

PYQSide

JEE MAIN GRAVITATION — PYQS

Max. Marks: 64

Questions: 16

Section A (MCQ)

- Q.1** When one moves from a point 16 km below the earth's surface to a point 16 km above the earth's surface, the change in g is approximately $\alpha\%$. The value of α is _____.

(Take radius of the earth = 6400 km.)

[JEE Main 2026 (Online) 5th April Morning Shift]

- (1) 0.12 (2) 0.25 (3) 0.50 (4) 0.75

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- Q.2** A body of mass m is taken from the surface of earth to a height equal to twice the radius of earth (R_e). The increase in potential energy will be _____. (g is acceleration due to gravity at the surface of earth)

[JEE Main 2026 (Online) 5th April Evening Shift]

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

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- Q.3** The height in terms of radius of the earth (R), at which the acceleration due to gravity becomes $\frac{g}{9}$, where g is acceleration due to gravity on earth's surface, is _____.

[JEE Main 2026 (Online) 4th April Evening Shift]

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

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- Q.4** A planet (P_1) is moving around the star of mass $2M$ in the orbit of radius R . Another planet (P_2) is moving around another star of mass $4M$ in an orbit of radius $2R$. Ratio of time periods of revolution of P_2 and P_1 is _____.

[JEE Main 2026 (Online) 2nd April Morning Shift]

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

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- Q.5** If a body of mass 1 kg falls on the earth from infinity, it attains velocity (v) and kinetic energy (k) on reaching the surface of earth. The values of v and k respectively are _____.

(Take radius of earth to be 6400 km and $g = 9.8 \text{ m/s}^2$)

[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) 11.2 km/s; $6.27 \times 10^7 \text{ J}$
 (2) 11.2 km/s; $12.54 \times 10^7 \text{ J}$
 (3) 8.8 km/s; $6.27 \times 10^7 \text{ J}$
 (4) 8.8 km/s; $12.54 \times 10^7 \text{ J}$

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- Q.6** Three masses 200 kg, 300 kg and 400 kg are placed at the vertices of an equilateral triangle with sides 20 m. They are rearranged on the vertices of a bigger triangle of side 25 m and with the same centre. The work done in this process is _____ J. (Gravitational constant $G = 6.7 \times 10^{-11} \text{ N m}^2/\text{kg}^2$)

[JEE Main 2026 (Online) 24th January Morning Shift]

- (1) 4.77×10^{-7} (2) 1.74×10^{-7}
 (3) 9.86×10^{-6} (4) 2.85×10^{-7}

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- Q.7** The escape velocity from a spherical planet A is 10 km/s. The escape velocity from another planet B whose density and radius are 10% of those of planet A, is _____ m/s.

[JEE Main 2026 (Online) 22nd January Morning Shift]

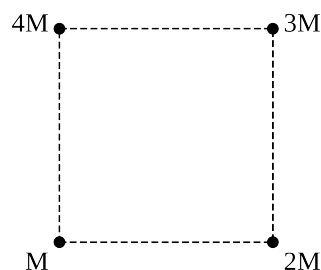
- (1) 1000 (2) $200\sqrt{5}$
 (3) $1000\sqrt{2}$ (4) $100\sqrt{10}$

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- Q.8** Net gravitational force at the center of a square is found to be F_1 when four particles having mass M , $2M$, $3M$ and $4M$ are placed at the four corners of the square as shown in figure and it is F_2 when the positions of $3M$ and $4M$ are interchanged. The ratio $\frac{F_1}{F_2}$ is $\frac{\alpha}{\sqrt{5}}$. The value of α is _____.

[JEE Main 2026 (Online) 22nd January Morning Shift]



- (1) 2 (2) $2\sqrt{5}$ (3) 1 (4) 3

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Q.9 Given below are two statements :

Statement-I: A satellite is moving around earth in the orbit very close to the earth surface. The time period of revolution of satellite depends upon the density of earth.

