

## DEPARTMENT OF MECHATRONICS VII SEMESTER B.TECH. (MECHATRONICS) END SEMESTER EXAMINATION, JULY 2023

**Subject:** Hydraulics and Pneumatics Systems

Subject Code: MTE 4303

Date:

Time: 3 Hrs

Exam Time:

MAX. MARKS: 50

Answer **ALL** the questions.

Questions	М	СО	РО	LO	BL
In a pneumatic transport system, a pneumatic cylinder must push the trolley to its desired rail with a precondition that the cylinder will start advancing after a time delay and retract to its original position back from its advanced position also after a time delay. Design a pneumatic circuit for the above problem.	05	3	2	2	6
With a neat sketch, explain the working of vane type motor.	03	2	2	4	2
Compare the working of pressure relief and unloading valves.	02	4	2	4	2
Quarry stones are fed from a crushing roller to two vibrating sieves by means of an overhead conveyor belt. The fine upper sieves oscillate in opposing the push-pull motion to the coarser lower screen. The sieve oscillating frequency of the two double-acting cylinders is set to $f = 1$ Hz via the quantity of air supplied in load-dependent relation. A reversal takes place in the retracted end position via two roller lever valves. A third single-acting cylinder unclogs the sieves via two cables. The stone sorter is switched on and off by a valve with a push-button switch. Refer fig. 2A for the setup. Design a pneumatic circuit for the above application.	05	3	2	2	6
Fig. 2A					
	QuestionsIn a pneumatic transport system, a pneumatic cylinder must push the trolley to its desired rail with a precondition that the cylinder will start advancing after a time delay and retract to its original position back from its advanced position also after a time delay. Design a pneumatic circuit for the above problem.With a neat sketch, explain the working of vane type motor.Compare the working of pressure relief and unloading valves.Quarry stones are fed from a crushing roller to two vibrating sieves by means of an overhead conveyor belt. The fine upper sieves oscillate in opposing the push-pull motion to the coarser lower screen. The sieve oscillating frequency of the two double- acting cylinders is set to f = 1 Hz via the quantity of air supplied in load-dependent relation. A reversal takes place in the retracted end position via two roller lever valves. A third single-acting cylinder unclogs the sieves via two cables. The stone sorter is switched on and off by a valve with a push-button switch. Refer fig. 2A for the setup. Design a pneumatic circuit for the above application.Fig. 2A	QuestionsMIn a pneumatic transport system, a pneumatic cylinder must push the trolley to its desired rail with a precondition that the cylinder will start advancing after a time delay and retract to its original position back from its advanced position also after a time delay. Design a pneumatic circuit for the above problem.03With a neat sketch, explain the working of vane type motor.03Compare the working of pressure relief and unloading valves.02Quarry stones are fed from a crushing roller to two vibrating sieves by means of an overhead conveyor belt. The fine upper sieves oscillate in opposing the push-pull motion to the coarser lower screen. The sieve oscillating frequency of the two double- acting cylinders is set to f = 1 Hz via the quantity of air supplied in load-dependent relation. A reversal takes place in the retracted end position via two roller lever valves. A third single-acting cylinder unclogs the sieves via two cables. The stone sorter is switched on and off by a valve with a push-button switch. Refer fig. 2A for the setup. Design a pneumatic circuit for the above application.Image: 100Fig. 2A	QuestionsMCOIn a pneumatic transport system, a pneumatic cylinder must push the trolley to its desired rail with a precondition that the cylinder will start advancing after a time delay and retract to its original position back from its advanced position also after a time delay. Design a pneumatic circuit for the above problem.053With a neat sketch, explain the working of vane type motor.032Compare the working of pressure relief and unloading valves.024Quarry stones are fed from a crushing roller to two vibrating sieves by means of an overhead conveyor belt. The fine upper sieves oscillate in opposing the push-pull motion to the coarser lower screen. The sieve oscillating frequency of the two double- acting cylinders is set to f = 1 Hz via the quantity of air supplied in load-dependent relation. A reversal takes place in the retracted end position via two roller lever valves. A third single-acting cylinder unclogs the sieves via two cables. The stone sorter is switched on and off by a valve with a push-button switch. Refer fig. 2A for the setup. Design a pneumatic circuit for the above application.Image: 1000000000000000000000000000000000000	QuestionsMCOPOIn a pneumatic transport system, a pneumatic cylinder must push the trolley to its desired rail with a precondition that the cylinder will start advancing after a time delay and retract to its original position back from its advanced position also after a time delay. Design a pneumatic circuit for the above problem.0532With a neat sketch, explain the working of vane type motor.0322Compare the working of pressure relief and unloading valves.0242Quarry stones are fed from a crushing roller to two vibrating sieves by means of an overhead conveyor belt. The fine upper sieves oscillate in opposing the push-pull motion to the coarser lower screen. The sieve oscillating frequency of the two double- acting cylinders is set to f = 1 Hz via the quantity of air supplied in load-dependent relation. A reversal takes place in the retracted end position via two roller lever valves. A third single-acting cylinder unclogs the sieves via two cables. The stone sorter is switched on and off by a valve with a push-button switch. Refer fig. 2A for the setup. Design a pneumatic circuit for the above application.Image: Provide the setup of the setup. Design a pneumatic circuit for the above application.Image: Provide table The setup of the setup. Design a pneumatic circuit for the above application.Image: Provide table The setup. The setup. Design a pneumatic circuit for the above application.Image: Provide table The setup. The setup. Design a pneumatic circuit for the above application.Image: Provide table The setup. The setup. Design a pneumatic circuit for the above application.Image: Provide table The setup. The setup. The setup. Design a pneumatic circuit for the above application.I	QuestionsMCOPOLOIn a pneumatic transport system, a pneumatic cylinder must push the trolley to its desired rail with a precondition that the cylinder will start advancing after a time delay and retract to its original position back from its advanced position also after a time delay. Design a pneumatic circuit for the above problem.03224With a neat sketch, explain the working of vane type motor.0303224Compare the working of pressure relief and unloading valves.02424Quarry stones are fed from a crushing roller to two vibrating sieves by means of an overhead conveyor belt. The fine upper sieves oscillate in opposing the push-pull motion to the coarser lower screen. The sieve oscillating frequency of the two double- acting cylinders is set to f = 1 Hz via the quantity of air supplied in load-dependent relation. A reversal takes place in the retracted end position via two roller lever valves. A third single-acting cylinder unclogs the sieves via two cables. The stone sorter is switched on and off by a valve with a push-button switch. Refer fig. 2A for the setup. Design a pneumatic circuit for the above application.Via Via Via Image: Page AImage: Pa

