MODERN SCIENCE ACADEMY

03. "DYNAMICS"

Sr.	Statements	A	B	C	D
1	Newton's first law of motion is valid only in the absence of:	force	net force	friction	momentum
2	Inertia depends upon:	force	net force	mass	velocity
3	A boy jumps out of a moving bus. There is a danger for him to fall:	towards the moving bus	away from the bus	in the direction of motion	opposite to direction of motion
4	A string is stretched by two equal and opposite forces 10 N each. The tension in the string is:	zero	5 N	10 N	20 N
5	The mass of a body:	decrease when accelerated	increases when accelerated	decreases at high velocity	none of these
6	Two bodies of masses m_1 and m_2 attached to the ends of an inextensible string passes over a friction-less pulley such that both move vertically. The acceleration of the bodies is:	$\frac{m_1 \times m_2}{m_2 \times m_1} g$	$\frac{m_1 - m_2}{m_2 + m_1} g$	$\frac{m_1 + m_2}{m_1 - m_2} g$	$\frac{2m_1 m_2}{m_1 + m_2} g$
7	Which of the following is the unit of momentum?	Nm	$kgms^{-2}$	Ns	Ns^{-1}
8	When horse pulls a cart, the action is on the:	cart	Earth	horse	Earth & cart
9	Which of the following material lowers friction when pushed between metal plates?	water	fine marble powder	air	oil
10	Momentum **p** =	$\frac{m}{v}$	$\frac{v}{m}$	m**v**	mv^2
11	S.I. unit of momentum is:	$kgm^{-1}s^{-1}$	$kg^{-1}m^{-1}s$	kgms	$kgms^{-1}$
12	A book of mass 5kg is placed on the table, what is the magnitude of force acting on the body?	50 N	5 N	25 N	10 N
13	The weight of a body is quantity:	scalar	vector	base	none
14	The weight of body is 147 N. Its mass will be:	1.47 kg	14.7 kg	147 kg	1.51 kg
15	1 newton is equal to:	$1\ kgms^{-2}$	$1\ gms^{-1}$	$2\ gms^{-1}$	$1\ kgms^{-1}$
16	Law of inertia is:	first law of motion	second law of motion	third law of motion	gravitational law
17	2nd law of motion is:	**F=ma**	$\mathbf{F}=\frac{m}{a}$	$\mathbf{F}=\frac{a}{m}$	$\mathbf{F}=m^2a^2$
18	The force that opposes motion of moving objects:	centrifugal	friction	inertia	weight
19	The molecules of a gas enclosed in a glass vessel at constant temperature is an example of:	force system	inertial system	isolated system	non-isolated system
20	Change in momentum of a body is equal to:	force	force × time	velocity	acceleration
21	Rate of change in momentum of a body is equal to:	force	velocity	acceleration	displacement
22	Rate of change in momentum of free falling body =	force	velocity	acceleration	weight
23	Friction coefficient=	$F_s R$	$\frac{R}{F_s}$	$F_s + R$	$\frac{F_s}{R}$
24	The formula of centripetal acceleration is:	$a_c = \frac{v}{r}$	$a_c = \frac{v^2}{r}$	$a_c = \frac{v^2}{r^2}$	$a_c = \frac{r}{v^2}$
25	The formula of centripetal force is:	$F_c = \frac{mv}{r}$	$F_c = \frac{mv^2}{r}$	$F_c = \frac{mv^2}{r^2}$	$F_c = \frac{mr}{v^2}$
26	A force acts on a body for 2 seconds and it produces 50 kgm/s change in its momentum. The force acting on the body is:	100 N	50 N	25 N	2 N
27	If the velocity of the body doubles, then F_c will be:	half	three times	double	four times
28	Centripetal force is directly proportional to:	m^2	v^2	r	v
29	A force of 5N is applied to a body weighing 10 N. What is its acceleration in m/s^2 ?	0.5	2	5	50

