U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

May 2023 Semester End Make-Up Examinations

Programme: B.E. **Semester: VII**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 20ME7DEHAP **Max Marks: 100**
Course: Hydraulics & Pneumatics **Date: 17.05.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably be assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1 a) Describe and explain Pascal's law with respect to hydraulic system and solve the following problem, where, in the hydraulic device shown in Fig. Q1(a), calculate the output torque T_2, if the input torque T_1 = 10N-cm. Given: Radius, R_1=2cm, diameter, d_1 = 8cm, Radius, R_2=4cm, diameter, d_2 = 24cm **08**

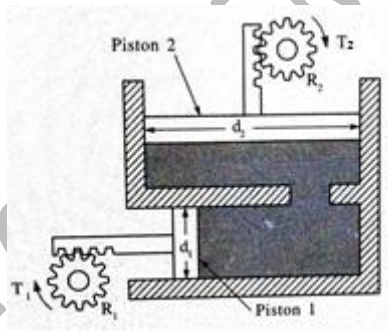

Fig. Q1(a)

b) Explain the construction and working of (i) external gear pump and (ii) swash plate piston pump. **12**

OR

2 a) A hydraulic motor has a volumetric displacement of 123 cm^3 operating at a pressure of 60 bar and speed 1800 rpm. If the actual flow rate consumed by the motor is 0.004 m^3/sec and the actual torque delivered by the motor is 100 Nm. Find (i) Volumetric efficiency, (ii) Mechanical efficiency, and (iii) Overall efficiency. **08**

b) How are pumps broadly classified? With a neat sketch explain the construction and working of bent axis type axial piston pump. **12**

UNIT - II

3 a) Classify the direction control valve, Sketch, and explain 3/2 sliding type direction control valve **08**

b) How are pressure and flow control valves classified? Explain with neat diagram construction and working of (i) Globe valve and (ii) Needle valve **12**

UNIT - III

4	a)	How are hydraulic accumulators classified? With neat hydraulic circuit diagram explain the construction and working of accumulator used as a shock absorber	**08**
	b)	Demonstrate the working of (i) hydraulic cylinder sequencing circuit and (ii) meter-in circuit method for speed control of cylinder with neat and proportionate sketch	**12**

UNIT - IV

5	a)	Explain the characteristics of compressed air	**06**
	b)	Differentiate between hydraulic and pneumatic system	**06**
	c)	Explain with neat sketch construction and working of end position cushioning in pneumatic cylinder	**08**

UNIT - V

6	a)	With neat sketch explain (i) Suspended seat type slide valve and (ii) Quick exhaust valve	**10**
	b)	With neat diagram explain the construction and working of direct and indirect actuation of pneumatic cylinder	**10**

OR

7	a)	With neat sketch explain air cooled and water-cooled heat exchanger system used in hydraulic system	**10**
	b)	Write a note on (i) types of contamination and sources of contamination and (ii) reservoir in hydraulic system	**10**

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