



PHYSICS

BOOKS - DHANPAT RAI & CO PHYSICS (HINGLISH)

Mathematical tools



1. Solve the equation: $6x^2 - 13x + 6 = 0$.

2. The value of acceleration due to gravity (g) at height h above the surface of earth is given by

$$g'=rac{gR^2}{\left(R+h
ight)^2}.$$
 If $h<\ < R$, then prove that $g'=gigg(1-rac{2h}{R}igg).$

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3. Find $\frac{dy}{dx}$ for the following functions: `y=x^5 +x^3 + 10



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5. Find
$$\frac{dy}{dx}$$
 for the following functions:
 $y = 5x^4 + 3x^{rac{3}{2}} + 6x.$





9. Find the differential coefficient of the following functions: $\cos\left(ax^2+b
ight)$



10. Find the differential coefficient of the following functions: $\tan^3 x$ **Vatch Video Solution**

11. Find the differential coefficient of the following functions: $\frac{\sin x}{1 - \cos x}$



12. A particle is moving with a uniform accerleration. Its displacement at any instant t is given by $s = 10t + 4.9t^2$. What is initial velocity?

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13. A particle is moving with a uniform accerleration. Its displacement at any instant t is given by $s = 10t + 4.9t^2$. What is velocity at t = 3 second.



14. A particle is moving with a uniform accerleration. Its displacement at any instant t is given by $s = 10t + 4.9t^2$. What is the uniform acceleration?



and t is second. Find the angular velocity to and angular acceleration a at the end of 5 seconds.

16. Show that power is the product of force and velocity.

17. A balloon is being filled by air so that its volume V is gradually increasing. Find the rate of increase of volume with radius r when r = 2 units.

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18. For a particle executing simple harmonic motion, the displacement from the mean position is given by $y = a \sin(wt)$, where a, w



acceleration of the particle at any instant t.



20. Evaluate





22. In Fig, find the value of x.



23. Find the value of



24.

Evaluate



M and I are constants.





1. Find
$$\frac{dy}{dx}$$
 for the following functions:
 $y = x^3 - 3x^2 + 3x - \left(\frac{2}{5}\right).$

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3. Find
$$\frac{dy}{dx}$$
 for the following functions:
 $y = \left(\sqrt{x} + \left(\frac{1}{\sqrt{x}}\right)\right)^2$.

4. Differentiate the following functions: $(x^2 - 4x + 5)(x^3 - 2).$

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7. Differentiate the following functions: `(4x^3 -

 $5x^{2} + 1)^{4}$.

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8. If the motion of aparticle is governed by the equation, $s = 2t^3 - 3t^2 + 2t + 2$, find the poswition, velocity and acceleration of the particle at time t = 2s.

9. The angular displacement of a particle

performing circular motion is

$$heta=rac{t^3}{60}-rac{t}{4}$$

where heta is in radian and 't' is in second .Then

the angular velocity and angular acceleraion

of a particle at the end of 5 s will be

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10. Show that force can be expressed as the product of mass and acceleration. [Hint $F = \left(d\frac{p}{dt}\right) - \left(\frac{d}{dt}\right)mv - m\left(d\frac{v}{dt}\right) - ma$]



12. Integrate the following: $ax^2 + bx + c$

13. Integrate the following:
$$\left(x + \left(\frac{1}{x}\right)\right)^3$$

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14. Integrate the following:
 $3 \cos ec^2 x - 5x + \sin x$)
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15. Integrate the following:
 $3 \cos ec^2 x + 2 \sin 3x$)















