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PHYSICS TEST - CHAPTER 3: TRANSLATORY MOTION

Name:		Roll No.		Section:

Total Time: 2:30 Hour
Time Allowed: 150 Minutes

Total Marks: 150

PAPER OBJECTIVE
SECTION-A (MARKS 150)

NOTE: Section-A is compulsory. All parts of this section are to be answered on these pages and handed over to the center superintendent. Deleting / overwriting is not allowed. Do not use lead pencil.

Q.1 Fill the relevant bubble for each part. All parts carry one mark.

Questions	A	B	C	D	A B C D
1. Equations of motion derived in this chapter are valid only for a body moving with:	variable acceleration	constant acceleration	increasing mass	zero velocity only	○●○○
2. While deriving the equations of motion, the object is assumed to move along a:	zigzag path	straight line	circular path	parabolic path	○●○○
3. In the derivation of the equations of motion, the direction of the initial velocity (and of all quantities along it) is taken as:	positive	negative	zero	perpendicular	●○○○
4. The first equation of motion, $v_f = v_i + at$, connects velocity, acceleration and:	time	force	mass	displacement	●○○○
5. Which equation of motion does NOT contain the time t?	$2aS = v_f^2 - v_i^2$	$v_f = v_i + at$	$S = v_i t + \frac{1}{2}at^2$	None of these	●○○○
6. Which equation of motion does NOT contain the displacement S?	$v_f = v_i + at$	$2aS = v_f^2 - v_i^2$	$S = v_i t + \frac{1}{2}at^2$	All of them contain S	●○○○
7. Which equation of motion does NOT contain the final velocity v_f?	$S = v_i t + \frac{1}{2}at^2$	$v_f = v_i + at$	$2aS = v_f^2 - v_i^2$	None of these	●○○○
8. The slope of a velocity-time graph at any point gives the body's:	displacement	force	momentum	acceleration	○○○●
9. The area under a velocity-time graph gives the total:	force	acceleration	distance travelled	momentum	○○●○
10. A body with non-zero initial velocity moves with constant acceleration. The area under its v-t graph is a:	circle	trapezium	single point	semicircle	○●○○
11. In deriving $S = v_i t + \frac{1}{2}at^2$ from the v-t graph, the two parallel sides of the trapezium represent:	v_i and t	v_f and t	a and t	v_i and v_f	○○○●
12. In the v-t graph of a uniformly accelerated body, the distance between the parallel sides of the trapezium represents:	final velocity v_f	distance S	time t	acceleration a	○○●○
13. From the v-t graph, the ratio $(v_f - v_i) / t$ gives the:	initial velocity	distance S	mass	acceleration a	○○○●
14. A bus moving at 10 m/s accelerates uniformly at 2 m/s² for 5 s. Its final velocity is:	15 m/s	12 m/s	20 m/s	30 m/s	○○●○

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Questions	A	B	C	D	A B C D
15. A car moving at 4 m/s accelerates uniformly at 1 m/s² for 10 s. The distance it covers is:	90 m	140 m	40 m	50 m	●○○○
16. A cyclist starts from rest and accelerates uniformly at 2 m/s². The distance covered in 6 s is:	24 m	12 m	36 m	72 m	○○●○
17. A car travelling at 20 m/s brakes with a uniform deceleration of 5 m/s². It stops after:	100 s	4 s	2 s	8 s	○●○○
18. A car travelling at 20 m/s brakes with a uniform deceleration of 5 m/s². Its stopping distance is:	20 m	100 m	80 m	40 m	○○○●
19. A motorbike moving at 6 m/s accelerates uniformly at 2 m/s² over a distance of 16 m. Its final speed is:	12 m/s	14 m/s	10 m/s	8 m/s	○○●○
20. A train starts from rest with an acceleration of 0.5 m/s². After 1 minute its speed is:	0.5 m/s	60 m/s	30 m/s	15 m/s	○○●○
21. A car speeds up uniformly from 10 m/s to 30 m/s in 10 s. Its acceleration is:	3 m/s²	4 m/s²	2 m/s²	20 m/s²	○○●○
22. A jet plane touches the runway at 100 m/s and can decelerate at most at 5.00 m/s². The minimum time it needs to stop is:	20 s	10 s	500 s	50 s	●○○○
23. A jet plane touches down at 100 m/s with a maximum deceleration of 5.00 m/s². The minimum runway length it needs is:	1000 m	2000 m	500 m	100 m	●○○○
24. A jet plane needs 1000 m to stop. Can it land safely on a small island airport with a 0.8 km runway?	Yes, with 200 m to spare	Yes, it needs only 400 m	No, the runway is too short	Yes, it needs only 500 m	○○●○
25. On dry concrete a car can decelerate at 7.00 m/s². Its stopping distance from 30.0 m/s is:	32.1 m	64.3 m	90.0 m	128.6 m	○●○○
26. On wet concrete a car can decelerate at only 5.00 m/s². Its stopping distance from 30.0 m/s is:	64.3 m	180 m	45.0 m	90.0 m	○○○●
27. A ball rolling at 8 m/s on rough ground comes uniformly to rest in 4 s. Its retardation is:	2 m/s²	0.5 m/s²	4 m/s²	32 m/s²	●○○○
28. An object starts from rest with uniform acceleration. If the time of motion is doubled, the distance covered becomes:	half	unchanged	four times	two times	○○●○
29. A body starts from rest with uniform acceleration. If the distance covered is made four times, its final speed becomes:	four times	two times	half	sixteen times	○●○○
30. The branch of mechanics that studies motion without considering its causes is called:	dynamics	kinematics	statics	thermodynamics	○●○○
31. The branch of mechanics that deals with the forces that cause objects to move is called:	optics	kinematics	acoustics	dynamics	○○○●

