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**MANIPAL INSTITUTE OF TECHNOLOGY**
Manipal University, Manipal – 576 104

**I SEM. M.Tech. (Manufacturing Engineering & Technology)**
**END SEMESTER EXAMINATIONS NOV/DEC 2015**

**SUBJECT: FLUID POWER AUTOMATION (MME535)**
**REVISED CREDIT SYSTEM**

Time: 3 Hours. MAX.MARKS: 50

**Instructions to Candidates:**

- Answer **ANY FIVE FULL** questions.

| | | |
|---|---|---|
| **1A** | Explain the working of one way flow control valve used in pneumatics with sketch and draw a circuit diagram giving its application. | **4** |
| **1B** | Discuss the principle of double pilot 5/2 way valve used in pneumatics with sketch. | **3** |
| **1C** | Upon actuation of a push button valve, the double acting cylinder slowly advances. After reaching the fully extended position, the cylinder retracts rapidly after a delay time of 4 seconds and preset pressure of 5 bar is reached behind the piston. Draw the manual pneumatic circuit for this application. | **3** |
| **2A** | Discuss the principle of working of counter balance 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.<br>i) Inductive Proximity sensor ii) Reed switch sensor. | **3** |
| **2C** | Using a diverting device parts are to be removed from one conveyor track onto another in linear sequence. By pressing a pushbutton switch the oscillating piston rod of a cylinder pushes the turntable via a pawl in stepped sequence. The parts are diverted and transported onwards in the opposite direction. By pressing another pushbutton switch the drive unit is switched off. Draw the electro pneumatic circuit for this application. | **3** |
| **3A** | Explain the principle of working of a floating type 4/3 direction control valve with sketch and state its advantages and limitations. | **4** |
| **3B** | Explain the principle of working of a step counter module used in pneumatics and show the different signals in it. | **3** |

**3C** Explain the working of a relay used in electro pneumatics with sketch and draw a circuit using relay latching principle. **3**

**4A** Draw the pneumatic circuit for sequencing of two cylinders in the order A+ B+ B- A- using Cascade method and list the steps followed. **4**

**4B** Explain the principle of working of a bladder type accumulator used in a hydraulic system with sketch and list the functions performed of accumulator. **3**

**4C** Explain the end cushioning arrangement used in hydraulic cylinders with sketch and state its function. **3**

**5A** Draw circuit diagrams giving application of different types of filters and state their relative advantages and limitations. **4**

**5B** Write a manual pneumatic circuit which uses quick exhaust valve, one way flow control valve, shuttle valve and a roller lever valve at the end of cylinder extension. **3**

**5C** Explain the working of pressure reducing valve with sketch and draw an application circuit. **3**

**6A** Explain the working of pilot operated check valve used in hydraulics with sketch **4**

**6B** Sketch a hydraulic pressure switch and explain its working **3**

**6C** For the crane system shown in figure given below, determine the hydraulic cylinder force required for lifting a load of 2000N, **3**