



MANIPAL INSTITUTE OF TECHNOLOGY



Manipal University, Manipal – 576 104

## VII SEM. B.Tech. (MECHANICAL ENGG.) DEGREE END SEMESTER (MAKE UP) EXAMINATIONS DEC. 2015/JAN. 2016

## SUBJECT: PNEUMATICS & HYDRAULICS (MME-443) (Elective – III) REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates

Answer **ANY FIVE FULL** questions.

- Draw neat sketches using pencil only.
- **1A)** Explain the working of a quick exhaust valve with sketch and draw an **(04)** application circuit.
- **1B)** Explain the advantages and limitations of pneumatic system. (03)
- **1C)** Sketch and explain the principle of working of an air filter used in **(03)** pneumatic system.
- 2A) Explain the working principle of the following types of sensors used in (04) electro pneumatics: i) Inductive sensor ii) Reed switch
- **2B)** Explain with sketch the working of 5/2 push button valve used in **(03)** pneumatics.
- 2C) Draw the electro pneumatic circuit for the following application. Using a conveyor belt, parts are to be transported in linear timed sequence to work stations which are arranged in line after one another. (03) When the latching push button switch is pressed the main wheel is indexed by the oscillating piston rod of a cylinder via a pawl. When the pushbutton switch is pressed again the drive is switched off.
- **3A)** Write the manual pneumatic circuits to illustrate the working of the **(04)** following pneumatic components.
  - i) Dual pressure valve ii) shuttle valve

- **3B)** A double acting cylinder is used to press together glued components. **(03)** Upon operation of a push button, the clamping cylinder slowly advances. At the end of the stroke, the cylinder is to remain for a time of 6 seconds and then immediately retract to the initial position. A new start cycle is possible only after the cylinder has fully retracted and after a delay of 5 seconds. During this delay, the finished part is manually removed and replaced with new part for gluing. The retracting speed is to be rapid, but adjustable. Draw the manual pneumatic circuit for this application.
- **3C)** Sketch and explain the working of a time delay valve used in pneumatic **(03)** system.
- **4A)** Explain the principle of working of counter balance valve with sketch **(04)** and draw a hydraulic circuit giving its application.
- **4B)** Sketch and explain the end cushioning arrangement used in the hydraulic cylinder.
- **4C)** Write the hydraulic circuit depicting the application of a pilot operated **(03)** check valve.

(03)

- **5A)** Explain the working of a hydraulic accumulator charging valve with **(04)** sketch.
- **5B)** Discuss the principle of working of a pressure reducing valve with **(03)** sketch.
- **5C)** Explain the working of axial piston pump with sketch. (03)
- 6A) Explain the principle of working of compound pressure relief valve with (04) sketch and state its advantage when compared to a direct acting pressure relief valve used in a hydraulic system.
- **6B)** A hydraulic cylinder is required to move a 90KN load at a velocity of **(03)** 0.5m/s. What is the output power?
- **6C)** Explain the principle of working of a bladder type accumulator with **(03)** sketch.