

**Unit Wise Real Time Applications/Live Examples**

**Department:** Mechanical

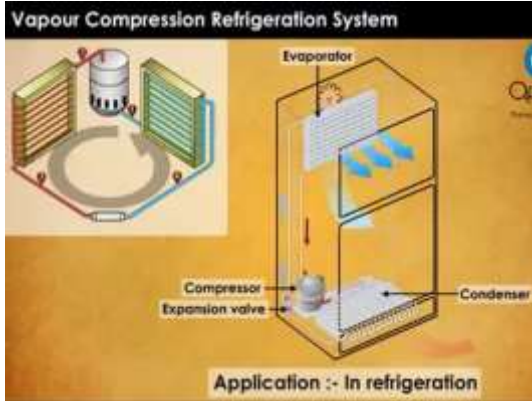
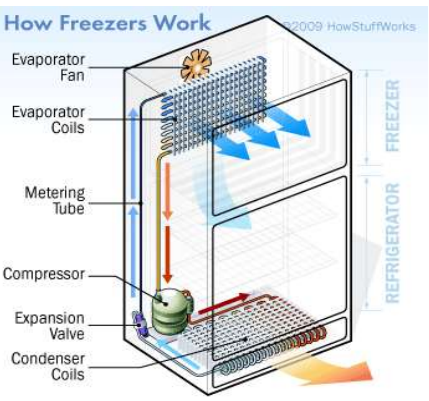
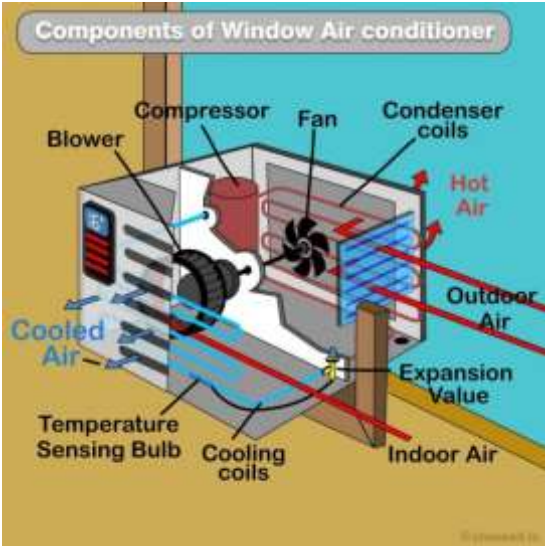
**Semester:** II

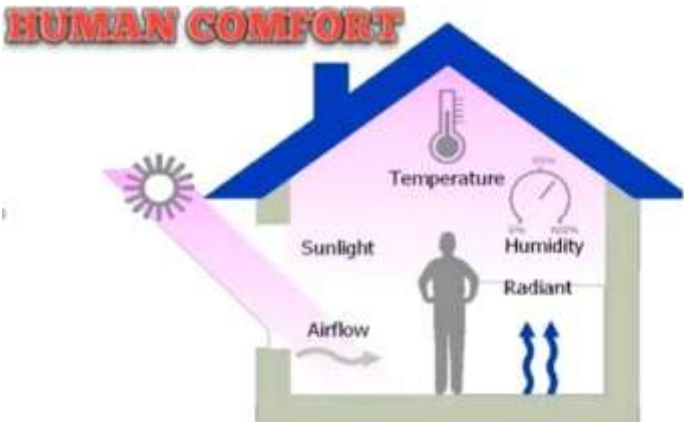
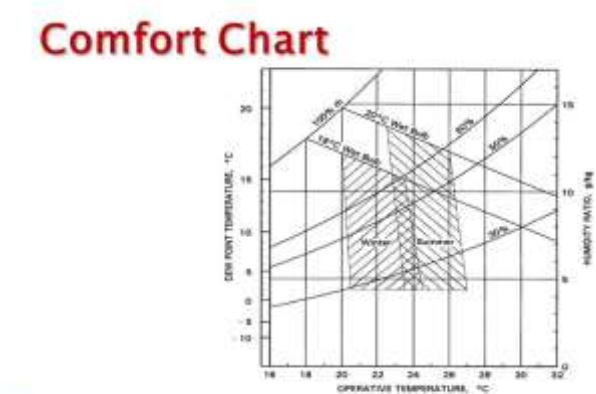
**Academic Year:** 2023–2024

