MULTIPLE CHOICE QUESTIONS (MCQs)

(1) The unit of angular momentum are:

* Newton sec * Joule sec * Newton meter * Joule meter

(2) The physical quantity which produce angular acceleration is called:

* Work * Force * Torque * Power

(3) Two forces which are equal in magnitude but opposite in direction and not acting on the same line constitute a:

* Circle * Couple * Power * Force

(4) A body may be in equilibrium when:

* It is in motion *It is at rest
* It is moving with a uniform acceleration
* It is moving with variable velocity

(5) The rate of change of angular momentum is equal to the: **(2010)**

* Force exerted on the body * Torque
* Force exerted by the body * Angular momentum

(6) Every point of a rotating rigid body has the same:

* Linear velocity * Linear momentum
* Angular velocity * Linear acceleral

(7) The dimension of the angular momentum is: **(2010)**

* ML^2T^{-1} * $ML^{-1}T^{-2}$ * ML^2T^{-2} * ML^2T^{-3}

(8) When the net torque acting on a system is zero which of the following will be constant:

* Force * Angular momentum
* Linear momentum * Angular velocity

(9) Torque is defined as:

* Time rate of change of linear velocity
* Time rate of change of angular velocity
* Time rate of change of linear momentum
* Time rate of change of angular momentum

(10) The centre of mass of a system of particles:

* Coincides with C.G * Does not coincides with C.G
* Coincides with C.G in the uniform gravitational field * Non of these

(11) The angular momentum is the cross product of position vector and:

* Linear velocity
* Linear momentum
* Linear acceleration
* None of these

(12) The dimension of torque are:

* ML^2T
* ML^2T^2
* ML^2T^{-2}
* MLT^2

(13) Which of the following as a spin motion:

* The motion of the plants round the sum
* The motion of electron round the nucleus
* The motion of the moon round the earth
* The daily rotation of earth causing day and night

(14) The torque acting on a body is given by:

* $\frac{1}{2} \times (\vec{r} \times \vec{F})$
* $\vec{r} \times \vec{F}$
* $\vec{r} \times \frac{1}{2}\vec{F}$
* $\vec{F} \times \vec{r}$

(15) For maximum torque the angle between $\vec{r}$ and $\vec{F}$ should be equal to:

* 0°
* 30°
* 45°
* 90°

(16) Conventionally anti-clockwise torque is taken as:

* Positive
* Negative
* Zero
* None of these

(17) The term torque is also known as:

* Momentum of inertial
* Angular velocity
* Momentum of force
* Couple

(18) Angular momentum is measured as:

* rF
* rP Cos θ
* rP Sin θ
* rP Tan θ

(19) The S.I unit of angular momentum is:

* g m/sec
* kg m/sec
* kg m^2/sec
* kg m^2/sec^2

(20) The total weight of body acts at:

* Its centre
* Its centre of gravity
* Its two point
* Many points

(21) A body is said to be in state of complete equilibrium if:

* Its rotational acceleration is zero
* Its translational acceleration is zero
* Its rotational and translational acceleration zero
* Its linear momentum is zero

(22) A body will be in rotational equilibrium if:

* $\sum \vec{F} = 0$ * $\sum \vec{P} = 0$ * $\sum \vec{\tau} = 0$ * $\sum \vec{L} = 0$

(23) A body will be in translational equilibrium if:

* $\sum \vec{F} = 0$ * $\sum \vec{P} = 0$ * $\sum \vec{\tau} = 0$ * $\sum \vec{L} = 0$

(24) The first condition for equilibrium of a body is that the:

* Velocity be zero * Acceleration be zero
* Vector sum of all the forces be zero * Vector sum of all the torques be zero

(25) The second condition for equilibrium of a body is that the:

* Velocity be zero * Acceleration be zero
* Vector sum of all the forces be zero * Vector sum of all the torques be zero

(26) Let torque $\vec{\tau} = \vec{r} \times \vec{F}$. The direction of torque is:

* In the direction of $\vec{r}$ * In the direction of $\vec{F}$
* Opposite to the direction of $\vec{F}$ * Normal to the plane containing $\vec{r} \times \vec{F}$

(27) Two equal and opposite forces acting on a body form a:

* Linear momentum * Torque * Couple * None of these

(28) For the angular momentum of a system to remains constant the external torque should be:

* Small * Large * Zero * None of these

(29) The direction of torque and angular momentum is determine by the:

* Left hand rule * Right hand rule * Addition of vector * None of these

(30) The torque and angular momentum are related to each other by the expression:

