

**GUJARAT TECHNOLOGICAL UNIVERSITY****M. E. - SEMESTER – IV • EXAMINATION – SUMMER • 2013****Subject code: 740901****Date: 14-05-2013****Subject Name: FLUID DRIVES & CONTROL****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) State different systems of power transmission and explain main advantages of hydraulic power transmission. **07**
- (b) (i) Why is the positive displacement pump selected in hydraulic system? Explain role of pressure relief valve in it. **05**
- (ii) State function of FRL unit of pneumatic system and give its symbol. **02**

- Q.2** (a) Explain functions of fluid used in hydraulic system. **07**
- Finely refined petroleum oil is considered as ideal fluid for hydraulic system. Why?
- (b) With the help of a neat sketch, explain construction, working and application of Unbalanced type vane pump. **07**

**OR**

- (b) Compare Vane pump with Piston pump in terms of maximum operating pressure and volumetric efficiency and give your comment with reference to construction of pump. **07**
- Q.3** (a) With the help of neat sketch, explain construction and working of double acting hydraulic cylinder. Explain its cushioning mechanism also. **07**
- (b) Give main classification of pressure control valve and explain its construction and working. State different applications of pressure control valve also. **07**

**OR**

- Q.3** (a) Explain the terms Cracking pressure and Pressure override in context to pressure relief valve. Compare simple pressure relief valve and compound pressure relief valve in terms of pressure override and give your comment. **07**
- (b) Show the application of counterbalancing valve with the help of suitable circuit diagram. Explain working of that hydraulic system. **07**

- Q.4** (a) Explain necessity of pressure compensation in flow control valve. Show the application of flow control valve with the help of meter-out type speed control circuit and explain its operation. **07**
- (b) (i) Draw a schematic of reservoir and explain its main features. Also explain function of air breather in it. **04**
- (ii) Describe working of Weight loaded accumulator and give its symbol. **03**

**OR**

- Q.4 (a)** Draw and explain power diagram of meter-in type speed control system. Mention different losses on it and comment about efficiency of the system. **07**
- Q.4 (b)** What is a servo motor system? When is it used? Explain operation of mechanical servo system with the help of its sketch and give its one practical application. **07**
- Q.5 (a)** A pneumatic system is to be prepared to operate two, double acting pneumatic cylinders in sequence. Enlist necessary components of the system and explain their function. **07**
- (b)** (i) State main components of power source of pneumatic system and explain how it provides compressed air at constant pressure. **03**
- (ii) Nominal cylinder velocity is decided by rating of direction control valve of pneumatic system. Explain role of Quick exhaust valve provided in pneumatic system, in connection to cylinder velocity. **04**
- OR**
- Q.5 (a)** In a pneumatic system, double acting pneumatic cylinder, remains in extended position for 90 sec and then it retracts. Enlist components of the system, state their function and explain working of the component which maintains time during operation of the system. **07**
- (b)** Explain influence of solid particles present in oil on hydraulic system and significance of filtration. Also define the term  $\alpha$ -degree of separation ( $\alpha$ ) giving its physical meaning. **07**

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