DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth **SUBJECT : PHYSICS**
Date : **DPP No. : 7**

Topic :- GRAVITATION

1. Two satellite A and B go round a planet orbits having radii $4R$ and R, respectivly. If the speed of satellite A is $3v$, then speed of satellite B is
   a) $\frac{3v}{2}$ b) $\frac{4v}{2}$ c) $6v$ d) $12v$

2. Rockets are launched in Eastward direction to take advantage of
   a) The clear sky on Eastesn side
   b) The thinner atmosphere on this side
   c) Earth's rotation
   d) Earth's tilt

3. If the moon is to escape from the gravitational field of the earth forever, it will require a velocity
   a) $11.2\ \text{kms}^{-1}$
   b) Less than $11.2\ \text{kms}^{-1}$
   c) Slightly more than $111.2\ \text{kms}^{-1}$
   d) $22.4\ \text{kms}^{-1}$

4. A uniform ring of mass M and radius r is placed directly above a uniform sphere of mass $8M$ and of same radius R. The centre of the ring is at a distance of $d = \sqrt{3}R$ from the centre of the sphere. The gravitational attraction beween the sphere and the ring is
   a) $\frac{GM^2}{R^2}$ b) $\frac{3GM^2}{2R^2}$ c) $\frac{2GM^2}{\sqrt{2}R^2}$ d) $\frac{\sqrt{3}GM^2}{R^2}$

5. The time period of a satellite of earth is 5h. If the separation between the earth and the satellite is increased to 4 times the previous value, the new time period will become
   a) 10 h b) 18 h c) 40 h d) 20 h

6. Two particles of equal mass m go around a circle of radius *R* under the action of their mutual gravitational attraction. The speed of each particle with respect to their center of mass is
   a) $\sqrt{\frac{Gm}{R}}$ b) $\sqrt{\frac{Gm}{4R}}$ c) $\sqrt{\frac{Gm}{3R}}$ d) $\sqrt{\frac{Gm}{2R}}$

7. A pendulum clock is set to give correct time at the sea level. This clock is moved to hill station at an altitude of $2500\ m$ above the sea level. In order to keep correct time of the hill station, the length of the pendulum
   a) Has to be reduced
   b) Has to be increased
   c) Needs no adjustment
   d) Needs no adjustment but its mass has to be increased

8. A particle falls towards earth from infinity. It's velocity on reaching the earth would be
   a) Infinity
   b) $\sqrt{2gR}$
   c) $2\sqrt{gR}$
   d) Zero

9. The acceleration due to gravity on a planet is $1.96\ \text{ms}^{-2}$. If it is safe to jump from a height of 3 m on the earth, the corresponding height on the planet will be
   a) 3 m
   b) 6 m
   c) 9 m
   d) 15 m

10. Weight of $1kg$ becomes 1/6 on moon. If radius of moon is $1.768 \times 10^6\ m$, then the mass of moon will be
   a) $1.99 \times 10^{30}kg$
   b) $7.56 \times 10^{22}kg$
   c) $5.98 \times 10^{24}kg$
   d) $7.65 \times 10^{22}kg$

11. A satellite in launched in a circular orbit of radius R around the earth. A second satellite is launch in to an orbit of radius 1.01R . The period of second satellite is longer than the first one (approximately) by
   a) 1.5 %
   b) 0.5%
   c) 3%
   d) 1%

12. At a distance 320 km above the surface of earth, the value of acceleration due to gravity will be lower than its value on the surface of the earth by nearly (radius of earth = 6400 km)
   a) 2%
   b) 6%
   c) 10%
   d) 14%

13. Escape velocity on the surface of earth is $11.2\ km/s$. Escape velocity from a planet whose mass is the same as that of earth and radius 1/4 that of earth is
   a) $2.8\ km/s$
   b) $15.6\ km/s$
   c) $22.4\ km/s$
   d) $44.8\ km/s$

14. The period of moon's rotation around the earth is nearly $29\ days$. If moon's mass were 2 fold, its present value and all other things remained unchanged, the period of moon's rotation would be nearly
   a) $29\sqrt{2}\ days$
   b) $29\sqrt{2}\ days$
   c) $29 \times 2\ days$
   d) $29\ days$

15. A missile is launched with a velocity less than the escape velocity. The sum of its kinetic and potential energy is
   a) Positive
   b) Negative
   c) Zero
   d) May be positive or negative depending upon its initial velocity

16. If a planet of given density were made larger its force of attraction for an object on its surface would increase because of planet's greater mass but would decease because of the greater distance from the object to the centre of the planet. Which effect predominate?
    a) Increases in mass
    b) Increase in radius
    c) Both affect attraction equally
    d) None of the above

17. A body is orbiting around earth at a mean radius which is two times as greater as parking orbit of a satellite, the period of body is
    a) 4 days
    b) 16 days
    c) $2\sqrt{2}$ days
    d) 64 days

18. If suddenly the gravitational force of attraction between earth and a satellite revolving around it becomes zero, then the satellite will
    a) Continue to move in its orbit with same velocity
    b) Move tangentially to the original orbit with the same velocity
    c) Become stationary in its orbit
    d) Move towards the earth

19. A geostationary satellite is revolving around the earth. To make it escape from gravitational field of earth, its velocity must be increased
    a) 100%
    b) 41.4%
    c) 50%
    d) 59.6%

20. A satellite is orbiting around the earth with orbital radius R and time period T. The quantity which remain constant is
    a) T/R
    b) T^2/R
    c) T^2/R^2
    d) T^2/R^3