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

(An Autonomous Institution affiliated to VTU, Belagavi)
Seventh Semester, B.E. - Mechanical Engineering
Semester End Examination; February - 2022
Hydraulics and Pneumatics

Time: 3 hrs *Max. Marks: 100*

Course Outcomes

The Students will be able to:
CO1: Define Pascal's law and Explain the different types of pumps.
CO2: Explain the various types of control components and Analyze the hydraulic circuits.
CO3: Understand the maintenance of hydraulic control system and Explain the pneumatic control system.
CO4: Illustrate the pneumatic control valves.
CO5: Identify the multi-cylinder applications in various fields and Explain filters, regulators and lubricators.

<u>*Note:*</u> I) **PART - A** is compulsory. **Two** marks for each question.
  II) **PART - B**: Answer any <u>**Two**</u> sub questions (from a, b, c) for Maximum of **18 marks** from each unit.

Q. No.	Questions	Marks	BLs	COs	POs
	I : PART - A	**10**			
I a.	Define fluid power.	2	L1	CO1	PO1
b.	Write the ANSI symbols for the following:				
	i) Check valve	2	L1	CO2	PO1
	ii) Pressure-compensated flow control valve				
c.	Define Accumulator.	2	L1	CO3	PO1
d.	What is the function of quick exhaust valve?	2	L2	CO4	PO1
e.	What is the function of FRL unit?	2	L2	CO5	PO1
	II : PART - B	**90**			
	UNIT - I	**18**			
1 a.	Explain the construction and working of an internal gear pump.	9	L2	CO1	PO2
b.	A pump has a displacement volume of 98.4 cm^3. It delivers 0.00152 m^3/s of oil at 1000 rpm and 70 bars. If the prime mover input torque is 124.3 N-m; i) What is its overall efficiency? ii) What is the theoretical torque required to operate the pump?	9	L2	CO1	PO2
c.	With neat sketches, explain telescope and tandem cylinders.	9	L2	CO1	PO2
	UNIT - II	**18**			
2 a.	With neat sketch, explain the working of a pressure reducing valve and also draw the graphical symbol for the valve.	9	L2	CO2	PO2
b.	Explain how oil is regenerated to increase the extending speed of a double acting hydraulic cylinder with a hydraulic circuit diagram?	9	L3	CO2	PO3

c.	Design a hydraulic circuit to operate a heavy platform, which needs to be raised and lowered on command from 4/3 double lever operated, spring centered and tandem centered DCV. Employ a counter-balance valve for the safe operation.	9	L3	CO2 PO3

UNIT - III	**18**

3 a.	Sketch and label different locations of filter in hydraulic system.	9	L2	CO3 PO2
b.	Explain the problems caused by gasses in hydraulic fluids.	9	L2	CO3 PO2
c.	Explain with a block diagram, structure of a pneumatic control system.	9	L2	CO3 PO2

UNIT - IV	**18**

4 a.	With a neat sketch, explain the working principle of quick exhaust valve.	9	L2	CO4 PO2
b.	Explain indirect control of a double acting pneumatic cylinder with a neat circuit diagram.	9	L2	CO4 PO2
c.	Explain supply air throttling and exhaust air throttling with the help of pneumatic circuit diagrams.	9	L2	CO4 PO2

UNIT - V	**18**

5 a.	Draw and explain a two cylinder Pneumatic circuit to control its motion in a Pneumatic system with a motion diagram.	9	L3	CO5 PO2
b.	What are the stages of air preparation for use in a pneumatic system? Explain them.	9	L2	CO5 PO2
c.	With the help of a neat sketch, explain the working principle of a lubricator.	9	L2	CO5 PO2

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