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

2B.	Mention the advantage and disadvantages of an open-center directional control valve.	03	4	2	4	2
2C.	Using a lid lifting device snap-on lids are to be pressed onto plastic buckets. By	02	3	2	2	6
	pressing a push button switch the domed press is advanced and the snap-on lid is					
	pressed on. When the push button switch is released, the domed press is returned to					
	its start position. Design a pneumatic circuit for the above application.					
3A.	Explain the working of the diaphragm and gas-loaded accumulators.	05	2	2	4	2
<b>3B.</b>	Mention the functions of a reservoir.	03	2	2	4	2
3C.	Design a hydraulic circuit using a float center directional control valve to control the	02	3	2	2	6
	speed of the forward stroke for a double-acting cylinder for meter-in application.					
4A.	A double-acting cylinder is used to press together glued components. Upon operation	05	3	2	2	6
	of a press button, the clamping cylinder slowly advances. Once the fully extended					
	position is reached, the cylinder is to remain for a time of $t = 6$ seconds and then					
	immediately retract to the initial position. A new start cycle is only possible after the					
	cylinder has fully retracted and after a delay of 5 seconds. During this delay, the					
	finished part is manually removed and replaced with new parts for gluing. The					
	retracting speed should be fast, but adjustable. Design a pneumatic circuit for the					
	same.					
<b>4B.</b>	Design an electro-pneumatic circuit for a condition where the pressing of two-push	03	5	2	2	6
	buttons, the cylinder moves forward and if either of the push buttons is depressed, the					
	cylinder moves backward.					
4C.	Represent the control task A <sup>+</sup> A <sup>-</sup> B <sup>+</sup> B <sup>-</sup> in a displacement-step diagram.	02	3	2	2	3
5A.	Develop a pneumatic circuit for A+ B+ B- A- sequence. Avoid signal conflict using	05	3	2	2	6
	idle – return roller.					
5B.	Analyze the circuit in Fig. 5B and explain the significance of the pressure sequence	03	4	2	13	4
	valve in the circuit.					

