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Courses » IC Engines and Gas Turbines

Announcements **Course** Ask a Question Progress FAQ

Unit 11 - Week 8 : Performance Analysis of Brayton Cycle

Register for
Certification exam

Course outline

How to access
the portal

Week 0 -
Introductory
Session

Week 1 -
Introduction to
IC Engines

Week 2 - Air
Standard Cycles

Week 3 -
Carburation

Week 4 - Ignition
and Lubrication
Systems

Week 5 -
Alternative
Fuels,
Combustion in
SI and CI
Engines

Week 6 - Fuel
Injection
Systems

Week 7:
Introduction to

Assignment 08

The due date for submitting this assignment has passed.

As per our records you have not submitted this **Due on 2019-03-27, 23:59 IST.**
assignment.

1) The efficiency of Brayton cycle with heat exchanger is higher than that of simple Brayton cycle because of **1 point**

- a) Work output of the turbine is increased
- b) Heat rejected is increased
- c) Heat required to be supplied is reduced
- d) Compressor work is reduced

No, the answer is incorrect.

Score: 0

Accepted Answers:

c) Heat required to be supplied is reduced

2) Consider the following statements, **1 point**

- The open cycle gas turbines are preferred over closed cycle when the gas is air.
- In open cycle gas turbine, the expansion of combustion products can take place up to atmospheric pressure.
- Brayton cycle is suitable for reciprocating engines.

Which of these statements are correct?

- a) 1 and 2
- b) 2 and 3
- c) 1 and 3
- d) 1, 2, and 3

No, the answer is incorrect.

Score: 0

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Analysis of Brayton Cycle

- Lec 1: Brayton Cycle: Introduction and General Relationships
- Lec 2: Brayton Cycle: Efficiency, Work Ratio and Optimum Work Output Condition
- Lec 3: Brayton Cycle with Heat Exchanger/ Reheater
- Lec 4: Brayton Cycle with Intercooler
- Lec 5: Real Brayton Cycle, Solved Example for Ideal Cycle
- Lec 6: Solved Examples for Real Brayton Cycle
- Quiz : Assignment 08
- Week 8 Assignment Solutions

Week 9: Introduction to Various Aircraft Engine and Performance Parameters

Week 10: Components of Brayton Cycle Based Power Plant

Week 11: Components of Brayton Cycle Based Power Plant

Week 12: Components of Brayton Cycle Based Power Plant

- b) Compressed air, compression work
- c) Hot gases, compression work
- d) Compressed air, expansion work.

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) Compressed air, compression work

4) Which of the following increases the work ratio in a simple gas turbine plant

1 point

- a) Heat exchanger
- b) Reheater
- c) Intercooler
- d) Both Reheater and intercooler

No, the answer is incorrect.

Score: 0

Accepted Answers:

d) Both Reheater and intercooler

5) Having reheater in a gas turbine power plant, mainly

1 point

- a) Decreases net output and increases thermal efficiency
- b) Decreases both thermal efficiency and net output
- c) Always increases specific work output
- d) Always increases thermal efficiency

No, the answer is incorrect.

Score: 0

Accepted Answers:

c) Always increases specific work output

6) Inter-cooling in gas turbines

1 point

- a) Decreases net output
- b) Increases net output
- c) Is implemented in between turbines
- d) None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) Increases net output

7) In a gas turbine power plant, the compressor work is 400 kJ/kg, the heat supplied is 1 MJ/kg and the turbine work is 600 kJ/kg. The thermal efficiency of plant is:

1 point

- a) 20%
- b) 30%
- c) 40%
- d) 50%

No, the answer is incorrect.

Score: 0

Accepted Answers:

a) 20%

8) Optimum Compression ratio for maximum specific output for ideal gas(air) turbine plant **1 point**
operating at initial temperature of 27 degree Celsius and maximum temperature of 727 degree Celsius,
is closure to

- a) 6
- b) 8
- c) 12
- d) 14

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) 8

Common Data for Questions Q9 to Q12:

In an open cycle gas turbine plant, air enters the compressor at 1 bar and 300 K. The pressure at the exit of compressor is 4 bar. The isentropic efficiencies of the turbine and the compressor are 85% and 80%, respectively. Air fuel ratio is 80:1. The calorific value of the fuel used is 42 MJ/kg and mass flow rate of air is 2.5 kg/s. Assume air as an ideal gas with specific heat at constant pressure equal to 1.005 kJ/kgK and the specific heat ratio as 1.4. Find the following:

9) Heat supplied by fuel to the plant in kJ/s is

1 point

- a) 1312
- b) 700
- c) 1050
- d) 900

No, the answer is incorrect.

Score: 0

Accepted Answers:

a) 1312

10) Work required to drive the Compressor in kW is

1 point

- a) 367
- b) 279
- c) 495
- d) 458

No, the answer is incorrect.

Score: 0

Accepted Answers:

d) 458

11) Actual turbine outlet temperature in Kelvin is

1 point

- a) 672
- b) 720
- c) 610
- d) 690

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) 720

12) Thermal efficiency of the plant in percentage is

1 point

- a) 21
- b) 28
- c) 19
- d) 25

No, the answer is incorrect.

Score: 0

Accepted Answers:

c) 19

Common Data for Questions Q13 to Q15:

In a regenerative gas turbine cycle, air enters the compressor at 1 bar 15 degree Celsius and the pressure ratio is 6. The isentropic efficiencies of compressor and turbine are 0.8 and 0.85, respectively. The maximum temperature in the cycle is 800 degree Celsius. The regenerator efficiency is 0.78. Assume specific heat of air at constant pressure as 1.005 kJ/kgK, specific heat ratio for air as 1.4, specific heat of gas at constant pressure is 1.147 kJ/kgK and specific heat ratio for gas is 1.33. Find the following:

13) The turbine work output(kJ/kg) for cycle is

0 points

- a) 367
- b) 332
- c) 353
- d) 323

No, the answer is incorrect.

Score: 0

Accepted Answers:

c) 353

14) The heat addition (kJ/kg) of air is

0 points

- a) 425
- b) 407
- c) 351
- d) 310

No, the answer is incorrect.

Score: 0

Accepted Answers:

b) 407

15) Thermal efficiency (%) of the cycle is

0 points

- a) 35
- b) 41
- c) 18
- d) 27

No, the answer is incorrect.

Score: 0

Accepted Answers:

d) 27

