Q.1 The orbital speed of a satellite revolving around a planet in a circular orbit is v_o. If its speed is increased by10%, then

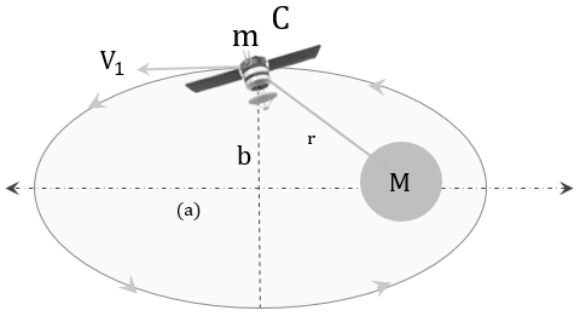
(A) It will escape from its orbit.

(B) It will start rotating in an elliptical orbit.

(C) It will continue to move in the same orbit.

(D) It will move in a circular orbit of radius 20% more than radius of initial orbit

Q.2 Find the velocity of a satellite travelling in an elliptical orbit, when it reaches point C on the end of the semi-minor axis



(A) $\sqrt{\frac{GM}{a}}$ **(B)** $\sqrt{\frac{2GM}{a}}$ **(C)** $\sqrt{\frac{GM}{2a}}$ **(D)** $\sqrt{\frac{GM}{3a}}$

Q.3 The time period of polar satellites is about (take $g = 9.8\ ms^{-2}$ and radius of the EarthR $= 6.3\ 10^6$ m), [Height of a polar satellite above earth's surface will be around700 km]

(A)24 hr **(B)**1000 min **(C)**100 min **(D)**6 hr

Q.4 The mean radius of earth is R, and its angular speed on its axis is ω. What will be the radius of orbit of a geostationary satellite?

(A) $\left(\frac{2R^2g}{\omega^2}\right)^{\frac{1}{3}}$ **(B)** $\left(\frac{R^2g}{\omega^2}\right)^{\frac{1}{3}}$ **(C)** $\left(\frac{R^2g}{3\omega^2}\right)^{1/3}$ **(D)** $\left(\frac{R^2g}{5\omega^2}\right)^{1/3}$

Q.5 The relay satellite transmits the television signals continuously from one part of the world to another because its

(A) Period is greater than the period of rotation of the earth

(B) Period is less than the period of rotation of the earth

(C) Period has no relation with the period of the earth about its axis

(D) Period is equal to the period of rotation of the earth about its earth.

Q.6 Orbital speed of geo-stationary satellite is (take $G = 6.67 \times 10^{-11}\ Nm^2kg^{-2}$ and mass of earth, $M = 6 \times 10^{24}$ kg).[Height of geostationary satellite from center of earth = 36000 km]

(A)8 km/sec From west to east **(B)**11.2 km/sec from east to west

(C) 3.1 km/sec From west to east **(D)**Zero

Q.7 A person sitting in a chair in a satellite feels weightlessness because

(A) The earth does not attract the objects in a satellite

(B)the normal force by the chair on the person balances the earth`s attraction

(C) The normal force is zero

(D) Person in a satellite is not accelerated

Q.8 A satellite is moving in a circular orbit round the earth with a diameter of orbit2R. At a certain point a rocket fixed to the satellite is fired such that it increases the velocity of the satellite tangentially and satellite is still bound to earth. The resulting orbit of the satellite would be

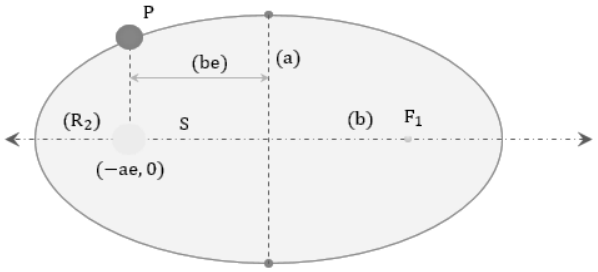
(A) Same as before

(B) Circular orbit with diameter greater than2R.

(C) Elliptical orbit with minimum distance from the earth equal toR.

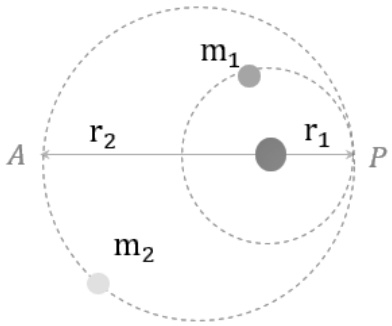
(D) Elliptical orbit with maximum distance from the earth equal to R

Q.9 The longest and the shortest distance of a planet from the sun is R_1 andR_2. Distance from sun when the radius vector of the planet is normal to the major axis of the orbit is:



(A) $\frac{R_1+R_2}{2}$ **(B)** $\sqrt{\frac{R_1^2+R_2^2}{2}}$ **(C)** $\frac{R_1R_2}{R_1+R_2}$ **(D)** $\frac{2R_1R_2}{R_1+R_2}$

Q.10 Two planets of equal masses orbit a much more massive star. Planet m_1 moves in a circular orbit of radius 1×10^8 km with a period of 2 years and planet m_2 moves in an elliptical orbit with closest distance $r_1 = 1 \times 10^8$ km and farthest distance $r_2 = 1.8 \times 10^8$ km, as shown:



(A) $V_p = 2.4V_A$ **(B)** $V_p = 4.2V_A$ **(C)** $V_p = 3.6V_A$ **(D)** $V_p = 1.8V_A$

ANSWER KEY

Q.	1	2	3	4	5	6	7	8	9	10

Sol.	(B)	(A)	(B)	(B)	(D)	(C)	(C)	(C)	(D)	(D)