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

PAPER ID : 4052 Roll No. | | | | | | | | | | |

B.Tech.

SIXTH SEMESTER EXAMINATION, 2005-2006

FLUID MACHINERY

Time : 3 Hours *Total Marks : 100*

Note : *(i) Answer **ALL** questions.*
(ii) All questions carry equal marks.
(iii) In case of numerical problems assume data wherever not provided.
(iv) Be precise in your answer.

1. Attempt ***any four*** parts of the following : **(5x4=20)**

(a) Define Dynamic force. How is it distinguished from hydrostatic pressure ?

(b) Derive impulse momentum equation.

(c) How is the absolute path of jet falling on a moving vane determined ?

(d) Derive an expression for the dynamic force exerted by fluid jet on a stationary inclined plate.

(e) State the functions of the casing of a Pelton turbine. Why has it no hydraulic function to perform ?

(f) What should be the qualities of a governor ?

2. Attempt *any four* parts of the following : **(5x4=20)**

(a) Show with the help of a line sketch as to how the speed of a reaction water turbine is governed by servomotor.

(b) Prove that a draft tube prevents for the loss of head of reaction turbine.

(c) Describe briefly an inward flow turbine.

(d) Why does it become necessary to install a water turbine below the tail race level ?

(e) What is specific speed and how does it differ in definition from the other specific quantities ?

(f) Draw the following characteristics of a Kaplan turbine :

(i) P_t vs N_1 and

(ii) P_1 vs Q_1

3. Attempt *any two* parts of the following : **(10x2=20)**

(a) What are the functions of a volute casing of a centrifugal pump ?

(b) Define specific speed of a centrifugal pump and derive an equation for the same.

(c) A centrifugal pump impeller has diameter at inlet and outlet as 360mm and 720mm respectively. The flow velocity at outlet is 2.4 m/s and the vanes are set back at an angle of 45° at the outlet. If the manometric efficiency is 70%, calculate the minimum starting speed of the pump.

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4. Attempt *any two* parts of the following : **(10x2=20)**

(a) Define slip, negative slip and coefficient of discharge of a reciprocating pump.

(b) Explain with the help of delivery curves, how the resultant rate of discharge can be made uniform in different types of reciprocating pumps.

(c) Why is the speed of reciprocating pump lower than that of centrifugal type ? On what factors does the speed of the reciprocating pump depend ?

5. Attempt *any two* parts of the following : **(10x2=20)**

(a) What is the difference between a hydraulic coupling and a hydraulic torque converter ? Where are they used in practice ?

(b) With the help of a neat sketch explain the working of a hydraulic press. Where is a hydraulic press used ?

(c) Differentiate a hydraulic lift and crane. How do these differ in working principle ?

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