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PHYSICS TEST – CHAPTER 3: DYNAMICS-I

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. Force is a ___ quantity that changes or tends to change the state of a body.	scalar	fundamental	vector	unitless	○○●○
2. A shopper starts a stationary trolley, then slows it and then turns it. All three effects are produced by:	force	inertia	mass	speed	●○○○
3. A batter hits a cricket ball with a bat. This is an example of a:	non-contact force	contact force	gravitational force	nuclear force	○●○○
4. Forces are broadly classified as:	contact and non-contact forces	scalar and vector forces	balanced and unbalanced only	strong and weak only	●○○○
5. A book lies on a table. The force perpendicular to the table surface acting on the book is the:	thrust	normal force	tension	friction	○●○○
6. Engines of a rocket push it upward. The force that propels a flying machine in its direction of motion is:	friction	tension	normal force	thrust	○○○●
7. A box pushed along a rough floor slows down. The force resisting its motion is:	friction	thrust	normal force	tension	●○○○
8. Air resistance on a falling parachutist is a kind of:	thrust	tension	normal force	drag (frictional) force	○○○●
9. A cord attached to a hanging mass pulls upward on it. This force is called:	tension	friction	thrust	gravitational force	●○○○
10. A stretched rubber band resists being stretched further. This resisting force is called:	thrust	elastic force	normal force	drag force	○●○○
11. Which of these is a non-contact force?	friction	gravitational force	tension	normal force	○●○○
12. Two magnets repel each other without touching. This is an example of:	contact force	action at a distance	friction	thrust	○●○○
13. The attractive force between the Moon and the Earth is:	electrostatic force	tension	normal force	gravitational force	○○○●
14. A positively charged nucleus attracts a negatively charged electron. The force involved is:	gravitational force	electrostatic force	thrust	friction	○●○○

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Questions	A	B	C	D	A B C D
15. The repulsive force between the North poles of two magnets is called:	magnetic force	electrostatic force	normal force	tension	● ○ ○ ○
16. Which pair consists of two contact forces?	Gravitational and thrust	Magnetic and normal	Friction and tension	Electrostatic and friction	○ ○ ● ○
17. The number of fundamental forces in nature is:	four	two	three	five	● ○ ○ ○
18. Which of the following is NOT a fundamental force of nature?	Weak nuclear force	Strong nuclear force	Friction	Gravitational force	○ ○ ● ○
19. Physicists explain the fundamental forces through:	contact surfaces	exchange particles	tension in strings	magnetic fields only	○ ● ○ ○
20. The strongest of all the fundamental forces is the:	electromagnetic force	strong nuclear force	gravitational force	weak nuclear force	○ ● ○ ○
21. Protons in a nucleus repel each other, yet the nucleus stays intact. The force overcoming the repulsion is:	gravitational force	weak nuclear force	friction	strong nuclear force	○ ○ ○ ●
22. The exchange particles of the strong nuclear force are called:	photons	pions	gravitons	vector bosons	○ ● ○ ○
23. The electromagnetic force is mediated by a massless particle called the:	pion	photon	graviton	W boson	○ ● ○ ○
24. The range of the electromagnetic force is:	10^{-15} m	10^{-17} m	infinite	about 1 m	○ ○ ● ○
25. Normal force, friction and tension are all the result of the:	strong nuclear force	gravitational force	weak nuclear force	electromagnetic force	○ ○ ○ ●
26. The weakest of the four fundamental forces is the:	weak nuclear force	electromagnetic force	strong nuclear force	gravitational force	○ ○ ○ ●
27. Gravitational force between two objects is noticed only if at least one of them has:	a large mass	a large charge	a high speed	a large volume	● ○ ○ ○
28. The only exchange particle that has not been detected yet is the:	graviton	photon	pion	Z boson	● ○ ○ ○
29. Radioactive decay is caused by the:	strong nuclear force	gravitational force	weak nuclear force	electrostatic force	○ ○ ● ○
30. During radioactive decay through the weak force, a neutron in the nucleus changes into a:	proton	photon	pion	graviton	● ○ ○ ○
31. The weak nuclear force is mediated by the exchange of:	vector bosons	photons	pions	gravitons	● ○ ○ ○

