Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (I & P ENGINEERING)

END SEMESTER MAKE UP EXAMINATIONS, DEC 2016/JAN 2017

SUBJECT: PNEUMATICS AND HYDRAULICS [MME 3111]

REVISED CREDIT SYSTEM

(31/12/2016)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Explain the working of a 4/2 direction control valve used in hydraulics with a neat sketch. **3**

1B. Sketch and explain the working of flow control valve used in pneumatics. **3**

1C. Sketch and explain direct acting relief valve. How is it different from a compound relief valve? **4**

2A. A single-acting cylinder with a large piston diameter is to clamp a work-piece following actuation of a push button. The cylinder is to retract once the piston is completely extended. Draw the pneumatic circuit for this application. **3**

2B. A cylinder with a bore of 150 mm and a piston rod diameter of 105 mm, has to extend with a speed of 7 m/s, pressure applied is 150 bar. Calculate **3**

(a) The flow rate in LPM of oil to extend the cylinder

(b) The retract speed in m/min

2C. Draw the pneumatic circuit for cylinder sequence A+/B+/A-/B-/. **4**

3A. What is a reed switch used in electro pneumatic circuit? Explain briefly with a sketch. **3**

3B. Sketch and explain the time delay valve used in pneumatics. **3**

3C. A double acting cylinder is to extend when a push button is actuated. When full extension is detected, it should retract to its initial position. Draw the pneumatic circuit and its corresponding electro pneumatic circuit as well. **4**

4A. Explain the working of a balanced vane pump with sketch. State its advantage over an unbalanced vane pump. **4**

4B. Sketch and explain the working of a hydraulic radial piston pump? **3**

4C. Describe the end cushioning assembly used in the double acting cylinder and state the reasons for its use. **3**

5A. What is a pressure reducing valve? Explain with a neat sketch and an application circuit. **5**

5B. Sketch and explain the working of following pneumatic valves: **5**

i. Shuttle valve

ii. AND valve