Name _____ Date _____ Moravian Quiz _____

Eclipses of the Sun and Moon

INSTRUCTIONS: Make sure that your first and your last name and date appear at all applicable locations, yes, even the first page. This examination is in the form of multiple choice and a few fill-in-the blank questions/statements. After reading the question or instructions carefully, select your answer(s) and mark it (or them) plainly on the answer sheet provided with this test. The answer sheet can be found at the end of the exam. You may detach it. Only answer the odd or even questions depending upon whether your exam number is odd or even. **Take a moment to circle the questions which are your questions throughout the exam.** You may work alone or with **ONE PARTNER** who is taking the other portion of the exam to help each other attain a higher grade. **There will be no communications between teams.** All correct answers must be provided to receive full credit; however, partial credit will be given unless stated otherwise. This exam has a total value of 20 points. **MUCH SUCCES!**

CANVAS INSTRUCTIONS: This Quest is in the form of multiple-choice questions and a few fill-in-the blanks. After reading the question carefully, select your answer or answers. **If the question calls for multiple answers, two or more, you must provide all answers and all answers must be correct.** Canvas does not allow for partial credit. Because of this, I will give you two attempts to take the test. Consider this open book. All answers can be found in the lecture material created in class, the assigned reading material, and the PowerPoint presentations, but if you feel the need to consult online sources, books, or magazines, please feel free to do so. This Quest has a total value of 20 points. **MUCH SUCCESS!!!**

ECLIPSES

1. I'm being followed by a moon shadow; moon shadow, moon shadow... Please think astronomically.
   Key Concept: Think of phases here and which one could produce a shadow that could follow you.

2. State the classical (geometrical) configuration which can cause a solar eclipse to occur.
   Key Concept: What are the alignments of the specific astronomical bodies which produce a solar eclipse?

3. State the classical geometrical configuration which can cause a lunar eclipse to occur.
   Key Concept: What are the alignments of specific astronomical bodies which would create a lunar eclipse?

4. Eclipses of the sun (solar eclipses) can only happen when the moon is
   Key Concept: What is the phase relationship for a solar eclipse?

5. Eclipses of the moon (lunar eclipses) can only happen when the moon is
   Key Concept: What is the phase relationship for a lunar eclipse?

6. Cartoon: Identify the numbered items in the total solar eclipse cartoon.
   Key Concept: Know the different visual aspects (parts) of a total solar eclipse.

7. Referring to eclipse slides A, B, and C, what types of solar eclipses are occurring in each? Your word choices are as follows: (a) Penumbral, (b) Partial, (c) Total, (d) Annular, (e) Broken Annular, (f) Partial Penumbral, (g) umbral.
   Key Concept: Know the different types of solar eclipses.

8. Referring to eclipse slides A, B, and C, what types of solar eclipses are occurring in each? Your word choices are as follows: (a) Penumbral, (b) Partial, (c) Total, (d) Annular, (e) Broken Annular, (f) Partial Penumbral, (g) umbral.
   Key Concept: Know the different types of solar eclipses.

9. Which of the following statements are **INCORRECT** with respect to the synodic period of the moon?
   Key Concept: Understand all of the implications of the phase period of the moon in the understanding of solar and lunar eclipses.

10. In a solar eclipse, an observer standing in the penumbra of the moon's shadow
    Key Concept: Recognize the visual effects during a partial solar eclipse.

11. During totality in a total solar eclipse the moon will appear to be what color?
    Key Concept: Recognize the visual effects of a solar eclipse during totality…

12. Pick the **BEST** possible answer. During a lunar eclipse the moon can be what color?
    Key Concept: Distinguish the visual effect of a lunar eclipse during totality.

13. Which of the following are associated with only a solar eclipse? Two Answers Please!
14. Which of the following are associated with only a lunar eclipse? Two Answers Please!
    Key Concept: Comprehend the different types of lunar and solar eclipses and unique terminology associated with each major type.

15. Any central solar eclipse
    Key Concept: Understand the different types of central solar eclipses. Vocabulary word…

16. The longest line segment of an ellipse; it connects the extremes of distance, the foci and the center. It is called the
    Key Concept: Know the most important part of an ellipse. Vocabulary word…

17. An object revolving around the sun in an elliptical (oval) orbit
    Key Concept: Understand how the distance of an object in an elliptical orbit affects the motion of the orbiting object.

