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| **Scheme of Valuation/Answer Key**  (Scheme of evaluation (marks in brackets) and answers of problems/key) | | | | | |
| **APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  FOURTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2019 | | | | | |
| **Course Code: ME204** | | | | | |
| **Course Name: THERMAL ENGINEERING (ME)** | | | | | |
| Max. Marks: 100 | | |  | Duration: 3 Hours | |
| **PART A** | | | | | |
|  |  | ***Answer any three full questions, each carries 10 marks.*** | | | Marks |
| 1 | a) | Proper T-s diagram representation (2 marks)  -Evaluation of state enthalpies using turbine and pump efficiencies:- h1=2758 kJ/kg, h2 (isen) =1795; h2 (actual)=1939; h3=174 and h4(act)=183. (3 marks)  - Thermal efficiency = 31.4% (2 marks)  -Mass flow rate = 123.6 kg/s (2 marks)  -Total Heat Supply =318 MW (1 mark | | | (10) |
| 2 | a) | With Regeneration:-  Efficiency = 36.08% (2 marks); Specific steam consumption = 3.85 kg/kWh (2 marks)  Without Regeneration :-  Efficiency = 34.18% (1marks); Specific steam consumption = 3.46 kg/kWh; (1marks)  Increase in efficiency = 1.9% (2 marks): Increase in specific steam consumption = 0.39 kg/kWh (2 marks) | | | (10) |
| 3 | a) | Figure -1 marks, Explanation - 3 marks | | | (4) |
|  | b) | Definition - 2 marks; Proof - 4 marks | | | (6) |
| 4 | a) | Sketch-3 marks, Explanation-4 Marks.  Differentiate- 3 marks | | | (10) |
| PART B | | | | | |
| *Answer any three full questions, each carries 10 marks.* | | | | | |
| 5 | a) | Figures of both cases– 1 mark each, Explanation of both cases – 1 mark each | | | (4) |
|  | b) | Figures – 3 marks, Explanation – 3 marks | | | (6) |
| 6 | a) | Heat addition = 1235.5 kJ/kg, ( 3 marks )  Heat rejected = 557.5 kJ/kg ( 3 marks )  Efficiency = 54.9%( 4 marks ) | | | (10) |
|  | b) |  | | | () |
| 7 | a) | Figures – 2 marks, Explanation – 2 marks | | | (4) |
|  | b) | Morse test description 3 marks, Discretion 3 marks | | | (6) |
| 8 | a) | Explanation-6 marks | | | (10) |
|  | b) | Explanation with figure-4 marks | | |  |
| **PART C** | | | | | |
| ***Answer any four full questions, each carries 10 marks.*** | | | | | |
| 9 | a) | 4 points – 4 marks | | | (4) |
|  | b) | Explanation – 6 marks | | | (6) |
| 10 | a) | Figure -1 marks, Explanation - 3 marks | | | (4) |
|  | b) | Figure -2 marks, Explanation - 4 marks | | | (6) |
| 11 | a) | 4 points – 4 marks | | | (4) |
|  | b) | Figure -2 marks, Explanation - 4 marks | | | (6) |
| 12 | a) | Net power output = 2019 kW (4 marks)  Specific fuel consumption = 0.3762 kg/kW h (3 marks)  Thermal efficiency = 22.2% (3 marks) | | | (10) |
|  | b) |  | | |  |
| 13 | a) | Power output = 224 kW (5 Marks), Thermal efficiency = 17.22% - (5 marks) | | | (10) |
|  | b) |  | | |  |
| 14 | a) | Derivation- 3 marks, representation of the cycle-2 marks | | | (5) |
|  | b) | Figure – 2 marks, Explanation – 3 marks | | | (5) |
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