NEET PHYSICS

Topic: Gravitation

Q.1 There is no atmosphere on moon because-

(1) The root mean square velocity of atoms is more than escape velocity

(2) The root mean square velocity of atoms is less than escape velocity

(3) There is no oxygen

(4) None of the above

Q.2 If the radius of earth shrinks by 1% maintaining its mass, then 'g' at the earth surface will-

(1) Decrease

(2) Increase

(3) Remain same

(4) Increase or decrease

Q.3 If R is the average radius of earth, ω is its angular velocity about its axis and g is the gravitational acceleration on the surface of earth then the cube of the radius of orbit of a geostationary satellite will be equal to-

(1) $\frac{R^2 g}{\omega}$ (2) $\frac{R^2 \omega^2}{g}$

(3) $\frac{Rg}{\omega^2}$ (4) $\frac{R^2 g}{\omega^2}$

Q.4 If the radius of a planet becomes half, where as its mass remains unchanged, then g becomes-

(1) Half (2) Doubled

(3) Unchanged (4) Four times

Q.5 Orbital radius of a satellite S of earth is four times that of a communication satellite C. Period of revolution of S is-

(1) 4 days (2) 8 days

(3) 16 days (4) 32 days

Q.6 A missile is launched with a velocity less than the escape velocity. Sum of its kinetic energy and potential energy is-

(1) Positive

(2) Negative

(3) May be negative or positive depending upon its initial velocity

(4) Zero

Q.7 Time period of a satellite revolving round a planet in an orbit of radius R is T. Periodic time of a satellite moving in an orbit of radius 9R will be-

(1) 27 T (2) 81 T

(3) 729 T (4) 3 T

Q.8 More amount of sugar is obtained in 1kg weight-

(1) At north pole

(2) At equator

(3) Between pole and equator

(4) At south pole

Q.9 If a satellite is revolving very close to the surface of earth, then its orbital velocity does not depend upon-

(1) Mass of satellite (2) Mass of earth

(3) Radius of earth (4) Orbital radius

Q.10 If the escape velocity from the surface of earth is v_e and velocity of a satellite revolving near the surface of earth is v then-

(1) $v = \sqrt{2}\, v_e$ (2) $v_e = 2v$

(3) $v_e \approx \sqrt{2v}$ (4) $v_e \approx \sqrt{2}\, v$

Q.11 Two identical satellites are at the heights R and 7R from the earth's surface. Then which of the following statement is incorrect- (R = radius of the earth)

(1) Ratio of total energy of both is 5

(2) Ratio of kinetic energy of both is 4

(3) Ratio of potential energy of both 4

(4) Ratio of total energy of both is 4

Q.12 Imagine a body revolving around a big star in a circular orbit of radius R with time period T. If the force of attraction between star and the body is proportional to $R^{-5/2}$, then T^2 will be proportional to-

(1) R^3 (2) $R^{7/2}$ (3) $R^{3/2}$ (4) $R^{3.75}$

Q.13 The minimum projection velocity of a body from the earth's surface so that it becomes the satellite of the earth ($R_e = 6.4 \times 10^6$ m)

(1) 11×10^3 m/s (2) 8×10^3 m/s

(3) 6.4×10^3 m/s (4) 4×10^3 m/s

Q.14 Geostationary satellite-

(1) is situated at a great height above the surface of earth

(2) moves in equatorial plane

(3) have time period of 24 hours

(4) have time period of 24 hours and moves in equatorial plane

Q.15 A planet whose mass and radius are both half of that of earth consists of a satellite. Acceleration due to gravity (g) at its surface should be-

(1) 29.4 m/sec^2 (2) 19.6 m/sec^2

(3) 9.8 m/sec^2 (4) 4.9 m/sec^2

Q.16 A satellite of mass m moves around the earth along a circular path of radius r. Let m_e is the mass of the earth and R_e is its radius. The linear speed of the satellite depends upon-