18-19. When the Earth is at ___18. __, it is closest to the sun; but when the moon is at ___19. __, it is closest to Earth. See below for the possible answers.

20-21. When the Earth is farthest from the sun, the position is called ___20. __, but this condition is called ___21. __, when the moon is at its greatest distance from the Earth.
Key Concept: Grasp the vocabulary relating to the extreme positions of the Earth and the moon in their orbits around the sun and the Earth.

22. **PICK THE BEST ANSWER.** The ecliptic represents
Key Concept: Know the many definitions of the ecliptic. Vocabulary word…

23. What is the inclination of the moon's orbit to the plane of the ecliptic?
Key Concept: Know the basic orbital characteristics of the moon.

24. In the image below the tilt of the moon's orbit to the plane of the ecliptic can be seen accurately. Depending upon where the moon is in its orbit with respect to the ecliptic when it is new or full will determine whether conditions are favorable or unfavorable for a solar or a lunar eclipse to occur. Indicate whether the position of the Earth and the moon are in a **FAVORABLE** or **UNFAVORABLE** location for an eclipse to happen. **Your answers must be in their correct order.**
Key Concept: Know the basic orbital characteristics of the moon.

25. In the same drawing you'll notice the tilt of the Earth's axis. Indicate which number represents the summertime position of the Earth in its orbit around the sun. Okay, I lied. I admit it. I'm throwing in a question about the seasons. I just could not resist it. It was sooo a part of the drawing.
Key Concept: Know how the axis of the Earth tilts so that the Northern Hemisphere gets direct radiation from the sun.

26. The greatest number of solar plus lunar eclipses which can occur during the course of a year is
Key Concept: Eclipses can happen in front of and in back of a node.

27. The lower limit regarding the number of solar and lunar eclipses that must occur each year results from the fact that
Key Concept: The number of nodes require this to be true.

28. The upper limit regarding the number of solar and lunar eclipses that must occur each year results from the fact that
Key Concept: The moon's crossing position on the ecliptic with respect to it angular distance from the node can produce this maximum number.

29. If the moon's orbit was exactly in the plane of the Earth's orbit, approximately one lunar and one solar eclipse would occur
Key Concept: Consider how the tilt of the moon's orbit affects the frequency of eclipses.

30. Solar eclipses do not happen every month because
Key Concept: Consider how the tilt of the moon's orbit affects the frequency of eclipses.

31. During an 18.61-year period, solar and lunar eclipses cycle through all of the seasons because
Key Concept: Understand the concept of the regression of the moon's nodes.

32. Why is the frequency or number of central (annular and total) solar eclipses greater than the frequency of total lunar eclipses?
Key Concept: How does the size of the Earth's shadow at the moon's distance compare to the diameter of the Earth? Remember the demonstration with the rubber bands.

33. It is a true fact that central solar eclipses are more common than total lunar eclipses. If surveyed, why will a greater number of people say they have seen more total lunar eclipses than central solar eclipses?
Key Concept: The viewing platform for lunar eclipses is different than solar eclipses.

34. The time interval between the new moon and the next new moon is called the moon's _____ period.
Key Concept: This is the basic beat for understanding why eclipses occur.

35. The actual amount of time it takes the moon to make one revolution around the Earth is termed its _____ period.
Key Concept: Understanding of this period helps explain why the other eclipse beats (intervals) are longer or shorter.

36. The counterclockwise (eastward) revolution of the apsides, the line segment connecting the closest and farthest positions of the moon's orbit around the Earth, cause the _____ period to be longer than the sidereal period of the moon.
Key Concept: This interval plays a definitive role in the repetition of similar eclipses and is responsible for the reason that eclipses appear in different parts of the sky.

37. The time period that the moon requires from one crossing of a node to the next crossing of the same node is called the _____ period of the moon.
Key Concept: Possibly responsible for the 56 Aubrey holes at Stonehenge and why eclipses occur in different parts of the sky.

38. With regard to the moon, which one of the following time periods has the least to do with the prediction of solar eclipses?
Key Concept: Know the eclipse beats and you won't feel the lack of knowledge heat.

39. What might be the only eclipse joke with some truth associated with it?
Key Concept: They are corny, but one has an element of truth about it.

40. A prepared group of Moravian College eclipse observers are unexpectedly attacked by a mob of _____.
Key Concept: Cartoon—Think eclipse vocabulary words—two words. You'll get it or be kicking yourself all the way home!