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Questions	A	B	C	D	A B C D
32. The three types of motion mentioned in this chapter are translational, rotational and:	frictional	periodic only	random	vibrational	○○○●
33. A short part of the path of an anti-ship missile fired from a navy ship can be treated as:	circular motion	rotational motion	vibrational motion	projectile motion	○○○●
34. For bodies falling freely in a uniform gravitational field, the acceleration a in the equations of motion is replaced by:	m	h	t	g	○○○●
35. In the free-fall equations, the displacement S is replaced by:	g	v	t	h	○○○●
36. The acceleration due to gravity, used in this chapter, is:	9.8 m/s² towards the centre of Earth	0.98 m/s² downward	9.8 m/s² away from Earth	98 m/s² downward	●○○○
37. A stone dropped from rest from a bridge falls for 2 s. Its speed after 2 s is (g = 9.8 m/s²):	4.9 m/s	19.6 m/s	9.8 m/s	39.2 m/s	○●○○
38. A coin dropped from a bridge takes 3 s to hit the water. The height of the bridge is about:	88.2 m	29.4 m	14.7 m	44.1 m	○○○●
39. A ball is thrown vertically upward at 19.6 m/s. The maximum height it reaches is:	39.2 m	4.9 m	9.8 m	19.6 m	○○○●
40. A ball is thrown vertically upward at 19.6 m/s. The time it takes to reach the highest point is:	9.8 s	1 s	2 s	4 s	○○●○
41. A ball is thrown vertically upward at 19.6 m/s. The total time before it returns to the thrower's hand is:	8 s	1 s	2 s	4 s	○○○●
42. A kangaroo jumps over an object 2.50 m high. Its vertical speed on leaving the ground is about:	4.9 m/s	2.5 m/s	7.0 m/s	12.3 m/s	○○●○
43. A kangaroo leaves the ground vertically at 7 m/s and lands at the same level. It stays in the air for about:	0.7 s	2.8 s	1.4 s	2.5 s	○○●○
44. At the highest point of its vertical motion, a ball thrown upward has:	zero acceleration only	zero velocity and zero acceleration	zero velocity but non-zero acceleration	maximum velocity	○○●○
45. In the free-fall equations, g is taken negative when the ball is moving:	horizontally	upward	at rest	downward	○●○○
46. Projectile motion is the two-dimensional motion of an object thrown in the air under the action of:	air resistance only	gravitational force only	friction only	its own thrust	○●○○
47. An object thrown into the air and moving under gravity alone is called a:	projectile	range	summit	trajectory	●○○○
48. The path followed by a projectile is called its:	trajectory	range	height	summit	●○○○

