

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – SUMMER • 2014****Subject Code: 162004****Date: 28-05-2014****Subject Name: Hydraulics and Pneumatics Systems****Time: 10:30 am - 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. **07**
 (i) Fire resistant (ii) Flash point (iii) Good Lubricity (iv) Viscosity
- (b) Write shortly on, **07**
 (i) Water-in-oil emulsions (ii) Water Glycol solutions
 (ii) Phosphate Esters (iv) Bio-degradable oils.
- Q.2** (a) (1) Compare positive displacement pump with Roto dynamic pump. **04**
 (2) Explain “ β ” rating of filter. **03**
- (b) Enlist axial piston pumps and compare them critically. **07**
- OR**
- (b) Give differences between a variable displacement pump and fixed displacement pump. When do users prefer a variable displacement pump? Describe one variable displacement pump in detail. **07**
- Q.3** (a) State & explain four main center conditions of 4/3 spool type direction control valve. Draw hydraulic symbols of each position for 4/3 operated spring centered direction control valve. **07**
- (b) State different types of pressure control valves. Explain working of each one with the help of neat sketch. **07**
- OR**
- Q.3** (a) Explain three different methods, the speed control of an hydraulic actuator can be achieved. Explain each one with the help of hydraulic circuit. **07**
- (b) (1) Why two stage electro-hydraulic valve is preferred over single stage valve? State the function of pilot stage in it. **04**
 (2) Give difference between throttle valve and flow control valve. **03**
- Q.4** (a) Explain construction and operation of Time delay valve. Show its application in setting delay in closing time through typical pneumatic circuit. **07**
- (b) Explain construction and operation of shuttle valve, twin pressure valve and quick exhaust valve. Also draw their pneumatic symbols. **07**
- OR**
- Q.4** (a) What is the service unit in pneumatic system? Why it is provided? Clearly mention the functions of each unit of service unit. Draw detailed and simplified symbols of service unit. **07**
- (b) State different types of Accumulators. Give their application. Explain one in detail. Which gas is used in gas charged accumulator? Why not oxygen? **07**
- Q.5** (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) A pneumatic strip feed mechanism is to be designed with the following sequence **07**

- (1) Holding the strip.
- (2) Moving the strip forward onto the tool.
- (3) Maintaining the strip in that position.
- (4) Returning the feeding element to its original position after the work is over.

Draw the pneumatic circuits by intuitive method.

Position step diagram is given in Fig.1.

OR

- Q.5** (a) Sketch the typical hydraulic reservoir and name the parts, giving their function. **07**
Briefly summarize the functions of a reservoir and state reservoir accessories.

- (b) (1) Explain 'cushioning' of pneumatic cylinder. **03**
(2) The automatic door of a bus is operated by a double acting cylinder. Both the opening and closing of the door are selected by a selector 3/2 D.C. valve and the time the door is kept open is decided by the bus driver. The speed of closing and opening is adjustable. Draw the pneumatic circuit. **04**

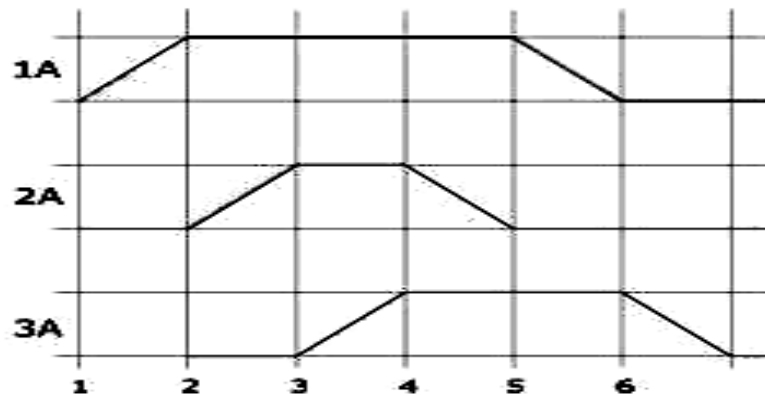


Figure # 1. Position Step Diagram