41. What is **INCORRECT** with respect to this cartoon?

Key Concept: The time of the occurrence of certain types of eclipses as well as which object overtakes the other is important.

42. Find two conditions which are necessary to produce a lunar or a solar eclipse.
Key Concept: How do different periods align to produce a similar type of lunar eclipse? Remember the eclipse beats.

43. What three conditions must be realized to produce two solar eclipses which are similar?
Key Concept: How do different periods align to produce a similar type of solar eclipse? Remember the eclipse beats.

44. The period of time between two eclipses, whether lunar or solar, which have similar conditions is called the
Key Concept: What is the fundamental cycle which allows for similar eclipses to repeat?

45. If a total solar eclipse occurs on June 20, 2014 the next similar eclipse in the same saros cycle should take place on one the following dates. Please note that June has 30 days.
Key Concept: What is the fundamental cycle which allows for similar eclipses to repeat?

46. If a central solar eclipse was going to occur, which one of the following factors would **MOST** influence the manner in which the eclipse would appear to an observer on the ground?
Key Concept: The moon's shadow cone becomes smaller as it approaches the Earth.

47. What minimal conditions must occur to produce a lunar eclipse?
Key Concept: Similar conditions must be met for all eclipses, lunar and solar, to occur.

48.

The woman looking through the telescopes on the right is called IMY. What kind of eclipse is IMY observing back on the Earth? Place your answer on the answer sheet. It is either a two or a three-word answer.

Key Concept: Know how eclipses look from different perspectives.

49. During the time people on Earth are viewing a total lunar eclipse, an astronaut on the near side of the moon viewing the same eclipse would say that he/she saw…
Key Concept: How does the position of the observer affect the eclipse type.

50. During the time people on Earth are viewing a total solar eclipse, an astronaut on the far side of the moon would see
Key Concepts: The location of the observer affects the way eclipses appear.

51. Pick the **THREE FACTORS** from the conditions listed below which would provide for a "great eclipse."
Key Concept: The distances of astronomical bodies as well as the location on Earth affects solar eclipse totality durations.

52. If a central solar eclipse was going to happen, which one of the following situations would automatically assure that the eclipse would be an annular event?
Key Concept: How does the distance of the astronomical bodies which create eclipses influence eclipse types.

53. We would still have total eclipses of the sun and the moon if
Key Concept: How does distance and inclination of the moon's orbit influences solar eclipses?

54. Which one of the following comments about a lunar eclipse is **FALSE**?
Key Concept: What factors that influence a lunar eclipse? One of the orbital or geometry factors in this question is incorrect.

55. When viewing a solar eclipse, the glow which surrounds the sun during totality is
Key Concept: Grasp the visual appearance of a total solar eclipses. Vocabulary word…

56. With regards to central eclipses of the sun or the moon, second contact means
Key Concept: What phenomenon occurs at second contact?

57. With regards to total lunar eclipses, fourth contact means.
Key Concept: What phenomenon occurs at fourth contact?

58. When is it **completely safe** to observe a total solar eclipse with just the unfiltered eyes?
Key Concepts: Safety and common sense must be used in viewing a total solar eclipse

59. When is it **completely safe** to observe a total lunar eclipse with just the unfiltered eyes?
Key Concepts: This is a lunar eclipse misconception, as well as common sense.

60. If the following situation were real, astronomically, the first stanza of Cat Steven's, Moon Shadow would deal with what general type of eclipse? The first stanza is below.

Oh, I'm bein' followed by a moonshadow, moon shadow, moonshadow—
Leapin and hoppin' on a moonshadow, moonshadow, moonshadow—

_____ Put your answer on the answer sheet.
Key Concepts: Know the basic types of eclipses.

61. If a total eclipse of the sun or moon occurs on a specific date, the same type of eclipse will happen in approximately what period of time beyond that date?
Key Concept: What is the fundamental cycle in quantitative terms which allows for similar eclipses to repeat?

62. This is a true astronomical story, well almost all of it is true: On the vernal equinox, March 20, 2015, Santa and his helpers at the North Pole were treated to a total solar eclipse with totality lasting one minute, 38 seconds. It was clear that day. Astronomically speaking, what did Santa observe from his location?
Key Concept: How does a solar eclipse at the North Pole affect toy production?