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Questions	A	B	C	D	A B C D
49. Which of the following is NOT an example of a projectile?	A car moving on a straight road	A football kicked to another player	An arrow shot into the air	A cricket ball hit by a batter	●○○○
50. In the absence of air resistance, the trajectory of a projectile is:	a parabola	a sine wave	a circle	a straight line	●○○○
51. For a projectile, the horizontal and vertical motions are:	both accelerated	always equal	dependent on each other	independent of each other	○○○●
52. In the absence of air resistance, the horizontal component of a projectile's velocity:	keeps increasing	remains constant	keeps decreasing	becomes zero at the start	○●○○
53. The acceleration of a projectile (without air resistance) is directed:	vertically upward	horizontally	along its motion	vertically downward	○○○●
54. The vertical acceleration of a projectile is equal to:	$v_i \sin\theta$	zero	$v_i \cos\theta$	g	○○○●
55. A blue ball is dropped vertically and a green ball is thrown horizontally from the same height at the same instant. They hit the ground:	at the same time	green ball first	depends on the green ball's speed	blue ball first	●○○○
56. A projectile is launched horizontally. Its initial vertical component of velocity is:	g	zero	v_i	$v_i \cos\theta$	○●○○
57. A projectile is launched horizontally. Its horizontal acceleration is:	zero	9.8 m/s^2 upward	v_i	g	●○○○
58. For a projectile launched at an angle θ, the horizontal component of the initial velocity is:	$v_i \cos\theta$	$v_i \tan\theta$	$v_i \sin\theta$	$v_i / \cos\theta$	●○○○
59. For a projectile launched at an angle θ, the vertical component of the initial velocity is:	$v_i \tan\theta$	$v_i \sin\theta / g$	$v_i \sin\theta$	$v_i \cos\theta$	○○●○
60. A football is kicked at 20 m/s at 30° to the horizontal. The initial vertical component of its velocity is:	34.6 m/s	10 m/s	20 m/s	17.3 m/s	○●○○
61. A football is kicked at 20 m/s at 30° to the horizontal. The (constant) horizontal component of its velocity is:	10 m/s	11.5 m/s	17.3 m/s	20 m/s	○○●○
62. At the highest point of its path, the vertical component of a projectile's velocity is:	maximum	zero	equal to g	equal to v_i	○●○○
63. At the highest point of its path, the velocity of a projectile is:	vertical	equal to $v_i \sin\theta$	zero	horizontal and equal to $v_i \cos\theta$	○○○●
64. The velocity and acceleration vectors of a projectile are perpendicular to each other at:	the launch point	no point	the landing point	the highest point	○○○●
65. The maximum vertical distance attained by a projectile is called its:	trajectory	range	time of flight	height	○○○●

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Questions	A	B	C	D	A B C D
66. The maximum height of a projectile is given by:	$H = v_i^2 \sin^2\theta / 2g$	$H = v_i^2 \sin 2\theta / g$	$H = v_i^2 \cos^2\theta / 2g$	$H = 2v_i \sin\theta / g$	●○○○
67. The time of flight of a projectile is given by:	$T = v_i \sin\theta / 2g$	$T = 2v_i \cos\theta / g$	$T = 2v_i \sin\theta / g$	$T = v_i^2 \sin 2\theta / g$	○○●○
68. The horizontal range of a projectile is given by:	$R = v_i \sin 2\theta / g$	$R = 2v_i \sin\theta / g$	$R = v_i^2 \sin 2\theta / g$	$R = v_i^2 \sin^2\theta / 2g$	○○●○
69. The time taken by a projectile to reach its highest point (time of summit) is:	T	2T	T / 2	T / 4	○○●○
70. For a given launch speed, the range of a projectile on level ground is maximum when the launch angle is:	30°	45°	90°	60°	○●○○
71. For a launch angle of 45°, the maximum range of a projectile launched at speed vi is:	$2v_i^2 / g$	$v_i^2 / 4g$	v_i^2 / g	$v_i^2 / 2g$	○○●○
72. Two projectiles launched with the same speed have the same range when their launch angles are:	complementary	supplementary	equal to 45° only	different by 10°	●○○○
73. A projectile launched at 60° has the same range as one launched at the same speed at:	45°	15°	90°	30°	○○○●
74. A cricket ball hit at 75° travels the same range as a ball hit with the same speed at:	15°	25°	60°	45°	●○○○
75. At the launch angle that gives maximum range, the range is equal to ____ times the height reached.	half	four	three	two	○●○○
76. A projectile is launched at 45° with 14 m/s on level ground ($g = 9.8\ m/s^2$). Its range is:	10 m	14 m	20 m	28 m	○○●○
77. A ball is thrown at 45° with 14 m/s ($g = 9.8\ m/s^2$). The maximum height it reaches is:	20 m	5 m	10 m	2.5 m	○●○○
78. A ball is kicked at 20 m/s at 30° on level ground. Its time of flight is about:	1.02 s	2.04 s	4.08 s	3.5 s	○●○○
79. A ball is kicked at 20 m/s at 30° on level ground. The maximum height it reaches is about:	5.1 m	2.55 m	20.4 m	10.2 m	●○○○
80. A ball is kicked at 20 m/s at 30° on level ground. Its range is about:	35.3 m	20.4 m	70.7 m	40.8 m	●○○○
81. The maximum range of a projectile launched at 19.6 m/s on level ground is:	78.4 m	9.8 m	39.2 m	19.6 m	○○●○
82. A projectile is launched at 200 m/s at 30° to the horizontal ($g = 9.8\ m/s^2$). Its time of flight is about:	34.7 s	40.8 s	10.2 s	20.4 s	○○○●

