

Central Administration for Curriculum Development

Science development office



Physics

Second Secondary Grade

20
26

Home Work + Assessment

Week 10

Name:

Class:

School:

إعداد

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إشراف

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رئيس الإدارة المركزية للتعليم العام

Chapter 4| Laws of circular motion

First: Multiple Choice Questions

(1) A body moves eastward with a velocity of 2 m/s. A resultant force acts on it toward the south, so the body

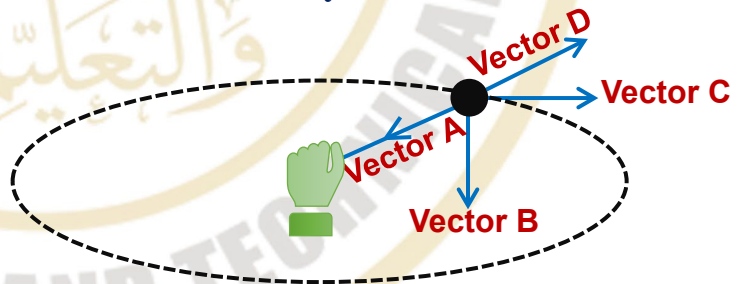
- A) Its speed increases
- B) Moves in a circular path
- C) Its direction remains constant
- D) Its acceleration is zero

2. Centripetal acceleration results from

- A) Change in the magnitude of velocity
- B) Change in the direction of velocity
- C) Change in both magnitude and direction of velocity
- D) Change in the applied force

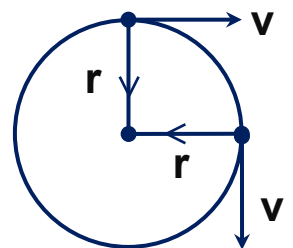
3- which vectors represent the velocity and acceleration of a body in circular motion?

- A) Velocity $\rightarrow$ A , Acceleration $\rightarrow$ B
- B) Velocity $\rightarrow$ B , Acceleration $\rightarrow$ D
- C) Velocity $\rightarrow$ D , Acceleration $\rightarrow$ C
- D) Velocity $\rightarrow$ C , Acceleration $\rightarrow$ A



4. The acceleration of a body in uniform circular motion is due to

- A) Change in direction of velocity
- B) Change in magnitude of velocity
- C) Both magnitude and direction remain constant
- D) Change in both magnitude and direction

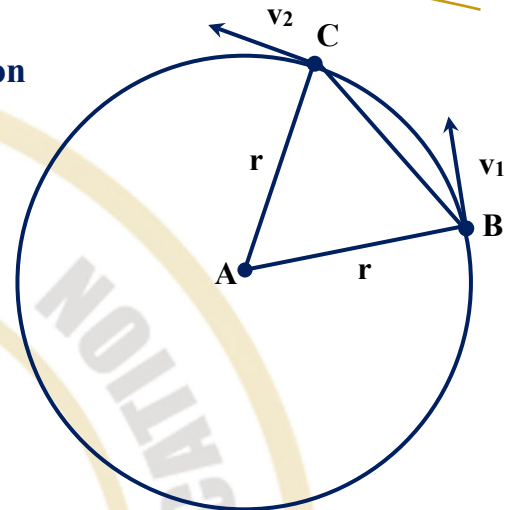


5. When a body moves in a circular path, the direction of the centripetal force is

- A) In the same direction as the velocity
- B) In the same direction as the acceleration
- C) Opposite to the direction of the acceleration
- D) Opposite to the direction of the velocity

6. The figure shows a body moving in uniform circular motion from point B to point C during a time interval t . Which of the following statements is correct?

- A) The direction of acceleration is the same as the direction of velocity v_1
- B) The magnitude of acceleration is inversely proportional to the distance AB
- C) The magnitude of acceleration is directly proportional to the distance AB
- D) The direction of acceleration is the same as the direction of velocity v_2



7. Two bodies (A) and (B) move in two different circular paths with the same centripetal acceleration.

If the speed of body (A) is greater than the speed of body (B), then:

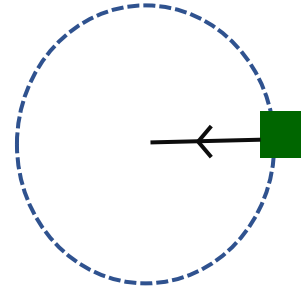
- A) The radius of the path of body (A) is smaller than that of body (B)
- B) The radius of the path of body (A) is equal to that of body (B)
- C) The centripetal force acting on body (B) is greater than that acting on body (A)
- D) The radius of the path of body (A) is greater than that of body (B)

8. A body moves with a uniform speed (v) in a circular path, and its centripetal acceleration is (a). If another identical body moves in the same circular path with a uniform speed ($3v$), the centripetal acceleration becomes:

