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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code: 162004 **Date: 17/05/2016**

Subject Name: Hydraulic and Pneumatic Systems

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)**	Describe following properties of hydraulic fluid. (i) Fire resistant (ii) Flash point (iii) Good Lubricity (iv) Viscosity	**07**
	(b)	What is the service unit in pneumatic system? Why is it provided? Clearly mention functions of each unit of service unit. Draw detailed and simplified symbols of service unit.	**07**
Q.2	**(a)**	What is the purpose of filter in hydraulic system? Where it is located in hydraulic circuit? What is the significance of location of filter?	**07**
	(b)	(i) Give difference between Meter-in and Meter-out circuit.	**04**
		(ii) What is Hydrostatic transmission? Give its applications.	**03**
		OR	
	(b)	Which are the different types of valves used in oil hydraulic systems? State their functions. Give specifications of a Direction Control valve.	**07**
Q.3	**(a)**	Explain the working principle of hydraulic motor. State the types of hydraulic motors. Also discuss the selection criteria for hydraulic motors.	**07**
	(b)	Explain three different methods, the speed control of an hydraulic actuator can be achieved. Explain each one with the help of hydraulic circuit.	**07**
		OR	
Q.3	**(a)**	State different types of Accumulators. Give their application. Explain one in detail. Which gas is used in gas charged accumulator? Why not oxygen?	**07**
	(b)	Draw the hydraulic circuit for a vertical cylinder in such a way that the cylinder while extending or retracting does not fall when the power cuts. Show equations of power loss during retraction of the vertical cylinder.	**07**
Q.4	**(a)**	Give different types of air compressors. Sketch multistage reciprocating air compressor and enumerate different parts of compressor. What is selection criteria for compressor?	**07**
	(b)	State the types of air filters and explain working of any one with neat sketch.	**07**
		OR	
Q.4	**(a)**	Explain construction and operation of shuttle valve, twin pressure valve and quick exhaust valve. Also draw their pneumatic symbols.	**07**
	(b)	Sketch the typical hydraulic reservoir and name the parts, giving their function. Briefly summarize the functions of a reservoir and state reservoir accessories.	**07**
Q.5	**(a)**	Draw the symbol of FRL unit. Explain each component of FRL in detail with neat sketch.	**07**
	(b)	Explain in short the actuators used for pneumatic control systems. Also explain detail of components on simple double acting cylinder with neat line sketch and state the function of each component.	**07**
		OR	

Q.5	**(a)**	(i) Compare air motor with electric motor	**03**
		(ii) Explain construction and operation of Time Delay Valve. Illustrate its application by a typical Pneumatic circuit.	**04**
	(b)	Discuss the role of automation in pneumatic and hydraulic control systems.	**07**

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