MODERN SCIENCE ACADEMY

4. "TURNING EFFECT OF FORCES"

Sr.	Statements	A	B	C	D
1	Two equal but unlike parallel forces having different line of action of force produce:	a torque	a couple	equilibrium	neutral equilibrium
2	The number of forces that can be added by head to tail rule:	2	3	4	any number
3	Number of perpendicular components of a force:	1	2	3	4
4	A force of 10 N is making an angle of 30° with the horizontal. Its horizontal component will be:	4 N	5 N	7 N	8.7 N
5	A body is in equilibrium when its:	acceleration is uniform	speed is uniform	both A & B	acceleration is zero
6	A body is in neutral equilibrium when its centre of gravity:	is at highest position	is at lowest position	keeps its height if displaced	is situated at its bottom
7	Racing cars are made stable by:	increasing their speed	decreasing their mass	decreasing their COG	decreasing their width
8	Torque acting on a football is _____ if the line of action of the applied force passes through its centre of mass.	maximum	minimum	zero	1
9	If the body is at rest or moving with uniform rotational velocity, torque acting on the body will be:	maximum	minimum	zero	infinite
10	If the body is moving with uniform velocity or rotating with uniform rotational velocity, it is said to be in:	static equilibrium	dynamic equilibrium	both A & B	non equilibrium
11	A boy exerts force on a body, that moves without rotation. The location on the body where force is applied, is known as:	midpoint	centre of gravity	centre of mass	all of these
12	If x and y component of force are 5N and 12N respectively. The magnitude of force is:	5 N	13 N	17 N	7 N
13	A body in equilibrium must not have:	speed	momentum	velocity	acceleration
14	You are trying to loosen a nut with a spanner but it is not happening. What would you do to loosen the nut?	insert a pipe to increase length of spanner	use a spanner of small length	use plastic and soft spanner	tie a rope with spanner
15	A boy weighing 500 N is sitting on edge of one side of seesaw at distance of 3 m from center. A girl weighing 600 N is sitting at 2 m from the center of seesaw.	side of girl will be more downward	side of boy will be more downward	seesaw is in horizontal state	net torque is 200 Nm
16	A force of 10 N is acting along y-axis, what is its horizontal component?	10 N	0	5 N	any value from 0 to 10 N
17	Conventionally, anticlockwise torque is taken as:	negative	positive	parallel	zero
18	A door requires a minimum torque of 80 Nm in order to open it. What is the minimum distance of the handle from the hinges, if the door is to be pulled with a force at the handle not greater than 100 N?	0.6 m	1 m	0.4 m	0.8 m
19	Two children are balanced on opposite sides of a seesaw. If one child leans inward toward the pivot point, her side will:	rise	fall	insufficient	neither rise nor fall
20	The torque in uniformly rotating fan having blade of length 0.5 m is:	0.5 Nm	2 Nm	- 0.5 Nm	0 Nm
21	tan 45°=	0.203	0.503	0.404	1