- A) $3a$
- B) $6a$
- C) a
- D) $9a$

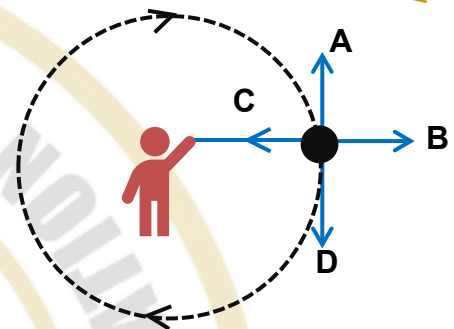
9. Someone ties a body to a string and holds the other end, rotating the body in a circular path. Suddenly, the string breaks. The direction of motion of the body after the string breaks will be

- A) In a circular path but with a larger radius
- B) Toward the center along the radius
- C) Along the tangent at the moment of breaking
- D) Along the extension of the radius outward



10-A child rotates a small stone using a string as shown in the figure. When the string is suddenly released, the body moves in.....

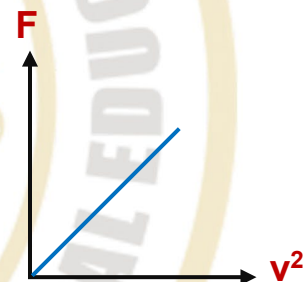
- A) Direction A
- B) Direction B
- C) Direction C
- D) Direction D



11-The graph represents the relation between the centripetal force and the square of the tangential velocity.

The slope of the graph equals:

- A) $r \cdot m^2$
- B) $r \cdot m$
- C) m/r
- D) r/m



12.A body of mass 3 kg moves in a circular path of radius 10 m with a time period of π s. The magnitude of the centripetal force is

- A) 15 N
- B) 30 N
- C) 60 N
- D) 120 N

13. A man drives his car whose weight is $5 \times 10^4 \text{ N}$ in a circular path of radius 500 m with a tangential speed of 7.5 m/s.

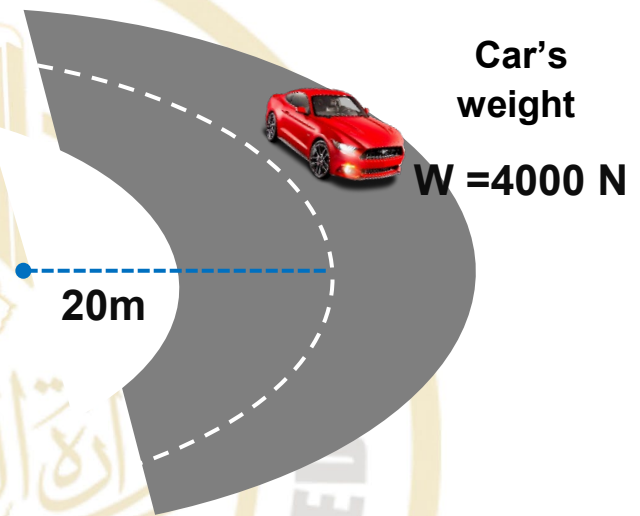
If the frictional force is 571.5 N and $g = 10 \text{ m/s}^2$, then the mass of the man is ..

- A) 40 kg
- B) 58 kg
- C) 80 kg
- D) 800 kg

14. The car shown in the figure moves in a circular path.

If the speed of the car is doubled while keeping the centripetal force constant, the car needs a path whose radius is the radius of the first path.

- A) Double
- B) One quarter
- C) Four times
- D) Half



15. A car of mass 1000 kg moves in a circular field of radius 20 m.

If the maximum frictional force that the car tires can provide is 450 N, the maximum speed the driver must not exceed so that the car remains in the circular path is

- A) 3 m/s
- B) 30 m/s
- C) 15 m/s
- D) 10 m/s



Second: Essay Questions

1) On rotating a stone attached to the end of a string in a circular path.
What is the direction of the force affecting on the stone? What is its benefit?
What is the direction of motion if the string is cut?

.....
.....

2- A car of mass 1000 kg is moving at a constant speed of 5 m/s in a curve of radius 50 m.
Calculate centripetal friction force that keeps the car moving around the curve.

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3- A car of mass 750 kg moves in a circle of diameter 80 m. If the centripetal force
acting on the car is 7500 N, find the speed of the car.

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.....

4- An object of mass 0.01 Kg moves in a circular path of radius 150 cm if it takes 3 s to
make a complete revolution , calculate magnitude & direction of the centripetal force.