(1) m_e and r (2) m_e only

(3) r only (4) m, R_e and r

Q.17 If the radius of earth is reduced by 2% keeping its mass constant, then the weight of the body on its surface will-

(1) increase (2) decrease

(3) remain same (4) either (2) or (3)

Q.18 An earth's satellite is moving in a circular orbit with a uniform speed v. If the gravitational force of the earth suddenly disappears, the satellite will-

(1) vanish into outer space

(2) continue to move with velocity v in original orbit

(3) fall down with increasing velocity

(4) fly off tangentially from the orbit with velocity v

Q.19 The distance of a geostationary satellite from the centre of earth (radius R = 6400 km) is nearly-

(1) 18 R (2) 10 R (3) 7 R (4) 5 R

Q.20 The maximum and minimum distances of a comet from the sun are 8×10^{12} m and 1.6×10^{12} m respecting. If its velocity when it is nearest to the sun is 60 m/sec then what will be its velocity in m/s when it is farthest ?

(1) 12 (2) 60 (3) 112 (4) 6

Q.21 The gravitational potential energy of a body at a distance r from the centre of the earth is U. The force at that point is-

(1) $\frac{U}{r^2}$ (2) $\frac{U}{r}$

(3) Ur (4) Ur^2

Q.22 If the spinning speed of the earth is increased, then the weight of the body at the equator-

(1) does not change

(2) doubles

(3) decreases

(4) increases

Q.23 When the radius of earth is reduced by 1% without changing the mass, then the acceleration due to gravity will-

(1) increase by 2%

(2) decrease by 1.5%

(3) increase by 1%

(4) decrease by 1%

Q.24 A particle falls from infinity to the earth. Its velocity on reaching the earth surface is-

(1) 2Rg (2) Rg

(3) $\sqrt{Rg}$ (4) $\sqrt{2Rg}$

Q.25 Weight of a body of mass m decreases by 1% when it is raised to height h above the earth's surface. If the body is taken to a depth h in a mine, then in its weight will-

(1) decrease by 0.5% (2) decrease by 2%

(3) increase by 0.5% (4) increase by 1%

Q.26 The escape velocity from the earth is 11.2 km/sec. The mass of another planet is 100 times of mass of earth and its radius is 4 times the radius of earth. The escape velocity for the planet is-

(1) 56.0 km/sec (2) 280 km/sec

(3) 112 km/sec (4) 11.2 km/sec

Q.27 Acceleration due to gravity at earth's surface is 'g' m/s^2. Find the effective value of acceleration due to gravity at a height of 32 km from sea level- (R_e = 6400 km)

(1) 0.5 g m/s^2 (2) 0.99 g m/s^2

(3) 1.01 g m/s^2 (4) 0.90 g m/s^2

Q.28 Near the earth's surface time period of a satellite is 1.4 hrs. Find its time period if it is at the distance '4R' from the centre of earth.

(1) 32 hrs. (2) $\left(\frac{1}{8\sqrt{2}}\right)$ hrs.

(3) $8\sqrt{2}$ hrs. (4) 16 hrs.

Q.29 The mass of the moon is 1% of mass of the earth. The ratio of gravitational pull of earth on moon to that of moon on earth will be-

(1) 1 : 1 (2) 1 : 10

(3) 1 : 100 (4) 2 : 1

Q.30 A planet revolves around the sun in an elliptical orbit. If v_p and v_a are the velocities of the planet at the perigee and apogee respectively, then the eccentricity of the elliptical orbit is given by-

(1) $\frac{v_p}{v_a}$ (2) $\frac{v_a - v_p}{v_a + v_p}$

(3) $\frac{v_p + v_a}{v_p - v_a}$ (4) $\frac{v_p - v_a}{v_p + v_a}$

ANSWER KEY

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.	C	B	D	A	A	B	C	A	C	A
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	C	B	D	A	A	D	B	C	D	D
Que.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans.	B	D	C	C	A	A	C	B	A	B