* $\vec{\tau} = \vec{L} \times t$ * $\vec{\tau} = \frac{L}{2t}$ * $\vec{\tau} = \frac{\vec{L}}{t}$ * $\vec{\tau} = \vec{L} \times t^2$

(31) If the axis of a rotating body passes through the body itself, then it's motion is called:

* Linear motion * Orbital motion
* Spin motion * Simple harmonic motion

(32) The magnitude of torque due to couple depends on:

* The distance of $(\vec{F})$ from origin * The distance of $(-\vec{F})$ from origin
* The distance between $\vec{F}$ and $-\vec{F}$ * None of these

ANSWER KEY

(1) Joule sec	**(2)** Torque	**(3)** Couple
(4) It is at rest	**(5)** Torque	**(6)** Angular velocity
(7) ML^2T^{-1}	**(8)** Angular momentum	**(9)** Time rate of change of angular momentum
(10) Coincides with C.G in the uniform gravitational field	**(11)** Linear momentum	**(12)** ML^2T^{-2}
(13) The daily rotation of earth causing day and night	**(14)** $\vec{r} \times \vec{F}$	**(15)** 0^o
(16) Positive	**(17)** Momentum of force	**(18)** rP Sin θ
(19) kg m^2/sec	**(20)** Its centre of gravity	**(21)** Its rotational and translational acceleration zero
(22) $\Sigma \vec{\tau} = 0$	**(23)** $\Sigma \vec{F} = 0$	**(24)** Vector sum of all the forces be zero
(25) Vector sum of all the forces be zero	**(26)** Normal to the plane containing $\vec{r} \times \vec{F}$	**(27)** Couple
(28) Zero	**(29)** Right hand rule	**(30)** $\vec{\tau} = \frac{\vec{L}}{t}$
(31) Spin motion	**(32)** The distance between $\vec{F}$ and $-\vec{F}$	

MULTIPLE CHOICE QUESTIONS (MCQs)

(1) The time period of Moon around the earth is: [2003]

* 29 days * 30 days * 27.3 days * 28.29 days

(2) If the distance between two masses is doubled the gravitational force between them is:

* One third * One fourth * Two time * Three time

(3) G is called:

* Gravitational constant * Gravitational acceleration
* Force of Gravitation * Gravitational reaction

(4) In S.I unit the value of G is:

* $6.673 \times 10^{-11}\ Nm^2/kg^2$ * $7.67 \times 10^{-11}\ Nm^2/kg^2$
* $8.67 \times 10^{-11}\ Nm^2/kg^2$ * $9.67 \times 10^{-11}\ Nm^2/kg^2$

(5) The weight of a 60kg object at the centre of the Moon will be:

* 588N * 98N * 60N * Zero [2006 F]

(6) The mass of the earth can be calculate by the relation:

* $\frac{Reg}{G}$ * $\frac{Re^2g}{G}$ * $\frac{Reg^2}{G}$ * $\frac{Re^2g^2}{G}$

(7) The average density of the earth is equal to:

* $2500\ kg/m^3$ * $5000\ kg/m^3$ * $5500\ kg/m^3$ * $5600\ kg/m^3$

(8) The force of gravitation between two bodies 1m apart and each of 1000kg is:

* $6.67 \times 10^{-11}N$ * $6.67 \times 10^{5}N$ * $6.67 \times 10^{-5}N$ * $6.67 \times 10^{-6}N$

(9) The mass of the earth comes out to be:

* $6.67 \times 10^{13}kg$ * $6.025 \times 10^{23}kg$ * $1.6 \times 10^{19}kg$ * $6 \times 10^{24}kg$

(10) The magnitude of the force of attraction between two bodies is equal to:

* $G\frac{m_1m_2}{r}$ * $G\frac{m_1m_2}{r^2}$ * $g\frac{m_1m_2}{r}$ * $g\frac{m_1m_2}{r^2}$

(11) The acceleration due to gravity on the surface of earth can be calculated as:

* $G\frac{Me}{Re^2}$ * $G\frac{Me^2}{Re^2}$ * $G\frac{Me^2}{Re}$ * $G\frac{Me}{Re}$

(12) The value of "g" at height "h" from the surface of the earth is equal to:

* $g-\frac{2gh}{Re}$ * $g+\frac{2gh}{Re}$ * $g-\frac{gh}{Re}$ * $g-\frac{gh}{Re^2}$

(13) If a man goes to a height equal to the radius the earth from its surface his weight relative to that of earth would becomes: [2011]

* W/2 * W * 2W * W/4

(14) If the radius of the earth were to shrink and its mass were to remain the same the acceleration due to gravity on the surface of the earth will:

