Visit **www.brpaper.com** for downloading previous years question papers of B-tech, Diploma, BBA, BCA, MBA, MCA, Bsc-IT, M-Tech, PGDCA, B-com

Roll No. Total No. of Pages: 02

Total No. of Questions: 09

B.Tech.(ME) (Sem.-6) FLUID MACHINERY Subject Code: ME-306 Paper ID: [A0821]

Time: 3 Hrs. Max. Marks: 60

### **INSTRUCTIONS TO CANDIDATES:**

- 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. Write briefly:

- (a) If the speed of reciprocating is increased. What will be unfavourable effect?
- (b) Why a draft tube is not used in Pelton wheel?
- (c) If turbine is operating under a head of 400 m and its unit speed is 33, what is its operating speed?
- (d) Why does Kaplan turbine have less number of blades?
- (e) What are the units of specific speed of turbine?
- (f) What is the difference between nozzle and diffuser? Which is more efficient and why?
- (g) A single nozzle Pelton wheel has specific speed as x. If the number of nozzle is 2, what will be its specific speed?
- (h) What are advantages of air vessels?
- (i) Make a proportionate sketch of fluid coupling.
- (j) What type of turbines are installed at Bhakhra dam?

1 | M-59055 (S2)-1098

### **SECTION-B**

- 2. A 4 cm dia jet with velocity of 30 m/c enters a stationary curved vane at 40 with horizontal and leaves at 20° with horizontal so that total deflection is 120°. Find magnitude and direction of force on vane.
- 3. Discuss the factors for selection of turbines in a hydropower plant. What are various losses in such plants?
- 4. Discuss the various steps in the design of a Francis turbine. What do you understand by runaway speed?
- 5. Find number of pumps required to take water from a deep well under a total head of 89 m. All pumps are identical and run at 800 r.p.m. The specific speed of each pump is 25 which deliver 0.016 m<sup>3</sup>/s of water.
- 6. Derive an expression for the head lost due to friction in delivery pipe of a reciprocating pump with and without air vessel in a double acting pump.

### **SECTION-C**

- 7. A Kaplan turbine is to be designed for developing 9100 kW. The net head available is 5.6. The speed ratio is 2.09 and flow ratio is 0.68. The overall  $\eta$  is 86% and Boss dia is 1/3 of runner dia. Find dia of runner, speed and specific speed of turbine.
- 8. Prove that the manometric head of a centrifugal pump can be written as  $H_m = AN^2 + BNQ + CQ^2$  where N is speed, Q is discharge and A, B, C are constant.
- 9. Write notes on the following:
  - (a) Thoma Cavitation Number and its significance.
  - (b) Performance characteristics of centrifugal pumps and Francis turbines.

**2** M-59055 (S2)-1098