Code No: 123AB

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, December - 2019

THERMODYNAMICS (Common to ME, AE, MSNT)

| 2 | Time: | 3Hours Carlo Carlo | ks: 75 |
|-----------------|----------|--|---|
| | Note: | This question paper contains two parts A and B. | |
| | 11010. | Part A is compulsory which carries 25 marks. Answer all questions in Part A. | |
| | | Part B consists of 5 Units. Answer any one full question from each | unit. |
| 2000 121 B | | Each question carries 10 marks and may have a, b, c as sub questions. | |
| | | | |
| 2 | | | Aarks) |
| レノ | 1.a) | Define system, control volume, surroundings, boundaries, universe. | [2] |
| | b) | Explain heat pump with the help of a neat sketch. Derive its COP. | [3] |
| | c) | Write the use of compressibility charts. | [2] |
| | d) | Define DBT, WBT, DPT, RH and specific humidity. | [3] |
| | e) | Draw p-v and T-s plots of Lenoir cycle and derive air standard efficiency. | [2] |
| | f | Clearly differentiate between microscopic and macroscopic view points. Explain heat engine with the help of a neat sketch. Derive its efficiency. | |
| 75 | g) h) | Derive Clasius - Clapeyron equation from Maxwell's equations. | |
| Edge Land State | i) | Draw psychrometric chart and indicate all constant property lines on it. | [2] |
| | . j) | Draw p-v and T-s plots of Ericsson cycle and derive air standard efficiency. | [3] |
| | • J) | | \$ |
| | | PART-B | |
| 4 | | The state of the s | Marks) |
| \bigcirc |)2. | Derive steady flow energy equation. Show difference applications of it | |
| | | Explain working of constant volume gas thermometer with help of a neat sketch. | [10] |
| | . 3. | Explain working of constant volume gas thermometer with help of a heat sketch. | [10] |
| | 4. | Prove equivalence of Kelvin- Planck and Clausius statement. | [10] |
| • | | OR | |
| | 5. | Prove that internal energy is a point function. | [10] |
| 7 | | on on on on | |
| 75 | -√6.a) | What are the deviations from perfect gas model. | [6] |
| | ' b) | Discuss about Vanderwaal's equation of state. | [2+2] |
| | _ \ | OR | |
| | 7.a) | State law of corresponding states. Explain Generalised compressibility chart and observations made from it. | [5+5] |
| | b) | Explain Generalised Compressionity chart and observations made from it. | [5.5] |
| | 8. | Define mole fraction, mass fraction, volume fraction, equivalent gas constant. | [10] |
| \bigcirc | | 90 90 90 90 9D 9D | \rightarrow |
| | (9.a) | The molar analysis of a gaseous fuel indicates that it contains 40% CH4, 20% | $6 C_2H_6, \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$ |
| | | 25% H ₂ and 15% N ₂ . Determine molar mass of the fuel and gravimetric analysis. | |
| | b) | Write a note on Gibbs function. | [5+5] |
| | | The standard off | iciency |
| | 10. | Draw p-v, T-s plots of Otto cycle and derive expressions for air standard effi | [10] |
| | T'''''\ | work done and mean effective pressure. | |
| >< | L/11 | Draw layout, p-v and T-s plots of Bell Coleman Cycle and derive expression for C | COP. SIN |
| | | Standard bearing a phone of Soil Soils and derive and assistant as | [10] |

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| | | Part A is compulsory which carries 25 marks. Answer all questions in Part A. | unit |
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| > + | () g) | The property of the property o | [2] [3] |
| | \ h) | District Campage Conference of | [2] |
| | i) j) | | [3] |
| | 3) | Dian p valid 1 s pross or 2 most of the | |
| | | PART-B | - 1 \ |
| ************************************** | | No. | Iarks) |
| | <i>y</i> 2. | Derive steady flow energy equation. Show difference applications of it | 1194 |
| レノロ | 13 | | [10] |
| | • • | | |
| | 4. | · · · · · · · · · · · · · · · · · · · | [10] |
| | _ | OR | [10] |
| | 5. | Prove that internal energy is a point function. | |
| R | -(6.a) | What are the deviations from perfect gas model. | |
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| | $\setminus 11.$ | Draw layout, p-v and T-s plots of Bell Coleman Cycle and derive expression for C | [10] |
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