**Space Exploration Final Exam Review**

1. What are the **two frames of** **reference** we use on the Earth to identify locations?
2. Explain what each of the following mean in describing position from a frame of reference on the Earth.

**Altitude**

**Azimuth**

**Zenith**

1. What are the sky co – ordinates for the moon in the illustration above?
2. How can you use the stars as a frame of reference?
3. Explain the different models of the solar system identified below.

**Geocentric Heliocentric**

1. Using his telescope, describe 5 observations **Galileo** made that nobody else had made.
2. Illustrate with light rays, how each type of optical telescope works:

**Refracting Reflecting**

1. How can the resolving power of a telescope be increased?
2. How do combination telescopes work?

**10.** Explain Newton’s Universal Law of Gravitation.

**11.** What did Newton discover using a prism?

12. Identify the different forms of energy present in the **electromagnetic** spectrum and put arrows at the end of the frequencies and wavelengths to identify whether they increase or decrease.

15. Explain how spectral lines can be formed and observed and what device is used to achieve this effect.

16. How doe astronomers use a spectrometer to determine a star’s composition?

17. How does a diffraction grating work? Why is it used?

18. Identify what elements are present in each mystery star in the think and link investigation on page 381.

19. Describe the Doppler Effect and identify 3 applications for its use.

20. Explain the difference between a red shift and a blue shift star.

21. What is adaptive optic technology able to do and how is it possible?

22. Measure the “unknown distance” in the illustration using triangulation.

23. What is the difference between an astronomical unit, a light year and a parsec?

24. What is the advantage of radio telescopes?

25. Explain radio interferometry.

26. What is VLBI and what advantage does it have?

27. Illustrate and label the parts of a rocket outlining in your illustration what the function of each part is.

28. What is gravitational escape velocity?

29. What is a ballistic missile?

30. Explain what gravitational assist is.

31. Explain the difference between natural and artificial satellites.

32. How many GPS satellites are orbiting the Earth and how many are needed to pinpoint a specific location on Earth?

33. What protects the Earth from the Sun’s solar winds?

34. Give the names of the inner planets and the names of the outer planets.

35. What space probes are the most recent ones to land on Mars and explore the surface?

36. How long does it take for light to reach us from the Sun?

37. How long does it take for transmissions from Voyager 1 and 2 to reach the Earth?

38. What factors affect the launch and flight of a spacecraft from the surface of the Earth and in space?

39. Briefly describe three tragedies that occurred during space travel.

40. When and where, (country), did the following Space Achievements occur?

 Sputnik

 Vostok

 Freedom 7

 Apollo 11

 Apollo/Soyuz joint mission

41. What are 6 Canadian contributions to the space program?

42. How is oxygen produced on the International Space Station?

44. How does microgravity affect the human body?

45. Explain how an ion drive works.

46. Explain how solar sails work.