**Class:** SE

**Div.:**

**Course:** Applied Thermodynamics

Unit No. -Name	Real life Applications
Unit I:	<p style="text-align: center;"><b>1. Vapour compression cycle (VCC) – Household refrigerator</b></p> <div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;"><b>2. Vapour compression cycle (VCC) – Window air conditioner</b></p> 

Unit No. -Name	Real life Applications
	<p>3. psychrometric chart human comfort</p> <div style="text-align: center;">  <p><b>HUMAN COMFORT</b></p> </div> <div style="text-align: center;">  <p><b>Comfort Chart</b></p> </div> <p align="center"> <small>Fig. 5 ASHRAE Summer and Winter Comfort Zones (Acceptable ranges of operative temperature and humidity for people in typical summer and winter clothing during primarily sedentary activity.)</small> </p>



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Record No.: ZCOER-ACAD/R/16H

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Date: 01/04/2021

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**Semester:** II

**Academic Year:** 2023–2024



**Class:** SE

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Unit No. -Name	Real life Applications
Unit II:	<p>4. Cylinder head – Top of cylinder</p>  <p>5. Cylinder – Piston reciprocate inside cylinder it withstands 70 bar pressure &amp; 1400 °C</p> 



Unit No. -Name	Real life Applications
	<p>6. Piston – Transfer gas force to connecting rod</p>  <p>7. Connecting rod – Transfer gas force to crank</p> 





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Unit No. -Name	Real life Applications
	<p>8. Oil Sump – Used to collect lubrication oil.</p>  <p>9. Crank shaft – crank convert reciprocating motion into rotary motion &amp; transfer it output shaft (Crank shaft)</p> 

**Prof. S. S. Borade**  
Course faculty








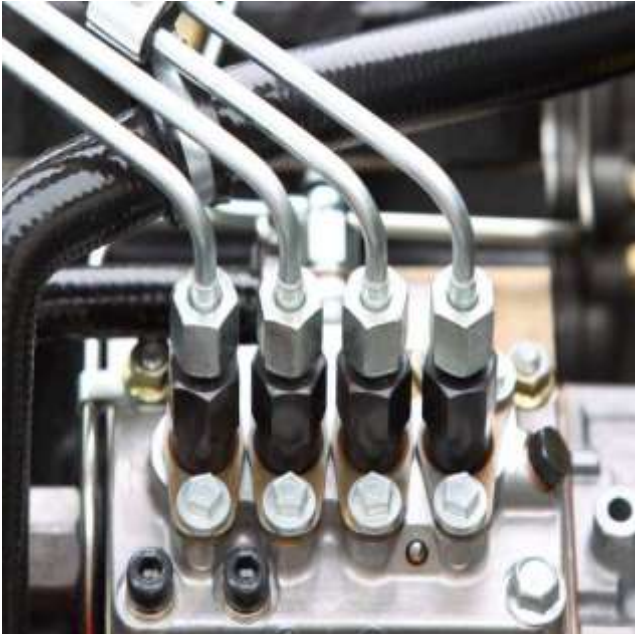
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Unit No. -Name	Real life Applications
	<p>11. Multi point fuel injection – Used in SI Engine (Multicylinder)</p>  <p>12. Fuel Injection system – Used in CI Engine</p> 



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Date: **01/04/2021**

Unit No. -Name	Real life Applications
	<p>13. Combustion chamber – In order to create swirl following type of combustion chambers are used in CI engine.</p> <div style="text-align: center;"><p><b>Types of Combustion Chamber For C.I. Engine</b></p></div>

