Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Marine Engg.) (2013 Batch) (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

Q1. Answer briefly :

a. What are the advantages of multistage pumps?

b. Why the vanes are made curved?

c. What is function of surge tank?

d. What is cavitation?

e. What are the basic components of a turbomachine?

f. Why the number of blades in Kaplan turbine is less?

g. How is the number of buckets decided in a Pelton turbine?

h. Which turbine is preferred for overload and part load operation?

i. Make an inlet velocity triangle for Pelton wheel.

j. Explain impulse momentum principle.

SECTION-B

Q2. Derive expression for model relationships in case of centrifugal pump.

Q3. Show from the first principles that work saved in a single- acting reciprocating pump by fitting an air vessel is 84.8 per cent.

Q4. Explain multistage pumps. What are the advantages of multistage pumps?

Q5. What is governing and how it is accomplished for different types of turbine?

Q6. State and explain Euler's equation for energy transfer in a turbomachine and energy transfer in terms of fluid and rotor kinetic energy changes.

SECTION-C

Q7. Discuss the phenomenon of cavitation in reaction turbines. How we can reduce cavitation? Discuss with the help of Thoma's Cavitation factor.

Q8. A 4-stage centrifugal pump supplying water is to be designed for a total lift of 120 m when running at 1450 rpm ; its discharge under these conditions is 0.24 m^3/s . The vanes are set back at an angle of 30° with the tangent to the wheel at outlet and the impeller is surrounded by guide vanes. The water enters the vane passage in a radial direction, the velocity of flow through the impeller is 0.3 of the outlet peripheral velocity and the losses in the pump amount to one-third of the velocity head at discharge from the impeller. Find the diameter and width of impeller at outlet the monometric efficiency and the angle of the guide vanes.

Q9. A Kaplan turbine operating under a head of 7.5 m develops 1835 kW with an overall efficiency of 87%. The turbine is set 2.5 m above the tail water level and vacuum gauge inserted at turbine outlet records a suction head of 3.15 m. Calculate the efficiency of 3 m and the loss of head due to friction in the draft tube equals 25% of kinetic at outlet.

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.