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| Lesson Plan | | | | | |
|  |  | Name of Faculty : | Pratik Vashist | |  |
|  |  | Discipline : | Automobile | |  |
|  |  | Semester : | 4th | |  |
|  |  | Subject | : BTHP | |  |
|  |  | Lesson Plan Duration : | 15 Weeks | |  |
| **Week** | **Theory** | | | Practical Day | Practical |
| **Lecture Day** | **Topic** | | Topic |
| 1st | 1st | **Thermodynamics Unit 1**- Introduction,Energy, work and  heat Thermodynamic state and system, boundary, | | 1st | 1. Measurement of temperature by thermocouple, pyrometer and infrared  thermometer |
| 2nd | Types of thermodynamic systems: closed, open, isolated,  adiabatic | |
| 3rd | Thermodynamic properties: pressure, volume,  temperature, enthalpy, internal energy, entropy | |
| 4th | Revision and numerical problems | |
| 2nd | 5th | **Unit 2**- Gas Laws: Definition of gas,Boyle's law, Charle's law, Joule's law, Avagadro’s law | | 2nd | 2. Measurement of pressure head by piezometer tube and manometer. |
| 6th | Ideal and real gas, Characteristics equation, gas constant, | |
| 7th | Specific heat at constant pressure, specific heat at  constant volume of gas | |
| 8th | Revision and numerical problems | |
| 3rd | 9th | Regnault’s law, universal gas constant,Vander-Wall’s  equation | | 3rd | 3. Verification of Bernoulli’s theorem. |
| 10th | **Unit 3**- Laws of Thermodynamic:- Zeroth, first and second law of thermodynamics (concept only) | |
| 11th | Applications of first law of thermodynamics, Steady flow  energy equation | |
| 12th | Revision and numerical problems | |
| 4th | 13th | constant volume, constant pressure, isothermal,  hyperbolic, adiabatic, polytropic, throttling process | | 4th | 4. To study the hydraulic circuit of an automobile brake and hydraulic ram. |
| 14th | free expansion processes; P-V & T-S diagrams, Air  Standard Cycles (without derivation) | |
| 15th | **Unit 4**- Definition of heat engine cycle, net work done in a  cycle | |
| 16th | Revision and numerical problems | |
|  | 17th | air standard efficiency of cycle, Description of Carnot  cycle, Otto cycle | | 5th | 5. Use of hydraulic press in removal and fitting of bearing, bushes and cylinder liner. |
| 18th | Diesel cycle and Dual combustion cycle | |

5th

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|  | 19th | **B. Hydraulics: Unit 5**- Introduction, Fluids and non-fluids,  Liquid, gas and vapour |  |  |
| 20th | Revision and numerical problems |
| 6th | 21st | Properties of fluids: Mass density, specific weight, pressure, specific volume, specific gravity, viscosity | 6th | 6. Dismantling and assembling of gear pump. |
| 22nd | compressibility, vapour pressure, surface tension,  capillarity |
| 23rd | **Unit 6**- Fluid statics: Concept of pressure, static pressure  and pressure head, |
| 24th | Revision and numerical problems |
| 7th | 25th | Types of pressure: Atmospheric pressure, gauge pressure | 7th | 7. Study of reciprocating air compressor. |
| 26th | vacuum, absolute pressure, Measurement of pressure:  Single tube manometer, U - tube manometer |
| 27th | Differential manometer, bourdon gauge, Pascal’s law and  its applications |
| 28th | Revision and numerical problems |
| 8th | 29th | **Unit 7**- Flow of Fluids: Types of fluid flow: steady and  unsteady, uniform and non - uniform | 8th | viva |
| 30th | laminar and turbulent, Rate of flow and its units |
| 31st | Continuity equation of flow |
| 32nd | Revision and numerical problems |
| 9th | 33rd | ?Bernoulli’s theorem (without proof) and its applications | 9th | 8. Inflating and deflating of tyres, checking of air pressure in tyres. |
| 34th | Simple problems |
| 35th | **Unit 8**- Hydraulic Devices: Principle of working |
| 36th | Revision and numerical problems |
| 10th | 37th | Layout of hydraulic system, Various components of  hydraulic system | 10th | 9. Study of a pneumatic circuit. |
| 38th | function of each component |
| 39th | Revision |
| 40th | Revision and numerical problems |
|  | 41st | Types of hydraulic pumps- reciprocating pump, centrifugal  pump | 11th | 10. Practice on pneumatic tools like pneumatic screw driver & pneumatic wrench |
| 42nd | gear type pump, screw pump |

11th

11th

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|  | 43rd | vane type pump and their working |  |  |
| 44th | Revision and numerical problems |
| 12th | 45th | Description, operation and application of hydraulic  machines – hydraulic ram | 12th |  |
| 46th | hydraulic jack, hydraulic brake |
| 47th | hydraulic accumulator, hydraulic press. |
| 48th | Revision and numerical problems |
| 13th | 49th | **PNEUMATICS: Unit 9**- Basic concept of pneumatics | 13th |  |
|  | 50th | Layout of pneumatic system |
|  | 51st | Various components of pneumatic system and their  functions |
|  | 52nd | Revision and numerical problems |
| 14th | 53rd | Construction and working of reciprocating and rotary air  compressor | 14th |  |
| 54th | Comparison of hydraulic system and pneumatic system. |
| 55th | **Unit 10**- Pneumatic tools: Construction and working of pneumatic gun |
| 56th | Revision and numerical problems |
|  | 57th | Uses of pneumatic gun for pneumatic screw driver | 15th |  |
|  | 58th | pneumatic wrenches and pneumatic nut runner |
|  | 59th | Revision |
|  | 60th | Revision and numerical problems |