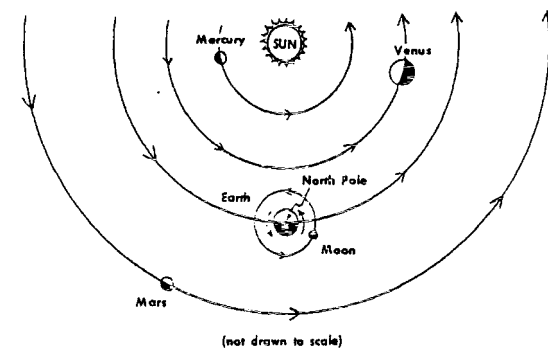


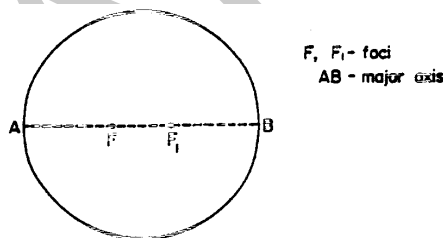
Laws of Planetary Motions Review

Base your answers to **questions 1-3** on your knowledge of Earth Science, the *Earth Science Reference Tables*, and the diagram below which shows part of the orbital paths of some of the planets of the solar system.

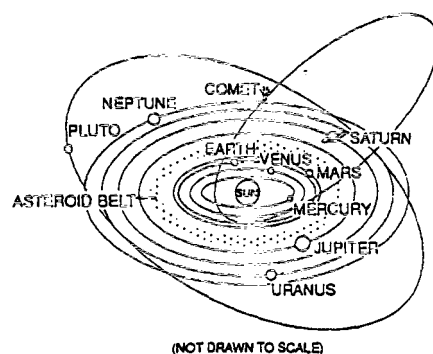
- What is the true shape of each planets actual orbit around the Sun?
 (1) perfectly circular (3) slightly elliptical
 (2) nearly spherical (4) very eccentric
- Which of the planets shown requires the longest time for one revolution around the Sun?
 (1) Mercury (3) Earth
 (2) Venus (4) Mars
- All of the planets and the Moon have approximately the same plane of orbit as on this sheet of paper. At midnight in New York State, an observer would never be able to see
 (1) Mercury (3) Mars
 (2) Polaris (4) the Moon



- What is the eccentricity of the ellipse shown to the right?
 (1) 1.00 (3) 0.250
 (2) 0.500 (4) 0.130

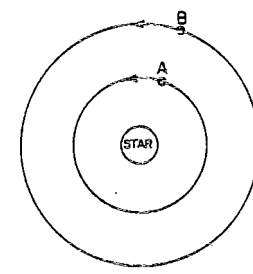


- The diagram to the right represents our solar system. This system is best classified as
 (1) geocentric, with elliptical orbits
 (2) geocentric, with circular orbits
 (3) heliocentric, with elliptical orbits
 (4) heliocentric, with circular orbits



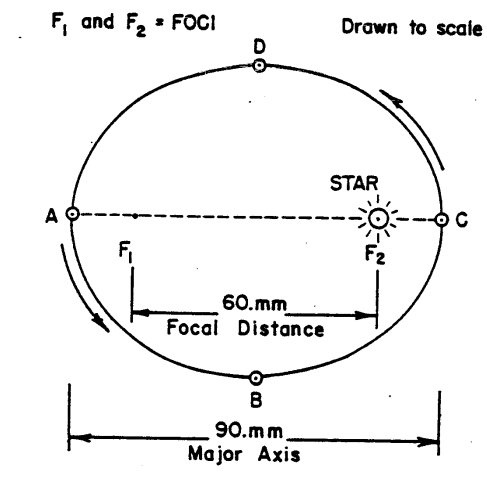
The diagram below shows the orbits of planets A and B in a star-planet system.

- The period of revolution for planet B is 40 days. The period of revolution for planet A most likely is
 (1) less than 40 days
 (2) greater than 40 days
 (3) 40 days

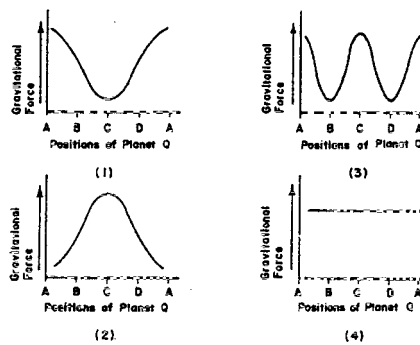


ROMANO

Base your answers to **questions 7-10** on your knowledge of Earth Science, the *Earth Science Reference Tables*, and the diagram below. The diagram 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 planet Q.



