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Courses » Principle of Hydraulic Machines and System Design

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Unit 5 - Week 3 - Radial Flow Pump Operational Issues

Course outline

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Introductory Session

Week 1 - Principle of Operation of Hydraulic Machines

Week 2 - Radial and Axial Flow Pumps

Week 3 - Radial Flow Pump Operational Issues

- Stodola Slip Model, Problems
- Stodola Slip Model, Problems (Contd.)
- Stodola Slip Model, Problems (Contd.)
- NPSH: Cavitation, Effect of Swirl on the

Assignment 03

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2018-09-05, 23:59 IST.

1) Due to slip at the blades, the blade angle _____ and flow angle _____. ***1 point***

- increases, increases
- remains constant, remains constant
- increases, decreases
- decreases, increases

No, the answer is incorrect.
Score: 0

Accepted Answers:
decreases, increases

2) The impeller of the pump rotates at 1500 RPM and the outer diameter is 0.2 meters. The blade angle is 32^0 and the number of blades are 10. If the flow velocity is 2 m/s, then find the slip factor. ***1 point***

- 0.5
- 0.79
- 0.2
- 1.0

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.79

3) The dynamic force impelled by the working fluid on the upper side of the blade is higher than the lower side of the blade. ***1 point***

True

4) If critical Thomas coefficient for a pump is 0.3 and datum head at the suction side is 4 meters, then find out minimum suction pressure required to avoid the cavitation. The head developed by the pump is 15 meters. ***1 point***

- 39240 Pa
- 17940 Pa
- 184710 Pa
- Insufficient data

No, the answer is incorrect.
Score: 0

Accepted Answers:
17940 Pa

5) The datum head at the suction side 3 meter and the critical Thomas coefficient defined for particular application is 0.1. The whirl velocity is 15 m/s and the outer diameter of the impeller is 0.2 meters. Temperature is 25^0C. Find the minimum RPM required for avoiding cavitation. ***1 point***

- 4371 RPM
- 4688 RPM
- 187 RPM
- Insufficient data

No, the answer is incorrect.
Score: 0

Accepted Answers:
4371 RPM

6) Assuming no change in the atomospheric pressure, if the temperature increases from 25^0 C to 45^0C, then find out a change in the NPSH. Water is a working fluid. (refer to the Standard vapor pressure versus temperature plot for water) ***1 point***

- 0.6537 meters
- 1.3 meters
- Insufficient data
- -0.6537 meters

No, the answer is incorrect.
Score: 0

Accepted Answers:
-0.6537 meters

7) To avoid cavitation at the pump suction side, ***0 points***

- Suction side pressure should be higher than the vapor pressure
- Thomas coefficient should be higher than critical Thomas coefficient
- The available head at the inlet should be less than NPSH
- Pump should be fixed in flooded suction mode.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Suction side pressure should be higher than the vapor pressure
Thomas coefficient should be higher than critical Thomas coefficient

The available head at the inlet should be less than NPSH
Pump should be fixed in flooded suction mode.

8) The hydraulic efficiency of the pump is 85%. The blade angle at the outlet is 30^0 and it rotates with 1500 RPM. The outer diameter of the impeller is 0.2 m and the width is 2 cm. The flow rate is 0.1 m^3/s. Find the actual head developed by the pump and the head loss in meters. ***1 point***

- 2.598, 0.462
- 0.462, 3.522
- 3.06, 0.462
- 3.06, 2.598

No, the answer is incorrect.
Score: 0

Accepted Answers:
2.598, 0.462

9) According to Stodola slip model, the velocity at the lower face of blade is _____ than the upper face whereas the pressure at the lower face is _____ than the upper face. ***1 point***

- higher, higher
- lower, higher
- higher, lower
- lower, lower

No, the answer is incorrect.
Score: 0

Accepted Answers:
higher, lower

10) If the pump rotates at 1500 RPM and the outer diameter of the impeller is 0.25 meters. The impeller has 8 blades. The blade angle at the outlet is 32^0. Calculate the slip velocity at the outlet of the impeller in m/s. ***1 point***

- 2.04
- 4.08
- 8.16
- Insufficient data

No, the answer is incorrect.
Score: 0

Accepted Answers:
4.08

You were allowed to submit this assignment only once.

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