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NEET GRAVITATION — KEPLER'S LAWS — PYQS

Max. Marks: 32 **Questions:** 8

Section A (MCQ) — 8 questions

Q.1 In a solar system, the time-period of revolution of a planet tracing a circular orbit of radius R is proportional to: [RE-NEET (UG) 2026]

(1) R^3 (2) $R^{1/2}$ (3) $R^{3/2}$ (4) R^2

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Q.2 The radius of Martian orbit around the Sun is about 4 times the radius of the orbit of Mercury. The Martian year is 687 Earth days. Then which of the following is the length of 1 year on Mercury? [NEET (UG) 2025]

(1) 172 earth days (2) 124 earth days
(3) 88 earth days (4) 225 earth days

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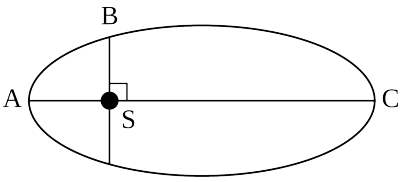
Q.3 The kinetic energies of a planet in an elliptical orbit about the Sun, at positions A, B and C are K_A, K_B and K_C, respectively. AC is the major axis and SB is perpendicular to AC at the position of the Sun S as shown in the figure. Then [NEET 2018]



(1) $K_A < K_B < K_C$ (2) $K_A > K_B > K_C$
(3) $K_B < K_A < K_C$ (4) $K_B > K_A > K_C$

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Q.4 A satellite S is moving in an elliptical orbit around the earth. The mass of the satellite is very small compared to the mass of the earth. Then, [AIPMT 2015]

(1) the linear momentum of S remains constant in magnitude.
(2) the acceleration of S is always directed towards the centre of the earth.
(3) the angular momentum of S about the centre of the earth changes in direction, but its magnitude remains constant.
(4) the total mechanical energy of S varies periodically with time.

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Q.5 Kepler's third law states that square of period of revolution (T) of a planet around the sun, is proportional to third power of average distance r between sun and planet i.e. $T^2 = Kr^3$ here K is constant. If the masses of sun and planet are M and m respectively then as per Newton's law of gravitation force of attraction between them is $F = \frac{GMm}{r^2}$, here G is gravitational constant. The relation between G and K is described as [AIPMT 2015 (Cancelled)]

(1) $K = G$ (2) $K = \frac{1}{G}$
(3) $GK = 4\pi^2$ (4) $GMK = 4\pi^2$

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Q.6 A geostationary satellite is orbiting the earth at a height of 5R above the surface of the earth, R being the radius of the earth. The time period of another satellite in hours at a height of 2R from the surface of the earth is [AIPMT 2012 (Prelims)]

(1) 5 (2) 10 (3) $6\sqrt{2}$ (4) $\frac{6}{\sqrt{2}}$

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Q.7 A planet moving along an elliptical orbit is closest to the sun at a distance r_1 and farthest away at a distance of r_2. If v_1 and v_2 are the linear velocities at these points respectively, then the ratio $\frac{v_1}{v_2}$ is [AIPMT 2011 (Prelims)]

(1) $(r_1/r_2)^2$ (2) r_2/r_1 (3) $(r_2/r_1)^2$ (4) r_1/r_2

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Q.8 The figure shows elliptical orbit of a planet m about the sun S. The shaded area SCD is twice the shaded area SAB. If t_1 is the time for the planet to move from C to D and t_2 is the time to move from A to B then [AIPMT 2009]

[Diagram unavailable]

(1) $t_1 = 4t_2$ (2) $t_1 = 2t_2$ (3) $t_1 = t_2$ (4) $t_1 > t_2$

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8			
Ans.	**3**	**3**	**2**	**2**	**4**	**3**	**2**	**2**			