Astronomy

HOMEWORK Chapter 7 - 9th Edition

Study and be prepared for: 1-20 except 7.

Questions to hand in:

1. Which pair of planets have atmospheres with the most similar chemical composition? (a) Earth and Venus; (b) Earth and Mars; (c) Venus and Mars; (d) Mercury and Mars; (e) Mercury and Venus;

(c) Venus and Mars. Both around 95% CO₂. The key difference is that Venus’ atmospheric pressure is 90 times Earth’s, while Mars’ atmospheric pressure is 0.06 times Earth’s. This means that Venus’ atmospheric pressure is 14,000 times that of Mars.

4. Why is Mercury difficult to observe? When is the best time to observe it?
Its maximum Greatest Elongation is only about 28 degrees, which means it is very close to the horizon when the sky is dark. The best only time to observe it is within a few days of its Greatest Elongation. Even then, the astronomer is looking through a lot of atmosphere.

11. Why is it hotter on Venus than on Mercury?
The Greenhouse Effect, which traps the heat inside. The atmosphere is acting like a thermal blanket.

17. During which configuration of planets is it easiest to observe Mars from Earth?
Opposition. Not only is it up all night, but it’s also closest to Earth. By the way, not all oppositions are equal. Due to the eccentricity of Mars’ orbit, it is about 0.4 AU away if the opposition occurs at Mars’ perihelion versus about 0.67 AU away if the opposition occurs at Mars’ aphelion.

25. Venus takes 440 days to move from greatest western elongation to greatest eastern elongation, but it only needs 144 days to go from greatest eastern elongation to greatest western elongation. With the aid of a diagram, explain why. Venus simply has a larger angle to gain on Earth in going from greatest western elongation to greatest eastern elongation. See diagram.

30. With carbon dioxide accounting for 95% of the atmosphere of both Mars and Venus, why is there little Greenhouse Effect on Mars today?
Even though Mars’ atmosphere is mostly CO₂, a greenhouse gas, Mars has so little atmosphere that it has little greenhouse effect. See the answer to Question 1 above.