Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institute of Manipal University, Manipal

I SEMESTER M.TECH (MET) END SEMESTER EXAMINATIONS,

NOVEMBER 2017

SUBJECT: FLUID POWER AUTOMATION [MME 5124]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

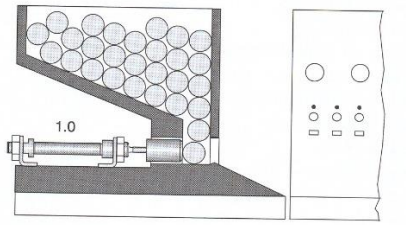
Instructions to Candidates:

- Answer **ANY FIVE FULL** questions.
- Missing data may be suitable assumed.

1A Explain the working of quick exhaust valve used in pneumatics with sketch and draw the circuit diagram giving its application. **4**

1B Discuss the principle of working of a double pilot operated 5/2 way valve used in pneumatics with sketch. **3**

1C A double acting cylinder guides cylinder pins towards a measuring device, as shown in figure below. The pins are separated by means of a continuous to and fro movement. The oscillating motion can be started by means of a detent push button valve. The duration of forward stroke and return stroke of the cylinder is to be adjustable. The cylinder is to remain in the forward end position for t = 5 seconds. Write the manual pneumatic circuit for this application. **3**



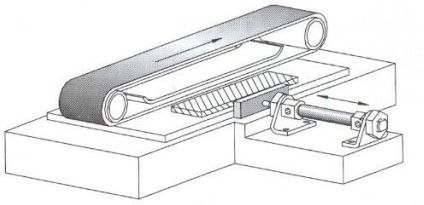
2A Discuss the principle of working of compound pressure relief valve used in hydraulics with sketch and state its application. **4**

2B Explain the working principle of the following types of proximity sensors used in electro pneumatics with sketch. **3**

i)Reed switch sensor ii) Inductive proximity sensor.

2C Using a sliding table a plank of wood is to be pushed under a belt sanding machine, as shown in figure below. By pressing a push button switch the sliding table with the plank of wood positioned on it is pushed **3**

under the belt sanding machine. By pressing another push button switch the sliding table is returned to its start position. Write the electro pneumatic circuit using a single solenoid 5/2 valve.



3A	Explain the principle of working of a floating center type 4/3 direction control valve with sketch and state its advantages and limitations.	**4**
3B	Write the pneumatic circuit for achieving the two cylinder sequence A+B+B-A- using cascade method.	**3**
3C	Explain the principle of working of pressure regulator unit used in pneumatic control with sketch.	**3**
4A	An external gear pump has 125 mm outside diameter, 85 mm inside diameter and 40 mm width. For a pump speed of 1500 rpm, determine the theoretical volumetric displacement and theoretical flow rate. If the volumetric efficiency is 90% what is the actual flow rate?	**4**
4B	Explain the principle of working of shuttle valve used in pneumatics with sketch.	**3**
4C	Explain the main components of programmable logic controller with a block diagram and write the ladder diagram for a logic containing an NO contact and an output coil.	**3**
5A	Explain the working of radial piston pump used in hydraulic system with sketch and state its advantages over other types of pumps.	**4**
5B	Explain the principle of working of a relay with sketch.	**3**
5C	For the crane system shown in figure below, determine the hydraulic cylinder force required to lift a 3000 N load.	**3**