Physics Chapter 13 End of Chapter Answers

1. Mass

2. Either is correct, the mass is the reason for the gravitational field

3. They are equal, although in different units N/kg, m/s^2

4. G, mass and radius of the planet

5. Decreases with distance by the inverse square law

6. On surface, if uniform density (actually slightly below but for all practical purpose on the surface)

7. Gravitational fiels diminishes (gets smaller) with decreasing r. now there is some mass above you pulling the opposite direction

8. Zero. There is equal mass pulling you in all directions (you float!!)

9. No, your weight would remain constant. Yes, the support force changes, the floor moves up toward you, the faster the floor is moving toward you the greater you would weigh. Watch this video of Psy launching onto the stage. Why was he crouched down in the beginning? https://www.facebook.com/LADbible/videos/psy-knows-how-to-make-an-entrance/325663760012812/

10. Support force = weight. The normal force. For every action there is an = and opposite reaction

11. No, tides are the result of a change in g across the earth, from one side to the other. If the gravitational pull was the same everywhere the pull would be equal so there would be no “extra” pull in a particular spot like there is now.

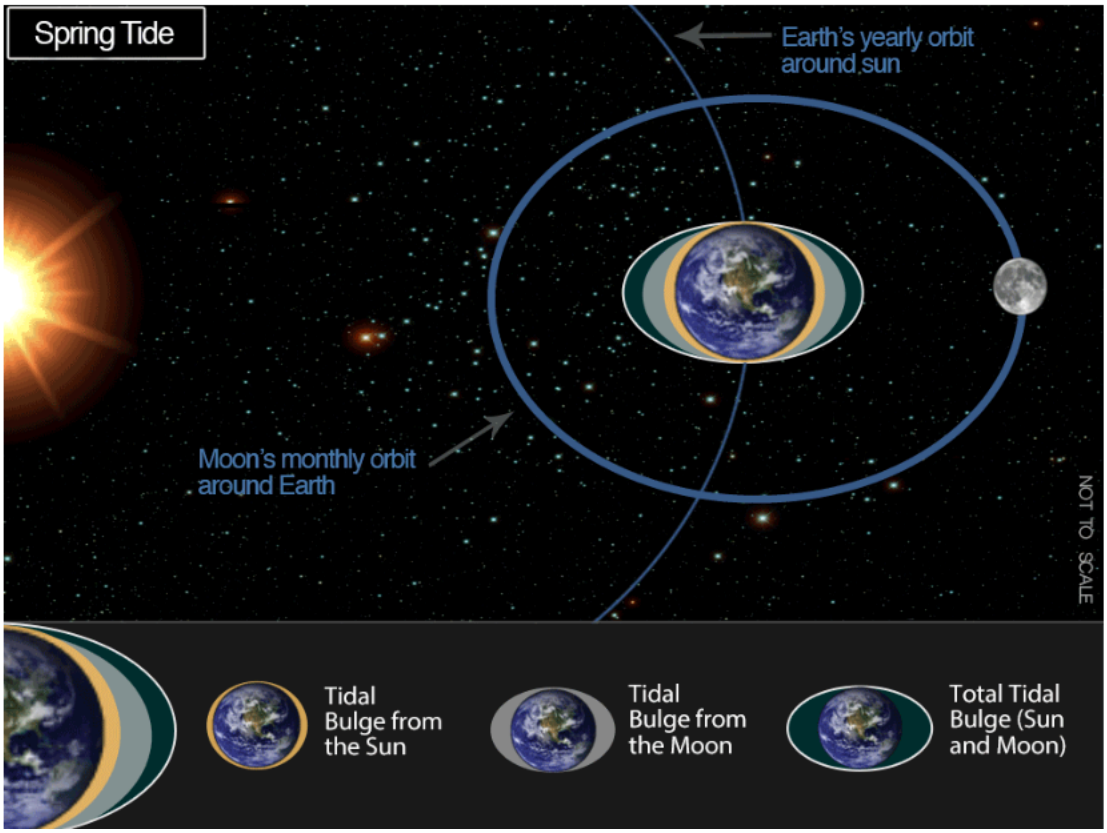
12. Because tides are the result of the change in gravity across the object, in this case the earth.

