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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2162004 **Date: 01/05/2017**

Subject Name: Hydraulic & 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.**

MARKS

Q.1 **Short Questions** **14**

1 Define displacement volume in terms of pump.

2 Define function of limit switch in electro-hydraulic system.

3 Calculate the value of force if system pressure is 50 bar and piston diameter is 25 mm.

4 Define specific gravity of a hydraulic fluid.

5 Evaluate the statement. Vertical Pneumatic Piston cannot not be stop in between the stroke length.

6 _____Valve is used to control the speed of a hydraulic piston.
(a) Pressure Relief (b) Non Return
(c) Flow Control (d) All of above

7 Gear pump is _____ pump.
a) Positive Displacement b) Rotary
c) Positive Displacement and Rotary d) None of above

8 Which of the following is not a physical characteristics of hydraulic fluid?
(a) Density (b) Specific Gravity
(c) Bulk Modulus (d) Specific weight

9 If temperature of fluid increases, viscosity will_____.
(a) Decreases (b) Increases
(c) Remain constant (d) All of above

10 Which of the following valve can be used to stop the piston in between the stroke length?
(a) Closed centre (b) Open centre
(c) Float centre (d) None of above

11 To obtain equal speed in both directions in differential cylinder which of the following circuit is used?
(a) Meter-in (b) Meter-out
(c) Bleed-off (d) Regenerative

12 _____ Valve is used to perform logical AND operation.
(a) Twin Pressure (b) Shuttle
(c) Quick Exhaust (d) All of above

13 The power to weight ratio in hydraulic system is _____ compare to other system.
(a) High (b) Low
(c) Same (d) None of above

14 The pressure at which valve first opens is called as
a) Atmospheric Pressure b) Cracking pressure
c) Vacuum Pressure d) Zero Pressure

03

Q.2	**(a)**	Explain broad applications of pneumatic system.	
	(b)	Explain major parts which are essentially needed to design and construct a hydraulic system.	**04**
	(c)	Compare hydraulic system and pneumatic system with their pros and cons.	**07**
		OR	
	(c)	Explain the following properties of hydraulic fluid. (i) Bulk Modulus (ii) Specific Gravity (iii) System Compatibility (iv) Flash Point (v) Demulsibility (vi) Fire Resistance (vii) Lubricity	**07**
Q.3	**(a)**	Explain different locations of filter in hydraulic circuit.	**03**
	(b)	Give detail classification of hydraulic cylinder according to construction.	**04**
	(c)	Explain construction and working of pressure relief valve with schematic diagram.	**07**
		OR	
Q.3	**(a)**	Explain effects of contamination on hydraulic valves.	**03**
	(b)	What are the characteristics the Bio-Degradable Oils should have?	**04**
	(c)	Explain construction and working of pressure compensated flow control valve with schematic diagram.	**07**
Q.4	**(a)**	With neat sketch explain construction and working of shuttle valve.	**03**
	(b)	What is trapped oil in terms of gear pump? Explain with schematic diagram.	**04**
	(c)	Explain construction and working of proportional valve using schematic diagram.	**07**
		OR	
Q.4	**(a)**	With neat sketch explain construction and working of quick exhaust valve.	**03**
	(b)	Explain construction of variable displacement vane pump	**04**
	(c)	With neat sketch explain construction and working of single stage electro-hydraulic servo valve.	**07**
Q.5	**(a)**	Explain functions of FRL unit.	**03**
	(b)	Explain any four major functions of hydraulic reservoir.	**04**
	(c)	Design and explain regenerative hydraulic circuit.	**07**
		OR	
Q.5	**(a)**	Explain Overlap in hydraulic valves with sketch.	**03**
	(b)	Classify hydraulic accumulators. Explain any one with schematic diagram.	**04**
	(c)	A pneumatic system is used for punching machining. Design a pneumatic circuit to control a double acting cylinder using 5/2 air-air valve and time delay valve. The piston should extend when two push buttons are pressed simultaneously and automatically retract after fully extended and after specified time delay.	**07**

****