

# Escape Velocity , Equations of motion under gravity

CLASS-IX

**SUBJECT : PHYSICS**  
**CHAPTER NUMBER: 10**  
**CHAPTER NAME : GRAVITATION**

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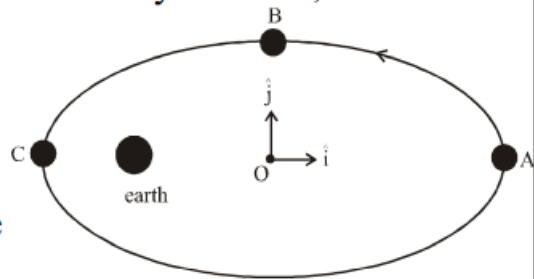
**CHANGING YOUR TOMORROW**

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## Home Assignment

An artificial satellite orbits around the earth in an elliptical orbit of the kind illustrated in Fig. The only appreciable force acting on the satellite is then the attractive gravitational force exerted on it by the earth, a force which decreases with increasing distance between the satellite and the earth.

- (a) Is the magnitude of the satellite's acceleration at the point C larger than, smaller than, or the same as the magnitude of its acceleration at the point A?
- (b) Is the satellite's speed at the point C larger than, smaller than, or the same as its speed at the point A?
- (c) Consider the components  $a_i$  and  $a_j$  of the satellite's acceleration along the indicated  $\hat{i}$  and  $\hat{j}$  directions. Is the acceleration component  $a_i$  at the point A positive, negative, or zero? Is the acceleration component  $a_j$  at the point A positive, negative, or zero?
- (d) Answer the same questions about the satellite's acceleration components at the point B.
- (e) Answer the same questions about the satellite's acceleration components at the point C.
- (f) Suppose that the satellite were moving around its orbit in the opposite sense (i.e., clockwise rather than in the counter-clockwise sense indicated in Fig.). Would the answers to the preceding three questions about the acceleration components then be the same or different?



## Home Assignment

- How much is the gravitational force that keeps an artificial satellite of mass 3500 kg in orbit around the earth at an altitude of 4200 km –  
(1) 12000 N            (2) 12500 N            (3) 13000 N            (4) 10000 N
- The value of  $g$  is maximum –  
(1) at poles of earth    (2) at equator of earth    (3) in a mine            (4) at a high hill
- A stone is thrown vertically upwards and caught at the point of projection after 10 seconds. The time taken by the stone to reach the highest point is –  
(1) 5 sec.            (2) 10 sec.            (3) 9.8 sec.            (4) 4.9 sec.
- The period of a satellite in a circular orbit of radius  $R$  is  $T$ , the period of another satellite in a circular orbit of radius  $4R$  is –  
(1)  $4T$             (2)  $T/4$             (3)  $8T$             (4)  $T/8$

**THANKING YOU**  
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