MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (MECHANICAL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2016

SUBJECT: PNEUMATICS AND HYDRAULICS [MME 443]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Sketches should be drawn neatly using scales (Strictly no free hand diagrams)
- Labelling is mandatory in sketches
- Answer any five full questions.

1A.	Sketch and explain the working of 5/2 double pilot direction control valve.	**4**
1B.	With the help of diagram write a note on air distribution system of pneumatics.	**4**
1C.	List the major components of hydraulic system and write their functions.	**2**
2A.	Sketch and explain the working of pressure unloading valve used in hydraulics.	**4**
2B.	Sketch and explain the working of one way flow control valve used in pneumatics.	**4**
2C.	Write displacement step diagram for the cylinder sequence A+B+ B-A-.	**2**
3A.	A double-acting cylinder is used to press together glued components. Upon operation of a push button, the cylinder extends rapidly. Once the fully advanced position is reached, the cylinder is to remain extended for a time of 6 seconds and also a pressure of 4 bar has to be reached in the piston end of the cylinder. Then immediately retract to the initial position. The cylinder retraction speed is to be adjustable. A new start cycle is only possible after the cylinder has fully retracted. Write suitable manual pneumatic or electro-pneumatic circuit for this application.	**6**
3B.	Using sketch, explain the working principle of sensor which is suitable for detecting the plastic parts.	**4**
4A.	Draw the regenerative circuit to control a double acting hydraulic cylinder using 4/2 direction control valve	**4**
4B.	Write the circuit diagram to illustrate the use of pilot operated check valve.	**4**
4C.	Explain the working of bleed of circuit in hydraulics.	**2**

5A.	A cylinder with a bore of 150 mm and a piston rod diameter of 105 mm, has to extend with a speed of 7 m/s, pressure applied is 150 bar. Calculate: (a) The flow rate in LPM of oil to extend the cylinder (b) The flow rate in LPM from annulus side to extend the cylinder. (c) The retract speed in m/min using (a). (d) The flow rate from full bore end on retract.	**4**
5B.	Sketch and explain the working of pressure reducing valve used in hydraulics.	**4**
5C.	Explain the working of depth filter with sketch	**2**
6 A.	Sketch and explain the working of dual pressure and shuttle valve used in pneumatics.	**4**
6 B.	Sketch and explain the working of axial piston pump.	**4**
6 C.	List 8 desirable properties of the good hydraulic fluid.	**2**