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Questions	A	B	C	D	A B C D
32. In Table 3.1, the relative strength of the strong force is taken as:	7.3×10^{-3}	10^{-5}	6×10^{-39}	1	○○○●
33. According to Table 3.1, the range of the weak force is:	10^{-17} m	10^{-15} m	infinite	1 m	●○○○
34. The electroweak theory unifies the electromagnetic force with the:	strong nuclear force	gravitational force	tension	weak nuclear force	○○○●
35. The Pakistani physicist who helped propose the electroweak theory is:	Isaac Newton	Abdus Salam	Steven Weinberg	Sheldon Glashow	○●○○
36. Which carrier particle of the electroweak force is massless?	W^+ boson	W^- boson	Photon	Z boson	○○●○
37. A diagram showing only the object under study with arrows for all forces on it is a:	system diagram	phase diagram	free-body diagram	force table	○○●○
38. A visual expression of all the objects involved in a situation is called a:	free-body diagram	system diagram	force triangle	bar graph	○●○○
39. In a free-body diagram, the length of each force vector is proportional to the force's:	magnitude	mass	time	charge	●○○○
40. Two teams in a tug of war pull with 500 N each in opposite directions. The net force on the rope is:	500 N	0 N	1000 N	250 N	○●○○
41. Forces of 4 N and 4 N act on a trolley in the same direction. The net force is:	0 N	4 N	8 N	16 N	○○●○
42. A trolley feels 4 N to the right and 7 N to the right. The resultant force is:	3 N to the right	11 N to the right	28 N	3 N to the left	○●○○
43. A cart is pulled 3 N to the right and 8 N to the left. The net force is:	5 N to the left	5 N to the right	11 N to the left	24 N to the left	●○○○
44. When the net force on an object is 0 N, the forces are said to be:	unbalanced	non-contact	balanced	unequal	○○●○
45. In a tug of war, one team pulls harder than the other. The rope:	changes its motion due to a net force	stays at rest	has zero net force	moves with constant speed only	●○○○
46. Forces that make an angle with each other are added using the:	algebraic sum	scalar product	head-to-tail rule	difference of magnitudes	○○●○
47. Newton's first law of motion is also known as the law of:	inertia	force	gravitation	momentum	●○○○
48. If the net external force on an object is zero, the object:	always stops	always speeds up	keeps its state of rest or uniform motion	moves in a circle	○○●○

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Questions	A	B	C	D	A B C D
49. Mathematically, the first law states that if F_net = 0, then:	Δv = 0	Δv = 1	a = F/m	v = 0 always	● ○ ○ ○
50. A soccer ball keeps rolling after it has been kicked because of its:	thrust	tension	charge	inertia	○ ○ ○ ●
51. In free space, an object moving with no friction and negligible gravity:	slows down	keeps a constant velocity	stops soon	speeds up	○ ● ○ ○
52. On Earth, uniform motion is hard to observe because of:	inertia	mass	volume	gravity and friction	○ ○ ○ ●
53. Inertia is the tendency of an object to:	increase its speed	lose its mass	fall downward only	remain in its state of rest or uniform motion	○ ○ ○ ●
54. A large man on a swing is harder to push than a small child because he has more:	inertia due to more mass	charge	friction	speed	● ○ ○ ○
55. A card is quickly flicked from under a coin placed over a glass. The coin drops into the glass because of its:	thrust	inertia	magnetism	tension	○ ● ○ ○
56. A bus suddenly starts moving while you stand holding a pole. You feel pushed:	forward	upward	backward	downward	○ ○ ● ○
57. A moving bus suddenly stops. The standing passengers move:	backward	forward	upward	not at all	○ ● ○ ○
58. A bus takes a turn around a corner. Passengers tend to continue moving:	along the curve of the bus	backward	in a straight line	upward	○ ○ ● ○
59. A stack of coins stays in place when the paper under it is pulled out quickly. This is due to:	inertia of the coins	friction only	air pressure	magnetic force	● ○ ○ ○
60. A player kicks a stationary soccer ball. The kick is an unbalanced force that:	keeps the ball at rest	has no effect	sends the ball in a new direction with a new speed	cancels inertia	○ ○ ● ○
61. The measure of the amount of matter in a body is its:	weight	mass	force	volume	○ ● ○ ○
62. If the mass of an object is doubled, its inertia becomes:	half	double	the same	four times	○ ● ○ ○
63. Newton's second law relates the acceleration of an object with its mass and:	time	charge	temperature	net force	○ ○ ○ ●
64. The acceleration produced by a net force is directly proportional to:	the mass	the time	the net force	the distance	○ ○ ● ○
65. For a given net force, acceleration is ___ proportional to the mass.	directly	exponentially	not	inversely	○ ○ ○ ●

