Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER–IV • EXAMINATION – SUMMER • 2014

Subject Code: 740901 **Date: 04-06-2014**

Subject Name: Fluid Drives and Control

Time: 02:30 pm - 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.**

Q.1 **(a)** With the help of illustrative examples explain each of the following phenomenon in context of hydraulic power transmission: **07**

1. Pressure is developed according to the resistance.
2. Pressure and flow rate are independent.

Justify showing the relationship between force, pressure, flow and speed.

(b) ñA pneumatic power transmission is preferred as a central power supply for a large factory/plant.ò Justify these statement. Also, describe each component of central power source? **07**

Q.2 **(a)** Explain significance of selection of pressure intensity in design of hydraulic power transmission system. Differentiate in terms of construction and application the External gear pump and Unbalanced vane pump. **07**

(b) What are the functions of hydraulic oil used for power transmission? Discuss which properties are required for fulfilling the functions. **07**

OR

(b) Why do you prefer the reciprocating pumps over rotary pumps? With the help of a neat sketch, explain the working principle of an Inline piston pump. Explain the features of its construction in the light of working principle. **07**

Q.3 **(a)** A mechanical shaper is to be converted to a hydraulic shaper. Develop a circuit diagram for the hydraulic shaper. Note that, existing facilities with mechanical transmission can be used. What are the force and motion requirements of a shaper? How they can be fulfilled using mechanical hydraulic power transmission? Justify your answer. **07**

(b) Give main classification of pressure control valve Give its constructional details, working and application. **07**

OR

Q.3 **(a)** Write Short notes on: **1.** Ram type actuators **2.** Telescopic type actuators. **07**

(b) Show the application of counterbalance valve with the help of suitable circuit diagram. Describe working of the system and explain how and when the counterbalance valve will operate. **07**

Q.4 **(a)** A machine vise is to be powered by oil. It involves following operations. **07**

1. The vise jaws are moving in the clamp position.
2. Holding pressure is built-up and applied, when the vise jaws are in clamped position.
3. The holding pressure is relieved.
4. The jaws are moved to the original position.

Suggest a suitable arrangement of hydraulic components represented in the form of a complete circuit using ANSI/ISO symbols. Justify your selection.

(b) What is servo motor system? State its one practical application. Explain function of its components and compare servo valve with direction control valve. **07**

OR

Q.4	**(a)**	Draw a schematic of reservoir and explain its main features. Explain the function of air breather in it.	**07**
	(b)	Explain necessity of pressure compensation in Flow control valve. Show the application of flow control valve with the help of Meter-in circuit and give its power diagram.	**07**
Q.5	**(a)**	With the help of a suitable circuit diagram explain one practical application of the pneumatic sequence system. Also explain role of roller operated DCV used in the system.	**07**
	(b)	Explain construction and operation of time delay valve with the help of sketch. How is the delay time adjusted in it? State one practical application of this valve.	**07**

OR

Q.5	**(a)**	Explain influence of solid particles present in oil on hydraulic system and significance of filtration. Also define the term ódegree of separation ($б_x$)ô giving its physical meaning.	**07**
	(b)	A pneumatic system has two cylinders operating in sequence. Explain functions of main components of the system and state at least one application of the system.	**07**

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