Physics 90 Exam for Unit 2 — SOLUTION

March 18, 2020

1. Eratosthenes and the Beach Ball

Eratosthenes is looking at a beach ball in the sand. He can see that the sunlight is falling straight down on one part of the beach ball. 20cm away on another part of the beach ball, the sunlight is coming down with an angle of 30°. The circumference of the beach ball is:

(D) 30° is 1/12 of 360° so 20cm must be 1/12 of the total. ==> 2.4m

2. Aristarchus Measures the Moon

(D) We made our calculation better than his by including the tapering of the Earth's umbra

3. Ptolemaic Model

(E) All of A-D are correct.

4. Moon's Phases

(D) Waning gibbous

5. Moon's Phases

(C) Waxing gibbous

6. Moon's Phases

(A) The bright side is on the **right**, and the bright side is facing **West** where the Sun went down.

7. Eclipses

(A) New

8. Eclipses

(C) Penumbra

9. Prograde and Retrograde Motion

(A) **Eastward** through the stars and this is called **prograde** motion.

10. Prograde and Retrograde Motion

(B) This is called **retrograde** motion, and Mars will be going **westward** through the stars.

11. Lawn Model

(C) saucer for a cup (closest answer to the actual value which is 14cm)

12. Lawn Model

(A) small nail head (it was 1.3mm, and this is the closest)

13. Lawn Model

(B) six or so strides (closest answer to 6 meters)

14. Black Rock Desert Model

(D) tractor tire (Wylie Overstreet used a really big beach ball, which is about a tractor tire in size)

15. Kepler's 1st Law

(A) Empty space

16. Properties of Ellipses

(C) semi-circle

17. Properties of Ellipses

(D) made the foci spacing zero

18. Properties of Ellipses

(C) Eccentricity, *e*, and the one on the left has the **smallest eccentricity**

19. Kepler's 2nd Law

(D) That the object is **moving faster** in the **right** wedge.

20. Kepler's 3rd Law

P = Sqrt(2.36^3) = 3.6255