Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Mid - Term Examinations – October 2025

Date: 07-10-2025 **Time:** 02.00pm to 03.30pm

School: SOE	**Program:** B. Tech. (Mechanical)	
Course Code: MEC3062	**Course Name:** Hydraulics and Pneumatics	
Semester: V	**Max Marks:** 50	**Weightage:** 25%

CO - Levels	CO1	CO2	CO3	CO4	CO5
Marks	20	30	-	-	-

Instructions:

(i) ***Read all questions carefully and answer accordingly.***

(ii) ***Do not write anything on the question paper other than roll number.***

(iii) ***Use of Design Data Handbook permitted.***

Part A

Answer ALL the Questions. Each question carries 2marks.				**2Mx5Q=10M**
1	Define Pascal's Law with example.	**2 Marks**	**L1**	**CO1**
2	Write two advantages Pneumatics System	**2 Marks**	**L1**	**CO2**
3	State any two limitations of Hydraulic System	**2 Marks**	**L1**	**CO1**
4	Mention Four components of Hydraulic system.	**2 Marks**	**L1**	**CO2**
5	Sketch the symbol of double acting cylinder spring return.	**2 Marks**	**L1**	**CO1**

Part B

Answer ALL Questions. Each question carries 10 marks.					4QX10M=40M
6	**a**	A pump supplies oil at 0.0016 cubic meter per second to a 40 mm diameter double acting hydraulic cylinder. If the load is 5000 N (extending and retracting) and rod diameter is 20 mm. Calculate the following in SI units. a) Hydraulic pressure during the extending stroke b) Piston velocity during the extending stroke c) Cylinder KW power during the extending stroke d) Hydraulic pressure during retracting stroke e) Piston velocity during the retraction stroke	**10 Marks**	**L3**	**CO1**
		or			
	b	A gear pump is a type of positive displacement (PD) pump. Gear pumps use the actions of rotating gears to transfer fluids. With a neat sketch, explain the construction and working principle of an external gear pump. Explain the working principle of external gear pump.	**10 Marks**	**L2**	**CO1**
7	**a**	Distinguish between balanced vane pump and unbalanced vane pump with a neat diagram.	**10 Marks**	**L2**	**CO1**
		or			
	b	Explain the construction and working of a vane motor with a neat diagram.	**10 Marks**	**L2**	**CO1**
8	**a**	In the hydraulic press shown below, a force of 100 N exerted on the small piston. Determine the upward force on the large piston. The diameter of smaller piston is 50 mm and the diameter of the large piston is 145 mm. Also find the distance moved by the large piston if the small piston moves by 100 mm.	**10 Marks**	**L3**	**CO2**
		or			
	b	Explain Tandem center 1/2-way direction control valve (mid-position) with a neat diagram and its symbol.	**10Marks**	**L2**	**CO2**
9	**a**	Explain directional control valve. Elaborate the classification of directional control valves.	**10 Marks**	**L2**	**CO2**
		or			
	b	An actuator is a component of a machine that is responsible for moving and controlling a mechanism or system, for example the opening a valve. State any four differences between linear and rotary actuators. Give examples for each actuator.	**10 Marks**	**L2**	**CO2**