Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

VI SEMESTER B.TECH (INDUSTRIAL AND PRODUCTION ENGG.)

END SEMESTER EXAMINATIONS, MAY 2016

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

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Explain briefly the working principle of an electromagnetic relay. **(3)**

1B. With a neat sketch explain the working of Compound pressure relief valve. **(4)**

1C. What is the difference between Beta ratio and Beta efficiency? **(3)**

2A. Discuss in detail the application of hydraulic accumulators as energy storage elements and draw a hydraulic circuit for this application. **(4)**

2B. List any three advantages and three limitations of pneumatic system. **(3)**

2C. With a neat sketch explain the working of quick exhaust vale. **(3)**

3A. Explain the working principle of the following types of sensors used in electro pneumatics. (i) Inductive proximity sensor (ii) Reed switch. **(3)**

3B. Explain the working of Regenerative circuit. **(3)**

3C. Sketch and explain the working of gear pump used in hydraulic systems. **(4)**

4A. Explain with simple sketches the following cylinder mountings

a) Foot mounting b) Flange mounting **(3)**

4B. An 8 cm diameter hydraulic cylinder has a 4 cm diameter rod. If the cylinder receives flow at 100 LPM and 12 MPa, find the (a) extension and retraction speeds and (b) extension and retraction load carrying capacities. **(4)**

4C. Write the symbol for following components.

a) Pressure gauge

b) Silencer

c) Heater

d) Reed switch

e) 3/2 Idle return roller lever valve

f) Tandem cylinder **(3)**

5A. What is cushioning effect in a cylinder? With a neat sketch, explain the cushioning assembly. **(3)**

5B. The piston rod of the cylinder 1A (as shown in Fig.1.) is to advance only if a workpiece is inserted in the workpiece retainer, a guard has been lowered and the operator press the push button valve. Upon the release of the push button or if the guard is no longer in its lower position, the cylinder 1A is to retract to the initial position. Draw the circuit diagram for the problem.

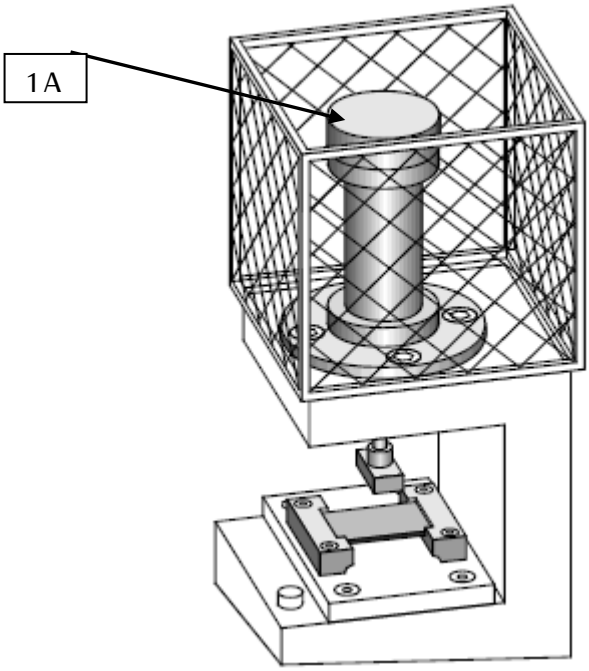

Fig.1. **(4)**

5C. Explain the working principle of a limit switch. **(3)**

6A. How are hydraulic seals classified based on geometrical cross-section? **(3)**

6B. What are the important locations of filters? Explain the advantages and disadvantages of each location. **(4)**

6C. What is relay latching? Write dominant off relay latching circuit. **(3)**