AIPMT 2007

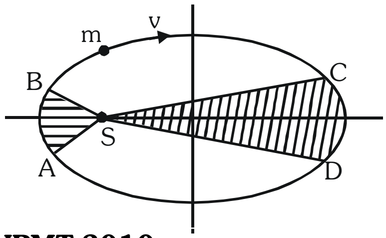
1. Two satellites of earth, S_1 and S_2, are moving in the same orbit. The mass of S_1 is four times the mass of S_2. Which one of the following statements is true ?

(1) The kinetic energies of the two satellites are equal
(2) The time period of S_1 is four times that of S_2
(3) The potential energies of earth and satellite in the two cases are equal
(4) S_1 and S_2 are moving with the same speed

AIPMT 2009

2. The figure shows elliptical orbit of a planet m about the sun S. The shaded area SCD is twice the shaded area SAB. If t_1 is the time for the planet to move from C to D and t_2 is the time to move from A to B then :-

(1) $t_1 = t_2$
(2) $t_1 < t_2$
(3) $t_1 = 4t_2$
(4) $t_1 = 2t_2$



AIPMT 2010

3. The radii of circular orbits of two satellites A and B of the earth, are 4R and R, respectively. If the speed of satellite A is 3V, then the speed of satellite B will be :-

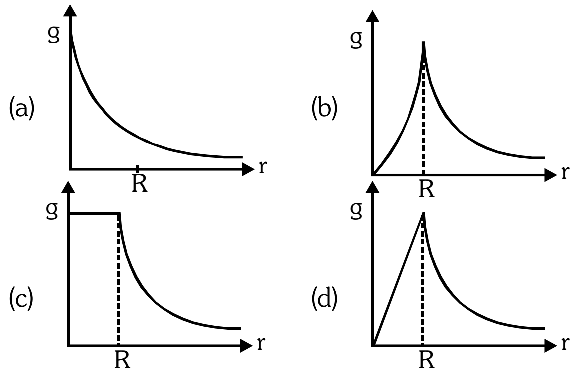
(1) 3V/2 (2) 3V/4
(3) 6V (4) 12V

4. A particle of mass M is situated at the centre of aspherical shell of same mass and radius a. The gravitational potential at a point situated at $\frac{a}{2}$ distance from the centre, will be :-

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

(3) $-\frac{2GM}{a}$ (4) $-\frac{GM}{a}$

5. The dependence of acceleration due to gravity 'g' on the distance 'r' from the centre of the earth, assumed to be a sphere of radius R of uniform density, is as shown in figure below :-



The correct figure is :-
(1) (a) (2) (b) (3) (c) (4) (d)

6. The additional kinetic energy to be provided to a satellite of mass m revolving around a planet of mass M, to transfer it from a circular orbit of radius R_1 to another of radius $R_2 (R_2 > R_1)$ is :-

(1) $GmM\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ (2) $2GmM\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$

(3) $\frac{1}{2}GmM\left(\frac{1}{R_1}-\frac{1}{R_2}\right)$ (4) $GmM\left(\frac{1}{R_1^2}-\frac{1}{R_2^2}\right)$

AIPMT 2011

7. A planet moving along an elliptical orbit is closest to the sun at a distance r_1 and farthest away at a distance of r_2. If v_1 and v_2 are the linear velocities at these points respectively, then the ratio $\frac{v_1}{v_2}$ is :-

(1) $(r_1/r_2)^2$ (2) r_2/r_1
(3) $(r_2/r_1)^2$ (4) r_1/r_2

AIPMT Pre. 2012

8. A spherical planet has a mass M_p and diameter D_p. A particle of mass m falling freely near the surface of this planet will experience an aceleration due to gravity, equal to :-

(1) GM_p/D_p^2 (2) $4GM_pm/D_p^2$
(3) $4GM_p/D_p^2$ (4) GM_pm/D_p^2

9. A geostationary satellite is orbiting the earth at a height of 5R above that surface of the earth, R being the radius of the earth. The time period of another satellite in hours at a height of 2R from the surface of the earth is :-

