

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)
B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY
2025

Fourth Semester

Mechanical Engineering

ME3492 - Hydraulics and Pneumatics

Regulations - 2021

(Use of standard Design Data Book is permitted in the University examination)

Duration : 3 Hrs

Maximum : 100 Marks

PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)

Q.No	Questions	BL T	CO	Mark s
1.	Differentiate between hydraulics and pneumatics.	L2	1	2
2.	List effects of high viscosity hydraulic fluids in the fluid power system.	L2	1	2
3.	Highlight the functions of pressure control valves	L2	2	2
4.	Compare open center and closed center in three position D.C. valves.	L2	2	2
5.	What do you mean by sizing of accumulator?	L2	3	2
6.	List the applications of intensifier in a hydraulic circuit.	L2	3	2
7.	Draw the standard graphical symbol for FRL unit.	L1	4	2
8.	What is the need, to include lubricator in pneumatic circuits?	L2	4	2
9.	List any two common faults observed in hydraulic system.	L2	5	2
10.	List the components of hydraulic power pack.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

Q.No	Questions	BL T	CO	Mark s
11.	a i Explain in detail about the various losses in hydraulic fluid power systems.	L3	1	10
	ii A gear pump with the following specification runs at 1400 rpm. Module = 3 mm/tooth, Gear width = 15 mm, Number of teeth = 12, Pressure angle = 20°. Determine (i) Theoretical discharge (ii) Hydraulic power produced by the pump when the working against a pressure of 100 bar.	L3	1	6
	Or			
b	A pump has a displacement volume of 150 cm ³ . It delivers 0.0014 m ³ /s at 1440 rpm and 65 bar. If the prime mover input torque is 135 Nm.	L3	1	16
	i. What is the overall efficiency of the pump?			
	ii. What is the theoretical torque required to operate the pump?			
	iii. The pump is driven by an electric motor having an overall efficiency of 83%. The hydraulic system operates 12 hours/day for 250 days per year. The			

cost of electricity is Rs. 12 per kWh. Determine the yearly cost of electricity to operate the hydraulic system.

12.	a	i	Explain with neat sketch about the construction and working of 4/3 direction control valves.	L2	2	8
		ii	Explain with neat sketch about the construction and working of pilot operated check valve with an application.	L2	2	8
			Or			
	b		Classify the flow control valve with examples and how it is different from direction control valves.	L2	2	16
13.	a		Design a hydraulic circuit with accumulator as a leakage compensator and auxiliary power source.	L4	3	16
			Or			
	b		Design a failsafe control circuit using emergency cut off valve and two hand safety control circuit.	L4	3	16
14.	a		Design a pneumatic cascade circuit for the following sequence $A^+ B^+ A^- C^+ C^- B$. Also develop travel-step diagram for the given sequence of operation.	L3	4	16
			Or			
	b	i	Explain the construction and working principle of quick exhaust valve with neat sketch.	L3	4	8
		ii	Explain the construction and working principle of Filter Regulator and Lubricator (FRL) unit.	L3	4	8
15.	a		Explain in detail about the factors considered while selecting the components for the pneumatic circuits.	L2	5	16
			Or			
	b		Design and develop a pneumatic circuit for pick and place of objects in a manufacturing environment.	L2	5	16