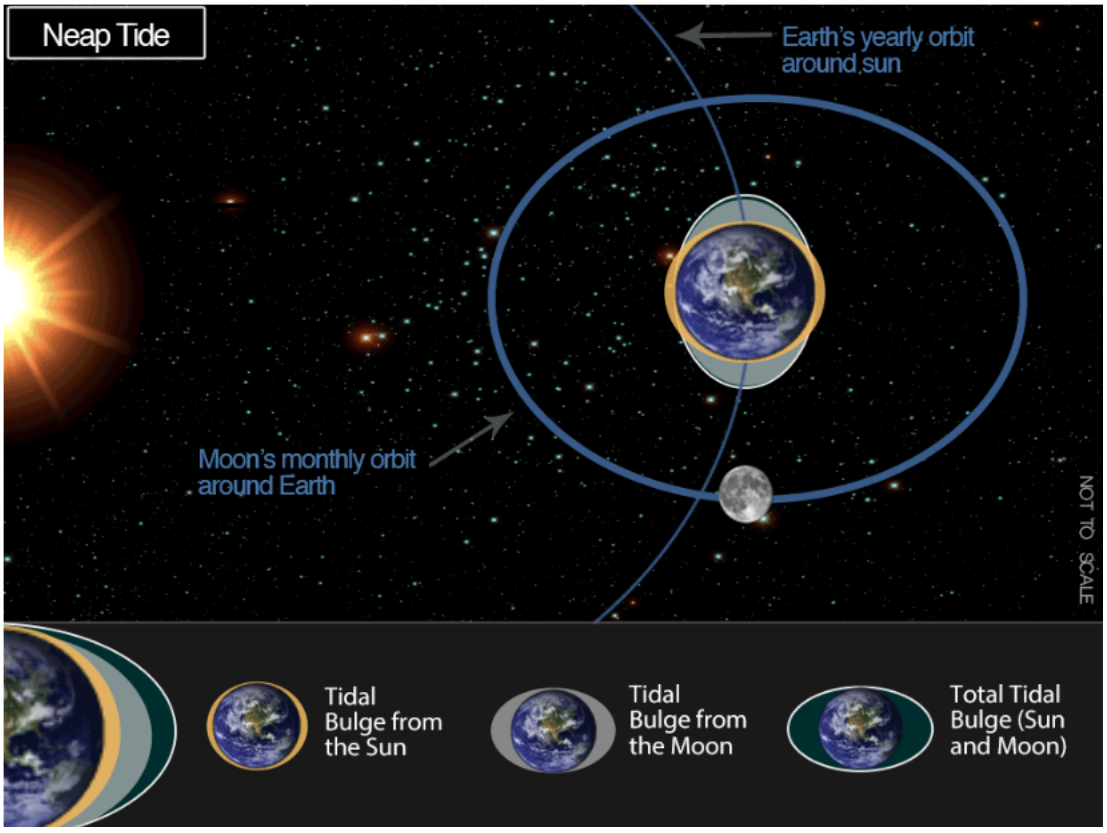
13. The force pair between the sun and the earth is about 180 times greater than the earth moon

14. The moon, even though the pull of the Sun is greater. Tides are caused by the difference in force across the earth. Because the moon is closer its gravity is different from one side of the earth to the other even though it is a smaller force than the Sun. Because the sun is so far away its gravitation pull is relatively the same across earth.

15. Because the sun, earth, and moon are all in a straight line

16. Spring tides the earth sun and moon align, neap tides they do not align





17. Yes, the atmosphere has mass, so it acts the same as the ocean tides, but there are other factors that influence the atmospheric tides such a heating.

18. The fusion rate which is determined by its temperature which is determined by its mass, and its gravity which is also determined by mass, also the elemental composition of the star

19. A black dwarf star would be the cold remnant of a star that is no longer fusing elements (a dead star). Since it takes trillions of years for a dead star to cool and the universe is only ~14 billion years old there are no known black dwarf stars. A black hole is a collapsed giant star that collapsed under its own gravity because it stopped fusing elements and so the outward pressure disappears.

20. First our sun could never become a black hole because it is not massive enough, but for arguments' sake if it did the mass does not increase so gravity would not increase it is just in a smaller area. And in fact, often the gravity would be less because sometimes when a black hole forms the star goes super nova first, ejecting enormous amounts of mass thus the left-over black hole is less massive than the original star.