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Questions	A	B	C	D	A B C D
66. The mathematical form of Newton's second law is:	F_net = m/a	F_net = a/m	F_net = ma	F_net = m + a	○○●○
67. The direction of the acceleration produced by a net force is:	opposite to the net force	the same as the net force	perpendicular to the net force	the same as the mass	○●○○
68. One newton is equal to:	1 kg m/s	1 kg m/s²	1 kg/m s²	1 g m/s²	○●○○
69. A force of 1 N gives an acceleration of 1 m/s² to a body of mass:	1 g	10 kg	9.8 kg	1 kg	○○○●
70. A force F gives a trolley acceleration a. If the force is doubled (same mass), the acceleration becomes:	2a	a/2	4a	a	●○○○
71. A trolley of mass m has acceleration a under force F. If its mass is doubled under the same force, the acceleration becomes:	2a	4a	a	a/2	○○○●
72. A net force of 3000 N acts on a 1200 kg car. Its acceleration is:	0.25 m/s²	25 m/s²	2.5 m/s²	3.6 m/s²	○○●○
73. The same 3000 N force acts on a bus of mass 12 000 kg. Its acceleration is:	0.25 m/s²	2.5 m/s²	25 m/s²	0.025 m/s²	●○○○
74. A 5 kg trolley is pushed by a net force of 20 N. Its acceleration is:	4 m/s²	100 m/s²	0.25 m/s²	15 m/s²	●○○○
75. A net force of 60 N produces an acceleration of 3 m/s² in a body. The mass of the body is:	180 kg	20 kg	0.05 kg	57 kg	○●○○
76. A 10 kg object accelerates at 2.5 m/s². The net force acting on it is:	4 N	12.5 N	250 N	25 N	○○○●
77. A boy holds a 2 kg book at rest (g = 9.8 m/s²). The force he applies is:	2 N	19.6 N	9.8 N	4.9 N	○●○○
78. The boy moves the 2 kg book upward with acceleration 3 m/s². The total force he applies is:	6 N	19.6 N	25.6 N	13.6 N	○○●○
79. A 15 kg robotic car moving at 25 m/s is stopped by a constant brake force of 50 N. Time taken to stop:	0.5 s	7.5 s	3.3 s	75 s	○●○○
80. A 4 kg body is acted on by 30 N to the right and 10 N to the left. Its acceleration is:	5 m/s² to the right	10 m/s² to the right	5 m/s² to the left	7.5 m/s²	●○○○
81. A 50 kg crate is pushed by a net force of 100 N. Its acceleration is:	0.5 m/s²	5000 m/s²	150 m/s²	2 m/s²	○○○●
82. A 24 N force gives an object 8 m/s². The same force on an object of twice the mass gives:	16 m/s²	8 m/s²	4 m/s²	2 m/s²	○○●○

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Questions	A	B	C	D	A B C D
83. According to Newton's third law, the two forces between two bodies are:	equal and in the same direction	equal in magnitude and opposite in direction	unequal and opposite	perpendicular and equal	○●○○
84. In F_AB = −F_BA, the negative sign shows that F_BA is:	smaller than F_AB	opposite to F_AB	zero	a non-contact force	○●○○
85. An action–reaction pair acts on:	the same body	only a body at rest	only a moving body	two different bodies	○○○●
86. Action and reaction cannot cancel each other because they:	act on different bodies	are unequal	are not forces	act at different times	●○○○
87. When we kick a football, the force the ball exerts on our foot is the:	action force	reaction force	tension	weight	○●○○
88. When you jump, your legs push the ground downward and the ground:	pushes you upward with an equal force	does not respond	pushes you sideways	pulls with half the force	●○○○
89. Punching a wall hurts the hand because the wall:	exerts an equal and opposite force on the hand	exerts no force	exerts a smaller force	pulls the hand	●○○○
90. A rocket moves upward because its exhaust gases are pushed:	upward by the air	sideways by the wind	downward, giving an equal upward thrust	upward by the Earth's magnetism	○○●○
91. A person pushes a wall with 80 N. The wall pushes back on the person with:	0 N	40 N	160 N	80 N	○○○●
92. A heavy truck collides with a small car. Compared with the force on the truck, the force on the car is:	greater	equal	smaller	zero	○●○○
93. Thrust force of a rocket is a consequence of Newton's:	first law	second law	law of gravitation	third law	○○○●
94. A bullet is fired from a gun. The forces the gun and the bullet exert on each other are:	equal and in the same direction	zero	acting on the bullet only	equal and opposite	○○○●
95. Newton's laws are not readily applicable on the very small scale such as the:	human scale	planetary scale	atomic scale	everyday scale	○○●○
96. For objects moving at speeds close to the speed of light we need:	quantum mechanics	relativistic mechanics	statics	fluid mechanics	○●○○
97. Can Newton's laws describe the position and acceleration of an electron in an atom well?	No, they are not well defined at that scale	Yes, exactly	Yes, using F = ma only	Yes, using inertia only	●○○○
98. Weight is the:	amount of matter in a body	gravitational force acting on a mass	measure of inertia	volume of a body	○●○○
99. The equation W = mg is a special case of:	F = ma	F = mv	p = mv	F = W/g	●○○○

