Week 5 : Assignment 5

The due date for submitting this assignment has passed.

Due on 2021-09-01, 23:59 IST.

As per our records you have not submitted this assignment.

1) The operating cycle of a simple gas turbine plant is, *1 point*

- The Carnot cycle.
- The Rankine cycle.
- The Brayton cycle.
- None of the above.

No, the answer is incorrect.
Score: 0
Accepted Answers:
The Brayton cycle.

2) The work output of the simple gas turbine cycle becomes maximum when *1 point*

- The turbine exhaust temperature is equal to the atmospheric temperature.
- The turbine exhaust temperature is less than the compressor outlet temperature.
- The turbine exhaust temperature is more than the compressor outlet temperature.
- The turbine exhaust temperature is equal to the compressor outlet temperature.

No, the answer is incorrect.
Score: 0
Accepted Answers:
The turbine exhaust temperature is equal to the compressor outlet temperature.

3) A regenerative cycle is used, *1 point*

- To enhance the plant efficiency.
- To enhance the specific work output.
- To enhance both plant efficiency and work output.
- None of the above.

No, the answer is incorrect.
Score: 0
Accepted Answers:
To enhance the plant efficiency.

4) The reheat cycle *1 point*

- Increases the specific work output and efficiency as compared to a simple gas turbine cycle.
- Decreases the specific work output but increases the efficiency as compared to a simple gas turbine cycle.
- Increases the specific work output but decreases the efficiency as compared to a simple gas turbine cycle.
- Increases the specific work output, but the efficiency remains the same compared to a simple gas turbine cycle.

No, the answer is incorrect.
Score: 0
Accepted Answers:
Increases the specific work output but decreases the efficiency as compared to a simple gas turbine cycle.

5) Following data refer to a single shaft gas turbine cycle.

Minimum temperature of the cycle:	300K
Turbine inlet temperature:	1200K
Isentropic efficiency of compressor:	0.82
Isentropic efficiency of turbine:	0.87

Pressure loss in the combutsor and other components is neglected. Calculate for maximum power output. Assume, $\gamma = 1.4$ and $C_p = 1.005kJ/kgK$ through out the cycle.

The pressure ratio of the turbine and compressor.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 6.05,6.39

3 points

6) Following Question 5, calculate the maximum specific power output in kW/kg/s.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 245,263

0 points

7) Following Question 5, calculate the thermal efficiency of the cycle in percentage.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 36,42

0 points

8) For the problem 5, the maximum power generated by the cycle is 100MW at 300K and 1.0 bar, when the Calorific value of fuel is 43100 kJ/kg. Assume $\gamma = 1.4$ and $C_p = 1.005kJ/kgK$ through out the cycle. Evaluate,

The mass flow rate of air in kg/s.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 387,401

0 points

9) Following question 8, calculate the specific value consumption (SFC) in kg/kW hr.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 0.19,0.25

0 points

10) A heat-exchange cycle is designed with the following specifications.

Compressor pressure ratio:	4.0
Turbine inlet temperature:	1000K
Isentropic efficiency of compressor:	0.85
Isentropic efficiency of turbine:	0.87
Heat exchanger effectiveness =	0.80

Ambient conditions are 1 bar and 300 K.
Pressure loss in the combustor and other components is neglected. Assume, $\gamma = 1.4$ and $C_p = 1.005kJ/kgK$ through out the cycle.

Evaluate the specific work output in kW/kg/s.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 110,116

3 points

11) Following Question 10, evaluate the thermal efficiency for the heat-exchange cycle in percentage.

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 31,36

3 points