



Assessment

DIRECTIONS: Read each question carefully. Choose the letter of the best answer. Write your answer on a separate sheet of paper.

8. What is space-time?

- a. Space-time is a combination of three-dimensional space with time.
- b. Space-time is a time an object takes to travel in space.
- c. Space-time is a gravitational field.
- d. Space-time is a two-dimensional space and time.

9. What can best explain the unusual orbit of Mercury?

- a. Perturbation
- b. Sun's warping of space-time
- c. gravity
- d. both a and b

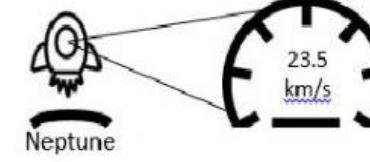
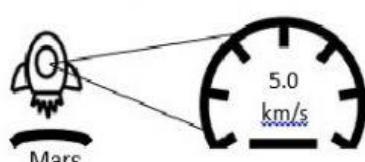
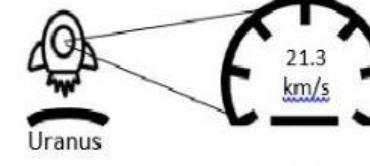
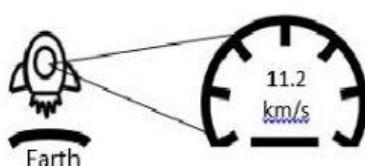
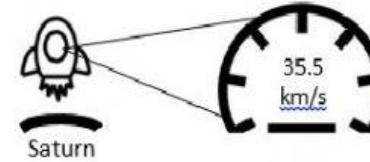
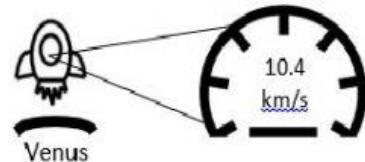
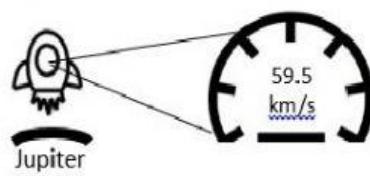
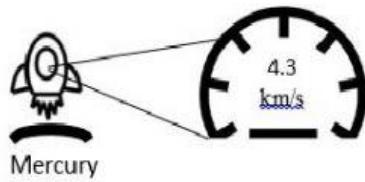
10. Why do GPS clocks need to be corrected using the General Theory of Relativity?

- a. because they are far away from Earth
- b. because they are stationary
- c. because they are orbiting the Earth
- d. because they are affected by the Earth's warping of space-time

11. What planet in the solar system is most affected by the sun's warping of space-time?

- a. Mercury
- b. Venus
- c. Earth
- d. Mars

12. The speedometer readings in every spacecraft show the escape velocities of each planet. Based on the following illustrations, determine which of the statements below is true.



<https://nssdc.gsfc.nasa.gov/planetary/factsheet/>
Photo Credits: Vee Marie V. (jbaradale), 2020

- a. A spacecraft must attain a speed of 11.2 km/s to leave the Earth's surface.
- b. It is easier to leave the surface of Jupiter than Earth.
- c. Escape velocity is not affected by the planet's mass.
- d. Mars has a smaller escape velocity than Venus and Earth because it is farther from the sun.

13. What must be the velocity of an object to escape a black hole?

- a. less than the speed of light (c)
- b. zero
- c. equal to c
- d. greater than c

14. How does mass affect the warping of space-time?

- a. The greater the mass of an object, the space-time around it becomes more distorted.
- b. The greater the mass of an object, the space-time around it becomes less distorted.
- c. The lesser the mass of an object, the space-time around it becomes more distorted.
- d. The mass of an object does not affect the warping of space-time.

For nos. 15 and 16, refer to the table below:

Planet	Mass ($\times 10^{24}$ kg)	Diameter (km)
Venus	4.87	12,104
Earth	5.97	12,756
Jupiter	1898	142,984
Uranus	86.8	51,118

15. Based on the data, what planet can warp space-time the most?

- a. Venus
- b. Earth
- c. Jupiter
- d. Uranus

16. Based on the data, what planet can warp space-time the least?

- a. Venus
- b. Earth
- c. Jupiter
- d. Uranus

17. What is an example of a non-inertial frame of reference?

- a. a stationary frame
- b. moving frame
- c. Earth
- d. a rotating frame

18. How does the curvature of space-time affect the light from distant stars?

- a. The curvature of space-time reflects light passing through it.
- b. The curvature of space-time bends light passing through it.
- c. The curvature of space-time does not allow light pass through it.
- d. The curvature of space-time absorbs the light passing through it.

19. Which is true about time according to general relativity?

- a. Time slows down with gravity.
- b. Time accelerates with gravity.
- c. Time is pulled down by gravity.
- d. Time can't be changed by gravity.

20. How does General Relativity view gravity?

- a. Gravity warps space and time.
- b. Gravity is the curvature of space-time.
- c. Gravity warps mass.
- d. Gravity is a force.