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Questions	A	B	C	D	A B C D
100. A student has a mass of 50 kg. Taking g = 9.8 m/s², her weight is:	490 N	50 N	5.1 N	4900 N	● ○ ○ ○
101. A school bag of mass 8 kg is weighed on Earth (g = 9.8 m/s²). Its weight is:	8 N	1.22 N	784 N	78.4 N	○ ○ ○ ●
102. The same 8 kg bag is carried to the Moon (g = 1.625 m/s²). Its weight there is:	13 N	78.4 N	1.625 N	5 N	● ○ ○ ○
103. A bag is carried from Earth to the Moon. Its mass:	decreases	increases	stays the same	becomes zero	○ ○ ● ○
104. On the Moon our weight is reduced roughly by:	1/6	2/3	1/2	5/6	○ ○ ○ ●
105. An object's weight W can be converted into its mass using:	m = W/g	m = Wg	m = g/W	m = W − g	● ○ ○ ○
106. A device with a high accuracy that gives a digital readout or graph of force is the:	beam balance	thermometer	force sensor	metre rule	○ ○ ● ○
107. A spring scale measures force by the:	flow of water	bending of light	mass of its pointer	stretching of a spring	○ ○ ○ ●
108. An astronaut of mass 60 kg stands on a planet where g = 3.7 N/kg. The weight is:	16.2 N	588 N	222 N	60 N	○ ○ ● ○
109. A box weighs 400 N on Earth and 150 N on another planet (g_E = 9.8 N/kg). The planet's g is:	26.1 N/kg	3.675 N/kg	9.8 N/kg	0.375 N/kg	○ ● ○ ○
110. An object weighs 98 N on Earth (g = 9.8 N/kg). Its mass is:	10 kg	98 kg	9.8 kg	1 kg	● ○ ○ ○
111. Net force on a 5 kg book lying on a table is:	50 N	5 N	0 N	25 N	○ ○ ● ○
112. A 1 kg object placed on the Earth's surface experiences a gravitational force of:	1 N	100 N	0 N	9.8 N	○ ○ ○ ●
113. Gravitational field strength is the gravitational force per unit:	charge	mass	volume	time	○ ● ○ ○
114. The SI unit of gravitational field strength is:	N/kg	N m	kg/N	N s	● ○ ○ ○
115. Gravitational field strength g is a vector directed:	away from the Earth	toward the centre of the Earth	parallel to the surface	randomly	○ ● ○ ○
116. The gravitational field strength on the Earth's surface is:	98 N/kg	0.98 N/kg	274 N/kg	9.8 N/kg	○ ○ ○ ●