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Unit No. - Name	Real life Applications
Unit IV:	<p>14. Engine Performance</p> <div style="background-color: #0070C0; color: white; padding: 10px; border: 1px solid black;"> <p align="center"><b><u>ENGINE PERFORMANCE PARAMETERS</u></b></p> <ul style="list-style-type: none"> <li>• Indicated Thermal Efficiency</li> <li>• Brake Thermal Efficiency</li> <li>• Mechanical Efficiency</li> <li>• Volumetric Efficiency</li> <li>• Relative Efficiency</li> <li>• Mean Effective Pressure</li> <li>• Mean Piston Speed</li> <li>• Specific Power Output</li> <li>• Specific Fuel Consumption</li> </ul> </div> <p>15. Turbocharger &amp; Supercharger</p> <div style="text-align: center;"> <p><b>TURBOCHARGER</b></p> </div>



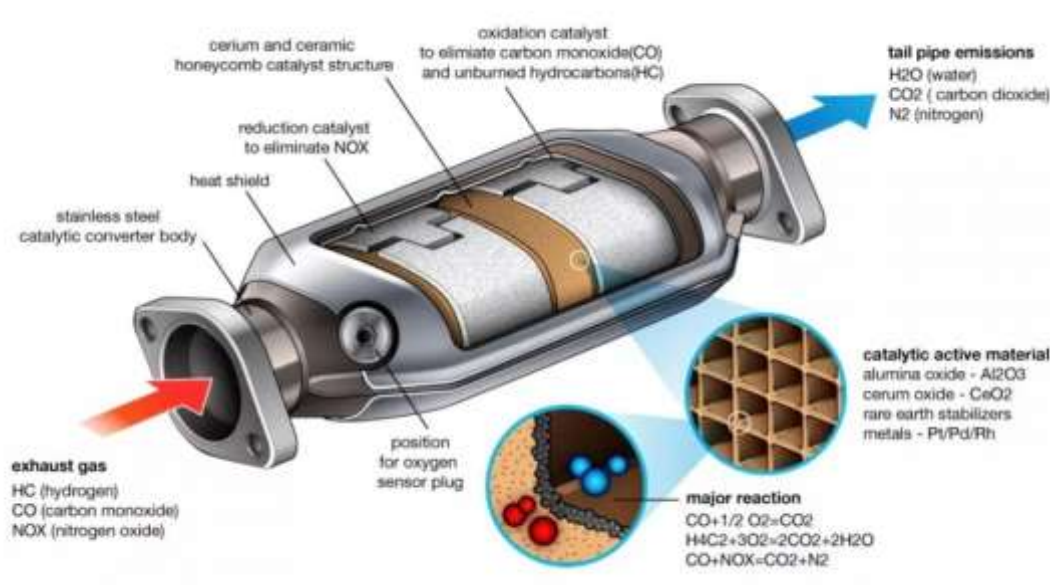
Unit No. -  
Name

Real life Applications



16. Exhaust gas analyzer



Unit No. - Name	Real life Applications
	<p align="center">17.Catalytic converter</p>  <p>The diagram illustrates a catalytic converter with the following components and processes:</p> <ul style="list-style-type: none"> <li><b>Exhaust Gas Inlet:</b> HC (hydrogen), CO (carbon monoxide), NOX (nitrogen oxide)</li> <li><b>Stainless steel catalytic converter body</b></li> <li><b>Heat shield</b></li> <li><b>Reduction catalyst:</b> to eliminate NOX</li> <li><b>Oxidation catalyst:</b> to eliminate carbon monoxide(CO) and unburned hydrocarbons(HC)</li> <li><b>Cerium and ceramic honeycomb catalyst structure</b></li> <li><b>Position for oxygen sensor plug</b></li> <li><b>Major reactions:</b> <math display="block">\text{CO} + \frac{1}{2} \text{O}_2 \rightarrow \text{CO}_2</math> <math display="block">\text{H}_4\text{C}_2 + 3\text{O}_2 \rightarrow 2\text{CO}_2 + 2\text{H}_2\text{O}</math> <math display="block">\text{CO} + \text{NOX} \rightarrow \text{CO}_2 + \text{N}_2</math> </li> <li><b>Catalytic active material:</b> alumina oxide - Al<sub>2</sub>O<sub>3</sub>, cerium oxide - CeO<sub>2</sub>, rare earth stabilizers, metals - Pt/Pd/Rh</li> <li><b>Tail pipe emissions:</b> H<sub>2</sub>O (water), CO<sub>2</sub> (carbon dioxide), N<sub>2</sub> (nitrogen)</li> </ul>

