



## AP Physics 1 Multiple Choice Questions - Chapter 7

1 A 0.400 kg object attached to the end of a string of length 0.500 m is swing in a circular path and in a vertical plane. If a constant angular speed of 8.00 rad/sec is maintained, what is the tension in the string when the object is at the top of the circular path?

- a 8.88 N
- b 10.5 N
- c 12.8 N
- d 19.6 N
- e None of the above

2 A merry-go-round rotates with constant angular speed. As a rider moves from the rim of the merry-go-round toward the center, what happens to the magnitude of the total centripetal force that must be exerted on him?

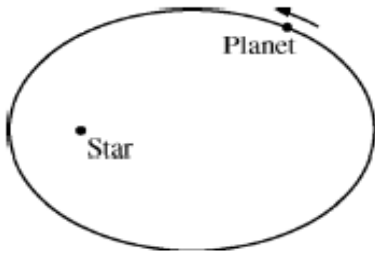
- a It increases
- b It is not zero, but remains constant
- c It decreases
- d Its always zero
- e It increases or decreases, depending on the direction of the rotation

3 A satellite moves in a circular orbit at a constant speed around Earth. Which of the following statements is true?

- a No force acts on the satellite
- b The satellite moves at constant speed and hence doesn't accelerate
- c The satellite has an acceleration directed away from Earth
- d The satellite has an acceleration directed towards Earth
- e Work is done on the satellite by the force of gravity

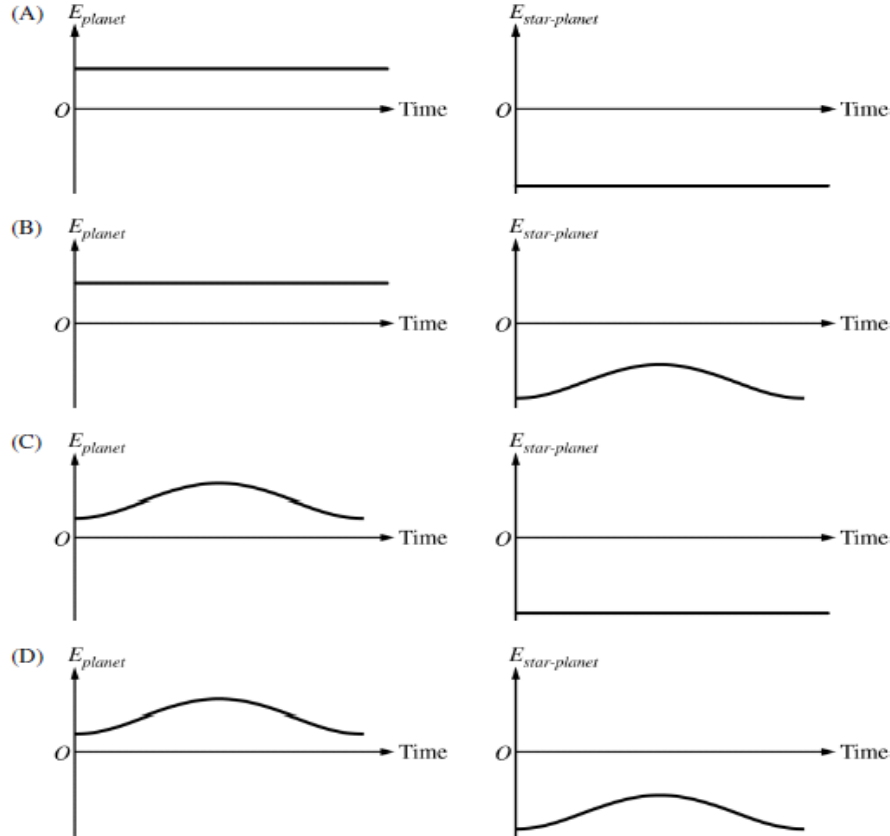


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7.4

- 1 A planet is in an elliptical orbit around a star, as shown above. Which of the following best represents the mechanical energy  $E_{\text{planet}}$  of just the planet and the mechanical energy  $E_{\text{star-planet}}$  of the star-planet system as functions of time for one complete orbit?



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3 Which of the following statements are true of an object in orbit around Earth?

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- a If the orbit is circular, the gravity force is perpendicular to the object's velocity
- b If the orbit is elliptical, the gravity force is perpendicular to the velocity vector
- c If the orbit is not circular, the speed is greatest when the object is farthest away from Earth
- d The gravity force on the object always has components both parallel and perpendicular to the object's velocity
- e All these statements are true



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1 An object is located on the surface of a spherical planet of mass  $M$  and radius  $R$ . The escape speed from the planet does *not* depend on which of the following?

- a  $M$
- b The density of the planet
- c  $R$
- d The acceleration due to gravity on the planet
- e The mass of the object

2 Calculate the escape speed needed to escape the gravitational pull of Mercury, with a mass of  $3.29 \times 10^{23}$  kg and a radius of 1516 miles.

- a 4.9 km/sec
- b 4.3 km/sec
- c 5.2 km/sec
- d 8.9 km/sec

3 Calculate the escape speed needed to escape the gravitational pull of Jupiter, with a mass of  $1.9 \times 10^{27}$  kg and a radius of 43441 miles.

- a 35 km/sec
- b 135 km/sec
- c 52 km/sec
- d 60 km/sec