Ex. Seat No._____

GANPAT UNIVERSITY

B.Tech Sem VI th (Mechatronics)

Regular Examination May-June, 2013

2MC 603/ MC 603 Hydraulics & Pneumatic Systems

Time: 3 Hrs **Marks: 70**

Instructions:

(i) All questions are compulsory.
(ii) Answers to two sections must be written in separate answer sheets.
(iii) Assume suitable data wherever necessary.
(iv) Figure to right indicates marks.

SECTION – I

Q.1 Answer the following questions. **[12]**

(a) Analogy between Electrical, Hydraulic and Pneumatic systems.

(b) What are the effects of contamination? What are the different ways of contaminations? How contaminations are removed from circuits?

(c) Draw construction diagram and explain working of radial piston pump.

OR

Q.1 Answer the following questions. **[12]**

(a) Short note on: desired industrial hydraulic oil properties.

(b) Draw construction diagram and explain working of external gear pump.

(c) Draw construction diagram and working of pilot operated check valve.

Q.2 Answer the following questions. **[12]**

(a) Draw construction diagram and working of multipurpose pressure control valve. Give its applications.

(b) Explain different central condition of direction control valve and its application.

(c) Draw construction and explain working of two way flow control valve.

OR

Q.2 Answer the following questions. **[12]**

(a) Draw and explain different application circuits of check valve.

(b) A hydraulic cylinder is used to compress a car body down to a bale size in 10 s. The operation requires a 300 cm stroke (S) and a force (F) of 35 kN. If a 7 MPa pressure (P) pump is selected, find (a) The required piston area, (b) The necessary pump flow rate (c) The hydraulic horsepower delivered by the cylinder.

(c) Draw construction and explain working of pilot operated pressure relief valve.

Q.3 Answer any **three** of given following Questions. **[11]**

(a) Explain hydraulic regenerative circuits and application.

(b) What is the use of accumulator in hydraulic circuits? Prepare an accumulator circuit.

(c) Where the counter balance valve is used? Prepare application circuit of counter balance valve.

(d) Prepare hydraulic circuit for different circuit pressure with single pressure relief valve.

SECTION – II

Q.4 Answer the following questions. [03]

(a) What is the function of the following components:
(i). Pressure switch of the receiver (ii). Fins (iii). Safety valve [03]

(b) a). Draw the symbols : (i) lubricator ii) twin pressure valve
b). Convert 9 kg/cm^2 absolute pressure in to gauge pressure. [06]

(c) Explain an air regulator used in pneumatic circuits.

OR

Q.4 Answer the following questions.

(a) Explain the different actuation methods of a direction control valve. [05]

(b) A Single acting air cylinder with a 6 cm diameter piston and 30 cm stroke operates at 700 kPa (g) pressure and reciprocates at 80 cycles/min. Compute the air consumption in standard m^3/min. [03]

(c) Explain different ways to classify a compressor. [04]

Q.5 Answer the following questions.

(a) Make a pneumatic circuit for a given sequence: START $A^+B^+B^-A^-C^+C^-$ STOP. [08]
Draw the timing diagram of the given sequence also.

(b) Explain advantages of a pneumatic motor. [04]

OR

Q.5 Answer the following questions.

(a) Explain the quick exhaust valve with a pneumatic circuit. [06]

(b) Make a pneumatic circuit for the following application. [06]
"When I press PBs of the two 3/2 DCVs then only a DA cylinder starts the forward stroke after few seconds. When the cylinder completes forward stroke, it start return stroke automatically. Here return stroke is faster than its normal speed. Here the DA cylinder is operated by a 5/2 both side pilot operated DCV".

Q6 Answer the following Questions. [11]

(a) Explain (i) through rod cylinder, and (ii). Tandem cylinder

(b) Explain a screw compressor.

(c) Explain the rules are to be used for the symbols of the direction controls valves.

End of Paper