

Gravitation

Question 1.

A body is projected vertically from the surface of the earth of radius R with velocity equal to half of the escape velocity. The maximum height reached by the body is

- (a) R
- (b) $R/2$
- (c) $R/3$
- (d) $R/4$

▼ [Answer](#)

Answer: (c) $R/3$

Question 2.

When the planet comes nearer the sun moves

- (a) fast
- (b) slow
- (c) constant at every point
- (d) none of the above

▼ [Answer](#)

Answer: (a) fast

Question 3.

Keplers second law regarding constancy of arial velocity of a planet is a consequence of the law of conservation of

- (a) energy
- (b) angular momentum
- (c) linear momentum
- (d) none of these

▼ [Answer](#)

Answer: (b) angular momentum

Question 4.

The escape velocity for a body projected vertically upwards from the surface of the earth is 11km/s . If the body is projected at an angle of 45° with the vertical, the escape velocity will be

- (a) $11/\sqrt{2}\text{ km/s}$
- (b) $11\sqrt{2}\text{ km/s}$
- (c) 2 km/s
- (d) 11 km/s

▼ [Answer](#)

Answer: (d) 11 km/s

Question 5.

The radii of the earth and the moon are in the ratio $10 : 1$ while acceleration due to gravity on the earths surface and moons surface are in the ratio $6 : 1$. The ratio of escape velocities from earths surface to that of moon surface is

- (a) $10 : 1$
- (b) $6 : 1$

- (c) 1.66 : 1
- (d) 7.74 : 1

▼ Answer

Answer: (d) 7.74 : 1

Question 6.

The escape velocity of a body from the surface of the earth is v . It is given a velocity twice this velocity on the surface of the earth. What will be its velocity at infinity?

- (a) v
- (b) $2v$
- (c) $\sqrt{2}v$
- (d) $\sqrt{3}v$

▼ Answer

Answer: (d) $\sqrt{3}v$

Question 7.

The period of geostationary artificial satellite is

- (a) 24 hours
- (b) 6 hours
- (c) 12 hours
- (d) 48 hours

▼ Answer

Answer: (a) 24 hours

Question 8.

If the radius of the earth were to shrink by 1% its mass remaining the same, the acceleration due to gravity on the earth's surface would

- (a) decrease by 2%
- (b) remain unchanged
- (c) increase by 2%
- (d) will increase by 9.8%

▼ Answer

Answer: (c) increase by 2%

Question 9.

The mean radius of the earth is R , its angular speed on its own axis is w and the acceleration due to gravity at earth's surface is g . The cube of the radius of the orbit of a geo-stationary satellite will be

- (a) r^2g / w
- (b) R^2w^2 / g
- (c) $RG w^2$
- (d) R^2g / w^2

▼ Answer

Answer: (d) R^2g / w^2

Question 10.

If escape velocity from the earth's surface is 11.2 km/sec. then escape velocity from a planet of

mass same as that of earth but radius one fourth as that of earth is

- (a) 11.2 km/sec
- (b) 22.4 km/sec
- (c) 5.65 km/sec
- (d) 44.8 km/sec

▼ [Answer](#)

Answer: (b) 22.4 km/sec

Question 11.

Geo-stationary satellite

- (a) revolves about the polar axis
- (b) has a time period less than that of the earths satellite
- (c) moves faster than a near earth satellite
- (d) is stationary in the space

▼ [Answer](#)

Answer: (a) revolves about the polar axis

Question 12.

If the radius of the earth were to be rease by 1% its mass remaining the same, the acceleration due to gravity on the surface of the earth will

- (a) increase by 1%
- (b) decrease by 2%
- (c) decrease by 1%
- (d) increase by 2%

▼ [Answer](#)

Answer: (d) increase by 2%

Question 13.

If the distance between the earth and the sun were half its present value , the number of day in a year would have been

- (a) 64.5
- (b) 129
- (c) 182.5
- (d) 730

▼ [Answer](#)

Answer: (b) 129

Question 14.

If the radius of the earth were to shrink by 1% its mass remaining the same, the acceleration due to gravity on the earths surface would

- (a) decrease by 2%
- (b) remain unchanged
- (c) increase by 2%
- (d) will increase by 9.8%

▼ [Answer](#)

Answer: (c) increase by 2%

Question 15.

If escape velocity from the earth's surface is 11.2 km/sec. then escape velocity from a planet of mass same as that of earth but radius one fourth as that of earth is

- (a) 11.2 km/sec
- (b) 22.4 km/sec
- (c) 5.65 km/sec
- (d) 44.8 km/sec

▼ [Answer](#)

Answer: (b) 22.4 km/sec

Question 16.

The radii of the earth and the moon are in the ratio 10 : 1 while acceleration due to gravity on the earth's surface and moon's surface are in the ratio 6 : 1. The ratio of escape velocities from earth's surface to that of moon's surface is

- (a) 10 : 1
- (b) 6 : 1
- (c) 1.66 : 1
- (d) 7.74 : 1

▼ [Answer](#)

Answer: (d) 7.74 : 1

Question 17.

Average density of the earth

- (a) is a complex function of g
- (b) does not depend on g
- (c) is inversely proportional to g
- (d) is directly proportional to g

▼ [Answer](#)

Answer: (b) does not depend on g

Question 18.

An infinite number of identical point masses each equal to m are placed at points $x = 1, x = 2, x = 4, x = 8m, \dots$. The total gravitational potential at point at $x = 0$ is

- (a) $-Gm$
- (b) $-2Gm$
- (c) $+2Gm$
- (d) infinite

▼ [Answer](#)

Answer: (b) $-2Gm$

Question 19.

A body is projected vertically from the surface of the earth of radius R with velocity equal to half of the escape velocity. The maximum height reached by the body is

- (a) R
- (b) $R/2$
- (c) $R/3$
- (d) $R/4$

▼ [Answer](#)

Answer: (c) R/3

Question 20.

A satellite is revolving around the earth in a circular orbit with a velocity of 7.07 km/s. What minimum increase in its velocity is needed to make it escape gravitational pull of earth?

- (a) 4.23 km/s in the direction of its velocity
- (b) 11.3 km/s in a direction perpendicular to its velocity
- (c) 2.93 km/s in the direction of its velocity
- (d) 4.23 km/s in a direction perpendicular to its velocity

▼ [Answer](#)

Answer: (c) 2.93 km/s in the direction of its velocity
