Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Marine Engg.) (2013 Onwards) (Sem.–6)

FLUID MACHINERY

Subject Code : BTME-603

M.Code : 72851

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt ANY FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt ANY TWO questions.**

SECTION-A

1. Answer briefly :

a) How turbo-machines are classified?

b) What do you understand by mixed flow pump?

c) What is a draft tube?

d) Name different priming device.

e) Explain cavitation.

f) Define specific speed of a turbine.

g) Define degree of reaction.

h) What is negative slip?

i) What is priming of a centrifugal pump?

j) What is the function of a hydraulic accumulator?

SECTION-B

2. A 75 mm diameter water jet having a velocity of 12 m/s impinges on a plane smooth plate at an angle of 60° to the normal to the plate. What will be the impact when

a) The plate is stationary and

b) The plate is moving in the direction of the jet at 6 m/s? Estimate the work done per unit time by the jet on the plate in each case. Take the density of water as 998 kg/m^3.

3. Discuss the function and brief description of commonly used surge tanks.

4. A centrifugal pump having impeller diameter of 1 m has backward curved vanes which make an angle of 25° with the wheel tangent at the blade tip. At the operational speed of 1440 *r.p.m*, the radial velocity of flow at the tip is 10 m/s and the slip coefficient is 0.85. Determine

   a) Actual work input/ kg of water flow

   b) Absolute velocity of fluid at the impeller tip

   c) Hydraulic efficiency considering that kinetic energy at the outlet is wasted.

5. Discuss in general the main and operating characteristics of a centrifugal pump.

6. A single acting reciprocating pump has a plunger diameter 20 cm and the stroke length 30 cm. It draws water from a sump 3.5 m below the centre of pump cylinder. Find the least diameter of suction pipe if it is 6 m long. The pump runs at 50 *rpm* with simple harmonic motion and separation occurs at 2.5 m of water absolute pressure. Barometric pressure = 10.3 m of water.

SECTION-C

7. A reaction turbine works at 450 *r.p.m* under a heads of 120 m. Its diameter at inlet is 120 cm and the flow area is 0.4 m^2. The angles made by the absolute and relative velocities at inlet are 20° and 60° respectively with the tangential velocity. Determine

   a) The volume flow rate

   b) The hydraulic power developed

   c) The efficiency

   Assume whirl at outlet to be zero.

8. Explain the function of air vessel fitted to suction and delivery pipes of a reciprocating pump.

9. Write a note on Hydraulic intensifier.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.