

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final examination: Semester-II

Academic year: 2003

Date: 24/02/2004

Time: 13:30-16:30

Subject: 216-436 (Gas Turbine Theory)

Room: 201

Remark: (49 students)

1. Answer all (5+bonus) questions
2. Allow to bring only 1 sheet of A4 with handwriting
3. Allow to bring a calculator
4. Cheater will be caught and investigated following the faculty rule for examination
5. Total score for this examination is 40%

ข้อที่	คะแนนเต็ม	คะแนนที่ได้
1	9	
2	5	
3	8	
4	6	
5	9	
Bonus	3	
รวม	40	

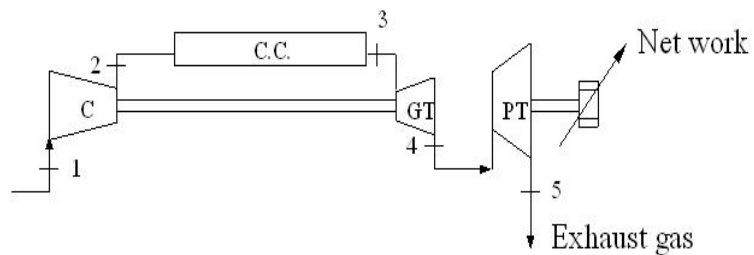
Wiriya Thongruang

Lecturer

ข้อ 1. (9 คะแนน)

A simple gas turbine with a gas generator system and a power turbine delivering 20 MW (net) is used for a peak load generator. The following data are applicable for this system :

Compressor pressure ratio	11.0
Compressor isentropic efficiency	0.82
Combustion pressure loss	0.4 bar
Combustion efficiency	0.99
Turbine inlet temperature	877°C
Gas generator turbine isentropic efficiency	0.87
Power turbine isentropic efficiency	0.90
Mechanical efficiency of power turbine shaft	0.90
Ambient condition P_a, T_a	1 bar, 15°C
$C_p = 1.07 \text{ kJ/kg.K}, \gamma = 1.3, \text{LHV} = 43,000 \frac{\text{kJ}}{\text{Kg}}$	



- 1.1) Draw T-S diagram for the system
- 1.2) Calculate the air mass flow required
- 1.3) Calculate the specific fuel consumption in the unit of kg/kWh

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