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Course faculty



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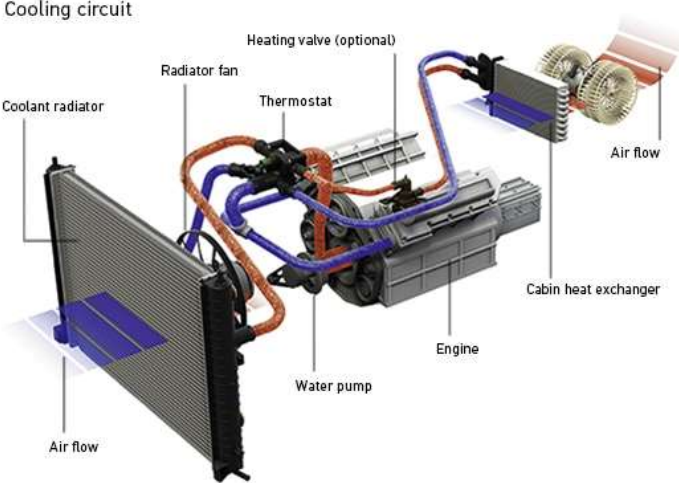
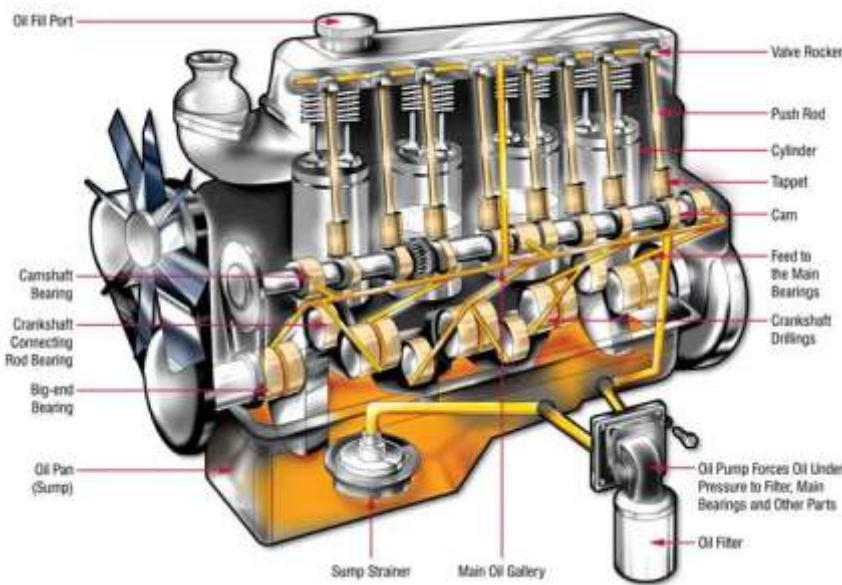
**Semester:** II

