

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

● Lecture 13: Cascade Analysis (Part-II)

● Lecture 14: Cascade Analysis (Part-III)

● Lecture 15: Cascade Analysis (Part-IV)

● Lecture 16: Example-Cascade Analysis (Part-V)

○ Quiz: Week 4: Assignment 4

● Feedback Form for Week 04

● Week 4 : Assignment 4- Solution

Week 5

Week 6

Week 7

Week 8

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Week 12

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Week 4: Assignment 4

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) In a compressor cascade, the static pressure

1 point

- drops
 increases.
 remains same.
 none of these.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 increases.

2) The actual lift in a turbine cascade under consideration of the drag force will be

1 point

- increased.
 decreased.
 invariant.
 none of these.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 increased.

3) The aerodynamic loss in a turbine or compressor cascade can be related to

1 point

- the decrease in static pressure.
 the decrease in static enthalpy.
 the decrease in total pressure.
 none of these.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 the decrease in total pressure.

4) The secondary flow loss in a turbine cascade occurs due to

1 point

- the formation of boundary layer on the blade surface
 the development of boundary layer on the annulus walls.
 the enwall boundary layer generating crossflow vortices.
 none of these.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 the enwall boundary layer generating crossflow vortices.

5) The stall point is arbitrarily defined as the incidence at which the total pressure loss would be

1 point

- twice of the minimum total pressure loss.
 equal to the minimum total pressure loss.
 twice of total pressure loss at the nominal condition.
 none of these.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 twice of the minimum total pressure loss.

6) The data for a turbine blade row is given below:

blade entry angle	$\alpha_1' = 30^\circ$
blade exit angle	$\alpha_2' = 60^\circ$
incidence	$i = 3^\circ$
deviation	$\delta = 2.5^\circ$
velocity of air at exit	$= 75 \text{ m/s}$
pith-chord ratio	$= 0.505$
stagnation pressure loss	$= 10 \text{ mm W.G.}$
density of air	$= 1.25 \text{ kg/m}^3$

Determine the drag coefficient.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 0.037,0.047

3 points

7) Following Q6, determine the lift coefficient.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 1.8,2.2

2 points

 8) A compressor cascade is constructed from circular arc airfoil blades (camber angle, $\theta = 25^\circ$) set at a stagger angle (λ) of 30° with a pitch-chord ratio of 1.0. The momentum thickness-chord ($\frac{\delta}{C}$) ratio is 0.031. The values of the incidence and deviation are 5° and 7.73° respectively. Determine the cascade inlet blade angle in degree.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 42,43

1 point

9) Following Q8, determine the cascade exit blade angle in degree.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 17,18

1 point

10) Following Q8, determine the drag coefficient.

 (Hint: $\frac{2\Delta p_0}{\rho C_1^2} = 2 \frac{m}{C} \frac{C}{S} \frac{\cos^2 \alpha_1}{\cos^2 \alpha_2}$)

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 0.036,0.046

2 points

11) Following Q8, determine the lift coefficient.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 0.89,0.99

1 point

12) A compressor cascade has the following data:

velocity of air at entry	$= 70 \text{ m/s}$
air angle at entry	$= 50^\circ$
air angle at exit	$= 30^\circ$
pitch-chord ratio	$= 1.1$
stagnation pressure loss	$= 11 \text{ mm W.G.}$
density of air	$= 1.25 \text{ kg/m}^3$

Determine drag coefficient.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 0.034,0.044

2 points

13) Following Q12, determine the lift coefficient.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 0.92,1.02

2 points

14) Following Q12, determine the maximum blade efficiency.

 No, the answer is incorrect.
 Score: 0

 Accepted Answers:
 (Type: Range) 0.86,0.96

1 point