Statement-II: The time period of revolution of the satellite is $T = 2\pi\sqrt{\frac{R_e}{g}}$ (for satellite very close to the earth surface), where R_e is radius of earth and g is acceleration due to gravity.

In the light of the above statements, choose the correct answer from the options given below :

[JEE Main 2026 (Online) 22nd January Evening Shift]

- (1) Statement-I is true but Statement-II is false
 (2) Statement-I is false but Statement-II is true
 (3) Both Statement-I and Statement-II are true
 (4) Both Statement-I and Statement-II are false

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Q.10 Initially a satellite of 100 kg is in a circular orbit of radius $1.5R_E$. This satellite can be moved to a circular orbit of radius $3R_E$ by supplying $\alpha \times 10^6$ J of energy. The value of α is _____.
 (Take Radius of Earth $R_E = 6 \times 10^6$ m and $g = 10 \text{ m/s}^2$)

[JEE Main 2026 (Online) 21st January Morning Shift]

- (1) 500 (2) 1000 (3) 100 (4) 150

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Q.11 Given below are two statements: one is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A): The radius vector from the Sun to a planet sweeps out equal areas in equal intervals of time and thus areal velocity of planet is constant.

Reason (R): For a central force field the angular momentum is a constant.

In the light of the above statements, choose the most appropriate answer from the options given below:

[JEE Main 2025 (Online) 7th April Evening Shift]

- (1) (A) is not correct but (R) is correct
 (2) Both (A) and (R) are correct but (R) is not the correct explanation of (A)
 (3) Both (A) and (R) are correct and (R) is the correct explanation of (A)
 (4) (A) is correct but (R) is not correct

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Q.12 Given below are two statements : one is labelled as **Assertion A** and the other is labelled as **Reason R**
Assertion (A): The kinetic energy needed to project a body of mass m from earth surface to infinity is $\frac{1}{2}mgR$, where R is the radius of earth.

Reason (R): The maximum potential energy of a body is zero when it is projected to infinity from earth surface.

In the light of the above statements, choose the correct answer from the options given below

[JEE Main 2025 (Online) 4th April Morning Shift]

- (1) A is false but R is true
 (2) Both A and R are true and R is the correct explanation of A
 (3) A is true but R is false
 (4) Both A and R are true but R is NOT the correct explanation of A

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Q.13 An object is kept at rest at a distance of $3R$ above the earth's surface where R is earth's radius. The minimum speed with which it must be projected so that it does not return to earth is : (Assume $M =$ mass of earth, $G =$ Universal gravitational constant)

[JEE Main 2025 (Online) 4th April Evening Shift]

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

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Q.14 Earth has mass 8 times and radius 2 times that of a planet. If the escape velocity from the earth is 11.2 km/s, the escape velocity in km/s from the planet will be:

[JEE Main 2025 (Online) 28th January Evening Shift]

- (1) 8.4 (2) 11.2 (3) 5.6 (4) 2.8

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Section B (Numerical)

Q.15 Three identical spheres of mass m are placed at the vertices of an equilateral triangle of length a . When released, they interact only through gravitational force and collide after a time $T = 4$ seconds. If the sides of the triangle are increased to length $2a$ and also the masses of the spheres are made $2m$, then they will collide after _____ seconds.

[JEE Main 2025 (Online) 3rd April Morning Shift]

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- Q.16** A satellite of mass 1000 kg is launched to revolve around the earth in an orbit at a height of 270 km from the earth's surface. Kinetic energy of the satellite in this orbit is _____ $\times 10^{10}$ J.
 (Mass of earth = 6×10^{24} kg, Radius of earth = 6.4×10^6 m, Gravitational constant = 6.67×10^{-11} N m² kg⁻²)

[JEE Main 2025 (Online) 2nd April Evening Shift]

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ANSWER KEY

Section A (MCQ)

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	2	4	3	2	1	2	4	1	3	2	3
Ques.	12	13	14								
Ans.	1	3	3								

Section B (Numerical)

Ques.	15	16									
Ans.	8	3									