USN ☐☐☐☐☐☐☐☐☐☐   **18MT54**

Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Hydraulics and Pneumatics

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Define Pascal's law and write the applications. **(04 Marks)**
   b. With the neat sketch, explain the components of hydraulic system. **(08 Marks)**
   c. Explain the desirable properties of hydraulic fluid. **(08 Marks)**

OR

2 a. Explain the factors that influence the selection of hydraulic pump. **(06 Marks)**
   b. With the neat sketch, explain the swash plate piston pump. **(08 Marks)**
   c. Displacement of pump operating at 1000 rpm at pressure of 70 bar is $100 \times 10^6 m^3$. The input torque is 120N/m. The pump delivers 0.0015 m^3/sec of oil. Find
      i) Overall efficient
      ii) Theoretical torque. **(06 Marks)**

Module-2

3 a. With the neat sketch, explain the working of double acting cylinder. **(06 Marks)**
   b. With the neat sketch, explain the working of external Gear motor. **(06 Marks)**
   c. A hydraulic motor has a displacement of 164cm^3 and operates with a pressure of 70bar and a speed of 2000rpm. If the actual flow – rate consumed by the motor is 0.006 m^3/sec and the actual torque delivered by the motor is 170N/m find :
      i)   Volumetric efficiency
      ii) Overall efficiency
      iii) Mechanical efficiency
      iv) The actual kW delivered by the motor. **(08 Marks)**

OR

4 a. With the neat sketch, explain the construction and working of
      i)   4/2 DCV
      ii) Shotlle Valve
      iii) Needle valve **(18 Marks)**
   b. List the functions of accumulator. **(02 Marks)**

Module-3

5 a. Describe Meter – in and Meter – out circuit for controlling the speed of hydraulic cylinder. **(12 Marks)**
   b. Explain with the neat circuit diagram, the working of Regenerative circuit. **(08 Marks)**

<div align="center">OR</div>

6 a. With the neat sketch, explain the hydraulic Reservoir and list the functions. **(10 Marks)**
 b. Explain water cooled heat exchanger with the neat sketch. **(06 Marks)**
 c. Explain static and dynamic seals with examples. **(04 Marks)**

<div align="center">Module-4</div>

7 a. With the neat sketch, explain the pneumatic system. **(08 Marks)**
 b. List the advantage and limitations of pneumatic system. **(08 Marks)**
 c. List the characteristics of compressed air. **(04 Marks)**

<div align="center">OR</div>

8 a. With a neat sketch, explain the working of vane air motor. **(07 Marks)**
 b. With a neat sketch, explain the working of Pneumatic end position cushioning. **(07 Marks)**
 c. With a neat sketch, explain quick exhaust valve. **(06 Marks)**

<div align="center">Module-5</div>

9 a. With neat circuit diagram, explain cylinder actuation with OR logic gate function. **(10 Marks)**
 b. With neat circuit diagram, explain cylinder actuation with AND logic gate function.
 (10 Marks)

<div align="center">OR</div>

10 a. Write the symbolic representation of following switches.

i)	Push – Button switch	a)	SPST – NO
		b)	SPST – NC
		c)	DPST – NO/NC
		d)	DPST – NO/NC
ii)	Pressure switches	a)	PS – NO
		b)	PS – NC
iii)	Limit switches	a)	LS – NO
		b)	LS – NC

(08 Marks)

 b. With neat diagram, explain dual cylinder sequencing circuits. **(12 Marks)**

<div align="center">* * * * *</div>