Disclaimer: Physics

Date: 20/09/2022

Subject: Physics | Class: Standard XI

Topic : circular motion | Time: 00:20 hrs

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1. For a particle moving in a circle of radius $1\ \mathrm{m}$, speed increases uniformly from $5\ \mathrm{m/s}$ to $10\ \mathrm{m/s}$ in $10\ \mathrm{seconds}$. The value of angular acceleration of the particle is

   A. $50\ \mathrm{rad/s^2}$

   B. $5\ \mathrm{rad/s^2}$

   C. $0.5\ \mathrm{rad/s^2}$

   D. $0.05\ \mathrm{rad/s^2}$

2. A particle is moving on a circular path of radius $3\ cm$ with a time varying speed of $v = 3t\ cm/s$, where t is in seconds. The magnitude of tangential acceleration and the total acceleration of the particle at $t = 1\ s$ is

   A. $3\ cm/s^2,\ 3\ cm/s^2$

   B. $3\sqrt{2}\ cm/s^2,\ 3\sqrt{2}\ cm/s^2$

   C. $\frac{3}{2} cm/s^2,\ 3\ cm/s^2$

   D. $3\ cm/s^2,\ 3\sqrt{2}\ cm/s^2$

3. A ceiling fan is rotating with an angular velocity of $4\ rev/s$. It takes $40\ s$ to stop when it is switched off. The angular retardation during this interval is

   A. $\frac{3\pi}{5} rad/s^2$

   B. $-\frac{\pi}{5} rad/s^2$

   C. $\frac{\pi}{5} rad/s^2$

   D. $\frac{2\pi}{5} rad/s^2$

4. A car wheel rotates with an angular acceleration $\alpha = 4t^3 (\text{in rad}/s^2)$ where t is the time taken (in seconds). If the wheel has initial angular velocity $\omega_0 = 20\ rad/s$, then the angular velocity $\omega(t)$ after $2\ s$ is

   A. $20\ rad/s$

   B. $36\ rad/s$

   C. $4\ rad/s$

   D. $16\ rad/s$

5. An exhaust fan is rotating with an angular velocity of $216\ \text{rad}/\text{min}$. When it is switched off, it is observed that the angular retardation of the fan is $\alpha = \frac{3}{2}\sqrt{t}\ \text{rad}/\text{min}^2$. The time taken by the fan to stop completely is

   A. $36\ \text{min}$

   B. $6\ \text{min}$

   C. $17\ \text{min}$

   D. $22\ \text{min}$