Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER MAKEUP EXAMINATIONS, NOV/DEC 2016

SUBJECT: ACTUATION SYSTEMS [AAE 3153]

REVISED CREDIT SYSTEM

(31/12/16)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.
- Draw sketch in Pencil only

1A. What is the need for an accumulator? Explain with neat sketch spring – loaded accumulator. **(02)**

1B. Explain with neat sketch constructional & functional details of quick return exhaust valve and its application. **(03)**

1C. The output force (F) and piston velocity (V) of double acting cylinders are not the same for extension and retraction strokes. Justify the statement with neat sketch and required formulae. **(05)**

2A. What is reed switch? Explain with neat sketch constructional features of reed switch. What are the advantages and disadvantages of reed switches? **(04)**

2B. Draw a circuit diagram for Indirect automatic return of double acting cylinder using double solenoid 5/2 valve. **(03)**

2C. Explain with neat block diagram stages of air treatment. **(03)**

3A. Double acting cylinder is used to perform forward and return motion automatically after reaching the extreme forward position. Pneumatic cylinder is advanced by pressing push button PB1. Draw the pneumatic circuit, PLC wiring diagram and ladder diagram to implement this task. **(03)**

3B. Explain with neat sketch supply air throttling and exhaust air throttling. **(02)**

3C. Using a transfer station, parts are to be transferred from a vertical magazine onto a chute. The parts are pushed out of the magazine by cylinder 1A and then transferred onto the chute by cylinder 2A. The piston rod of the cylinder 1A may only extend once the cylinder 2A has retracted. **(05)**

The cycle is to start when a start button is pressed. Limit switches are used to confirm cylinder positions. Draw the required circuit diagram & displacement –step diagram to accomplish the action.

4A. Define PLC. Explain three divisions of PLC. Enumerate six advantages of PLC over electromechanical relays. **(03)**

4B. What is timer or timer delay relay? Explain with neat circuit diagram functional aspect of. timer 'ON' del **(03)**

4C. Explain with neat schematic diagram constructional and functional details of fixed type cushioning of pneumatic cylinder. **(04)**

5A. Draw the symbol for the following: i) time delay valve ii) pressure regulating valve iii) UP counter in electro pneumatic circuit iv) flow control valve. **(04)**

5B. Explain with neat cross sectional diagram constructional & functional details of counter balance valve. **(04)**

5C. What is meant by 'signal conflict'-pilotvalve? How will it affect the operation of pneumatic circuits? What is the solution for such problem? **(02)**