DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : PHYSICS**
Date : **DPP No. : 4**

Topic :- GRAVITATION

1. The time period T of the moon of planet Mars ($mass\ M_m$) is related to its orbital radius R(G = Gravitational constant) as
   a) $T^2 = \frac{4\pi^2 R^3}{GM_m}$ b) $T^2 = \frac{4\pi^2 GR^3}{M_m}$ c) $T^2 = \frac{2\pi R^3 G}{M_m}$ d) $T^2 = 4\pi M_m G R^3$

2. The mean radius of the earth is R, its angular speed on its own axis is ω and the acceleration due to gravity at earth's surface is g. The cube of the radius of the orbit of a geostationary satellite will be
   a) $R^2 g/\omega$ b) $R^2\omega^2/g$ c) Rg/ω^2 d) $R^2 g/\omega^2$

3. The escape velocity from the earth is 11 kms^{-1}. The escape velocity from a planet having twice the radius and the same mean density as the earth would be
   a) 5.5 kms^{-1} b) 11 kms^{-1} c) 15.5 kms^{-1} d) 22 kms^{-1}

4. If the Earth losses its gravity, then for a body
   a) Weight becomes zero, but not the mass b) Mass becomes zero, but not the weight
   c) Both mass and weight become zero d) Neither mass nor weight become zero

5. A body of mass 500 g is thrown upward with a velocity 20ms^{-1} and reaches back to the surface of a planet after 20 s. Then the weight of the body on that planet is
   a) 2 N b) 4 N c) 5 N d) 1 N

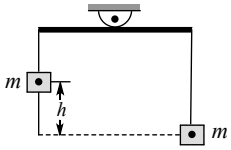
6. Hubble's law states that the velocity with which milky ways is moving away from the earth is proportional to
   a) Square of the distance of the milky way from the earth
   b) Distance of milky way from the earth
   c) Mass of the milky way
   d) Product of the mass of the milky way and its distance from the earth

7. Which of the following statements is correct in respect of a geostationary satellite
   a) It moves in a plane containing the Greenwich meridian
   b) It moves in a plane perpendicular to the celestial equatorial plane
   c) Its height above the earth's surface is about the same as the radius of the earth
   d) Its height above the earth's surface is about six times the radius of the earth

8. A planet moves around the sun. At a given point P, it is closest from the sun at a distance d_1 and has a speed v_1. At another point Q, when it is farthest from the sun at a distance d_2, its speed will be

a) $\frac{d_1^2 v_1}{d_2^2}$ b) $\frac{d_2 v_1}{d_1}$ c) $\frac{d_1 v_1}{d_2}$ d) $\frac{d_2^2 v_1}{d_1^2}$

9. Two equal mass m and m are hung from balance whose scale pans differ in vertical height by h. Calculate the error in weighing. If any, in terms of density of earth ρ.



a) $\frac{2}{3}\pi\rho R^3 Gm$ b) $\frac{8}{3}\pi\rho Gm\mathrm{h}$ c) $\frac{8}{3}\pi\rho R^3 Gm$ d) $\frac{4}{3}\pi\rho Gm^2\mathrm{h}$

10. To an astronaut in a spaceship, the sky appears

a) Black b) White c) Green d) Blue

11. If ρ is the density of the planet, the time period of nearby satellite is given by

a) $\sqrt{\frac{4\pi}{3G\rho}}$ b) $\sqrt{\frac{4\pi}{G\rho}}$ c) $\sqrt{\frac{3\pi}{G\rho}}$ d) $\sqrt{\frac{\pi}{G\rho}}$

12. Two planets of radii in the ratio 2:3 are made from the material of density in the ratio 3:2. Then, the ratio of acceleration due to gravity $\frac{g_1}{g_2}$ at the surface of the two planets will be

a) 1 b) 2.25 c) 4/9 d) 0.12

13. A planet has twice the radius but the mean density is $\frac{1}{4}$th as comparsed to earth.What is the ratio of escape velocity from earth to that from the planet?

a) 3:1 b) 1:2 c) 1:1 d) 2:1

14. The ratio $\frac{g}{g_\mathrm{h}}$, where g and g_h are the accelerations due to gravity at the surface of the earth and at a height h above the earth's surface respectively, is

a) $\left(1+\frac{\mathrm{h}}{R}\right)^2$ b) $\left(1+\frac{R}{\mathrm{h}}\right)^2$ c) $\left(\frac{R}{\mathrm{h}}\right)^2$ d) $\left(\frac{\mathrm{h}}{R}\right)^2$

15. Orbital velocity of an artificial does not depend upon

a) Mass of the earth b) Mass of the satellite
c) Radius of the earth d) Acceleration due to gravity

16. Which is constant for a satellite in orbit

a) Velocity b) Angular momentum c) Potential energy d) Acceleration

17. An object weighs 10N at the north-pole of the earth. In a geostationary satellite distance $7R$ from the centre of earth (of radius R) what will be its true weight?

a) 3 N b) 5 N c) 2 N d) 0.2 N

18. Escape velocity on the earth
    a) Is less than that on the moon
    b) Depends upon the mass of the body
    c) Depends upon the direction of projection
    d) Depends upon the height from which it is projected

19. The acceleration of a body due to the attraction of the earth (radius R) at a distance $2R$ from the surface of the earth is (g = acceleration due to gravity at the surface of the earth)
    a) $\frac{g}{9}$ b) $\frac{g}{3}$ c) $\frac{g}{4}$ d) g

20. The mass of the moon is $1/8$ of the earth but the gravitational pull is $1/6$ of the earth. It is due to the fact that
    a) Moon is the satellite of the earth
    b) The radius of the earth is 8.6 the moon
    c) The radius of the earth is $\sqrt{8/6}$ of the moon
    d) The radius of the moon is $6/8$ of the earth