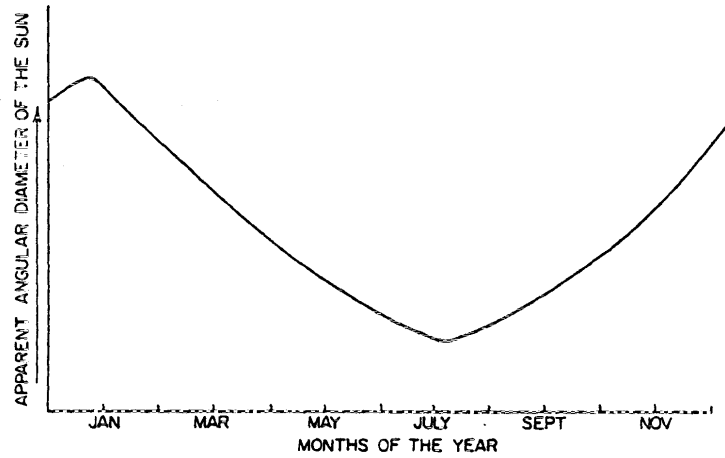
7. At which position in its orbit does planet Q have the greatest velocity?
- (1) A (3) C
 (2) B (4) D
8. What is the approximate eccentricity of planet Q's orbit?
- (1) 0.06 (3) 0.67
 (2) 0.15 (4) 1.50
9. How would a scale drawing of the Earth's orbit around the Sun compare to the drawing shown of planet Q's orbit?
- (1) Earth's orbit would appear to have a more circular shape than planet Q's.
 (2) Earth's orbit would appear to have a more eccentric shape than planet Q's.
 (3) Earth's orbit would appear to be the same shape as planet Q's.
10. Which graph best approximates the gravitational force between the star and planet Q at positions A through D?



11. 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?
- (1) Planet A is larger. (3) Planet A's revolution period is longer.
 (2) Planet A's speed of rotation is greater. (4) Planet A's day is longer.

ROMANO

Base your answers to **questions 12-16** on your knowledge of Earth Science and the diagram below. The diagram represents the apparent angular diameter of the Sun as measured by an observer on the Earth during one year.



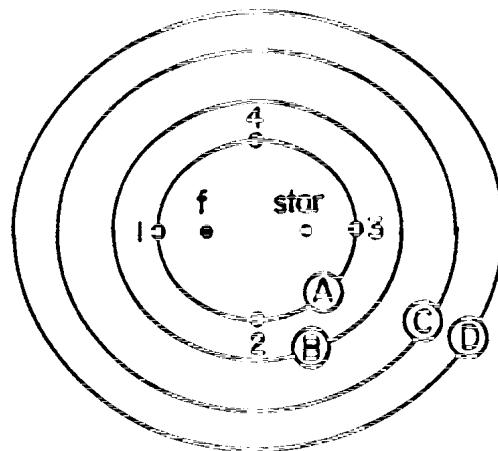
12. During which month was the apparent angular diameter of the Sun the smallest?
- (1) January (2) March (3) July (4) December
13. How did the apparent angular diameter of the Sun change from June to September?
- (1) It decreased steadily. (2) It increased steadily. (3) It decreased, then increased. (4) It remained the same.
14. The apparent diameter of the Sun decreases as the distance between the observer and the Sun
- (1) decreases (2) increases (3) remains the same
15. The cyclic change in the apparent angular diameter of the Sun is a result of the
- (1) Sun's daily rotational pattern (2) Earth's circular orbit (3) Earth's daily rotational pattern (4) Earth's slightly elliptical orbit
16. During which month was the orbital velocity of the Earth around the Sun the greatest?
- (1) January (2) March (3) June (4) July
17. Compared to Neptune, Mercury moves more rapidly in its orbit because Mercury
- (1) is larger (2) is more dense (3) is closer to the Sun (4) has a more elliptical orbit
18. What happens to the gravitational attraction between the Earth and Sun as it moves from perihelion to aphelion?
- (1) it increases, then decreases (2) it decreases, then increases (3) it increases (4) it decreases

ROMANO

Use the diagram below to answer **questions 19-20**. The diagram represents four planets, A, B, C, and D, traveling in elliptical orbits around a star. The center of the star and letter f represent the foci for the orbit of planet A. Points 1 through 4 are locations on the orbit of planet A.

19. Which is the order of the planets from shortest period of revolution to longest?
- (1) A, B, C, D (3) C, D, A, B
 (2) B, A, D, C (4) D, C, B, A

20. If planets A, B, C, and D have the same mass and are located at the positions shown in the diagram, the planet that has the greatest gravitational attraction to the star is
- (1) A (2) B (3) C (4) D

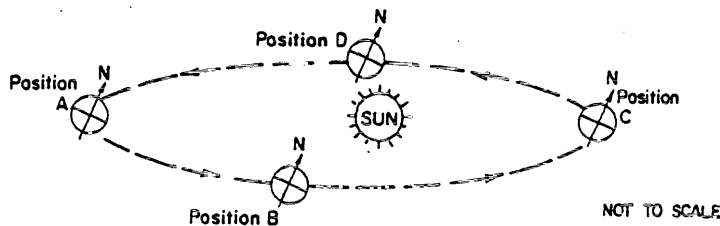


(DRAWN TO SCALE)

21. Planet A has the greatest orbital velocity at location
- (1) 1 (2) 2 (3) 3 (4) 4

22. The eccentricity of planet A's orbit is found to be approximately
- (1) 0.100 (2) 0.200 (3) 0.500 (4) 5.000

Base your answers to **questions 23-24** on the diagram below which shows four positions of the Earth in its orbit around the Sun. The diagram indicates relative positions of the Earth to the Sun, last the diagram has not been drawn to scale.



NOT TO SCALE

23. As the Earth moves from position B to position C, its orbital velocity will
- (1) decrease (2) increase (3) remain the same

24. At which position will the Sun have the greatest angular diameter as viewed from Earth?
- (1) A (2) B (3) C (4) D

25. Which planet's orbit is more eccentric than Jupiter's orbit?
- (1) Venus (2) Neptune (3) Earth (4) Mars

26. In each diagram below, the mass of the star is the same. In which diagram is the force of gravity greatest between the star and the planet shown?

