

GUJARAT TECHNOLOGICAL UNIVERSITY
BE – SEMESTER – VIII. EXAMINATION – WINTER 2016

Subject Code: 180204**Date: 22/10/2016****Subject Name: Automotive Hydraulics & Pneumatics (Department Elective-II)****Time: 02:30 PM to 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) Which are the components involves in Fluid Power system structure? Write down their function and represents the same on structure diagram of fluid power system. **07**

(b) Compare Oil Hydraulics and Pneumatics based on any seven aspects. **07**

Q.2 (a) Draw symbols for following fluid power components. **07**

1. Fixed displacement bidirectional hydraulic pump.
2. Double acting double rod end hydraulic cylinder.
3. Push button actuated and spring return 3/2 direction hydraulic control valve.
4. Adjustable pressure compensated hydraulic flow control valve with by pass.
5. Variable displacement Bidirectional Pneumatic motors.
6. 5/3 way pneumatic directional control valve.
7. Pneumatic silencer

(b) Write down the function of sequence valve for hydraulic system application. Illustrate the application of sequence valve by simple hydraulic circuit. **07**

OR

(b) With neat sketch explain the operation of telescopic hydraulic cylinder. And calculate the extend speed and pressure required for each stage of the telescopic hydraulic cylinder for following case. **07**

A two stage telescopic hydraulic cylinder is used to tilt the body of a lorry. When the lorry is fully laden, the cylinder has to exert a force equivalent to 50 kN at all points in its stroke. The outside diameter of the tubes forming two stages are 80mm and 100mm and pump delivery rate for cylinder is 14 litre/min. Here laden lorry is tilted fully.

Q.3 (a) What are the primary functions of hydraulic fluid? Define the following properties of hydraulic fluid. **07**

1. Viscosity Index
2. Demulsibility
3. Oxidation stability
4. Neutralisation Number

(b) In a hydraulic press system the following details are given. **07**

- Single acting gravity return hydraulic cylinder to be used.
- Tonnage of pressing force = 100 ton
- Cylinder bore diameter = 250mm
- Speed: Rapid approach 2.2m/min.
- Speed: Pressing speed 0.3 m/min.
- A manual directional control valve is used.

Calculate Working pressure, Required flow rate of the pump and Power required to run the pump. Draw a hydraulic circuit for this application.

OR

- Q.3** (a) Draw a simple circuit in which a hydraulic motor is connected and operated in both directions. Enlist different types of hydraulic motors in use. Mention the application of each type. **07**
- (b) Define servo valve. What is its function in hydraulic system? Explain any application of servo valve in automobile. **07**
- Q.4** (a) Write down the function of following Pneumatic valves and draw an application circuit for the same. **07**
1. Pneumatic shuttle valve.
 2. Time delay valve.
- (b) Enlist the types of pneumatic actuators. Write down the application of each them. **07**
- OR**
- Q.4** (a) What is F-R-L unit in Pneumatic system? Draw graphical symbol of each and explain the function of each of them. **07**
- (b) What is the application of pneumatic position sensors? Explain working of Back pressure sensor and Proximity sensor with neat sketch. **07**
- Q.5** (a) Explain construction and working of rotary spool hydraulic valve and Illustrate its application in automobile. **07**
- (b) What is the meaning of term “Troubleshooting”? Enlist the possible causes and remedies of following problem in hydraulic power system components. **07**
1. Noisy Hydraulic pump
 2. Overheating of fluid in a hydraulic system.
- OR**
- Q.5** (a) Explain Hydro pneumatic suspension system used in automotive. **07**
- (b) Enlist the regular and adequate preventive maintenance checks for Pneumatic systems. **07**