* Decrease * Remain the same * Increase * None of these

(15) Above the surface of earth if we go to a distance equal to double earth radius: [2007 F]

* One-ninth * One-third * One-fourth *One-half

(16) The ocean tides are caused by gravitational force exerted on earth by: [2005]

* Moon only * Sun only
* Both the Sun and the Moon * Jupiter only

(17) If we go up from the surface of the earth to a distance equal to the radius of the earth the value of g will be: [2008 S, 2008, 2007 S, 2005 F, 2009]

* $\frac{1}{2}g$ * $\frac{1}{4}g$ * 2g * 2g

(18) The value of g at the centre of the earth is:

* Zero * $9.80\ m/s^2$ * $9.81\ m/s^2$ * $4.9\ m/s^2$

(19) At what depth below the surface of the earth the value of "g" reduces to one half of its value on the earth surface:

✔ Re/2 * Re/4 * Re * 2Re

(20) If the mass of the earth becomes four times large the value of g will:

* Remain unchanged * Be doubled
✔ Become four times large * Become 5th time large

(21) The acceleration due to gravity on a planet with mass and radius half that of the earth will:

* g/2 * g/4 * g ✔ 2g

(22) As we go below the surface of the earth, the value of g:

* Increases ✔ Decreases * Remains constant * Reduces to zero

(23) The weight of the body at the centre of the earth is: [2007 S]

* Slightly less * Slightly greater ✔ Zero * Infinity

(24) The frequency of rotation of a spaceship about its own axis to create artificial gravity like that on earth is:

* $\upsilon = \frac{1}{2\pi}\sqrt{R/g}$ ✔ $\upsilon = \frac{1}{2\pi}\sqrt{g/R}$ * $\upsilon = \frac{1}{2\pi}\sqrt{g/R^2}$ * $\upsilon = 2\pi\sqrt{g/R}$

(25) A man in an elevator ascending with an acceleration will conclude that his weight has:

✔ Increase * Decrease * Remain constant * None of these

(26) A man in an elevator descending with an acceleration will conclude that his weight has:

* Increase ✔ Decrease * Remain constant * None of these

(27) The value of "g" at a depth "x" below the surface of earth is equal to:

✔ $g - \frac{gx}{2Re}$ * $g - \frac{Rey}{g}$ * $g - \frac{gx}{Re}$ * $g + \frac{gx}{Re}$

(28) The apparent weight of a body in a satellite orbiting around the earth is always: [2007, 2006, 2013 Failure]

✔ Zero * mg * Increasing * None of these

(29) The apparent weight of a person standing in an elevator which is moving down with uniform acceleration will be:

* Same as that on the surface of the earth
* Greater than its weight on the surface of the earth
✔ Less than its weight on the surface of the earth
* None of these

(30) Artificial gravity is produced in a space craft to:

* Increase the weight of the astronaut * Decrease the weight of the astronaut
✔ Overcome the state of weightlessness * Overcome the force of friction

(31) An elevator starts up from rest at the basement with the initial acceleration of $4m/s^2$. A passenger in the elevator will feel that his weight has been:

✔ Increased * Decreased * Reduced to zero * None of these

(32) If a body of mass 10kg is allowed to fall freely its weight becomes.

✔ Zero * 98N * 9.8N * 980N

(33) The acceleration due to gravity on the surface of moon is $\frac{1}{6}$ of it's value on earth. What will be it's mass on moon if it's mass on earth is m [2011 F]

* $\frac{m}{6}$ * $\frac{m}{4}$ * 6m ✔ m

ANSWER KEY

1. 27.3 days	**2.** One-fourth
3. Gravitational constant	**4.** $6.673 \times 10^{-11} Nm^2/kg^2$
5. Zero	**6.** $\frac{Re^2 g}{G}$
7. $5500\ kg/m^3$	**8.** $6.67 \times 10^{-5}\ N$
9. $6 \times 10^{24}\ kg$	**10.** $G\frac{m_1 m_2}{r^2}$
11. $G\frac{Me}{Re^2}$	**12.** $g - \frac{2gh}{Re}$
13. W/4	**14.** Increase
15. One-ninth	**16.** Both Sun and Moon
17. ¼ g	**18.** Zero
19. Re/2	**20.** Become four time large
21. 2g	**22.** Decreases
23. Zero	**24.** $\upsilon = \frac{1}{2\pi}\sqrt{g/R}$
25. Increase	**26.** Decrease
27. $g - \frac{gx}{Re}$	**28.** Zero
29. Less than its weight on the surface of the earth	**30.** Over come the state of weight lessness
31. Increased	**32.** Zero
33. m	