| Reg. No. | | | | | | | | | | |
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# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

*A Constituent Institution of Manipal University*

## V SEMESTER B.TECH. (MECHANICAL ENGINEERING)

## END SEMESTER MAKE UP EXAMINATIONS, DEC 2016/JAN 2017

SUBJECT: PE II: FLUID DRIVES AND CONTROL [MME 4017]

**REVISED CREDIT SYSTEM**
**(05/01/2017)**

Time: 3 Hours MAX. MARKS: 50

**Instructions to Candidates:**

- Answer **ALL** the questions.
- Sketches should be drawn neatly using scales (Strictly no free hand diagrams)

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| **1A.** | Sketch and explain the working of air lubricator | **4** |
| **1B.** | What is a multistage air compressor? Illustrate with an example | **4** |
| **1C.** | Define actuator and also write the detailed classification of actuators? | **2** |
| **2A.** | What is a variable displacement pump? With the help of neat sketch explain working of any variable displacement pump | **4** |
| **2B.** | Sketch and explain the working of pressure to electrical converter valve (PE sensor) | **4** |
| **2C.** | With a block diagram explain the control structure of programmable logic controller. | **2** |
| **3A.** | A double-acting cylinder is used to press together glued components. Upon operation of a push button, the cylinder extends. Once the fully advanced position is reached, the cylinder is to remain for a time of T= 6 seconds and then immediately retract to the initial position. The cylinder retraction is to be adjustable. A new start cycle is only possible after the cylinder has fully retracted. Write the electro-pneumatic control circuit for this application. | **5** |
| **3B.** | Consider an automatic drilling machine. The complete cycle is as follows: Cylinder A extends to clamp the work-piece, then cylinder B extends to drill a hole and then retracts. Cylinder A then retracts to unclamp the work-piece. Design a pneumatic control circuit for this application. The circuit is provided with a start valve to avoid continuous cycling. | **5** |
| **4A.** | Briefly discuss the working of a pressure unloading valve. Also sketch the circuit which shows the use of this valve. | **6** |
| **4B.** | Write down various styles of cylinder mounting. Sketch and explain clevis joint and why is it used? | **4** |
| **5A.** | Sketch and explain the working of compound relief valve and also compare this valve with a simple pressure relief valve | **5** |
| **5B.** | What is the accumulator and list any four functions of the same. Also write hydraulic circuit illustrating use of accumulator. | **3** |
| **5C.** | In a hydraulic jack, the input cylinder of 25 mm diameter is connected to load cylinder of 100 mm diameter which has to carry a load of 2 KN. Determine the required force to drive this load at input cylinder. Also determine how far the load piston will move if the input piston is moved by distance of 100 mm. | **2** |