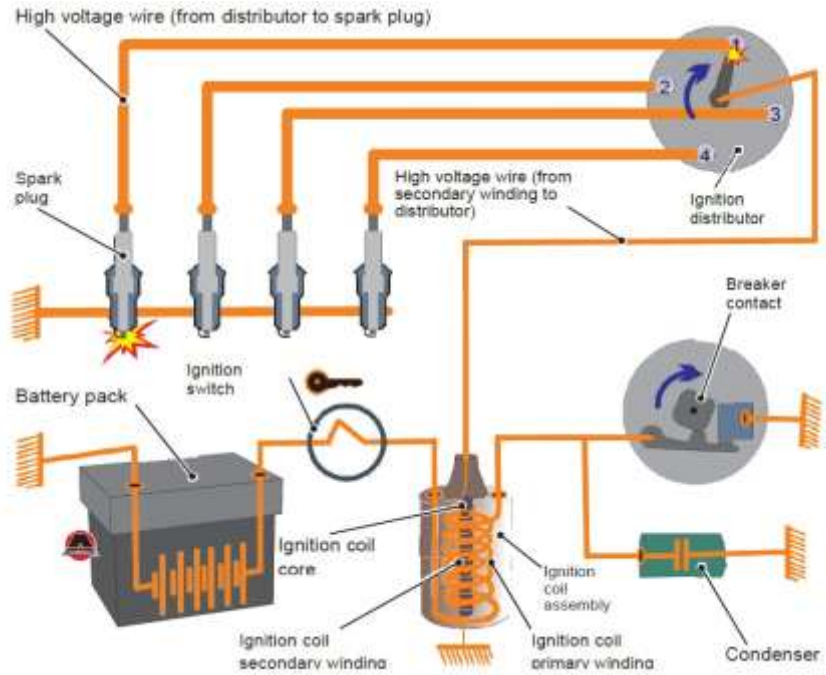
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**Course:** Applied Thermodynamics

Unit No. -Name	Real life Applications
<p>Unit V:</p>	<p align="center"><b>18. Engine Cooling</b></p>  <p>The diagram illustrates a cooling circuit for an engine. It shows a coolant radiator with air flow passing through it. A radiator fan is positioned to draw air through the radiator. A thermostat is connected to the engine and the radiator. A water pump circulates the coolant between the engine and the radiator. A heating valve (optional) is also shown. A cabin heat exchanger is connected to the engine and the radiator, allowing for heat transfer to the cabin.</p>
	<p align="center"><b>19. Lubrication system</b></p>  <p>The diagram shows a cutaway view of an engine's lubrication system. Key components labeled include: Oil Fill Port, Valve Rocker, Push Rod, Cylinder, Tappet, Cam, Feed to the Main Bearings, Crankshaft Drillings, Crankshaft, Big-end Bearing, Oil Pan (Sump), Sump Strainer, Main Oil Gallery, Oil Filter, and Oil Pump Forces Oil Under Pressure to Filter, Main Bearings and Other Parts. The oil pump is shown drawing oil from the sump and forcing it through a filter and gallery to lubricate the engine parts.</p>

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	<p>20. Ignition system</p>  <p>The diagram illustrates the electrical circuit of an ignition system. It starts with a battery pack connected to an ignition switch. The switch is linked to the primary winding of the ignition coil assembly, which also includes a condenser. The secondary winding of the coil is connected to an ignition distributor. The distributor then distributes high voltage through wires to multiple spark plugs. Labels include: High voltage wire (from distributor to spark plug), Spark plug, High voltage wire (from secondary winding to distributor), Ignition distributor, Breaker contact, Battery pack, Ignition switch, Ignition coil core, Ignition coil secondary winding, Ignition coil assembly, Ignition coil primary winding, and Condenser.</p>





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Unit V:	<p>21. Spray painting – using rotary air compressor</p>  





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**Unit No. -Name**

**Real life Applications**

22. Air Compressor - In construction



23. Air compressor – In refrigeration






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Unit No. -Name	Real life Applications
	<p>24. Air Compressor – In gas turbine Engine</p>  A photograph showing a close-up of a gas turbine engine's compressor section. The image displays several rows of highly polished, curved compressor blades, which are part of the air compressor. The blades are arranged in a radial pattern, and the overall structure is metallic and complex.

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