

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – WINTER • 2014****Subject Code: 162004****Date: 05-12-2014****Subject Name: Hydraulics and Pneumatics Systems****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) State and explain the advantages and disadvantages of hydraulic systems. **07**
(b) Describe the following property of hydraulic fluid: **07**
(i) System Compatibility (ii) High bulk modulus (iii) Low volatility
(iv) Good Demulsibility (v) Low specific gravity
- Q.2** (a) With the help of neat sketch, explain working principle of Balanced vane pump **07**
and explain its main features.
(b) Explain the criteria for selection of pump. **07**
OR
(b) With the help of neat sketch explain the main features of hydraulic reservoir. **07**
- Q.3** (a) Explain the application of flow control valve with help of meter-in and meter-out **07**
circuits for speed control.
(b) Explain the working of proportional control valve with the help of neat sketch. **07**
OR
- Q.3** (a) What is the purpose of pressure relief valve? How does a pressure relief valve **07**
works? With the help of neat diagram, explain the working of pressure relief
valve.
(b) Explain the significance of heating and cooling devices in oil hydraulic power **07**
transmission systems.
- Q.4** (a) Draw the symbol of FRL unit. Explain each component of FRL in detail with **07**
neat sketch.
(b) Explain the advantages and disadvantages of pneumatic system over a **07**
Mechanical and Hydraulic system.
OR
- Q.4** (a) (i) A pump supplies oil at 1.6 Liters/sec to a 40 mm diameter double acting **04**
hydraulic cylinder. If the load is 5000N (Extending and retracting) and rod
diameter is 20mm, find the hydraulic pressure, piston velocity and cylinder
power (kW) during extending stroke and retracting stroke.
(ii) Explain Shuttle valve illustrating neat sketch. Also draw symbol of same. **03**
(b) What is the purpose of filter in hydraulic system? Where it is located in hydraulic **07**
circuit? What is the significance of location of filter?
- Q.5** (a) Explain the significance of different components present in a Time delay valve. **07**
Explain one practical application of the time delay valve.
(b) A pneumatically actuated 4/2 DCV operates a double acting pneumatic cylinder. **07**
By using roller operated 3/2 DCV as pilot valve, prepare the system to achieve
automatic operation of the cylinder. Substantiate your answer with relevant
circuit diagram.

OR

- Q.5** **(a)** With the help of suitable circuit diagram explain one practical application of the pneumatic sequence system. **07**
- (b)** State and explain the different hydraulic valves used in fluid power transmission systems. **07**
