Earth’s Atmosphere

Choose one answer per question. Circle A, B, C, or D.

1. Which gas makes up the largest share of dry air near Earth’s surface?
   A. Nitrogen
   B. Oxygen
   C. Argon
   D. Carbon dioxide

2. Which atmospheric layer contains most of the clouds and storms that affect us at the surface?
   A. Mesosphere
   B. Stratosphere
   C. Troposphere
   D. Exosphere

3. A balloon has climbed through the tropopause. Which layer is it entering?
   A. Mesosphere
   B. Stratosphere
   C. Thermosphere
   D. Exosphere

4. Most of the ozone that forms Earth’s protective ozone layer is found in which atmospheric layer?
   A. Thermosphere
   B. Troposphere
   C. Mesosphere
   D. Stratosphere

5. What generally happens to atmospheric pressure as you climb from sea level to the top of a high mountain?
   A. It increases.
   B. It decreases.
   C. It stays the same.
   D. It becomes zero at the summit.

6. Why do composition charts often specify that their percentages are for dry air?

A. The amount of water vapor varies with conditions.
B. Nitrogen disappears whenever water vapor is present.
C. Only dry air has atmospheric pressure.
D. Oxygen changes into water vapor on humid days.

7. Which part of incoming sunlight does stratospheric ozone help keep from reaching the ground?

A. Radio waves from the Sun
B. Visible green light
C. All infrared radiation
D. Ultraviolet radiation

8. In which layer do many incoming meteoroids burn up and become visible as meteors?

A. Stratosphere
B. Troposphere
C. Mesosphere
D. Exosphere

9. In which atmospheric layer do sparse gas particles travel long distances before colliding, and can some escape into space?

A. Exosphere
B. Troposphere
C. Stratosphere
D. Mesosphere

10. At a location where the tropopause is 12 kilometers high, a balloon records rising air temperature as it climbs from 20 to 35 kilometers. Which layer and process best match?

A. Exosphere, where water condenses to form most clouds
B. Troposphere, where air pressure rises with altitude
C. Mesosphere, where the air is heated by ocean currents
D. Stratosphere, where ozone absorbs ultraviolet radiation

11. A gauge reads 1,000 hectopascals at sea level and 500 hectopascals at a higher station. Assuming gravity is nearly constant, what does the second reading tell you?

A. Exactly half the oxygen in the air has changed into nitrogen.
B. The air temperature at the second station is half as high.
C. The weight of air per unit area overhead is about half as large.
D. The second station is halfway to the top of the atmosphere.

12. An atmospheric profile shows a steady temperature drop from 55 to 85 kilometers and then a rise above 90 kilometers. Which named boundary is near the cold point?

A. Tropopause
B. Mesopause
C. Stratopause
D. Surface inversion

13. A diagram labels both the thermosphere and the ionosphere across much of the same height range. Why can both labels apply?

A. The labels mark two atmospheric layers that have no overlap.
B. Both names are for two separate locations at Earth’s surface.
C. The ionosphere is exactly another name for the entire atmosphere.
D. Thermosphere describes a temperature region. Ionosphere describes a region with many charged particles.

14. Following sunset, which change is expected in an ionospheric region with little direct solar illumination?

A. Fewer new ions and electrons are produced by sunlight.
B. Most nitrogen molecules immediately become ozone.
C. The temperature layers all merge into a single boundary.
D. Sunlight ionizes more of the local gas than at midday.

15. Why can a very thin part of the thermosphere have a high measured temperature and still transfer relatively little heat to an object passing through it?

A. Temperature measures only pressure and says nothing about particle motion.
B. Every collision cools the object regardless of its speed.
C. Individual particles can move very fast while few particles strike the object.
D. Thermospheric gas is dense enough to prevent any contact.