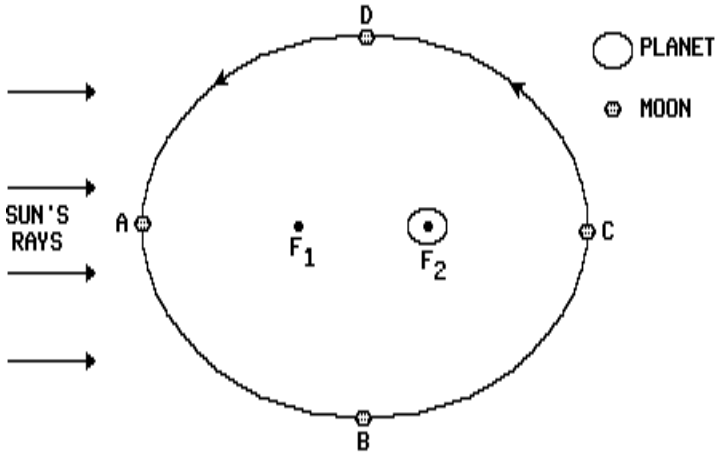
Name: _____

Questions 1 through 4 refer to the following:

The diagram below represents a model of the orbit of a moon around a planet. Points *A*, *B*, *C*, and *D* indicate four positions of the moon in its orbit. Points F_1 and F_2 are focal points of the orbit.



1) When viewed from the planet, the moon has the *greatest* apparent diameter at point
   A) *B* B) *D* C) *A* D) *C*

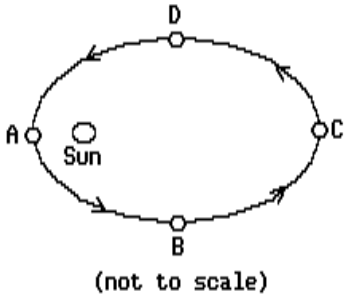
2) If the moon takes 6.8 days to move from point *A* to point *B*, the best estimate of the time required for one complete revolution is
   A) 27 days B) 34 days C) 20. days D) 41 days

3) If the distance from F_1 to F_2 is 42,000 kilometers and the distance from *A* to *C* is 768,000 kilometers, what is the eccentricity of the moon's orbit?
   A) 0.055 B) 0.81 C) 0.94 D) 0.18

4) As the moon moves in its orbit from point *D* to point *B*, the force of gravitational attraction between the moon and the planet
   A) increases, then decreases
   B) decreases, only
   C) increases, only
   D) decreases, then increases

5) The Earth reaches its *greatest* orbital speed when it is
   A) farthest from the Moon
   B) closest to the Moon
   C) farthest from the Sun
   D) closest to the Sun

6) The diagram below shows a planet's orbit around the Sun.



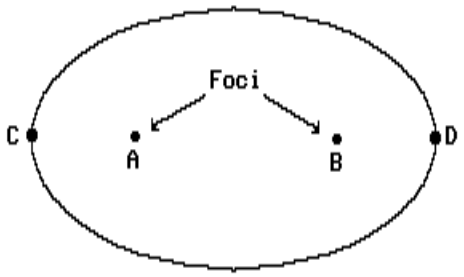
At which location is the planet's orbital velocity *greatest*?
   A) *D* B) *C* C) *B* D) *A*

7) The apparent angular diameter of the Sun was calculated by an observer in New York State once a month for four months. The diameters are shown in the data table below. Which statement is best supported by the data?

Month	Angular Diameter
1	32'16"
2	32'30"
3	32'35"
4	32'31"

A) The Sun rotates.
B) The distance between the Earth and the Sun varies.
C) The Earth is tilted $23\frac{1}{2}$ degrees.
D) The Earth rotates.

8) According to the *Earth Science Reference Tables*, what is the approximate eccentricity of the ellipse shown below?



Drawn to Scale

A) 0.25 B) 4.0 C) 2.0 D) 0.50

9) What is the eccentricity of an orbit having a major axis length of 100 million miles and a focal distance of 10 million miles?

A) 1 B) 0.01 C) 10 D) 0.1

10) According to the *Earth Science Reference Tables*, which of the following takes the longest time to make one complete spin on its axis?

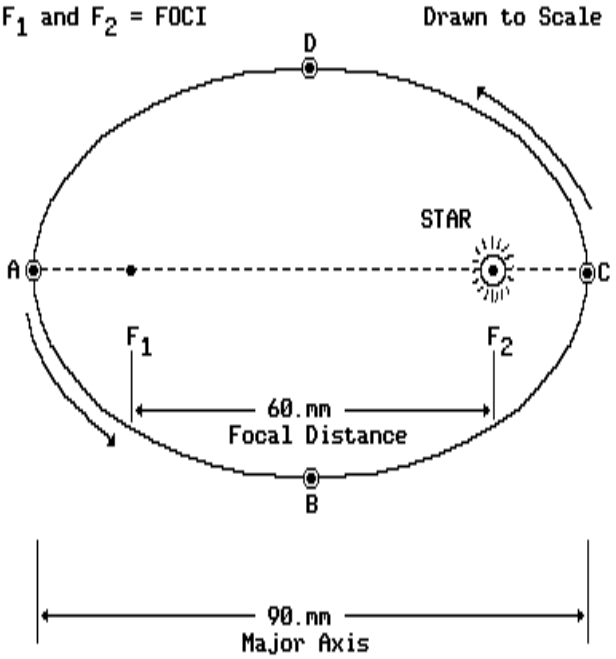
A) Uranus B) Mercury C) Earth D) Jupiter