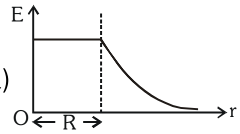
(1) $6\sqrt{2}$ (2) $6/\sqrt{2}$ (3) 5 (4) 10

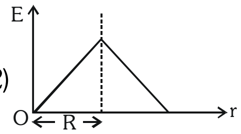
10. The height at which the weight of a body becomes $1/16^{th}$, its weight on the surface of earth (radius R), is :-

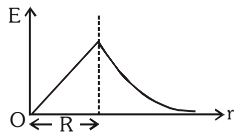
(1) 3R (2) 4R (3) 5R (4) 15R

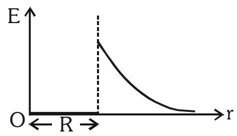
AIPMT Mains 2012

11. Which one of the following plots represents the variation of gravitational field on a particle with distance r due to a thin spherical shell of radius R? (r is measured from the centre of the spherical shell)

(1) 

(2) 

(3) 

(4) 

12. If v_e is escape velocity and v_0 is orbital velocity of a satellite for orbit close to the earth's surface, then these are related by :

(1) $v_e = \sqrt{2v_0}$ (2) $v_e = \sqrt{2}v_0$

(3) $v_0 = \sqrt{2}v_e$ (4) $v_0 = v_e$

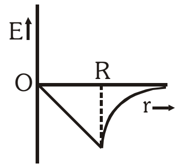
AIPMT 2014

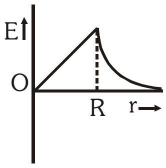
13. A black hole is an object whose gravitational field is so strong that even light cannot escape from it. To what approximate radius would earth (mass = 5.98×10^{24} kg) have to be compressed to be a black hole ?

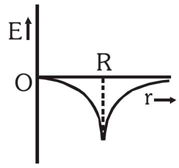
(1) 10^{-9} m (2) 10^{-6} m

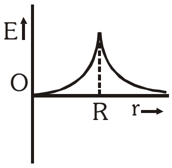
(3) 10^{-2} m (4) 100 m

14. Dependence of intensity of gravitational field (E) of earth with distance (r) from centre of earth is correctly represented by :-

(1) 

(2) 

(3) 

(4) 

AIPMT 2015

15. Kepler's third law states that square of period of revolution (T) of a planet around the sun, is proportional to third power of average distance r between sun and planet

i.e. $T^2 = Kr^3$

here K is constant.

If the masses of sun and planet are M and m respectively then as per Newton's law of gravitation force of attraction between them is

$F = \frac{GMm}{r^2}$, here G is gravitational constant.

The relation between G and K is described as :

(1) $GMK = 4\pi^2$ (2) $K = G$

(3) $K = \frac{1}{G}$ (4) $GK = 4\pi^2$

Re-AIPMT 2015

16. A satellite S is moving in an elliptical orbit around the earth. The mass of the satellite is very small compared to the mass of the earth. Then,

(1) the acceleration of S is always directed towards the centre of the earth.

(2) the angular momentum of S about the centre of the earth changes in direction, but its magnitude remains constant.

(3) the total mechanical energy of S varies periodically with time.

(4) the linear momentum of S remains constant in magnitude.

17. A remote - sensing satellite of earth revolves in a circular orbit at a height of 0.25×10^6 m above the surface of earth. If earth's radius is 6.38×10^6 m and g=9.8 m/s^2, then the orbital speed of the satellite is :

(1) 6.67 km/s (2) 7.76 km/s

(3) 8.56 km/s (4) 9.13 km/s

NEET-I 2016

18. At what height from the surface of earth the gravitation potential and the value of g are -5.4×10^7 J/kg and 6.0 m/s^2 respectively ? Take the radius of earth as 6400 km :

(1) 2600 km (2) 1600 km

(3) 1400 km (4) 2000 km

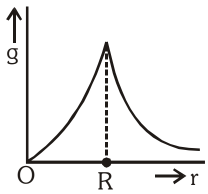
19. The ratio of escape velocity at earth (v_e) to the escape velocity at a planet (v_p) whose radius and mean density are twice as that of earth is :-