MODERN SCIENCE ACADEMY

22	The shortest distance between two couple forces is:	moment arm	couple arm	radius	double moment
23	A girl pushes to open a door perpendicularly with a force of 25 N at 0.6 m from the hinge, the torque:	41.6 Nm	25.6 Nm	15 Nm	0 Nm
24	The angle at which x and y components of a force are equal?	0°	30°	45°	60°
25	Centre of mass is different from Centre of gravity, when we have non-uniform:	shape of object	mass of object	gravitational force	none of these
26	sin θ=	$\frac{\text{base}}{\text{hypotenuse}}$	$\frac{\text{perpendicular}}{\text{hypotenuse}}$	$\frac{\text{perpendicular}}{\text{base}}$	$\frac{\text{base}}{\text{perpendicular}}$
27	$\frac{\mathbf{F}_y}{\mathbf{F}_x} =$	cosec θ	cos θ	tan θ	sin θ
28	The value of sin 90° is:	0	1	10	0.5
29	cos θ=	$\frac{\text{base}}{\text{hypotenuse}}$	$\frac{\text{perpendicular}}{\text{hypotenuse}}$	$\frac{\text{perpendicular}}{\text{base}}$	$\frac{\text{base}}{\text{perpendicular}}$
30	Turning effect of a force:	torque	moment arm	inertia	force
31	Torque is a ____ quantity.	scalar	vector	constant	basic
32	SI unit of torque is:	Nm^{-1}	Nm	Nm^{-2}	Nm^2
33	Number of factors on which torque depends.	2	3	4	5
34	The net torque acting on a rotating body with uniform speed is:	0	1	2	3
35	If the force is 200 N and length of spanner is 0.15 m then torque will be:	30 Nm	20 Nm	15 Nm	10 Nm
36	First condition of equilibrium is:	$\sum \mathbf{F}=0$	$\sum \boldsymbol{\tau}=0$	Both A & B	none
37	How many states are there of equilibrium?	1	2	3	4
38	Second condition of equilibrium is:	$\sum \mathbf{F}=0$	$\sum \boldsymbol{\tau}=0$	Both A & B	none
39	A force of 100 N is applied perpendicularly at 0.5 m, to turn nut of wheel of a bus. The torque acting on nut is:	500 Nm	50 Nm	5 Nm	0.005 Nm
40	Bunsen burner is made stable by:	Increasing its length	Increasing its mass	Decreasing its base area	Increasing its base area

"Important Short Questions"

1) Define resultant vector, torque, centre of mass and centre of gravity.
2) How head to tail rule helps to find the resultant of forces?
3) Differentiate like and unlike parallel forces, torque and couple, stable and neutral equilibrium.
4) Two forces of 7 N and 5 N are added, how will they give resultant of 12 N and 2 N?
5) A pair of like parallel forces 15N each are acting on a body. Find their resultant.
6) Two unlike parallel forces 10 N each acting along same line. Find their resultant.
7) In a right angled triangle, length of base is 4 cm, and its perpendicular is 3 cm, find length of hypotenuse.
8) Can the rectangular component of vector be greater than the vector itself? Explain.
9) Define rigid body and axis of rotation.
10) Define moment arm and line of action of force?
11) When a body is said to be in equilibrium?
12) Why long spanner is used to open or tight nuts of vehicle's tyre? While tightening a small nut, extra-long wrench is not suitable. Why?
13) Can a small force ever exert a greater torque than a larger force? Explain.
14) Why door knobs are fixed at the edge of door? What will happen if the door knob is at the middle of the door?
15) State and explain principle of moments.

16) The gravitational force acting on a satellite is always directed towards the center of earth. Does this force exert torque on the satellite?
17) Two forces produce the same torque. Does it follow that they have the same magnitude?
18) Why there is a need of 2nd condition for equilibrium if a body satisfies 1st condition for equilibrium?
19) Give an example of a moving body which is in equilibrium.
20) A fan is rotating uniformly, is it in equilibrium?
21) Think of a body which is at rest but not in equilibrium.
22) A small boy is thrown straight up by his father. At the top of his path, he comes to rest for a moment. Will he be in equilibrium at this point?
23) Why a body cannot be in equilibrium due to single force acting on it?
24) Why tight rope walkers carry a long, narrow rod?
25) Why does wearing high-heeled shoes sometimes cause lower back pain?
26) Why is it more difficult to lean backwards? Explain.
27) Give an example of body, which satisfies first condition of equilibrium but is not in equilibrium?
28) Why the height of vehicles is kept as low as possible?
29) A boy standing by joining both legs is more likely to fall than a boy standing with legs wide open, if slightly pushed by another boy. Why?

"Important Long Questions"

1) What is meant by resolution of forces? How can a force be resolved into its perpendicular components?
2) How can a force be determined from its rectangular components?
3) Explain conditions for equilibrium.
4) Explain states of equilibrium.
5) What is plumb line? How it can be used to find COG of irregular shaped objects?