



PHYSICS

BOOKS - R G PUBLICATION

LAW OF MOTION

Exercise

1. The moment of inertia of a body depends upon



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2. What is rolling friction ? How does it arise ?



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3. How can you determine co-efficient of friction by inclined plane method?



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4. "The total charge of the isolated system is always conserved". How?



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5. The motion of particle of mass m is given by $y = ut + \frac{1}{2}gt^2$. The force acting on the particle is



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6. Define radius of gyration. Is it a constant quantity?



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7. Write down the difference between mass and moment of inertia.



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8. What is centripetal force? Derive an expression for it. Show that centripetal force does no work.



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9. Show that $J = m\Delta V$, where J is the impulse acting on a body of mass m and ΔV is the change in velocity.



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10. Show that in an isolated system linear momentum is conserved.



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11. Obtain an expression for the maximum speed with which a car can turn safely on a banked road.



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12. Write the Newton's 2nd law and explain force.



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13. Can a body remain in rest position when external force are acting on it?



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14. How is impulse related with linear momentum?



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15. Why does a gun recoil when a bullet is fixed.



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16. Action and reaction force do not balance each other. Why?



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17. What is inertia at rest and inertia at motion?



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18. Is friction independent of actual area of contact.



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19. What is static and dynamic friction.



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20. What is the relation between co-efficient of friction and angle of repose?



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21. Why are wheels circular?



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22. How is impulse related with linear momentum?



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23. Prove that $F = ma$.



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24. Establish the Newton's first and third law from second law.



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25. Vehicles stop on applying brakes. Does these phenomena violate the principle of

conservation of momentum.



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26. Briefly discuss the concept of inertial mass.



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27. Derive an expression for acceleration of body in inclined plane.



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28. Why does a cyclist bend inwards while negotiating a curve ?



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29. Calculate the work done in moving a boy up a rough inclined plane.



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30. A force of 5N changes the velocity of a body from $10\text{ms}^{-1} \rightarrow 20\text{ms}^{-1}$ in 5 sec. How much force is required to bring about the same change in 2 sec.



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31. A bullet of mass 50 g moving with a speed of 500ms^{-1} is brought to rest in 0.1 sec. Find the impulse and average force.



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32. Two bodies whose masses are $m_1 = 50\text{kg}$ and $m_2 = 150\text{g}$ are tight by a string and placed in a horizontal surface. When m_1 is pulled by a force F and acceleration of 5ms^{-2} is produced in both the bodies. Calculate the value of F and tension in the string.



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33. A curve road of diameter 1,8 km is banked so that no friction is required at a speed of

30m/s^{-1} . What is the banking angle.



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34. A car starts from rest on a half kilometer bridge. The co-efficient of friction between the tyres and road is 1. Show that one can't drive through the bridge in less than 10 sec.



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35. Derive an expression for acceleration of body in inclined plane.



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36. Find the force required to move a train of mass 5000 quintals up an incline of 1 in 50 with an acceleration $2ms^{-2}$. Take force of friction = $.2N/s$ quintal and $g = 10ms^{-2}$.



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