Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VI SEMESTER B.TECH (INDUSTRIAL AND PRODUCTION ENGG)

END SEMESTER EXAMINATIONS, JUNE/JULY 2016

SUBJECT: FLUID DRIVES AND CONTROLS IN AUTOMATION SYSTEMS [MME 348]

REVISED CREDIT SYSTEM (PE – II)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL** the questions.
- Missing data may be suitable assumed.

1A. Sketch and explain the working of Tandem centered 4/3 DCV. **(3)**

1B. Explain the principle of working of shuttle valve and dual pressure valve used in pneumatic system. **(4)**

1C. With a neat circuit explain indirect actuation of double acting cylinder using a relay. **(3)**

2A. How are hydraulic seals classified? **(3)**

2B. A double-acting cylinder is used to press together glued components. Upon operation of a push button, the clamping cylinder extends. Once the fully advanced position is reached, the cylinder is to remain for a time of T= 6 seconds and then immediately retract to the initial position. The cylinder retraction is to be adjustable. A new start cycle is only possible after the cylinder has fully retracted. **(4)**

2C. Explain the construction and operation of diaphragm-type accumulators. **(3)**

3A. With a neat sketch explain the working of absorption dryer. **(3)**

3B. Explain the working of Bleed-off circuit. **(3)**

3C. With a neat sketch explain the working of balanced vane pump. **(4)**

4A. With the help of a neat sketch derive and compare the cylinder force required for first and second class lever systems. **(4)**

4B. With the help of neat circuit explain Exhaust air throttling. **(3)**

4C. Explain with simple sketches the following cylinder mountings

a) Clevis mounting
b) Turnion mounting **(3)**

5A. Draw the symbols for the following pneumatic and hydraulic elements

a) Rotary actuator
b) Visual indicator
c) Cooler
d) Shuttle valve
e) Electric motor
f) Capacitive proximity sensor **(3)**

5B. With a neat sketch explain the working of proportional flow filters. **(3)**

5C. A displacement-type cylinder has a piston of 65 mm diameter and is powered by a hand pump with a displacement of 5 mL per double stroke. The maximum operating pressure of the system is to be limited to 350 bar. (a) Draw a suitable circuit diagram showing the cylinder, pump and any additional valving required. (b) Calculate the number of double pumping strokes needed to extend the cylinder rod by 50 mm. (c) Calculate the maximum load that could be raised using this system. **(4)**

6A. With help of neat sketch explain the working of air lubricator. **(4)**

6B. List any three advantage and three limitations of hydraulic systems. **(3)**

6C. Explain the functions of a hydraulic fluid? **(3)**