Class : NEET Repeaters Sub: Physics Worksheet–42 Date: 08-03-2019

Gravitation–1

1. Mass particles of 1kg each are placed along x-axis at x=1, 2, 4, 8, ……∞. Then gravitational force on a mass of 3kg placed at origin is (G=universal gravitational constant)
   (A) 4G (B) 4G/3 (C) 2G (D) ∞

2. Three identical bodies (each mass M) are placed at vertices of an equilateral triangle of arm L, keeping the triangle as such by which angular speed the bodies should be rotated in their gravitational fields so that the triangle moves along circumference of circular orbit
   (A) $\sqrt{\frac{3GM}{L^3}}$ (B) $\sqrt{\frac{GM}{L^3}}$ (C) $\sqrt{\frac{3G}{3L^3}}$ (D) $3\sqrt{\frac{GM}{L^3}}$

3. If the distance between the centres of earth and moon is D and mass of earth is 81 times that of moon. At what distance from the centre of earth gravitational force will be zero
   (A) $\frac{D}{2}$ (B) $\frac{2D}{3}$ (C) $\frac{4D}{5}$ (D) $\frac{9D}{10}$

4. Mars has a diameter of approximately 0.5 of that of earth, and mass of 0.1 of that of earth. The surface gravitational field strength on mars as compared to that on earth is a factor of
   (A) 0.1 (B) 0.2 (C) 2.0 (D) 0.4

5. If the earth stops rotating suddenly, the value of g at a place other than poles would
   (A) Decrease (B) Remain constant (C) Increase
   (D) Increase or decrease depending on the position of earth in the orbit round the sun

6. Imagine a new planet having the same density as that of earth but is 3 times bigger than the earth in size. If the acceleration due to gravity on the surface of earth is g and that on the surface of the new planet is g', then :
   (A) $g' = 3g$ (B) $g' = g/9$ (C) $g' = 9g$ (D) $g' = 27g$

7. The change in the value of 'g' at a height 'h' above the surface of the earth is same as at a depth 'd'. If 'd' and 'h' are much smaller than the radius of earth, then which one of the following is correct?
   (A) d = h (B) d = 2h (C) d= $\frac{3h}{2}$ (D) d = h/2

8. The imaginary angular velocity of the earth for which the effective acceleration due to gravity at the equator shall be zero is equal to

[Take g=10m/s^2 for the acceleration due to gravity if the earth were at rest and radius of earth equal to 6400 km.]

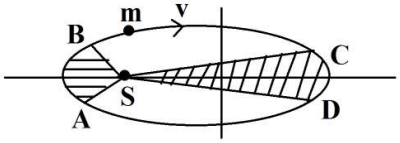
(A) 1.25 x 10^{-3} rad/s (B) 2.50 x 10^{-3} rad/s

(C) 3.75 x 10^{-3} rad/s (D) 5.0 x 10^{-3} rad/s

9. The earth revolves around the sun in one year. If distance between them becomes double, the new time period of revolution will be

(A) $4\sqrt{2}$ years (B) $2\sqrt{2}$ years (C) 4 years (D) 8 years

10. 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



(A) $t_1 = t_2$ (B) $t_1 < t_2$

(C) $t_1 = 4t_2$ (D) $t_1 = 2t_2$

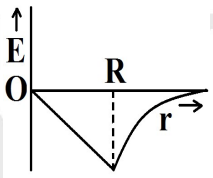
11. A planet moving along an elliptical orbit is closest to the sun at a distance r_1 and farthest away at a distance of r_2. If v_1 and v_2 are the linear velocities at these points respectively, then the ratio $\frac{v_1}{v_2}$ is

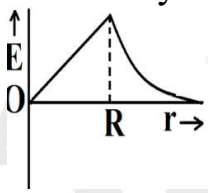
(A) $(r_1/r_2)^2$ (B) r_2/r_1 (C) $(r_2/r_1)^2$ (D) r_1/r_2

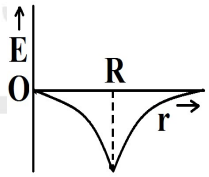
12. The height at which the weight of a body becomes 1/16th, its weight on the surface of earth (radius R), is

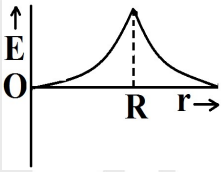
(A) 3R (B) 4R (C) 5R (D) 15R

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

(A) 

(B) 

(C) 

(D) 

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

(A) move towards each other (B) move away from each other

(C) will become stationary (D) keep floating at the same distance between them.

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

(A) Raindrops will fall faster.

(B) Walking on the ground would become more difficult.

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

(D) 'g' on the Earth will not change.

Physics Worksheet–42				Gravitation–1									08-03-2019
1-A	2-A	3-D	4-D	5-C	6-A	7-B	8-A	9-B	10-D	11-B	12-A	13-A	14-A	15-D