Unit 8 - Week 6 :Gas Turbine Cycles

Assignment 6

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-11, 23:59 IST.

1) With increase in the pressure ratio, the efficiency of the Brayton cycle *1 point*

- continuously increases
- continuously decreases
- increases till a maxima and then decreases
- remains unaffected

No, the answer is incorrect.
Score: 0
Accepted Answers:
continuously increases

2) While analyzing a Brayton cycle, if different specific heat values are considered during the heat addition and heat rejection processes, in order to counter the changes in specific heats with temperature, then the estimated cycle efficiency *1 point*

- will be lower
- will be higher
- will remain unchanged
- will be dependent on the maximum temperature alone

No, the answer is incorrect.
Score: 0
Accepted Answers:
will be higher

3) If infinite number of intercooling stages can be incorporated during the compression stage of the Brayton cycle, then the compression process can be assumed to be *1 point*

- isenthalpic
- isobaric
- isochoric
- isothermal

No, the answer is incorrect.
Score: 0
Accepted Answers:
isothermal

4) Among the followings, which one is not a consequence of adopting reheating in the Brayton cycle? *1 point*

- increase in exhaust temperature
- increase in exhaust pressure
- increase in heat addition
- increase in work output

No, the answer is incorrect.
Score: 0
Accepted Answers:
increase in exhaust pressure

5) Among the followings, which one is not a consequence of adopting regeneration in the Brayton cycle? *1 point*

- increase in the thermal efficiency
- reduction in the heat input requirement
- increase in the specific work output
- reduction in the exhaust gas temperature

No, the answer is incorrect.
Score: 0
Accepted Answers:
increase in the specific work output

6) For a given pressure ratio in a Brayton cycle with regeneration, as the ratio of maximum-to-minimum cycle temperatures increases, overall cycle efficiency *1 point*

- continuously increases
- continuously decreases
- remains unaffected
- increases till a maxima and then decreases

No, the answer is incorrect.
Score: 0
Accepted Answers:
continuously increases

7) An ideal Brayton cycle has a compression ratio of 15, with the highest cycle temperature of 1600 K. The state at the beginning of compression is 290 K and 100 kPa. If air can be assumed as an ideal gas with $C_p = 1.004 kJ/kg.K$ and $k = 1.4$,then the net specific work output from this cycle (correct to 1 decimal place) is _____ kJ/kg.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 512,538

1 point

8) An ideal Brayton cycle has inlet state properties of 290 K and 90 kPa. 1000 kJ/kg of heat is added during the combustion process. From the material considerations, it is essential to maintain the maximum cycle temperature below 1700 K. If air can be assumed as an ideal gas with $C_p = 1.004 kJ/kg.K$ and $k = 1.4$, then the maximum possible value of the pressure ratio for this cycle (correct to 1 decimal place) is _____

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 22,22.6

1 point

9) A gas turbine cycle has two stages of compression, with an intercooler between the stages. Air enters the first stage at 100 kPa, 300 K. Both compression stages have pressure ratios of 5 and isentropic efficiencies of 82%. Air exits the intercooler at 330 K. If air can be assumed as an ideal gas with $C_p = 1.004 kJ/kg.K$ and $k = 1.4$, then the total specific work input requirement for the this cycle (correct to 1 decimal place) is _____ kJ/kg.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 435,465

1 point

10) An ideal Brayton cycle incorporates an ideal regenerator. The state at the entry to the compressor is 290 K, 90 kPa, while the highest cycle pressure and temperatures are 1170 kPa and 1700 K respectively. If air can be assumed as an ideal gas with $C_p = 1.004 kJ/kg.K$ and $k = 1.4$,then the efficiency of this cycle (correct to 1 decimal place) is _____ %.

Hint

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 63,66

1 point