Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC- SEMESTER–IV - EXAMINATION – SUMMER 2017

Subject Code: X41902 **Date:29/05/2017**

Subject Name: Fluid Power Engineering

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Show that in case of jet striking the flat plates mounted on wheel, the efficiency will be maximum when the tangential velocity of wheel is half of the jet.	**07**
	(b)	A jet of water coming out of nozzle of 8 cm diameter with a velocity of 50m/s strikes the flat plate. Calculate force on the plate, work done and power developed when (i) plate is stationary (ii) plate is moving with a velocity of 12m/s along with jet direction (iii) plate is moving with a velocity of 12m/s towards the jet.	**07**
Q.2	**(a)**	What is the function of draft tube? State the type of draft tube and explain with a neat sketch of any one.	**07**
	(b)	Why governing of water turbine is required? Explain governing of any one hydraulic turbine with neat sketch	**07**
		OR	
	(b)	Discuss any Characteristic curves of hydraulic turbine	**07**
Q.3	**(a)**	State the main components of the Centrifugal pump and explain working with neat sketch.	**07**
	(b)	A centrifugal pump runs at 500 rpm and discharges 8 m^3/min against head of 10m. It has impeller of 50cm outer diameter and 25cm inner diameter. Vanes are set back at outlet angle of 45^0. The constant velocity flow is 2 m/s. Calculate: 1.The manometric efficiency 2.Vane angle at inlet.	**07**
		OR	
Q.3	**(a)**	Derive Darcy- Weisbach formula for calculating loss of head due to friction in a pipe.	**07**
	(b)	An oil of specific gravity 0.78 is flowing through a pipe of diameter 300 mm at the rate of 0.6m^3/sec . Find the head loss due to friction and power required to maintain the flow for a length of 500 meter. Take kinematic viscosity of an oil as 0.29 stokes.	**07**
Q.4	**(a)**	A centrifugal air compressor draws air at a temperature of 25°C running at 15000 rpm has the following data: 1. Outer diameter of blade tip= 500 mm 2. Slip factor=0.85 3. Isentropic total head efficiency= 0.82 Assuming that the absolute velocities of air at inlet and outlet are same. Calculate : 1. Temperature rise of air passing through compressor 2. Static pressure ratio	**07**
	(b)	Give detail classification of rotary compressor and explain any one with line sketch	**07**
		OR	
Q.4	**(a)**	Derive an expression for the optimum value of the intercooler pressure in a two stage reciprocating air compressor for perfect inter cooling condition.	**07**
	(b)	Define the following terms in case of centrifugal air compressor. 1. Slip	**07**

2. Slip factor
3. Power in put factor
Derive an equation of Euler's work in case of centrifugal compressor with usual notation.

Q.5	**(a)**	What do you mean by minor energy losses? Derive equation for the loss of head due to sudden enlargement in pipe.	**07**
	(b)	Draw and explain Hydro-electric Power Plant with neat Sketch.	**07**

OR

Q.5	**(a)**	Give classification of Reciprocating pump. Draw neat sketch of single acting reciprocating pump.	**07**
	(b)	Write short note on Jet pump.	**07**

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