Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

V SEMESTER B. TECH (IP ENGG.) END SEMESTER EXAMINATIONS, NOVEMBER 2019

SUBJECT: PNEUMATICS AND HYDRAULICS [MME 3111]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data may be suitably assumed.
- Draw the sketches neatly and hand writing should be clearly readable

1A) Explain the structure and signal flow in pneumatic control system 3

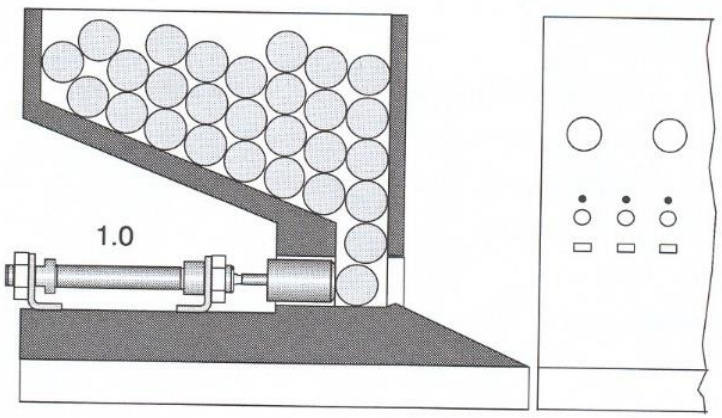
1B) With the help of neat sketch explain the working of shuttle valve 3

1C) With the help of neat sketch explain the working of air lubricator 4

2A) Sketch and explain working of time delay valve 3

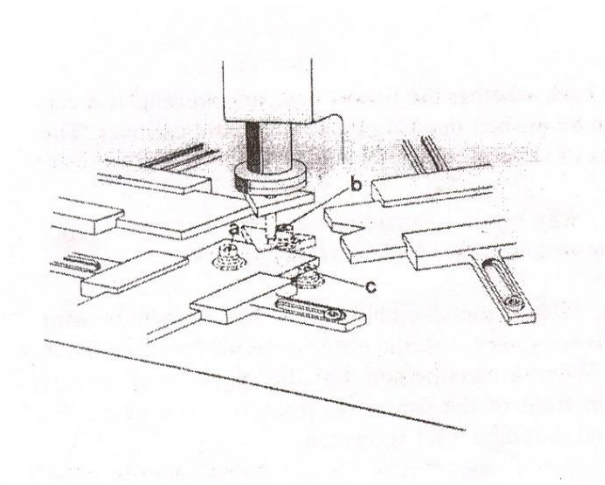
2B) Sketch and explain working of 5/2 single pilot direction control valve 3

2C) A double acting cylinder guides cylinder pins towards a measuring device. The pins are separated by means of a continuous to and fro movement. The oscillating motion can be started by means of a valve with detent switch. 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 before retraction 4



3A) Describe the working of capacitive proximity sensors used in electro pneumatics and also highlight the features of this sensor 3

3B) A pneumatic cylinder is used to stamp a notch in the work piece. The stamping operation must be initiated when two of three electrical signal generators are activated. The signal components a, b and c are fitted to provide sensing functions. When the work piece is removed from the device, the cylinder returns to its rearmost end position. Solve the problem by using single acting cylinder.



3

3C) Explain the working of pressure reducing valves using neat sketch 4

4A) Describe the accessories of power pack used in hydraulic controls system 3

4B) Write the electro-hydraulic circuit to illustrate the use of counterbalance valve to regulate acceleration of vertically mounted cylinder due to self-weight 3

4C) Sketch and explain the working of spring loaded accumulator and illustrate how it can be used as emergency power course using appropriate circuit 4

5A) Sketch and explain the working of pilot operated check valve 3

5B) Draw symbols for following components 3

i) 4/3 tandem neutral direction control valve ii) Accumulator

iii) Rotary pneumatic actuator iv) Rotary hydraulic actuator

v) Counter balance valve vi) electrical push button

5C) Write the circuit to regulate the speed of hydraulic cylinder using meter-in and meter-out control 4