Reg. No.

# MANIPAL INSTITUTE OF TECHNOLOGY

## V SEMESTER B.TECH (IP ENGG.) END SEMESTER EXAMINATIONS,

## NOVEMBER 2017

# SUBJECT: PNEUMATICS & HYDRAULICS [MME 3111]

### **REVISED CREDIT SYSTEM**

Time: 3 Hours

MAX. MARKS: 50

#### Instructions to Candidates:

- ✤ Answer ALL the questions.
- Missing data may be suitably assumed.
- **1A.** Explain the signal flow of pneumatic systems with neat block diagram **3** showing elements.
- **1B.** Describe the components in an air generation and distribution set-up with a **3** neat sketch.
- **1C.** There is a choice of two push buttons to start the forward movement of **4** measuring rods via cylinder, which has the exhaust air throttled. The idle stroke, also started by a push button, can only take place when the double acting cylinder has reached its forward end position. Draw the pneumatic circuit and explain its working briefly.
- 2A. An electrically heated welding rail is pressed onto a rotatable cold drum by a double acting cylinder and welds a continuous plastic sheet into pieces of tubing. The forward stroke is triggered by means of a push button. The maximum cylinder force is set at 4 bar via a pressure regulator with pressure gauge (This prevents the welding rail damaging the metal drum). The return stroke is not initiated until the forward end position has been acknowledged and the pressure in the piston area has reached 3 bar. Restarting is only possible when the retracted end position has been reached and a time of t = 2 seconds has elapsed. Draw the pneumatic circuit.
- 2B. Using a transfer station, parts are to be transferred from a vertical magazine 5 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 retract once the cylinder 2A has retracted. The cycle is to start when a start button is pressed. Draw the circuit using idle roller lever valve to avoid signal overlap. Explain the circuit.
- **3A.** Briefly explain the working of relay contactor with a sketch and symbol.

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- **3B.** Describe the principle of inductive and capacitive proximity sensors with **3** schematic diagram and symbol.
- 3C. By pressing a pushbutton switch the oscillating piston rod of a cylinder starts. 5 By pressing another pushbutton switch the drive unit is switched off. The end positions are to be sensed by magnetic proximity sensors. Draw the electro pneumatic circuit for the application.

4A.	Sketch and briefly explain the schematic block diagram representation of a hydraulic system.	3
4B.	Describe the construction and working principle of gas charged accumulator.	3
4C.	With a neat sketch explain the working of an external gear pump.	2
4D.	Enumerate any four functions of hydraulic fluid.	2
5A.	What are the characteristics of Tandem centered 3 /4 DCV. Draw the symbol	2
5B.	Explain the construction and working of pressure sequence valve with a neat sketch.	3
5C.	Construct Meter in and Meter out hydraulic circuits. Differentiate between the two.	5