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30	If a steel cube has acceleration of 10 m/s^2. Another same steel cube is plugged into it. What is acceleration of this combination?	10 m/s^2	5 m/s^2	1 m/s^2	zero
31	Taking of rocket can be explained by___of motion?	1^{st} law	2^{nd} law	3^{rd} law	4^{th} law
32	As the rocket moves upwards during its motion, its acceleration goes on:	decreasing	increasing	remains same	none of these
33	Net force on the body falling in air with uniform velocity is equal to:	weight of the body	air resistance on the body	difference between A & B	zero
34	A small sports car collides head-on with a massive truck. Which vehicle experiences greater impact force?	The car	The truck	They experiences same force	depends on speed of vehicle
35	A body is moving on a straight line and you apply a force perpendicular to its motion:	body speeds up	body slows down	body moves in a circle	body moves in direction of force
36	When a hanging carpet is beaten by stick. Dust flies off the carpet. It is mainly due to:	action force on the carpet	reaction force by the carpet	inertia of dust	none of these
37	A bucket having some water is removed in vertical circle. Water does not spill out, even the bucket is upside down, due to:	weight of the water	centrifugal force on water	inertia of water	action and reaction balance
38	The force which moves the car is:	force exerted by engine	force of friction between road and tyre	weight of the car	water split on the road
39	Ball A collide with ball B which is at rest, after collision which of the following condition is not possible?	both balls move in same direction	both balls move in opposite direction	ball A comes to rest and ball B starts moving	both balls come to rest
40	An object at earth taken to moon should have:	less mass/ same weight	same mass/ more weight	same mass/ less weight	less mass/ same weight
41	The unit of coefficient of friction is:	N	kg	μ	no unit
42	The centripetal acceleration for an object of mass 1kg moving with 6 m/s in a circle of radius 3 m is:	18 m/s^2	12 m/s^2	10 m/s^2	2 m/s^2
43	An empty suitcase is placed in the middle of a high speed travelling bus on its floor. When the bus stops suddenly, the suitcase slide:	backwards	forwards	jumps up	remains in place
45	Action-Reaction pair does not balance each other, because they:	act on same body	act on different bodies	act on third body	produces friction

"Important Short Questions"

1) Briefly explain terms "kinematics" and "dynamics".
2) Define: inertia, momentum, force, force of friction, centripetal force.
3) Differentiate between: mass and weight, action and reaction, sliding friction and rolling friction.
4) As the card flick away, the coin falls into the glass. Why?
5) Why is it dangerous to travel on the roof of the bus?
6) Why a balloon filled with air move forward, when its air is released?
7) Why does hose pipe tend to move backward when the fireman directs a powerful stream of water towards fire?
8) Deduce Newton's first law of motion from Newton's second law of motion?
9) Why does a passenger move outward when a bus takes a turn?
10) What will be tension in a rope that is pulled from its ends by two opposite forces 100 N each?
11) What is Atwood machine? Write its purpose.
12) Action and reaction are always equal and opposite. Then how does a body moves?
13) A horse pulls the cart. If the action and reaction are equal and opposite then how does the cart move?
14) What is law of conservation of momentum? Write its mathematical form.

15) When a gun in fired, it recoils. Why?
16) What is friction? Define coefficient of friction.
17) Describe three situations in which force of friction is needed. (Advantages of friction)
18) Why is it dangerous to drive on wet roads?
19) Why tyres of vehicles are wrapped with chains during snow in hilly areas?
20) Write three disadvantages of friction.
21) How does oiling the moving parts of a machine lowers friction?
22) Describe ways to reduce friction?
23) How does friction help you walk? Is it kinetic friction or static friction?
24) The parking brake on a car causes the air wheels to lockup. What would be the likely consequence of applying the parking brake in a car that is in rapid motion?
25) Why is the surface of a conveyor belt made rough?
26) Why does a boatman tie his boat to a pillar before allowing the passengers to step on the river bank?
27) In uniform circular motion, is the velocity constant? Is the acceleration constant? Explain.
28) You tie a brick to the end of the rope and whirl the brick around you in a horizontal circle. Describe the path of the brick after you suddenly let go of the rope.
29) Why rolling friction is less than sliding friction?
30) What would happen if all friction suddenly appears?
31) Why the spinner of a washing machine is made to spin at a very high speed?
32) Differentiate between centripetal force and centrifugal force.
33) Centripetal force acting the car moving at a round about is 200 N. If velocity of the car is doubled then what will be centripetal force acting on the car?
34) Why the posted speed for a turn is lower than the speed limit on most highways?

"Important Long Questions"

1) State and explain Newton's first law of motion. Why it is called law of inertia?
2) State and explain Newton's second law of motion. Derive its formula. Define one newton.
3) What is Atwood machine? Derive expressions for its acceleration and tension.
4) What is an isolated system? Explain law of conservation of momentum.
5) Define momentum. How can you relate a force with the change of momentum of a body?
6) What do you mean by centripetal force? Derive its equation. Also explain centrifugal force and banking of roads.

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