

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER- V EXAMINATION-SUMMER 2023****Subject Code: 2151903****Date: 28/06/2023****Subject Name: Fluid Power Engineering****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) State the function of following components of a hydro-electric power plants : **03**
Spillway, Dam, Penstock
- (b) Discuss any four factors for selection of site for hydro power plant. **04**
- (c) Derive an expression for work done per second by a jet of water striking moving plate held inclined to the direction of jet. **07**
- Q.2** (a) Discuss the impulse-momentum principle. **03**
- (b) Explain with neat diagram working of Pelton wheel. **04**
- (c) A boat moved by jet propulsion discharges water through a jet of area 0.02 m^2 , water being drawn from inlet opening facing the direction of motion. The total drag is estimated to be $17.75 u^2 \text{ N}$ where u is speed of the boat in metre per second. If the boat moves at 54 km/hr , determine (i) relative velocity of jet, (ii) energy supplied by the jet and power of the motor required to drive the pumps, (iii) efficiency of propulsion. Take density of water 1020 kg/m^3 and efficiency of pump as 76% . **07**
- OR**
- (c) Show that when a jet of water impinges on a series of curved vanes, maximum efficiency is obtained when the vane is semi-circular and the velocity of jet is double the velocity of vane. **07**
- Q.3** (a) Differentiate between Francis and Kaplan turbine. **03**
- (b) Describe multistage centrifugal pump. **04**
- (c) What do you mean by an air vessel ? Discuss the functions of an air vessel for reciprocating pump. **07**
- OR**
- Q.3** (a) Differentiate between centrifugal and reciprocating pump. **03**
- (b) Discuss any one method of governing of hydraulic turbine. **04**
- (c) Define characteristic curves. Discuss main characteristic curves for centrifugal pump. **07**
- Q.4** (a) Classify air compressors. **03**
- (b) Discuss working of any one type of rotary positive displacement compressor. **04**
- (c) Discuss phenomenon of surging and choking in centrifugal compressor. **07**
- OR**
- Q.4** (a) Discuss working of reciprocating air compressor. **03**
- (b) Explain lift and drag as related to axial flow compressor. **04**
- (c) Discuss losses in centrifugal compressor. **07**
- Q.5** (a) Define mechanical advantage and leverage with reference to hydraulic press. **03**
- (b) Discuss working of air lift pump. **04**
- (c) Explain function, construction and working of hydraulic intensifier. **07**
- OR**
- Q.5** (a) Compare fluid coupling and fluid torque converter. **03**
- (b) With neat diagram explain working of direct acting lift. **04**
- (c) Explain function, construction and working of hydraulic crane. **07**