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Courses » Fluid dynamics and turbomachines

Announcements **Course** Ask a Question Progress Mentor FAQ

Week #8.

PERFORMANCE OF STEAM AND GAS TURBINES

Course outline

How to access the portal

Pre-requisite Assignment

Course Content

Week #1.
INTRODUCTION TO FLUID FLOWS

Week #2.
INTEGRAL ANALYSIS

Week #3.
DIFFERENTIAL ANALYSIS

Week #4.
VISCOUS FLOW

Week #5.
INTRODUCTION TO TURBOMACHINES

Week #6.
PRINCIPLE OF TURBOMACHINES

Week #7.
PERFORMANCE OF PUMPS AND HYDRAULIC

Assignment 8

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment. **Due on 2018-10-03, 23:59 IST.**

Instructions:

- For questions (1-4): fill in the blanks
- For questions (5-9): select the most appropriate option.

Note: The numerical value marked in red colour is correct answer while the answers within the numerical range of value given in the blue colour are considered as correct answer.

Steam at a velocity of 500 m/s enters an impulse turbine having a nozzle angle of 25° . The exit angle of the moving blade is 20° and the relative velocity may be assumed to remain constant over the moving blade. The blade speed is 200 m/s.

- 1) Moving blade angle at the inlet is ($^\circ$)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 135,145

6 points

- 2) Absolute exit velocity is (m/s)

No, the answer is incorrect.

Score: 0

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NPTEL

National Programme on
Technology Enhanced Learning

In association with

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Funded by

Introduction to compressible flow

Lec02 - Steam and Gas Turbine : Introduction and classification

Lec03 - Steam and Gas Turbine : h-s Plots and velocity triangle

Lec04 - Tutorial

Week 8 - Handout 1

Week 8 - Handout 2

Week-8 Lec-01 Introduction to compressible flow Presentation

Week-8 Lec-02 Steam and Gas Turbine Introduction and classification Presentation

Week-8 Lec-03 Steam and Gas Turbine h-s Plots and velocity triangle Presentation

WEEK 8 - FEEDBACK - Fluid dynamics and turbomachines

Quiz : Assignment 8

Assignment 8 Solution

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m/s. Assume that the energy loss in each row of blades (moving and fixed) is 24% of the kinetic energy of the steam entering the blades. Outlet angles of the blade are as follows: a) first row of moving blades is 18° ; b) intermediate guide blades 22° and c) second row of moving blades 38° .

3) Inlet blade angle of first moving blade is ($^\circ$)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 150,170

8 points

4) Inlet blade angle of second moving blade is ($^\circ$)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 135,155

8 points

Steam flows from nozzles at the rate of 0.2 kg/s and at a speed of 900 m/s. It then enters the rotor of single stage impulse turbine with symmetric blades. The flow leaves the nozzles at an angle of 20° , the mean radius of the blades is 120 mm, and the rotor speed is 18000 rpm. Due to the frictional loss in the rotor blades, kinetic energy of relative flow at rotor exit is 85% of kinetic energy of relative flow entering the rotor. Determine

5) the relative inlet flow angle ($^\circ$)

6 points

- 26.4
- 53.6
- 126.4
- 153.6

No, the answer is incorrect.

Score: 0

Accepted Answers:

153.6

6) the absolute velocity of steam leaving the rotor (m/s)

6 points

- 446.7
- 223.4
- 670.2
- 893.6

No, the answer is incorrect.

Score: 0

Accepted Answers:

446.7

7) power delivered by the turbine (kW)

6 points

- 26.5
- 40.2
- 53.9
- 67.6

No, the answer is incorrect.

Score: 0

Accepted Answers:

53.9

8) In pressure-compounded impulse type of steam turbine: 2 points

- pressure is reduced in stages.
- velocity is reduced in stages.
- both pressure and velocity are reduced in stages.
- neither pressure nor velocity is reduced in stages.

No, the answer is incorrect.

Score: 0

Accepted Answers:

pressure is reduced in stages.

9) In velocity-compounded impulse type of steam turbine, a typical stage comprises of: 2 points

- only rotor.
- stator and rotor.
- stator and nozzle.
- nozzle, rotor and stator.

No, the answer is incorrect.

Score: 0

Accepted Answers:

stator and rotor.

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