

IBDP - D1 - MCQ

Question 1

A planet has double the mass of Earth and half its radius. What is the gravitational field strength on the surface of the planet ?

- a. 10 N kg^{-1}
- b. 20 N kg^{-1}
- c. 40 N kg^{-1}
- d. 80 N kg^{-1}

Ans - d

Question 2

In Newton's universal law of gravitation, the masses are assumed to be

- a. Extended masses
- b. Point masses
- c. Masses of planets
- d. Spherical masses.

Ans - b

Question 3

Gravitational field strength at a point may be defined as

- a. The work done per unit mass to move a small mass from infinity to the point
- b. The force on a small mass placed at the point
- c. The force per unit mass on a small mass placed at the point
- d. The work done to move unit mass from infinity to the point

Ans - c

Question 4

The Earth is distance R_m from the Moon and the distance R_s from the Sun. The ratio

$$\frac{\text{gravitational field strength at the Earth due to the Moon}}{\text{gravitational field strength at the Earth due to the Sun}}$$

Is proportional to which of the following :

- a. $\frac{R_m^2}{R_s^2}$
- b. $\frac{R_m}{R_s}$
- c. $\frac{R_s^2}{R_m^2}$

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d. $\frac{R_s}{R_m}$

Ans - c

Question 5

Planet X has radius r and mass m . Planet Y has radius $2r$ and mass $8m$. Which of the following is the correct value of the ratio.

$\frac{\text{gravitational field strength at surface of planet X}}{\text{gravitational field strength at surface of planet Y}}?$

- a. 0.5
- b. 2
- c. 4
- d. 0.25

Ans - a

Question 6

Mass of the Moon is 7.35×10^{22} kg and the radius of the Moon is 1.74×10^6 m. The escape speed from the surface of the moon is

- a. $4.37 \times 10^3 \text{ ms}^{-1}$
- b. $2.37 \times 10^4 \text{ ms}^{-1}$
- c. $2.37 \times 10^{-3} \text{ ms}^{-1}$
- d. $2.37 \times 10^3 \text{ ms}^{-1}$

Ans - d

Question 7

A space probe of mass 640 kg is to be launched from the surface of the earth. The energy needed to move the probe from the surface to a parking orbit at a height of 500 Km is :

Radius of Earth is 6.37×10^6 m , mass of Earth is 5.97×10^{24} kg

- a. $2 \times 10^9 \text{ J}$
- b. $2 \times 10^{10} \text{ J}$
- c. $2 \times 10^8 \text{ J}$
- d. $2 \times 10^{11} \text{ J}$

Ans - b

Question 8

The escape speed of the Earth is related to the gravitational field strength (g) of the Earth with the following relation

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- a. $\sqrt{5gr}$
- b. $\sqrt{2gr}$
- c. $\sqrt{3gr}$
- d. $\sqrt{4gr}$

Ans - b

Question 9

Which statement is true regarding the gravitational field strength inside the Earth and outside the surface of the earth

- a. g is constant both inside the Earth and outside the Earth
- b. g varies as $\frac{1}{r}$ inside the Earth and as $\frac{1}{r^2}$ outside the Earth's surface.
- c. g varies as $\frac{1}{r^2}$ inside the Earth's surface and as $\frac{1}{r}$ outside the Earth's surface.
- d. g varies as $\frac{1}{r^2}$ both inside and outside the surface of the Earth.

Ans - b

References

IBDP Physics Cambridge

IBDP physics Oxford