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

Total No. of Questions : 18

B.Tech. (ME) (2012 Onwards)   (Sem.–6)

FLUID MACHINERY

Subject Code : BTME-603

M.Code : 71187

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

Answer briefly :

1. Classify the Hydraulic Turbine according to head of water.

2. Define Overall Efficiency of Hydraulic Turbine.

3. State disadvantages of a Francis turbine over a pelton wheel.

4. What is a draft tube and state different types of draft tubes?

5. What is function of surge tank?

6. Define Priming in Pumps.

7. State two functions of air-vessels.

8. What is cavitation?

9. State losses in centrifugal pump.

10. What is slip in reciprocating pump?

SECTION-B

11. Derive an equation for force exerted by jet on a curved plate tangentially.

12. Differentiate between Francis turbine and Kaplan turbine.

13. An inward flow reaction turbine is supplied 0.233 m³/s of water under a head of 11 m. The wheel vanes are radial at inlet and the inlet diameter is twice the outlet diameter. The velocity of flow is constant and equal to 1.83 m/s. The wheel makes 370 rpm.

Determine :

a) Guide vane angle

b) Diameter of the wheel

c) Width of the wheel at inlet and outlet.

Assuming that the discharge is radial and there are no losses in wheel and speed ratio is 0.7.

14. A turbine is to operate under a head of 25 m at 200 rpm. The discharge is 9 m³/s. If the efficiency is 90%, determine the performance of turbine under 20 m head.

15. Derive an expression for minimum starting speed for starting a centrifugal pump.

SECTION-C

16. A centrifugal pump impeller having external and internal diameters 480 mm and 240 mm respectively is running at 100 rpm. The rate of flow through the pump is 0.0576 m³/s and velocity of flow is constant at 2.4 m/s. The diameter of suction and delivery pipes are 180 mm and 120 mm respectively and, suction and delivery heads are 6.2 m (abs.) and 30.2 m of water respectively. If the power required to drive the pump is 23.3 kW and outlet vane angle is 45 degree,

Determine :

a) Inlet vane angle

b) Manometric and overall efficiency of pump.

17. A acting reciprocating pump has a stroke length of 150 mm, suction pipe is 7 m long and the ratio of suction pipe diameter to the piston diameter is 3/4. The water level in the sump is 2.5 m below the axis of the pump cylinder and the pipe connecting the sump and pump cylinder is 75 mm in diameter. If the crank is running at 75 rpm, determine the pressure head on the piston at the beginning, middle and end of the suction stroke. Take f = 0.01.

18. a) Explain the working of hydraulic ram.

b) Discuss working and construction of torque converter.

NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC case against the Student.