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Questions	A	B	C	D	A B C D
83. A projectile is launched at 200 m/s at 30° to the horizontal. The maximum height it reaches is about:	1020 m	2040 m	510.2 m	255 m	○○●○
84. A projectile is launched at 200 m/s at 30° to the horizontal. Its range is about:	7070 m	4081.6 m	3534.7 m	1767 m	○○●○
85. A projectile is launched at 21.8 m/s at 35° above the horizontal. Its time of flight is about:	5.1 s	3.6 s	2.55 s	1.28 s	○○●○
86. A projectile is launched at 21.8 m/s at 35° above the horizontal. Its peak height is about:	16 m	11 m	4.0 m	8.0 m	○○○●
87. A projectile is launched at 21.8 m/s at 35° above the horizontal. Its horizontal displacement (range) is about:	38 m	45.6 m	91 m	23 m	○●○○
88. A stone is thrown horizontally at 12.0 m/s from the top of a 24.6 m high building. The time it takes to reach the ground is about:	3.2 s	1.12 s	2.24 s	4.5 s	○○●○
89. A stone is thrown horizontally at 12.0 m/s from the top of a 24.6 m high building. It lands at a horizontal distance of about:	12 m	26.9 m	13.4 m	53.8 m	○●○○
90. A ball is thrown horizontally at 10 m/s from a tower. After 2 s, how far has it moved horizontally?	40 m	20 m	19.6 m	10 m	○●○○
91. A ball is thrown horizontally at 10 m/s from a tower. How far does it fall vertically in 2 s?	20 m	9.8 m	39.2 m	19.6 m	○○○●
92. An aeroplane flying horizontally releases a bomb exactly above the target and misses it. The bomb lands ahead of the target because it:	falls vertically only	has no horizontal velocity	keeps the horizontal velocity of the plane	is pushed forward by the air	○○●○
93. A stone is thrown horizontally from a 45.2 m high cliff and lands 17.6 m from the base of the cliff. Its launch speed is about:	3.9 m/s	5.79 m/s	11.6 m/s	17.6 m/s	○●○○
94. The time of flight of a horizontally launched projectile depends on:	the horizontal range only	the height of launch	the launch speed	the mass of the object	○●○○
95. Two balls are thrown horizontally from the same height at 5 m/s and 10 m/s. They reach the ground:	depending on mass	faster ball first	slower ball first	at the same time	○○○●
96. A cricketer wants to hit the ball the greatest distance on level ground. He should hit it at about:	45°	90°	30°	60°	●○○○
97. A javelin thrower doubles the launch speed at the same angle. The range becomes:	two times	four times	half	unchanged	○●○○
98. If the launch speed of a projectile is doubled at the same angle, its maximum height becomes:	four times	half	two times	three times	●○○○
99. A projectile has a maximum range of 80 m for a given launch speed. The height it reaches at the 45° launch is:	160 m	40 m	10 m	20 m	○○○●

