Unit - V

5. a) What are different characteristics curves for a Turbine? Explain.

   b) What is priming of a pump?

   c) What is governing mechanism of Turbine? Explain.

   d) Draw inlet and outlet velocity triangle for inward flow reaction turbine and for a Centrifugal pump.

OR

An Inward Flow Reaction Turbine has an inlet guide vane angle of 30 degree and inlet edges of runner blade at 120 degree to the direction of rotation. The breadth of the runner at inlet is a quarter of the diameter and there is no whirl velocity at outlet. The overall head is 20 m and the speed is 1200 rpm. The hydraulic and overall efficiency may be assumed to be 89% and 85% respectively. Estimate the runner diameter at inlet and the power developed.

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Roll No .....

CE - 503

B.E. V Semester

Examination, December 2015

Fluid Mechanics - II

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

1. a) What do you understand by Aging of pipes? Also explain laminar sub layer.

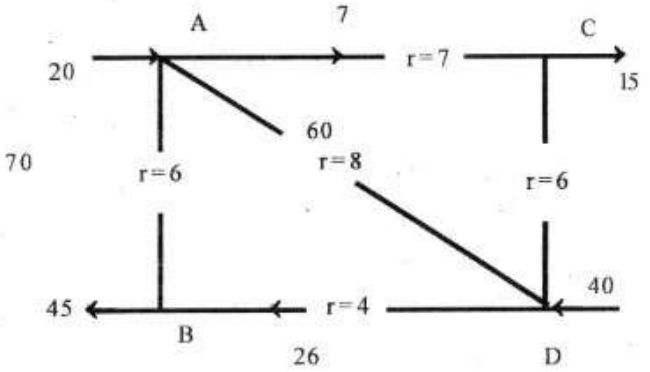
   b) What is Siphon and where is it used?

   c) What do you understand by the term "Water Hammer" in pipes? Explain.

   d) For the distribution main of a city water supply a 36 cm diameter pipe is required. As pipe above 30 cm are not available, it is decided to lay two parallel pipes of the same diameter. Assuming the friction factor of all the pipes to be same, determine the diameter of the parallel mains.

OR

Calculate the discharge in each pipe of the network as shown in figure. The pipe network consists of 5 pipes. The head loss h_f in a pipe is given by $h_h = rQ^2$. The values of 'r' for various pipes and also the inflow or outflow at nodes are shown in figure.



Unit - II

2. a) What is Critical Flow? Also show its relation to Froude number.
   b) What is Specific Energy? Show its importance to open channel flow.
   c) Differentiate open channel flow to a pipe flow.
   d) Obtain an expression for the condition for most efficient trapezoidal channel section.

OR

A Triangular Channel has a side slope of 1.5 (H): 1 (V) and is laid on a longitudinal slope of 1 in 1650. Assuming Manning's 'N' is 0.013, estimate the normal depth required to pass a discharge of 0.30 m^3/s.

Unit - III

3. a) What is Venturi Flume? Explain with neat sketch.
   b) Define rapidly varied flow and gradually varied flow.
   c) Explain the phenomena of formation of Hydraulic Jump.
   d) Uniform flow occurs at a depth of 1.5m in a long rectangular channel 3 m wide and laid to a slope of 0.0009. If manning's N = 0.015, calculate maximum height of hump on the floor to produce critical depth.

OR

Define :

i) Froude Number and its importance
ii) Hydraulic depth and Hydraulic Radius

Unit - IV

4. a) What is Profile Drag and lift?
   b) What is Magnus effect? Explain clearly.
   c) Derive an expression for lift coefficients for rotating cylinder.
   d) If the power to overcome aerodynamic drag of an aircraft remains the same, what percentage increase in the velocity is reflected by 15% reduction in the drag coefficient?

OR

A Kite in the form of a rectangular airfoil with a chord length of 60 cm and a width of 45 cm and weights 0.8N it is maintained at an angle of 20 degree to the horizontal and the string makes an angle of 30 degree to the vertical. If the wind speed is 15 km/hr (horizontal flow) and C_D is 0.25. Estimate the tension in the string and the coefficient for lift. Take density for air is 1.2 kg/m^3.