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## P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. - Mechanical Engineering

Semester End Examination; Dec. - 2015

Hydraulics and Pneumatics

Time: 3 hrs

Max. Marks: 100

*Note: Answer any FIVE full questions, selecting at least TWO full questions from each part.*

### PART - A

1. a. State Pascal's law and explain its application. 6
- b. With a neat sketch explain construction and working of external gear pump. 8
- c. Determine the volumetric efficiency of a gear pump of external dia and internal dia of gears 75 mm and 50 mm respectively and width of the gear teeth 50 mm, if the actual discharge is 30 LPM at 1800 RPM. 6
2. a. List the classification of hydraulic motors. 6
- b. With the help of a neat sketch explain the construction and working of an external gear motor. 8
- c. A hydraulic motor has a volumetric displacement of 123 cm<sup>3</sup>, if it receives 0.0009 m<sup>3</sup>/s of oil at 50 bars, find;
  - i) Speed of the motor 6
  - ii) Theoretical torque
  - iii) Theoretical power of the motor.
3. a. Explain with a neat sketch the working of a direct acting pressure relief valve and also draw the graphical symbol for the valve. 10
- b. With a neat sketch explain the working of a pilot operated dc valve with graphical symbol. 10
4. a. Explain with a neat circuit diagram the working of a locking cylinder using pilot operated check valve. 10
- b. With a net circuit diagram explain the working of speed control and direction reversal of a hydraulic motor. 10

### PART - B

5. a. List five common causes of hydraulic system breakdown. 5
- b. List the desirable properties of hydraulic fluid and explain any two. 9
- c. Sketch and label different locations of filter in a hydraulic system. 6
6. a. Explain with a block diagram, a structure of pneumatic system. 10
- b. What is meant by cushioning of cylinders? Why cushioning is necessary? Explain the working of cushioned cylinder with a diagram. 10

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| 7 a. | With a neat diagram explain the construction and working of a 4/2 poppet valve.  | 6  |
| b.   | Explain with a neat diagram along with graphical symbol the working of quick exhaust valve.  | 7  |
| c.   | With a neat circuit diagram explain time dependent retraction of double acting cylinder using time-delay valve without limit switch. | 7  |
| 8 a. | With a neat circuit diagram explain signal elimination by reversing valves using cascading method.                                   | 14 |
| b.   | What are the stages of air preparation for use in a pneumatic system? Explain them.  | 6  |

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