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**Formula Sheet**

**Physics 2017**

**Speed of wave**

\[ v = f \lambda \]

\[ v = \sqrt{\frac{\rho}{ho_0}} \text{ (rampart wave)} \]

\[ v = \frac{f}{2} \text{ (longitudinal waves)} \]

**Centripetal force**

\[ F_c = m \frac{v^2}{r} \]

\[ T = \frac{m v^2}{r} \]

**Centripetal acceleration**

\[ a_c = \frac{v^2}{r} \]

\[ \frac{v}{r} = \omega r \]

**Instantaneous d\omega**

\[ 2 \pi x \sin \theta \]

\[ \tan \theta \]

**Instantaneous d\omega**

\[ 2 \pi x \cos \theta \]

\[ \omega = \frac{v}{r} \]

**Velocity**

\[ v_{max} = 2 \pi x \]

\[ v_{min} = 0 \]

**Mass Spring System**

\[ \omega = \sqrt{\frac{k}{m}} \]

\[ f = \frac{1}{2 \pi} \sqrt{\frac{k}{m}} \]

\[ T = 2\pi \sqrt{\frac{m}{k}} \]

**Angular Displacement**

\[ \theta = \frac{1}{2} \pi \]

**Angular Velocity**

\[ \omega = \frac{v}{r} \]

**Angular Acceleration**

\[ \alpha = \frac{d\omega}{dt} \]

**Energy Conservation**

\[ P = \frac{1}{2} k \omega^2 \]

\[ K = \frac{1}{2} k \left( x^2 - 2 \omega \right) \]

**Tangential Velocity**

\[ v_t = \omega \]

**Tangential Acceleration**

\[ a_t = \frac{d^2 v_t}{dt^2} \]

**Normal Acceleration**

\[ a_n = \frac{d^2 \theta}{dt^2} \]

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By Prof. Ab

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Half-Wave Rectification

Full-Wave Rectification

Photoelectric Effect

K.E, V, f

f₀

Different Frequencies

Mass Defect Δm

Binding Energy B.E

Energy Cons. in SHM

Pressure Law

Resonance Curve

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**Capacitor**

\[
Q = CV, \quad \text{Area} = \frac{1}{2} QV
\]

**Charging**

\[
q = \frac{C}{t}
\]

**Disscharging**

\[
q = \frac{C}{t}
\]

**OHM'S LAW**

1. Ohmic

\[
V = IR
\]

2. Non-Ohmic

\[
V = f(I)
\]

**Diode**

**Resistivity**

**Series combination**

**Parallel combination**

**Magnetic Field Intensity**

\[
B = \frac{1}{r}
\]

**Steam Energy Density**

Area = \frac{1}{2} C = U = \frac{1}{2} F = L

**Young's Modulus**

\[
E = \frac{\Delta L}{\Delta L}
\]

**Slope of**

\[
\frac{q}{t} = I
\]

\[
\frac{d}{t} = V
\]

\[
\frac{q}{V} = C
\]

\[
\frac{v}{t} = a
\]

\[
E = \frac{1}{2} P
\]

**Half-life**

\[
\frac{1}{h} = 1.5 \times 10^{-13}
\]

\[
h_c = 2 \times 10^{-15}
\]

\[
h_c = 12 \times 10^{-8}
\]

\[
\frac{e}{h} = 240 \times 10^{-12}
\]

\[
eV = 1.6 \times 10^{-19} J
\]

\[
1 J = 6.25 \times 10^{18} eV
\]

\[
25 e = 6 \times 10^5
\]

**Relative Abundance**

**General Graph (Slope)**

**Modul Islam**

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**MEGA LECTURE**
### Displacement-Time Graph

<table>
<thead>
<tr>
<th>Graphs</th>
<th>Displacement-Time Graph</th>
<th>Velocity-Time Graph</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Constant</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Increasing uniform positive</td>
<td>Uniform positive</td>
<td>Increasing uniformly increasing</td>
</tr>
<tr>
<td>Increasing non-uniform positive</td>
<td>Non-uniform increasing</td>
<td>Decrement non-uniform positive</td>
</tr>
<tr>
<td>Decreasing uniform negative</td>
<td>Uniform negative</td>
<td>Decreasing uniformly decreasing</td>
</tr>
<tr>
<td>Decreasing non-uniform negative</td>
<td>Non-uniform decreasing</td>
<td>Decreasing non-uniform linear</td>
</tr>
</tbody>
</table>

### Electric Field Intensity

- Electric field intensity: \( \text{Electric field intensity} = \frac{E d}{t^2} \)
- Slope = \( E \)

### Electric Potential Difference

- \( V \)
- \( \Delta V \) and \( d \)
- \( V \)
- \( d \) (distance between plates)

### Momentum-Time Graph

- \( F \) and \( t \)
- \( \Delta p \) and \( t \)
- \( F = \frac{d\Delta p}{dt} \)
- Area = Energy stored in capacitor

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### Work
- \( F \) and \( d \)
- \( \text{Area} = W \)

### Power
- \( E \) and \( t \)
- \( \text{Slope} = P \)
- \( \text{Area} = P \)