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Questions	A	B	C	D	A B C D
100. Compared with motion in a vacuum, air resistance makes the range of a projectile:	smaller	unchanged	infinite	larger	●○○○
101. Compared with motion in a vacuum, a cricket ball moving through air reaches a:	higher maximum height	same maximum height	lower maximum height	negative height	○○●○
102. When air resistance acts on a projectile, its horizontal component of velocity:	increases	stays constant	decreases with time	becomes vertical	○○●○
103. A ball is launched at 20 m/s at 30°. After 1 s, the vertical component of its velocity is about:	10 m/s	0.2 m/s	9.8 m/s	19.8 m/s	○●○○
104. The linear momentum of a body is the product of its:	mass and displacement	mass and acceleration	mass and velocity	force and time	○○●○
105. A truck on a highway has a large momentum. If it moves at the same speed but has twice the mass, its momentum is:	doubled	halved	unchanged	quadrupled	●○○○
106. The SI unit of momentum is:	kg m/s	N/m	joule	kg m/s²	●○○○
107. The momentum of a 1000 kg car moving at 10 m/s is:	10 000 kg m/s	100 kg m/s	5000 kg m/s	1000 kg m/s	●○○○
108. According to the law of conservation of momentum, the total momentum of an isolated system of interacting particles is:	always zero	always decreasing	always increasing	conserved	○○○●
109. A system is said to be isolated if the total external force acting on it is:	equal to its weight	equal to friction	maximum	zero	○○○●
110. For an isolated system, the change in total momentum Δp is:	negative	zero	equal to the mass	positive	○●○○
111. In an explosion, the chemical energy stored in the bonds of atoms is transformed into:	momentum only	mass of the fragments	gravitational force	kinetic energy of the fragments	○○○●
112. Objects at rest before an explosion have zero total momentum. After the explosion the total momentum of all fragments is:	zero	infinite	equal to that of the largest fragment	maximum	●○○○
113. A bomb at rest explodes into two fragments. The fragments move:	only upward	in the same direction	in opposite directions	only downward	○○●○
114. A bomb at rest explodes into two pieces of masses 2 kg and 4 kg. If the 2 kg piece moves at 12 m/s, the 4 kg piece moves at:	24 m/s in the opposite direction	6 m/s in the opposite direction	6 m/s in the same direction	12 m/s in the opposite direction	○●○○
115. A bomb at rest bursts into two fragments of equal mass. One flies east at 15 m/s. The other moves:	30 m/s to the west	15 m/s to the west	15 m/s to the east	7.5 m/s to the west	○●○○
116. A 46 g tennis ball is fired from a 1.35 kg homemade cannon which recoils at 2.1 m/s. The muzzle speed of the ball is about:	2.1 m/s	123 m/s	61.6 m/s	30.8 m/s	○○●○

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Questions	A	B	C	D	A B C D
117. A 4 kg gun fires a 20 g bullet with a muzzle velocity of 200 m/s. The recoil speed of the gun is:	10 m/s	1 m/s	0.1 m/s	4 m/s	○●○○
118. When a cannon fires a ball, the cannon recoils much more slowly than the ball because the cannon has a much:	smaller mass	larger velocity	smaller momentum	larger mass	○○○●
119. When a cannon fires a ball, the momenta of the ball and the cannon are:	unequal	equal and in the same direction	equal in magnitude and opposite in direction	zero for both	○○●○
120. Rockets and jet engines work on the principle of:	conservation of momentum	conservation of charge	Ohm's law	Archimedes' principle	●○○○
121. In a rocket, burnt fuel gases rush out backward with a large momentum, so the rocket gains:	no momentum	less momentum	only weight	equal and opposite momentum	○○○●
122. A karate player breaks a pile of tiles with one fast blow because the momentum of his hand:	does not change	is increased over a long time	becomes zero over a long time	is reduced to zero in a very short time, exerting a large force	○○○●
123. When a bat hits a ball, the momentum is conserved if we consider:	the ball alone	the air only	the bat alone	the ball and the bat together	○○○●
124. The main difference between an explosion and a collision is that in an explosion the objects:	come nearer	move apart	stay at rest	stick together	○●○○
125. Two 1 kg carts move towards each other at 2 m/s and 1 m/s on a level, low-friction track and then couple. Their combined speed is:	0.5 m/s	1 m/s	1.5 m/s	3 m/s	●○○○
126. A 2 kg trolley moving at 3 m/s hits a stationary 1 kg trolley and they stick together. Their common speed is:	2 m/s	3 m/s	1.5 m/s	1 m/s	●○○○
127. A 60 kg skater and a 40 kg skater, both at rest, push each other apart. If the 60 kg skater moves at 2 m/s, the 40 kg skater moves at:	1.33 m/s in the opposite direction	3 m/s in the same direction	3 m/s in the opposite direction	2 m/s in the opposite direction	○○●○
128. In a collision, two bodies:	never touch each other	stay together forever	attract each other from far away	come in physical contact for a short time and then separate	○○○●
129. The quantity that remains conserved in all types of collisions is:	kinetic energy	momentum	speed	velocity of each body	○●○○
130. In an inelastic collision:	neither is conserved	momentum is conserved but kinetic energy is not	both momentum and kinetic energy are conserved	kinetic energy is conserved but momentum is not	○●○○
131. In an elastic collision:	only momentum is conserved	only kinetic energy is conserved	both momentum and kinetic energy are conserved	neither is conserved	○○●○
132. A meteorite falling on the Earth is an example of a/an:	elastic collision	projectile motion	inelastic collision	explosion	○○●○
133. Collisions between atomic and subatomic particles are generally:	explosions	impossible	inelastic	elastic	○○○●

