JeZag's 2016 It's About Time Practice Test

Instructions:

1. **This test is date sensitive: treat this test as if you were taking it on 6/1/2015**
2. There are 36 questions to answer in 30 minutes past the starting period [to make up for no Time Trials]
3. This test is meant to be taken as a pair and may be difficult to finish alone
4. Answers must include appropriate units and use 3 sig figs where appropriate
5. Answers for calculation questions will accept up to 10% error
6. Each question is weighted the same
7. A question is either fully correct or fully wrong
8. A graphing calculator and binder with secured sheets are allowed for the test
9. Relevant information will be provided in the questions
10. This test may not represent the nature of the 2015-2016 It's About Time tests
11. **Have Fun!**

Team Number _____ **Team** _____

Names _____

1. How many time zones does China currently have?

2. If the distance between the earth and the moon is approximately 384,400 km, how many seconds does it take light from the moon to reach our eyes?

3. What date (month, day, year) is the next leap second?

4. The electron of an excited hydrogen atom jumps from an energy level of -1.51eV to ground state at -13.6 eV and releases a photon. What is the frequency (Hz) of this photon?

5. Find the period in seconds of a rod pendulum 2.68 meters long. Acceleration due to gravity is 9.81 m/s^2 and the amplitude of oscillation is small.

6. I can write a practice test in 5.00 days. My cat can write a practice test in 8.00 days. How many minutes would it take us to write a practice test if we worked together?

7. The equation of time accounts for the difference between standardized time and apparent solar time. Who is the first person to describe the equation of time?

8. I am 1 km away from a light source I am moving at .9c towards the light source and the light source emits light at t=0 seconds. How many seconds does it take me to start seeing light? 1 km and 0.9 c are measured in the rest frame.

9. What date (month, day, year) was the Standard Time Act passed in the U.S. Congress?

10. In what geologic time period did the modern human first appear?

11. Abby and Bob are attached together by a 12 meter rope and are orbiting each other in outer space at a rate of 9 rotations per hour. If they pulled each other closer so they are separated by 3 meters, how many seconds long is the new period of their orbit?

12. Around which decade was the first digital LED wrist watch invented?

13. If the *k* of a certain reaction is 4.20 sec^{-1}, how long does it take the reactant to reach 20% of initial concentration?

14. What are the date and the UTC time of the Hunter's Moon this year?

15. Taking a picture of the sun at the same time everyday reveals a figure eight path. What is this path known as?

16. What property of quartz allows it to vibrate when exposed to an electric current?

17. How many times a day will military time read three or more of the same number in a row? (ie 01:11)

18. During which Chinese dynasty was the first escapement mechanism created?

19. The sundial casts a shadow onto a surface of the sundial to read time. What is the name of this surface?

20. The Antikythera mechanism was a clockwork mechanism capable of calculating position of planets, time of eclipses, and more. How many gears does the largest fragment have?

21. I have a clock which displays military time and every day, it gains one second. If I synchronize the clock at the start of this year, 0000 UTC, what time will the clock display at the end of this year, 2400 UTC? Answer should be in the form: (xx:xx:xx)

22. In what year was the first pendulum clock made?

23. A circuit consists of a 0.6 F capacitor and a 9 ohm resistor connected in series to a 12 volt battery. In how many seconds will the potential difference across the resistor reach 10 volts?

24. The NIST-F1 was America's first cesium fountain clock and served as USA's standard of time between 1999 and 2014. Where is this monumental timepiece located?

25. At what frequencies do household microwave ovens operate?

26. If the distance between Planet X and the sun is on average 3 times larger than that of earth and the sun, approximately how long does a year last on Planet X?

27. The AirInflator900 pumps 1.5 kg of hot air per minute. If the density of hot air is around 0.9486 kg/m^3, how many seconds will it take to fill a 1.5 meter cube with hot air?

28. What escapement did Jost Bürgi invent?

29. What describes other functions of a luxury watch other than keeping time?

30. How many days are in one draconic year?

31. What is the beat frequency between a concert A (440 Hz) and middle C (259 Hz)?

32. A spring has an original period of oscillation of 9 seconds. If the spring is cut in half, what is the new period in seconds?

33. Seven bells during first watch at sea signals what time? Your answer should be in the form: (xx:xx:xx)

34. A flight from LAX leaves on Thursday, 10 AM, and arrives in Tokyo, Japan on Friday, 3 PM. What is the average speed (m/s) over the 8810 km voyage?

35. The Henry Graves Supercompication timepiece was sold last year for $24.4 million, making it the most expensive watch in history. Who constructed this modern masterpiece?

36. How many decimal minutes fit into a biennium? Assume that the biennium in this problem spans over the least amount of leap years realistically possible.