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**Chapter 4| Laws of circular motion****Group (A)****First: Multiple Choice Questions**

1-When a resultant force acts on a body moving with constant velocity in a direction opposite to its motion, the body's velocity

- A) **Increases in magnitude and direction remains constant**
- B) **Decreases in magnitude and direction changes**
- C) **Decreases in magnitude and direction remains constant**
- D) **Increases in magnitude and direction changes**

2.When a body moves in uniform circular motion, its velocity

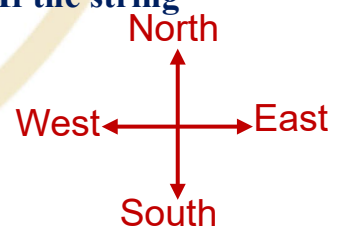
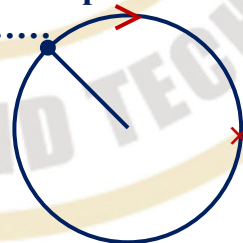
- A) **Changes in magnitude and direction**
- B) **Changes in magnitude and remains constant in direction**
- C) **Remains constant in magnitude but changes in direction**
- D) **Remains constant in both magnitude and direction**

3.The angle between the centripetal acceleration and the instantaneous (tangential) velocity is

- A) **0°**
- B) **45°**
- C) **90°**
- D) **180°**

4. A ball tied to a string move in a horizontal circular path clockwise. If the string breaks at point (X), the ball moves

- A) **In a circular direction**
- B) **Toward the west**
- C) **Toward the east (along the tangent)**
- D) **Toward the south**

**Second: Essay Questions**

5- An object of 2 kg mass is tied to the end of a string to rotate in a horizontal circular path with a radius of 1.5 m making 3 revolutions in 9 s. Calculate:

- (a) The linear (tangential) speed. (b) The tension force of the string on the body.

First: Multiple Choice Questions

1. When a body moves in uniform circular motion, the physical quantities remain constant except

- A) The weight of the body
- B) The velocity vector
- C) The mass of the body
- D) The uniform speed

2. The centripetal acceleration of a body moving in a circular path increases when

- A) The radius of the circular path increases
- B) The mass of the body decreases
- C) The radius of the circular path decreases
- D) The mass of the body increases

3. A body of mass 5 kg moves in a circular path of radius 0.1 m and takes a time equal to π s to complete one revolution.

The centripetal force acting on the body equals N

- A) 2
- B) 6
- C) 4
- D) 8

4. From the given figure, the Earth moves in its orbit around the Sun due to:

- A) An attractive force in the same direction as the planets
- B) An attractive force opposite to the direction of the Sun
- C) An attractive force in the same direction as the Earth's motion
- D) An attractive force perpendicular to the direction of the Earth's motion



Second: Essay Questions

5- A helicopter toy of mass 100 g flies in a circular path of radius 1 m and rotates at a rate of 100 revolutions in 20 sec. Calculate:

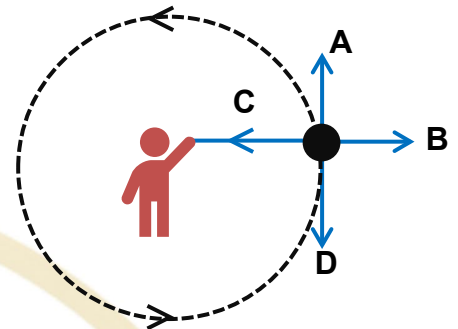
- a) The linear (tangential) velocity of the toy.
- b) The centripetal acceleration.

c) The centripetal force.

First: Multiple Choice Questions

1. A child rotates a small stone using a string as shown in the figure. When the string is suddenly released, the body moves in.....

- A) Direction A
- B) Direction B
- C) Direction C
- D) Direction D



2. A body moves in a circular path and then moves along the tangent. The value of the force acting on it

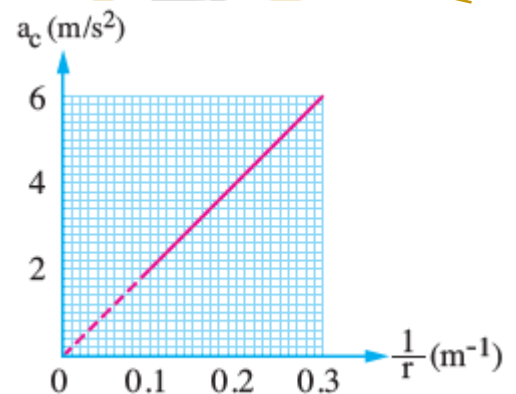
- A) Becomes zero
- B) Doubles
- C) Decreases to half
- D) Does not change

3. A body of mass 2 kg moves in a circular path of radius 5 m with a tangential speed of 2 m/s. The magnitude of the centripetal force is

- A) 0.2 N
- B) 0.4 N
- C) 1.6 N
- D) 3.2 N

4. The opposite graph shows the relationship between the centripetal acceleration (a_c) with which a body moves in a horizontal circular path and the inverse of the radius of this path ($1/r$), then the tangential velocity with which the body moves equals

- a) 4.47 m/s
- b) 5.58 m/s
- c) 3.13 m/s
- d) 9.8 m/s



Second: Essay Questions

5) A car in amusement park of mass 200 kg moves in a circular path with velocity 10 m/s. If the centripetal force acting on it 2000 N
Find: a) Radius of rotation. b) Centripetal acceleration.

- The end -

