

9. Which of the following pump is suitable for lifting water to the turbines?

- a) Centrifugal pump
- b) Air lift pump
- c) Jet pump
- d) Reciprocating pump

10. The slip of a reciprocating pump is

- a) Ratio of actual discharge to theoretical discharge
- b) Product of actual discharge to theoretical discharge
- c) Difference of actual discharge to theoretical discharge
- d) Sum of actual discharge to theoretical discharge

PART B (10 x 2 = 20 Marks)

11. Define Bulk modulus

12. Define capillarity.

13. Why is C_d of orifice meter is much smaller than that of venturimeter?

14. A pitot tube was inserted in a pipe to measure the velocity of water in it. If the water rises in the tube is 200mm. Find the velocity of water.

15. Write down the two methods to find out the loss of head due to friction in pipes.

16. Define hydraulic gradient line.

17. Mention any two function of a surge tank.

18. Differentiate between axial flow & radial flow turbine.

19. Name the different types of casings for the impeller of a centrifugal pump.

20. List out the function of casing.

PART C (5 x 14 = 70 Marks)

21 a) (i) The dynamic viscosity of an oil, used for lubrication between a shaft and sleeve is poise. The shaft is of diameter 0.4m and rotates at 190 rpm. Calculate the power loss in the bearing for a sleeve length of 90mm. the thickness of the oil film is 1.5mm

(10)

(ii) The surface tension of water in contact with air is given as 0.07 N / m. The pressure inside a droplet of water is 0.015 N / cm² greater than outside pressure. Find the diameter of droplet of water.

(4)

(OR)

A Vessel of 4 m^3 volume contains an oil which weighs 30.2 KN . Determine the specific gravity of oil. (6)

Explain briefly the working principle of bourdon pressure gauge with a neat sketch. (8)

State Bernoulli's theorem. Derive an expression for Bernoulli's equation of motion with assumption. (10)

The water is flowing through a pipe through a pipeline of 100 mm diameter with an average velocity of 10 m/s . Determine the discharge through the pipe in lps. (4)

(OR)

(i) The diameter of pipe at the sections 1 & 2 are 10 cm & 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5 m/s . Determine the velocity for section 2. (6)

(ii) Enumerate in detail about the different types of flow. (8)

(i) Derive Darcy's Equation for determining the loss of head due to friction in pipeline. (10)

(ii) Define the term Kinetic correction factor & Momentum correction factor. (4)

(OR)

(i) Find the head lost due to friction in a pipe of diameter 300 mm & length 50 m through which water is flowing at a velocity of 3 m/s using (9)

1. Darcy's formula. 2. Chezy's formula assume $c = 60$.

(ii) Derive Chezy's Formula for determining the loss of head due to friction in pipeline. (5)

a) With the neat sketch describe the procedure used for governing a turbine.

(OR)

b) A pelton wheel is to be designed for the following specifications:

Shaft power = $11,772 \text{ Kw}$,

Head = 380 m

Speed = 750 rpm ,

Overall Efficiency = 86%

Jet diameter is not to exceed one sixth of the wheel diameter. Determine:

(i) The wheel diameter

(ii) The Number of jets required

(iii) Diameter of the jet take $K_{v1} = 0.985$ & $K_{u1} = 0.45$

25 a) (i) What are the different types of pumps?

(ii) Explain the working principle of a centrifugal pump with neat sketch.

(OR)

b) (i) Differentiate between Centrifugal pump and Reciprocating pump.

(ii) A single acting reciprocating pump has a plunger of 300mm diameter and 200mm. If the speed of the pump is 30 rpm & it delivers 6.5 litres / sec of water. Find the C_d & % of slip of the pump.

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