

NEET GRAVITATION — ESCAPE SPEED — PYQS

Max. Marks: 48

Questions: 12

Section A (MCQ) — 12 questions

- Q.1** Two planets P_1 and P_2 with equal mass have radii R_1 and R_2 , respectively, where $R_2 = \frac{R_1}{2}$. The escape speeds of P_1 and P_2 are v_1 and v_2 , respectively. Then $\frac{v_2}{v_1}$ is: [RE-NEET (UG) 2026]

- (1) 2 (2) $\frac{1}{\sqrt{2}}$ (3) 1 (4) $\sqrt{2}$

Scan or tap for the full solution



- Q.2** The escape velocity for earth is v . A planet having 9 times mass that of earth and radius, 16 times that of earth, has the escape velocity of:

[RE-NEET (UG) 2024]

- (1) $\frac{v}{3}$ (2) $\frac{2v}{3}$ (3) $\frac{3v}{4}$ (4) $\frac{9v}{4}$

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- Q.3** The escape velocity from the Earth's surface is v . The escape velocity from the surface of another planet having a radius, four times that of Earth and same mass density is : [NEET (UG) 2021]

- (1) $4v$ (2) v (3) $2v$ (4) $3v$

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- Q.4** A particle of mass ' m ' is projected with a velocity $v = kV_e$ ($k < 1$) from the surface of the earth. (V_e = escape velocity)
The maximum height above the surface reached by the particle is : [NEET (UG) 2021]

- (1) $\frac{Rk^2}{1-k^2}$ (2) $R\left(\frac{k}{1-k^2}\right)^2$
(3) $R\left(\frac{k}{1+k^2}\right)^2$ (4) $\frac{R^2k}{1+k}$

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- Q.5** The ratio of escape velocity at earth (v_e) to the escape velocity at a planet (v_p) whose radius and mean density are twice as that of earth is

[NEET 2016 (Phase 1)]

- (1) 1 : 4 (2) 1 : $\sqrt{2}$ (3) 1 : 2 (4) 1 : $2\sqrt{2}$

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- Q.6** A black hole is an object whose gravitational field is so strong that even light cannot escape from it. To what approximate radius would earth (mass = 5.98×10^{24} kg) have to be compressed to be a black hole? [AIPMT 2014]

- (1) 10^{-9} m (2) 10^{-6} m (3) 10^{-2} m (4) 100 m

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- Q.7** The radius of a planet is twice the radius of earth. Both have almost equal average mass densities. V_p and V_e are escape velocities of the planet and the earth, respectively, then [NEET 2013 (Karnataka)]

- (1) $V_p = 1.5 V_e$ (2) $V_p = 2 V_e$
(3) $V_e = 3 V_p$ (4) $V_e = 1.5 V_p$

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- Q.8** A particle of mass ' m ' is kept at rest at a height $3R$ from the surface of earth, where ' R ' is radius of earth and ' M ' is mass of earth. The minimum speed with which it should be projected, so that it does not return back, is

(g is acceleration due to gravity on the surface of earth)

[NEET 2013 (Karnataka)]

- (1) $\left(\frac{GM}{2R}\right)^{1/2}$ (2) $\left(\frac{gR}{4}\right)^{1/2}$
(3) $\left(\frac{2g}{R}\right)^{1/2}$ (4) $\left(\frac{GM}{R}\right)^{1/2}$

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- Q.9** If v_e is escape velocity and v_o is orbital velocity of a satellite for orbit close to the earth's surface, then these are related by [AIPMT 2012 (Mains)]

- (1) $v_o = \sqrt{2v_e}$ (2) $v_o = v_e$
(3) $v_e = \sqrt{2v_o}$ (4) $v_e = \sqrt{2} v_o$

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Q.10 A particle of mass m is thrown upwards from the surface of the earth, with a velocity u . The mass and the radius of the earth are, respectively, M and R . G is gravitational constant and g is acceleration due to gravity on the surface of the earth. The minimum value of u so that the particle does not return back to earth, is

[AIPMT 2011 (Mains)]

- (1) $\sqrt{\frac{2GM}{R^2}}$ (2) $\sqrt{\frac{2GM}{R}}$
 (3) $\sqrt{\frac{2gM}{R^2}}$ (4) $\sqrt{2gR^2}$

Scan or tap for the
full solution



Q.11 The earth is assumed to be a sphere of radius R . A platform is arranged at a height R from the surface of the earth. The escape velocity of a body from this platform is fv , where v is its escape velocity from the surface of the Earth. The value of f is

[AIPMT 2006]

- (1) $1/2$ (2) $\sqrt{2}$ (3) $1/\sqrt{2}$ (4) $1/3$

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full solution



Q.12 For a planet having mass equal to mass of the earth but radius is one fourth of radius of the earth. Then escape velocity for this planet will be [AIPMT 2000]

- (1) 11.2 km/s (2) 22.4 km/s
 (3) 5.6 km/s (4) 44.8 km/s

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full solution



ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	4	3	1	1	4	3	2	1	4	2	3
Ques.	12										
Ans.	2										