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Mechanical Power

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Tamanna Chaudhary
(Physics Expert)

Tamanna Chaudhary

Expert in NEET UG

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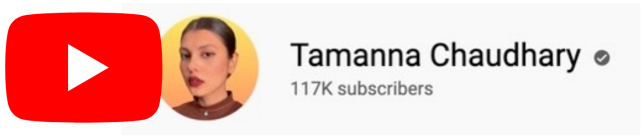

Details about the series-

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- PDF (without annotations) - Provided on my Telegram Channel
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One Stop for Physics Practice for NEET

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Tamanna Chaudhary
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Updated- 16 November'22

Books Covered in this Session-

- HC Verma
- SL Arora
- DC Pandey
- TC Selected

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A coolie 1.5 m tall raises a load of 80 kg in 2 sec from the ground to his head and then walks a distance of 40 m in another 2 second. The power developed by the coolie is : ($g = 10\ m/s^2$)

(a) 0.2 kW
(b) 0.4 kW
(c) 0.6 kW
(d) 0.8 kW

A lorry of mass 2000 kg is travelling up a hill of certain height at a constant speed of 10 m/s. The frictional resistance is 200 N, then the power expended by the engine is approximately : (take $g = 10\ m/s^2$)

(a) 22 kW
(b) 220 kW
(c) 2000 W
(d) none of these

Ten litre of water per second is lifted from well through 20 m and delivered with a velocity of 10 m/s, then the power of the motor is :

(a) 1.5 kW
(b) 2.5 kW
(c) 3.5 kW
(d) 4.5 kW

The average human heart forces four litre of blood per minute through arteries a pressure of 125 mm. If the density of blood is 1.03×10^3 kg/m^3, then the power of heart is :

(a) 112.76×10^{-6} HP (b) 112.76 HP

(c) 1.03×10^{-3} HP (d) 1.03×10^{-6} HP

An object of mass M, initially at rest under the action of a constant force F attains a velocity v in time t. Then the average power supplied to the mass is :

(a) Fv

(b) $\frac{1}{2}Fv$

(c) zero

(d) $\frac{mv^2}{2t}$

The power supplied by a force acting on a particle moving in a straight line is constant. The velocity of the particle varies with the displacement x as :

(a) $\sqrt{x}$ (b) x

(c) x^2 (d) $x^{1/3}$

A particle moves with a velocity $(5\hat{i}-3\hat{j}+6\hat{k})$ m/s under the influence of a constant force $\vec{F}=10\hat{i}+10\hat{j}+20\hat{k}$ N. The instantaneous power applied to the particle is

(a) 200 J/sec
(b) 40 J/sec
(c) 140 J/sec
(d) 170 J/sec

EXAMPLE 54. Calculate the horse power of a man who can chew ice at the rate of 30 g per minute. Given 1 $hp = 746$ W and $J = 4.2$ $J\ cal^{-1}$.

EXAMPLE 55. *A machine gun fires 60 bullets per minute with a velocity of 700 ms^{-1}. If each bullet has a mass of 50 g, find the power developed by the gun.*

One coolie takes 1 min to raise a box through a height 2 m. Another takes 30 s for the same job and does the same amount of work. Which one of these two has a greater power and which one uses greater energy ?

Problem 30. When a constant force is applied to a body moving with constant acceleration, is the power of the force constant ? If not, how would force have to vary with speed for power to be constant ?