Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.TECH. (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: ACTUATION SYSTEMS [AAE 3153]

REVISED CREDIT SYSTEM

(29/11/2016)

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. Sketch and explain with circuit diagram for control the double acting cylinder using electric counter to count 25 to and fro oscillations, with two end sensors. **(03)**

1B. Draw circuit diagram for multiple actuation of pneumatic cylinders with cascade method (grouping method) for the sequence given A+ B- B+ A-. Explain the function of the circuit with displacement-step diagram and grouping of sequence of operation for the control task. **(05)**

1C Explain the function of the circuit with displacement-step diagram and grouping of sequence of operation for the control task mentioned in the circuit of Q No 1B. **(02)**

2A. Define and classify pneumatic valves. Illustrate with neat sketch, constructional & functional details of 3/2 disc poppet valve, its advantages and disadvantages. **(05)**

2B. Explain with neat block diagram major components of PLC **(05)**

3A. Enumerate & explain any three physical properties of hydraulics. Explain the objective and function of a hydraulic power pack. **(05)**

3B. Explain with neat line diagram difference between absolute and gauge **(02)**

pressure.

3C. Enumerate pressure control valves. Explain with neat cross sectional diagram simple pressure relief valve, its application, advantages and limitations **(03)**

4A. A plastic component is to be embossed by using a die which is powered by a double acting cylinder. The return of the die is to be effected when the cylinder rod has fully extended to the embossing position and the preset pressure is reached. 4 bar pressure required is maintained for 15 seconds. A roller lever valve is to be used to confirm full extension. The signal for retracting must only be generated when the piston rod has reached the embossing position. The pressure in the piston chamber is indicated by a pressure gauge. Draw the required circuit diagram to implement this task. **(05)**

4B. Explain the term Latching with example. Explain Latching circuit with Dominant OFF and its application. **(03)**

4C. Explain with neat functional circuit diagram UP counter(electric) **(02)**

5A. Define proximity sensor? What is the principle of sensor? Discuss the advantages & disadvantages of proximity sensors? Explain with neat sketch inductive sensor. **(05)**

5B. Double acting cylinder is used to perform continuous to and fro motion. Cylinder has to move forward when PB1 button is pressed and once to and fro reciprocation starts, it should continue till stop the button PB2 is pressed. Limit switches are used for end position sensing. Draw the pneumatic circuit, PLC wiring diagram and ladder diagram to implement this task **(03)**

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5C. Define & classify actuators. Explain the need for cylinder end cushioning **(02)**