Reg.No.										

MANIPAL INSTITUTE OF TECHNOLOGY

A Constituent Institute of Manipal University, Manipal

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

NOV/DEC 2016

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 on delay timer valve used in pneumatics with sketch and draw the circuit diagram giving its application.	**4**
1B	Discuss the principle of working of a manually operated 5/2 way valve used in pneumatics with sketch.	**3**
1C	A double acting cylinder is used to press together glued components. Upon operation of a push button, the clamping cylinder slowly advances. Once the fully extended position is reached, the cylinder is to remain for a time t_1 = 5 seconds and then immediately retract to the initial position. A new start cycle is only possible after the cylinder has fully retracted and after a delay of t_2 = 6 seconds. During this delay, the finished part is manually removed and replaced with new parts for gluing. The retracting speed also is to be adjustable. Draw the manual pneumatic circuit for this application.	**3**
2A	Discuss the principle of working of unloading 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. i)Capacitance sensor ii) Optical sensor.	**3**
2C	Using a hot pressing die, packing material is to be sealed by application of heat and pressure. By pressing a push button switch the heating rail is advanced and the packing material is heated along the adhesive strip. After the adhesion pressure has been reached, the heating coil is returned to its start position. Write the electro pneumatic circuit for this application.	**3**

3A Explain the principle of working of a closed 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 step counter module. **3**

3C Explain the working of pilot operated check valve used in hydraulics with sketch and draw an application circuit **3**

4A A hydraulic pump has a displacement volume of 120 cm^3/rev. Its actual flow rate is 0.0015 m^3/s at 900 rpm and pressure of 75 x 10^5 N/m^2. If the actual torque input by the prime mover to the pump is 150 N.m, determine the overall efficiency of the pump. Also find the theoretical torque input to the pump for its operation. **4**

4B Explain the principle of working of dual pressure valve used in pneumatics with sketch. **3**

4C Discuss the principle of working of quick exhaust valve used in pneumatics with sketch and draw an application circuit. **3**

5A Explain the working of compound pressure relief valve used in hydraulic system with sketch and state its advantages over direct acting pressure relief valve. **4**

5B Explain the working of a variable displacement vane pump with sketch and state its advantage over fixed displacement vane pump. **3**

5C For the system given in the figure below, determine the force required to drive a 2000 N load. **3**