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Questions	A	B	C	D	A B C D
117. Gravitational field strength (N/kg) and acceleration due to gravity (m/s²) are:	always different	inversely related	numerically equal	unrelated	○○●○
118. When we move away from the Earth's surface, the gravitational field strength:	increases	remains constant	decreases	becomes infinite	○○●○
119. According to Table 3.2, the gravitational field strength on the Sun is:	24.7 N/kg	9.8 N/kg	11.0 N/kg	274 N/kg	○○○●
120. A 10 kg object is on Jupiter (g = 24.7 N/kg). Its weight is:	24.7 N	98 N	247 N	2.47 N	○○●○
121. A 100 kg body lands on Mars (g = 3.7 N/kg). Its weight is:	980 N	37 N	370 N	3700 N	○○●○
122. A 5 kg mass feels a gravitational force of 45 N in a field. The field strength is:	225 N/kg	0.11 N/kg	50 N/kg	9 N/kg	○○○●
123. Among the planets in Table 3.2, the highest gravitational field strength is that of:	Neptune	Jupiter	Earth	Mercury	○●○○
124. Momentum is the product of an object's mass and its:	velocity	acceleration	time	weight	●○○○
125. The SI unit of linear momentum is:	kg m/s²	N m	kg/s	kg m/s	○○○●
126. A girl of mass 30 kg runs at 4 m/s. Her momentum is:	7.5 kg m/s	120 kg m/s	34 kg m/s	480 kg m/s	○●○○
127. A golfer hits a 45 g ball so that it travels at 80 m/s. The momentum imparted is:	3600 kg m/s	0.56 kg m/s	3.6 kg m/s	1.8 kg m/s	○○●○
128. The net force on a body equals the time rate of change of its:	momentum	mass	velocity only	energy	●○○○
129. A fielder catches a fast ball. Moving the hands back with the ball:	decreases the time and increases the force	increases the force	does not change the force	increases the time and reduces the force	○○○●
130. A 1200 kg car moving at 8 m/s stops in 5 s. The average braking force is:	9600 N	1920 N	240 N	1.5 N	○●○○
131. A 10 000 kg truck moving at 8 m/s stops in 5 s. The magnitude of the average force is:	2000 N	80 000 N	16 000 N	1600 N	○○●○
132. The negative sign in F = −1920 N shows that the force is:	perpendicular to the velocity	zero	opposite to the velocity	along the velocity	○○●○
133. A 2 kg steel ball moving at 15 m/s stops in 0.2 s in sand. The force from the sand is:	6 N	30 N	1.5 N	150 N	○○○●

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Questions	A	B	C	D	A B C D
134. Impulse is the product of the force and the:	distance moved	mass of the object	velocity of the object	time interval of its action	○○○●
135. Impulse is equal to the change in:	velocity only	mass	momentum	energy	○○●○
136. The area under a force-time graph gives the:	momentum	power	impulse	work	○○●○
137. A force of 500 N acts on a ball for 0.02 s. The impulse is:	25 000 N s	0.04 N s	520 N s	10 N s	○○○●
138. A 0.15 kg cricket ball moving at 30 m/s is stopped by a fielder in 0.05 s. The average force is:	4.5 N	225 N	9 N	90 N	○○○●
139. The momentum of a body changes by 50 kg m/s in 2 s. The force acting is:	100 N	25 N	50 N	2 N	○●○○
140. The mass of an object is doubled and its velocity is halved. Its momentum:	remains the same	doubles	halves	becomes four times	●○○○
141. A system on which the net external force is zero is called:	an isolated system	an open system	a moving system	an unstable system	●○○○
142. The law of conservation of momentum holds for:	every system with friction	rotating bodies only	an isolated system	falling bodies only	○○●○
143. In an isolated system, the total final momentum is equal to the total:	kinetic energy	mass	initial momentum	force	○○●○
144. Before a gun is fired, the total momentum of the gun and bullet system is:	maximum	equal to mv	infinite	zero	○○○●
145. A rifle recoils on firing because the:	gun gains momentum equal and opposite to the bullet's	air pushes it back	bullet attracts it	barrel has friction	●○○○
146. The gun's mass is much larger than the bullet's. The recoil velocity of the gun is:	greater than the bullet's	much smaller than the bullet's velocity	equal to the bullet's	infinite	○●○○
147. A 17 g bullet leaves a 3 kg gun at 350 m/s. The recoil velocity of the gun is:	+1.98 m/s	−350 m/s	−1.98 m/s	−0.12 m/s	○○●○
148. A 100 g bullet is fired from a 5 kg gun at 20 m/s. The recoil velocity of the gun is:	−4 m/s	+0.4 m/s	−0.04 m/s	−0.4 m/s	○○○●
149. A rocket accelerates in space, where there is no air, because its exhaust gases:	push against the air	are attracted by Earth	reflect sunlight	carry momentum and the rocket gains equal opposite momentum	○○○●
150. A 4 kg rifle fires a 20 g bullet at 300 m/s. The recoil speed of the rifle is:	1.5 m/s	0.15 m/s	15 m/s	6 m/s	●○○○

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