

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

- Lecture 5: Euler Equation for Turbomachinery (Part-I)

- Lecture 6: Euler Equation for Turbomachinery (Part-II)

- Lecture 7: Solved Examples

- Lecture 8: Similarity Analysis (Part-I)

 Quiz: Assignment 2

- Feedback Form for Week 02

- Week 2 : Assignment 2- Solution

Week 3

Week 4

Week 5

Week 6

Week 7

Week 8

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Assignment 2

The due date for submitting this assignment has passed.

Due on 2021-08-18, 23:59 IST.

As per our records you have not submitted this assignment.

1) The equation of motion of a point mass m with respect to a rotating frame of reference is given by $m\vec{f} = \vec{P} - m \times 2(\vec{\Omega} \times \vec{W}) - m\vec{\Omega} \times (\vec{\Omega} \times \vec{r})$. Which of the following statement is valid? **1 point**

- $2(\vec{\Omega} \times \vec{W})$ is the centrifugal force, while $\vec{\Omega} \times (\vec{\Omega} \times \vec{r})$ is the coriolis force per unit mass.
- $2(\vec{\Omega} \times \vec{W})$ is the coriolis force, while $\vec{\Omega} \times (\vec{\Omega} \times \vec{r})$ is the centrifugal force per unit mass.
- They are unknown inertia forces.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$2(\vec{\Omega} \times \vec{W})$ is the coriolis force, while $\vec{\Omega} \times (\vec{\Omega} \times \vec{r})$ is the centrifugal force per unit mass.

2) The enthalpy is denoted by h , and pressure by p , while section 1 refers to the inlet and 2 as the exit of a rotating impeller. Now, the Euler work w of the impeller handling compressible flow can be equated to **1 point**

- $W = h_{0r2} - h_{0r1}$
- $W = p_{0r2} - p_{0r1}$
- $W = h_{02} - h_{01}$
- $W = u_{02} - u_{01}$
- $W = p_{02} - p_{01}$
- None of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$W = h_{02} - h_{01}$

3) The enthalpy is denoted by h , and pressure by p , while section 1 refers to the inlet and 2 as the exit of a rotating impeller. Now, the Euler work w of the impeller handling incompressible flow can be equated to **1 point**

- $W = h_{0r2} - h_{0r1}$
- $W = p_{0r2} - p_{0r1}$
- $W = h_{02} - h_{01}$
- $W = u_{02} - u_{01}$
- $W = p_{02} - p_{01}$
- None of the above.

No, the answer is incorrect.

Score: 0

Accepted Answers:

$W = p_{02} - p_{01}$

4) A Kaplan turbine is, **1 point**

- An impulse turbine
- A reaction turbine
- A radial flow turbine
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

A reaction turbine

5) Section 1 refers to the inlet and 2 as the exit of a rotating impeller handling incompressible flow. Further, enthalpy is denoted by h and pressure by p . The aerodynamic losses can be equated to **1 point**

- Loss= $h_{0r1}-h_{0r2}$
- Loss= $p_{0r1}-p_{0r2}$
- Loss= $h_{01}-h_{02}$
- Loss= $p_{01}-p_{02}$
- None of the above

No, the answer is incorrect.

Score: 0

Accepted Answers:

Loss= $p_{0r1}-p_{0r2}$

6) A turboprop engine has a better propulsive efficiency than turbofan engine in the range of Mach number, **1 point**

- 0.3-0.6
- 0.6-1.1
- 1.1-1.5
- 1.5-2.5

No, the answer is incorrect.

Score: 0

Accepted Answers:

0.3-0.6

7) A centrifugal pump of 1.5 m diameter delivers 5.0 m³/min of water at a tip speed of 15 m/s and a flow velocity of 3.0 m/s. The outlet blade angle is at 30° to the tangent at the impeller periphery. Assuming zero whirl at the inlet, and zero slip, a hydraulic efficiency η_H of 82%, and an overall efficiency of 75%. Calculate the actual head developed in meter. **1 point**

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 11.5,12.6

8) Following Q7, calculate the magnitude of absolute velocity. **1 point**

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 9.5,10.7

9) Following Q7, calculate the absolute velocity angle w.r.t peripheral direction. **1 point**

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 16.5,17.5

10) Following Q7, Shaft power in kW **1 point**

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 12.5,14.2

11) Following Q7, the torque input to the impeller in N-m. **1 point**

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 668.5,670.5

12) A centrifugal pump impeller having a diameter of 130 mm delivers 3.0 l/s at a speed of 2000 rpm. If a 100 mm diameter impeller is fitted and the pump runs at a speed of 2500 rpm, then, what is the volume flow rate? **2 points**

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 1.5,1.7

13) Following Q12, determine the new pump head. **0 points**

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 9.5,11.5