11) The actual shape of the Earth's orbit around the Sun is best described as

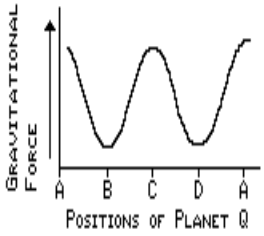
A) a slightly eccentric ellipse
B) an oblate spheroid
C) a perfect circle
D) a very eccentric ellipse

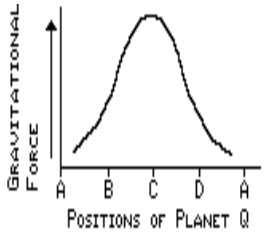
Questions 12 through 16 refer to the following:

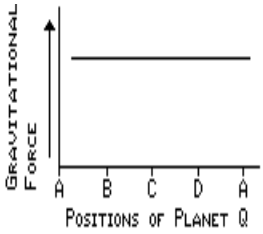
The diagram below is a model of the orbit of an imaginary planet *Q* around a star. Points *A*, *B*, *C*, and *D* indicate four orbital positions of the planet *Q*.

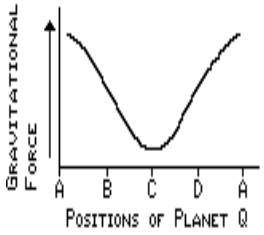


12) Which graph best approximates the gravitational force between the star and planet *Q* at positions *A* through *D*?

A)


C)


B)


D)


13) What is the approximate eccentricity of planet *Q*'s orbit?

A) 0.67 B) 1.50 C) 0.15 D) 0.06

14) As planet *Q* moves from position *A* to position *C*, what change occurs in the gravitational attraction between the star and planet *Q*?

A) The gravitational attraction becomes 5 times greater.

B) The gravitational attraction becomes 25 times greater.

C) The gravitational attraction becomes $\frac{1}{5}$ as great.

D) The gravitational attraction becomes $\frac{1}{25}$ as great.

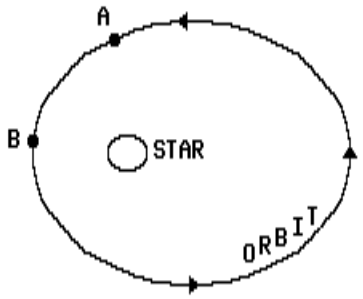
15) At which position in its orbit does planet *Q* have the *greatest* velocity?

A) *A* B) *C* C) *D* D) *B*

16) How would a scale drawing of the Earth's orbit around the Sun compare to the scale drawing shown of planet *Q*'s orbit?

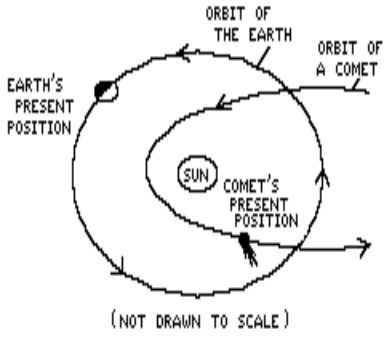
A) Earth's orbit would appear to have a more circular shape than planet *Q*'s.
B) Earth's orbit would appear to be the same shape as planet *Q*'s.
C) Earth's orbit would appear to have a more eccentric shape than planet *Q*'s.

17) The diagram below represents a planet in orbit around a star. Which statement best describes how the planet's energy is changing as it moves from point *A* to point *B*?



A) Both kinetic and potential energy are decreasing.
B) Kinetic energy is increasing and potential energy is decreasing.
C) Kinetic energy is decreasing and potential energy is increasing.
D) Both kinetic and potential energy are increasing.

18) The diagram below shows the Earth's orbit and the partial orbit of a comet on the same plane around the Sun.



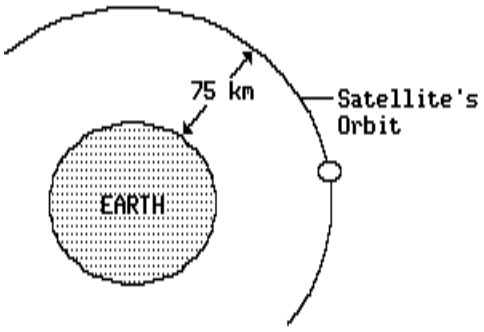
Compared with the Earth's orbit, the comet's orbit has

A) the same eccentricity B) less eccentricity C) more eccentricity

19) According to the *Earth Science Reference Tables*, which planet has a diameter most similar to the Earth's?

A) Saturn B) Venus C) Pluto D) Mars

20) The diagram below shows part of the orbit of a satellite around the Earth. The distance from the satellite's orbit to the Earth's surface is 75 kilometers.



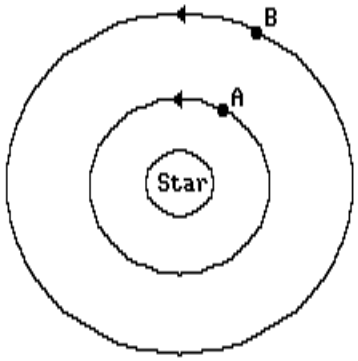
Which force is most directly responsible for keeping the satellite in orbit around the Earth?

A) Coriolis B) gravity C) magnetism D) friction

21) Planet *A* has a greater mean distance from the Sun than planet *B*. On the basis of this fact, which further comparison can be correctly made between the two planets?

A) Planet *A*'s day is longer.
B) Planet *A*'s revolution period is longer.
C) Planet *A* is larger.
D) Planet *A*'s speed of rotation is greater.

22) The diagram below shows the orbits of planets *A* and *B* in a star-planet system.



The period of revolution for planet *B* is 40 days. The period of revolution for planet *A* most likely is

A) less than 40 days
B) 40 days
C) greater than 40 days

23) According to the *Earth Science Reference Tables*, which planet has the most eccentric orbit?

A) Pluto
B) Mars
C) Venus
D) Saturn