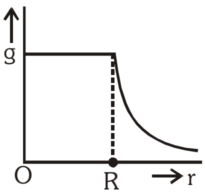
(1) 1 : 2 (2) 1 : $2\sqrt{2}$

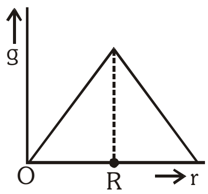
(3) 1 : 4 (4) 1 : $\sqrt{2}$

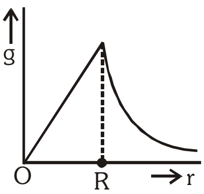
NEET-II 2016

20. Starting from the centre of the earth having radius R, the variation of g (acceleration due to gravity) is shown by :-

(1) 

(2) 

(3) 

(4) 

21. A satellite of mass m is orbiting the earth (of radius R) at a height h from its surface. The total energy of the satellite in terms of g_0, the value of acceleration due to gravity at the earth's surface, is:-

(1) $\frac{2mg_0R^2}{R+h}$ (2) $-\frac{2mg_0R^2}{R+h}$

(3) $\frac{mg_0R^2}{2(R+h)}$ (4) $-\frac{mg_0R^2}{2(R+h)}$

NEET(UG) 2017

22. The acceleration due to gravity at a height 1 km above the earth is the same as at a depth d below the surface of earth. Then :-

(1) d = 1 km (2) d = $\frac{3}{2}$ km

(3) d = 2 km (4) d = $\frac{1}{2}$ km

23. Two astronauts are floating in gravitational free space after having lost contact with their spaceship. The two will :-

(1) Move towards each other.

(2) Move away from each other.

(3) Will become stationary

(4) Keep floating at the same distance between them.

NEET(UG) 2018

24. If the mass of the Sun were ten times smaller and the universal gravitational constant were ten time larger in magnitude, which of the following is ***not*** correct ?

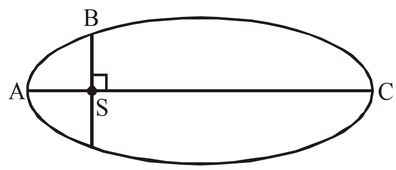
(1) Raindrops will fall faster

(2) Walking on the ground would become more difficult

(3) Time period of a simple pendulum on the Earth would decrease

(4) 'g' on the Earth will not change

25. The kinetic energies of a planet in an elliptical orbit about the Sun, at positions A, B and C are K_A, K_B and K_C respectively. AC is the major axis and SB is perpendicular to AC at the position of the Sun S as shown in the figure. Then



(1) $K_A < K_B < K_C$

(2) $K_A > K_B > K_C$

(3) $K_B < K_A < K_C$

(4) $K_B > K_A > K_C$

NEET(UG) 2019

26. A body weighs 200 N on the surface of the earth. How much will it weigh half way down to the centre of the earth ?

(1) 150 N (2) 200 N

(3) 250 N (4) 100 N

27. The work done to raise a mass m from the surface of the earth to a height h, which is equal to the radius of the earth, is :

(1) mgR (2) 2 mgR

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

NEET(UG) 2019 (Odisha)

28. The time period of a geostationary satellite is 24 h, at a height $6R_E$ (R_E is radius of earth) from surface of earth. The time period of another satellite whose height is 2.5 R_E from surface will be,

(1) $6\sqrt{2}$ h (2) $12\sqrt{2}$ h

(3) $\frac{24}{2.5}$ h (4) $\frac{12}{2.5}$ h

29. Assuming that the gravitational potential energy of an object at infinity is zero, the change in potential energy (final – initial) of an object of mass m, when taken to a height h from the surface of earth (of radius R), is given by,

(1) $-\frac{GMm}{R+h}$ (2) $\frac{GMmh}{R(R+h)}$

(3) mgh (4) $\frac{GMm}{R+h}$

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