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Questions	A	B	C	D	A B C D
134. Two cars crash and crumple together. Their lost kinetic energy is mainly changed into:	heat, sound and deformation	extra momentum	extra speed	nuclear energy	●○○○
135. A 2 kg trolley moving at 3 m/s sticks to a stationary 1 kg trolley. The kinetic energy lost in the collision is:	9 J	6 J	0 J	3 J	○○○●
136. For two bodies colliding elastically, the relative speed of approach before the collision is ____ the relative speed of separation after it.	greater than	equal to	half of	double	○●○○
137. For an elastic collision in one dimension, the equation u1 − u2 = −(v1 − v2) expresses that:	kinetic energy is lost	mass is conserved	charge is conserved	relative speed of approach equals relative speed of separation	○○○●
138. Two bodies of equal mass collide head-on elastically in one dimension. After the collision their velocities are:	both zero	exchanged	unchanged	both doubled	○●○○
139. A moving billiard ball hits an identical ball at rest head-on, elastically. After the collision:	both move with half the speed	both stop	the first ball stops and the second moves with the first one's velocity	the first rebounds and the second stays at rest	○○●○
140. A light ball hits a very massive body at rest elastically. The light ball:	moves with double speed	rebounds with nearly the same speed	continues with the same velocity	stops	○●○○
141. A massive body hits a very light body at rest elastically. The light body moves with ____ the initial velocity of the massive body.	twice	three times	half	the same as	●○○○
142. A 0.5 kg ball moving at 4 m/s hits a 3.5 kg ball at rest, elastically and head-on. The velocity of the 0.5 kg ball afterwards is:	−3.00 m/s	+3.00 m/s	−1.00 m/s	+1.00 m/s	●○○○
143. A 0.5 kg ball moving at 4 m/s hits a 3.5 kg ball at rest, elastically and head-on. The 3.5 kg ball afterwards moves at:	0.57 m/s	1.00 m/s	4.00 m/s	3.00 m/s	○●○○
144. A 2 kg ball moving at 6 m/s collides elastically and head-on with a 2 kg ball at rest. The speed of the second ball afterwards is:	6 m/s	12 m/s	zero	3 m/s	●○○○
145. A 1 kg ball at 5 m/s hits a 3 kg ball at rest, elastically and head-on. The 3 kg ball moves with:	10 m/s	5 m/s	2.5 m/s	1.67 m/s	○○●○
146. A 3 kg ball at 4 m/s hits a 1 kg ball at rest, elastically and head-on. The 1 kg ball moves with:	6 m/s	8 m/s	2 m/s	4 m/s	●○○○
147. A 1 kg ball at 4 m/s hits an identical ball at rest elastically. The total kinetic energy after the collision is:	4 J	16 J	zero	8 J	○○○●
148. In v1 = [(m1 − m2)/(m1 + m2)] u1 + [2m2/(m1 + m2)] u2, if m1 = m2 and u2 = 0, then v1 is:	u1	0	2u1	−u1	○●○○
149. A rubber ball thrown at a fixed wall bounces back with the same speed. This is an example of:	an explosion	an elastic collision with a massive body at rest	an inelastic collision	projectile motion	○●○○
150. Though momentum of a closed system is always conserved in a collision, kinetic energy may change because some of it is transferred to:	thermal energy, sound and deformation	momentum	the velocity of light	mass	●○○○

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