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Courses » Principle of Hydraulic Machines and System Design

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Unit 10 - Week 8 - Hydraulic Turbine: Reaction Turbine

Course outline

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Assignment 08

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.

1) A hydraulic reaction turbine converts *1 point*

- [ ] Mechanical energy into pressure energy
- [ ] Kinetic energy into mechanical energy
- [ ] Mechanical energy into kinetic energy
- [ ] Pressure energy into mechanical energy

No, the answer is incorrect.
Score: 0

Accepted Answers:
Kinetic energy into mechanical energy
Pressure energy into mechanical energy

2) The energy transferred to a Francis turbine is maximum when the whirl velocity at the blade outlet is *1 point*

- ( ) Minimum
- ( ) Maximum
- ( ) Half the blades peripheral velocity at the outlet
- ( ) Equal to the blades peripheral velocity at the outlet

No, the answer is incorrect.
Score: 0

Accepted Answers:
Minimum

3) "For identical size and operating conditions, a reaction turbine produces more power compared to an impulse turbine." This statement is *1 point*

4) In a Kaplan turbine, in absence of frictional effects, the water approaching the runner blades can be considered as **1 point**

- Couette flow
- Free vortex flow
- Forced vortex flow
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Free vortex flow

5) The specific speed of a turbine is defined as the speed of a geometrically similar turbine that **1 point**

- Produces unit power at unit discharge.
- Delivers unit discharge producing unit power.
- Produces unit power by working under unit head.
- Delivers unit discharge by working under unit head.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Produces unit power by working under unit head.

6) Which of the following turbine does not require a draft tube **1 point**

- Turgo turbine
- Bulb turbine
- Deriaz turbine
- Pelton wheel

No, the answer is incorrect.
Score: 0

Accepted Answers:
Turgo turbine
Pelton wheel

7) A draft tube is essentially used in a reaction turbine to **1 point**

- Increase the flow rate.
- Set the turbine above the tailrace without any appreciable drop in available head.
- Convert the residual pressure energy into kinetic energy.
- Convert the residual kinetic energy into pressure energy.

No, the answer is incorrect.
Score: 0

Accepted Answers:
Set the turbine above the tailrace without any appreciable drop in available head.
Convert the residual kinetic energy into pressure energy.

8) A Francis turbine running at 400 rpm develops 1 MW power. If the unit speed of the turbine is 50 rpm, the net head under which the turbine operates is ____ m.

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 63.5,64.5

1 point

9) A Kaplan turbine working under a net head of 12 m develops 10 MW power. The speed ratio and flow ratio of the turbine are 2 and 0.65 respectively. If the diameter of the hub is 0.3 times the diameter of the runner, the absolute diameter of the runner is _____ m.

(Consider the overall efficiency of the turbine to be 94%, density of water $1000\,kg/m^3$ and $g = 9.81\,m/sec^2$)

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 3,4

1 point

10)An axial flow turbine working under a gross head of $35\,m$ rotates at $145\,rpm$. The mean diameter of the turbine runner is $2\,m$. Water leaves the guide vanes at 30^o to the direction of the runner rotation and at the mean radius, the angle of runner blade at the outlet is 28^o. If 7% of the gross head is lost in the casing and guide vanes, and the relative velocity is reduced by 8% due to friction in the runner, the hydraulic efficiency of the turbine is

1 point

(Consider the coefficient of velocity as 1, Density of water $1000\,kg/m^3$ and $g = 9.81\,m/sec^2$. Based on the mean runner diameter, consider fixed blade velocity at the runner entrance and exit)

- 71%
- 81%
- 91%
- 100%

No, the answer is incorrect.
Score: 0

Accepted Answers:
81%

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