Reg. No.

# A Constituent Institute of Manipal University, Manipal

### V SEMESTER B.TECH (MECHANICAL ENGG.) END SEMESTER

## **EXAMINATIONS, NOV/DEC 2017**

# SUBJECT: FLUID DRIVES AND CONTROL [MME 4017]

## **REVISED CREDIT SYSTEM**

Time: 3 Hours

#### MAX. MARKS: 50

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#### Instructions to Candidates:

- ✤ Answer ALL the questions.
- Draw neat sketches using appropriate instruments.
- Free hand sketches are strictly not encouraged.
- **1A.** What are the advantages of pneumatic control system? List any 8 **3** applications of pneumatics.
- **1B.** With a neat sketch explain the working of time delay valve.
- **1C.** With neat sketches explain various logic components used in pneumatics.
- 2A. A press with a stamping die is available to produce badges from a very thin metal sheet. A double acting cylinder should extend when two push buttons are pressed simultaneously. The return stroke is to occur automatically only after the forward end position and preset pressure has been reached to get the consistent quality on the badge. The cylinder should immediately retract if emergency push button E is pressed. Draw a suitable manual pneumatic circuit.



- 2B. A cylinder with 80 mm bore diameter has its rod diameter 40 mm. The fluid flow rate is adjusted to 100 lpm and the operating pressure is maintained at 12 MPa. Find cylinder speed, load carrying capacity and power developed during forward and retraction strokes.
- Write a suitable manual pneumatic circuit using cascade method to control 4 two cylinders for the following sequence: B+ A+ A- B-

- **3A.** With a neat sketch explain the working of pressure to electric convertor.
- 3B. Using a sliding table a plank of wood is to be pushed under a belt sanding machine. By pressing a push button switch the sliding table with the plank of wood positioned on it is pushed under the belt sanding machine. By pressing another push button switch the sliding table slowly returns to its start position. Draw a suitable electro-pneumatic circuit.



| 3C. | Write a note on any two types of proximity sensors mentioning their working principles and limitations.   | 4 |
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| 4A. | npare hydraulic and pneumatic systems.  | 3 |
| 4B. | Sketch and explain working of spring loaded accumulator.  | 3 |
| 4C. | Using suitable circuits explain various methods of controlling the piston speed in hydraulic actuators.   | 4 |
| 5A. | With a neat sketch explain the working of pilot operated check valve.   | 3 |
| 5B. | In a hydraulic press, when a push button is pressed, the cylinder should extend and exert force on the die. After reaching the end position the cylinder should stay in the position for 10 seconds and then retract automatically. Write an electro hydraulic circuit. | 3 |
| 50  | Cleater and even bin the warking of equatorial planes welve   |   |

**5C.** Sketch and explain the working of counterbalance valve.

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