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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 :

- What are the advantages of multistage pumps?
- Why the vanes are made curved?
- What is function of surge tank?
- What is cavitation?
- What are the basic components of a turbomachine?
- Why the number of blades in Kaplan turbine is less?
- How is the number of buckets decided in a Pelton turbine?
- Which turbine is preferred for overload and part load operation?
- Make an inlet velocity triangle for Pelton wheel.
- 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 $0.24 \text{ m}^3/\text{s}$. 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.