Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (INDUSTRIAL AND PRODUCTION ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: PNEUMATICS AND HYDRAULICS [MME 3111]

REVISED CREDIT SYSTEM
(25/11/2016)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A.	Explain the working of a 3/2 direction control valve with a neat sketch.	**3**
1B.	What is an accumulator? explain the different types of accumulators used in Hydraulic circuits.	**3**
1C.	A double-acting cylinder is used in a hydraulic press. 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= 4 seconds and then immediately retract to the initial position. Draw the circuit and explain.	**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 push button is released. Draw an indirect circuit for the same.	**3**
2B.	Explain the AND and OR logic functions in electro pneumatics with suitable circuits.	**3**
2C.	Draw a circuit using cascading technique for A+/B+/B-/A-/ avoiding signal overlapping.	**4**
3A.	What is a relay used in electro pneumatic circuit? Explain briefly with a sketch.	**3**
3B.	A cylinder with a bore of 200 mm and a piston rod diameter of 100 mm, has to extend with a speed of 5 m/s, pressure applied is 160 bar. Calculate (a) The flow rate in LPM of oil to extend the cylinder (b) The retract speed in m/min (c) The flow rate from the rod end on retract.	**3**
3C.	The combined actuation of a manually actuated valve and a roller lever valve advances a forming tool on an edge folding device. The forming tool is driven by a double acting cylinder. For rapid forward travel, the circuit utilizes a quick exhaust valve. The retracting speed is to be adjustable. If either of the two valves are released, the tool returns to its initial position.	**4**
4A.	Explain the working of Swash plate axial piston pump with a neat sketch.	**4**
4B.	Explain the working of a hydraulic rotary vane actuator with a neat sketch?	**3**
4C.	What is pressure override? How is it effected in a compound relief valve? Explain with necessary sketch	**3**

5A.	Sketch and explain meter- in and meter-out circuits for extension of a double acting cylinder.	**5**
5B.	Sketch and explain the working of an unloading valve. Draw an application circuit for the same.	**5**