

Reg. No: 

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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B. Tech I Year I Semester Regular & Supplementary Examinations May-2022**

**BASIC THERMODYNAMICS**

(Agricultural Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

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|---|---|----|----|
| 1 | a Explain about mechanical equilibrium. | L1 | 6M |
|   | b Explain about thermal equilibrium.    | L2 | 6M |

OR

- |   |  |    |     |
|---|--|----|-----|
| 2 | Explain Work transfer and its types with sketches. | L1 | 12M |
|---|--|----|-----|

**UNIT-II**

- |   |  |    |     |
|---|--|----|-----|
| 3 | Explain the Applications of Steady flow energy Equation. | L2 | 12M |
|---|--|----|-----|

OR

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|---|---|----|-----|
| 4 | Explain the following:<br>(i) Available Energy<br>(ii) Unavailable Energy | L2 | 12M |
|---|---|----|-----|

**UNIT-III**

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|---|--|----|-----|
| 5 | Explain Adiabatic Process. Derive the relation between P, V & T and Work done of an Adiabatic Process. | L3 | 12M |
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OR

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|---|---|----|-----|
| 6 | What is Isothermal Process and also derive the relation for Work done, change in enthalpy and Heat Transfer of the Process. | L3 | 12M |
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**UNIT-IV**

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|---|---|----|-----|
| 7 | Derive an expression for the thermal efficiency of an Otto cycle with PV and TS diagrams. | L3 | 12M |
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OR

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|---|---|----|-----|
| 8 | An Engine operates on Otto cycle with the following data:<br>Maximum Temperature=1227°C,<br>Exhaust Temperature=427°C,<br>Ambient conditions= 1 bar and 27°C.<br>Find the Compression ratio, Maximum Pressure and efficiency. | L3 | 12M |
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**UNIT-V**

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|---|---|----|----|
| 9 | a Explain with the help of neat diagram of Reheat cycle and Draw its T-S & H-S diagram. | L2 | 6M |
|---|---|----|----|

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|---|--|----|----|
| b | A steam power plant works between 40 bar and 0.05 bar. If the steam supplied is dry saturated and the cycle of operation is Rankine, Find: (i) Cycle efficiency,<br>(ii) Specific steam consumption. | L3 | 6M |
|---|--|----|----|

OR

- |    |  |    |     |
|----|--|----|-----|
| 10 | The adiabatic enthalpy drop across the prime mover of the Rankine cycle is 840 kJ/kg. The enthalpy of steam supplied is 2940 kJ/kg. If the back pressure is 0.1 bar, find the specific steam consumption and thermal efficiency. | L1 | 12M |
|----|--|----|-----|

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