Date: 9/5/20

GANPAT UNIVERSITY
B.TECH SEM. VI (MECHATRONICS) ENGINEERING
REGULAR EXAMINATION APRIL – JUNE 2016
2MC603 HYDRAULICS & PNEUMATICS SYSTEMS

Time: 3 Hours

Total Marks: 70

Instructions:

1). All questions are **compulsory**.

2). Figures to the **right** indicate full marks.

3). Answers to the two sections must be written in **separate** answer books.

Section – I

Que:-1   Attempt All.   12

(A)   Explain Rotary vane compressor with neat sketch.

(B)   What is the function of Filter in pneumatic system? Explain it with   neat sketch.

OR

Que:-1   Attempt All.   12

(A)   Explain Screw compressor with neat sketch.

(B)   Why we need a lubricator in the pneumatic system? Explain it in details with neat sketch.

Que:-2   Attempt All.

(A)   Why the cushion assembly applied inside the cylinder? Explain it with neat sketch.   06

(B)   How the 5/2 pilot operated DCV works? Give its internal construction with neat sketch.   05

OR

Que:-2   Attempt All.

(A)   What is the use of Time delay valve? Draw its internal construction.   04

(B)   What is twin pressure valve? Explain its application with the pneumatic cir..it diagram.   04

(C)   Explain the different types of pneumatic cylinders which are used in the systems.   03

Que:-3   Attempt All.   12

(A)   Which are the different actuation methods used for direction control valve? Explain them with symbols.

(B)   Draw the symbols of following.

   (i) Push button operated 3/2 DCV (ii) pilot operated 5/2 DCV (iii) shuttle valve
   (iv) quick exhaust valve

(C)   Design the pneumatic circuit for A+B- B+ A-.

Que:-4 **Attempt All.**
  (A) Discuss merits and demerits of the hydraulic system.
  (B) Explain an external gear pump.
  (C) Discuss the following terms for the hydraulic oil:
      (i) density (ii) Specific gravity (iii) Specific weight (iv) Viscosity

<div align="center">OR</div>

Que:-4 **Attempt All.**
  (A) Explain all properties which are considered for the selection of the fluid.

  (B) Explain the vane pump. Why do we need balanced vane pump & variable displacement pump?

Que:-5 **Attempt All.**
  (A) List all the center conditions of the direction control valve. Explain any two with the   06
       hydraulic circuit diagram.
  (B) Explain regenerative circuit in the hydraulic system. How can we obtain equal speeds   05
       in both directions?

<div align="center">OR</div>

Que:-5 **Attempt All.**
  (A) What is importance of the counter balance valve? Explain with circuit diagram.   05
  (B) Draw the meter-out circuit to control return stroke of the double-acting hydraulic   03
       cylinder.
  (C) Why the return stroke is faster than the forward stroke of the double-acting hydraulic   03
       cylinder?

Que:-6 **Attempt All.**
  (A) What is role of an accumulator in the hydraulic systems? Which are the different types
       of the accumulators used in the hydraulic systems?

  (B) Draw the sequence circuit for two double acting cylinders by using pressure sequence
       valve. The sequence is:
       "First cylinder 'A' completes forward stroke. Then the cylinder 'B' completes
       forward stroke. Then both the cylinders complete return stroke simultaneously."

  (C) A vane pump has a rotor diameter of 50 mm, a cam ring diameter of 75 mm, and a
       vane width of 50 mm. The volumetric efficiency & the pump speed is 90% & 1000
       rpm respectively. Determine the actual flow rate if the eccentricity is 8 mm.

<div align="center"># END OF PAPER</div>