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Courses » Principle of Hydraulic Machines and System Design

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Unit 6 - Week 4 - Pump Design: Degrees of Reaction

Course outline

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  - Degrees of Reaction: Velocity Triangles
  - Radial Equilibrium of Axial Flow Machines
  - Radial Equilibrium of Axial Flow Machines

Assignment 04

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

Due on 2018-09-12, 23:59 IST.

Try all questions. Consider water as a working fluid if not mentioned specifically.

1) If pressure gradient in the radial direction is +ve, then the centrifugal force _____ with increment in the radius in radial direction. ***1 point***

- Increases
- decreases
- remains constant
- can't say anything

No, the answer is incorrect.
Score: 0

Accepted Answers:
Increases

2) The distribution of the tangential velocity c_θ in the radial direction for free vortex and forced vortex flow is: ***1 point***

- $rc_\theta = k, c_\theta = kr$
- $kc_\theta = r, c_\theta = kr$
- $rk = c_\theta, c_\theta r = k$
- $c_\theta = \frac{r}{k}, c_\theta = \frac{k}{r}$

No, the answer is incorrect.
Score: 0

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- [ ] To decrease the shock loss
- [ ] To increase the static pressure rise in the pump

No, the answer is incorrect.
Score: 0

Accepted Answers:
To increase the head developed by the pump
To increase the efficiency of the pump
To decrease the shock loss
To increase the static pressure rise in the pump

4) According to radial equilibrium of the axial pump, the centrifugal force exerted on the fluid is balanced by ***1 point***

- ( ) axial pressure change in the impeller
- ( ) radial pressure change in the impeller
- ( ) both axial and radial pressure change in the impeller
- ( ) none of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
radial pressure change in the impeller

5) For a pump, the head developed is 15 meters and hydraulic efficiency is 85%.The impeller rotates at 1500 RPM and has a diameter of 0.2 meters. Calculate the degrees of reaction for this pump. ***1 point***

- ( ) 0.3
- ( ) 0.65
- ( ) 0.8
- ( ) 0.35

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.65

6) Statement A: If degree of reaction of pump is Zero, then impeller does not contribute for static pressure rise. ***1 point***
Statement B: If degree of reaction of pump is One, then impeller solely contribute for static pressure rise.

- ( ) A is correct but B is wrong
- ( ) B is correct but A is wrong
- ( ) Both are wrong
- ( ) Both are correct

No, the answer is incorrect.
Score: 0

Accepted Answers:
Both are correct

7) Degrees of reaction for a pump is ratio of ***1 point***

- [ ] Static pressure rise in a rotor to the total pressure rise in the pump

- [ ] Static head developed by the impeller to the total head developed by the pump
- [ ] Total pressure rise to the static pressure rise in the pump
- [ ] Static pressure rise in casing to the total pressure rise in pump

No, the answer is incorrect.
Score: 0

Accepted Answers:
Static pressure rise in a rotor to the total pressure rise in the pump
Static head developed by the impeller to the total head developed by the pump

8) For purely axial flow machine, find the head developed. ***1 point***

- $H = \frac{u_2^2 - u_1^2}{g} - \frac{u_2 w_{\theta 2} - u_1 w_{\theta 1}}{g}$
- $H = \frac{u_2 w_{\theta 2} - u_1 w_{\theta 1}}{g}$
- $H = \frac{u_1 w_{\theta 1} - u_2 w_{\theta 2}}{g}$
- $H = \frac{u_2^2 - u_1^2}{g}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$H = \frac{u_1 w_{\theta 1} - u_2 w_{\theta 2}}{g}$

9) For a pump, the flow rate is 0.1m^3/sec and impeller rotates at 1500 RPM. The diameter of the impeller is 0.2 meters and width is 2 cm. The blade angle at the outlet is 32^0 . Find the degrees of reaction. ***1 point***

- 0.806
- 0.906
- 0.811
- 0.801

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.906

10) For purely radial flow pump, find the head developed by the coriolis force. The outer and inner diameter of the impeller are 0.25 meters and 0.2 meters respectively and it rotates at 1500 RPM. ***1 point***

- 3.54 meters
- 14.15 meters
- 7.08 meters
- Insufficient data

No, the answer is incorrect.
Score: 0

Accepted Answers:
14.15 meters

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