



Printed Pages : 3

ME – 604

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 4052

Roll No.

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B. Tech.

(SEM. VI) EXAMINATION, 2006-07

FLUID MACHINERY

Time : 3 Hours]

[Total Marks : 100

- Note :
- (1) Attempt *all* questions.
 - (2) All questions carry *equal* marks.
 - (3) Assume suitably, missing data, if any.

- 1 Attempt any **four** parts of the followings :
- (a) What are the bases of classification of fluid machines?
 - (b) Derive linear-momentum equation.
 - (c) What is the difference between the force of jet when it impinges on a single moving flat plate and the force of jet when it strikes on a series of moving plates?
 - (d) What is significance of Euler's fundamental equation for fluid machines?
 - (e) Why is the jet deflected by the buckets between 160° to 165° instead of 180°?
 - (f) What importance has the ratio.
$$m = \frac{\text{mean diameter of pelton wheel}}{\text{Least diameter of jet.}}$$

- 2** Attempt any **four** parts of the following :
- (a) Describe briefly how the governing of a Kaplan Turbine is carried out.
 - (b) What are the functions of a draft tube?
 - (c) Why is it necessary to choose the number of Francis runner blades as odd and the number of guide vanes as even.
 - (d) What is meant by 'cavitations'? How and where does it occur in water power plant?
 - (e) Deduce an expression for the specific speed of a hydraulic turbine and explain how it is useful in practice.
 - (f) A Francis turbine with an overall efficiency of 76% is required to produce 150 kW. It is working under a head of 8 m. The peripheral velocity = $0.55 \sqrt{2gH}$ and the radial velocity of flow at inlet is $0.95 \sqrt{2gH}$. The wheel runs at 150 rpm and the hydraulic losses in the turbine are 20% of the available energy. Assuming radial discharge, determine :
 - (i) guide blade angle (ii) the wheel vane angle at inlet, and (iii) diameter of wheel at inlet.
- 3** Attempt any **two** parts of the followings :
- (a) How the centrifugal pumps are classified ?
 - (b) What are the different efficiencies of a centrifugal pump?
 - (c) Explain the effect of variation of speed on discharge, head and power.

- (d) Describe cavitations and separation phenomenon in centrifugal pump.

4 Attempt any **two** parts of the following :

- (a) Explain the working principle of a centrifugal pump with the help of a line sketch, naming all the parts.
- (b) Explain working of positive rotary pumps namely gear and vane pumps with this help of neat sketches.
- (c) Why is the suction height of a pump limited ? On what factors does it depend ?

5 Attempt any **two** parts of the following :

- (a) Describe the working of a hydraulic accumulalator with the help of a neat sketch. Also define the capacity of an accumulator.
 - (b) Explain the working of a hydraulic intensifier with the aid of a neat sketch.
 - (c) State and draw the characteristics of fluid coupling and torque convertor.
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