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P.E.S. College of Engineering, Mandya - 571 401
(An Autonomous Institution affiliated to VTU, Belgaum)
Eighth Semester, B.E. - Industrial and Production Engineering
Semester End Examination; June - 2016
Fluid Power System

Time: 3 hrs   *Max. Marks: 100*

Note: i) Answer any **FIVE** full questions, selecting at least **TWO** full questions from each part.
    ii) Write symbols wherever necessary.

PART - A

1 a.	Explain with block diagram the structure of a hydraulic control system.		6
b.	Explain with a neat sketch a simple vane pump.		8
c.	A pump has a displacement volume of 100 cm^3. If delivers oil at a rate of 0.0015 m^3/s and rotates at 1000 rpm generating 70 bars pressure. If the prime mover input torque is 120 N-m. Calculate ;		
	(i) Mechanical efficiency		6
	(ii) Volumetric efficiency		
	(iii) Overall efficiency of the PUMP		
	(iv) What is the theoretical torque required to operate the pump?		
2 a.	Show that the second class lever system requires less force than first and third class lever system.		12
b.	A hydraulic motor has a displacement of 164 cm^3 and operates with a pressure of 70 bars and a speed of 2000 rpm. If the actual flow rate consumed by the motor is 0.006 m^3/s and the actual torque delivered by the motor is 170 N-m. Calculate;		8
	i) Volumetric efficiency of the motor ii) Mechanical efficiency of the motor		
	iii) Overall efficiency of the motor iv) The actual power delivered by motor.		
3 a.	Explain with the help of a neat sketch a pressure reducing valve.		8
b.	Explain with neat sketch the following vales :		12
	(i) Throttle check valve (ii) $\frac{4}{3}$ closed centre directional control valve.		
4 a.	Show that when the cylinder connected in series, the cylinder will operate in synchronization.		6
b.	Explain the various differences between meter-in and meter-out speed control for cylinder extending with the help of hydraulic circuit diagram.		8
c.	Explain with the help of a circuit diagram the application of an accumulator as an emergency power force.		6

PART - B

5 a. Explain the various filter location in hydraulic circuits with the help of circuits. 8

  b. Explain O-rings and compression packing types of scale configuration. 6

  c. How do solid contaminates in the hydraulic fluid cause wear of the moving part of hydraulic component? Explain. 6

6 a. Explain the detailed procedure for compressed air preparation. 8

  b. What are the characteristics of compressed air? 6

  c. Explain with block diagram the structure of pneumatic control system. 6

7 a. Explain with neat sketch the following types of valves used in pneumatic system :

  (i) Shuttle Valve

  (ii) Twin Pressure Valve

  (iii) Memory Valve. 12

  b. Mention the difference between indirect and direct actuation of pneumatic cylinder with the help of pneumatic circuit. 8

8 a. Explain AND and OR logic function using shuttle and Twin pressure valve to build the circuit. 12

  b. Explain with the help of a sketch a Time delay valve. 8

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