a. atmospheric teleconnection
   b. Southern Oscillation
   c. seesawing of surface air pressure between Darwin and Tahiti
   *d. All of the above are correct.
   e. None of the above is correct.

46. Over the course of a year, daily weather exhibits a ______ weather bias.
   *a. fair
   b. stormy

47. A weather __________ is issued when hazardous weather is taking place or is imminent.
   a. advisory
   b. watch
   *c. warning

48. Weather watches and warnings are issued for
   a. tornadoes.
   b. hurricanes.
   c. floods.
   d. winter storms.
   *e. All of these are correct.

49. A(n) __________ is issued by the National Weather Service for people who require
    considerable advanced notice of a specific weather event.
   a. advisory
   b. warning
   *c. outlook
50. Source(s) of weather information for the general public is (are)
a. NOAA Weather Radio.
b. cable-TV weather channels.
c. radio and newspapers.
d. the Internet.
*e. All of the above are correct.