U.S.N.										

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

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Mechanical Engineering **Duration: 3 hrs.**
Course Code: 20ME7DEHAP **Max Marks: 100**
Course: Hydraulics & Pneumatics **Date: 24.02.2023**

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) Sketch and explain the structure of a hydraulic system. **06**

b) Explain the construction and working of bent axis type piston pump. **07**

c) A force of 500 N applied on a plunger of diameter 5 cm of a hydraulic press moves the piston through a distance of 20 cm as shown Fig. Q1(c). What is the maximum weight of the load that can be placed on the ram and what will be the displacement of the ram, if the diameter of the ram is 40 cm. **07**

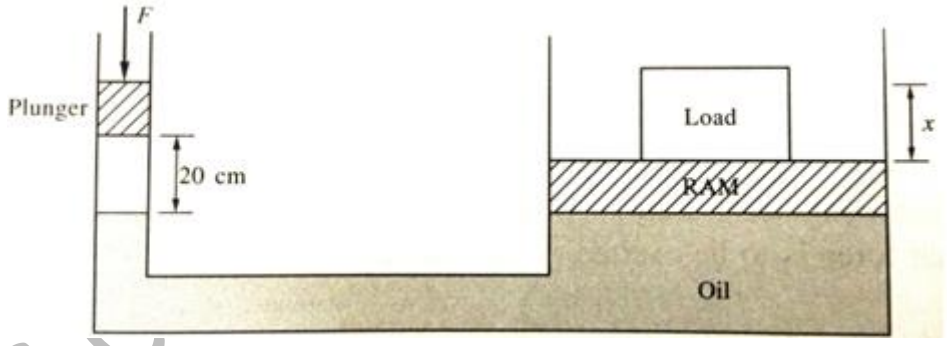

Fig:Q1(c)

OR

2 a) Sketch and explain the construction and working of double acting cylinder for both extraction and retraction stroke. **06**

b) Explain the construction and working of an unbalanced vane motor. **07**

c) A hydraulic motor has volumetric displacement of 123 cm3. If it receives 0.0009 m^3/sec of oil at 50 bar. Find (i) the speed of the motor, (ii) theoretical torque and (iii) theoretical power of the motor. **07**

UNIT - II

3 a) How are direction, pressure, and flow control valves are classified **05**

b) Sketch and explain the construction and working of direct acting pressure reducing valve **06**

	c)	Sketch the following flow control valves (i) sliding spool flow control valve, (ii) simple needle flow valve and (iii) globe valve.	**09**

UNIT - III

4	a)	Draw the symbolic representation of (i) pressure compensated flow control valve, (ii) pressure relief valve and (iii) tandem neutral, four way three position spring centered, solenoid actuated direction control valve.	**04**
	b)	What is regenerative circuit? With neat circuit diagram explain the construction and working of regenerative circuit to increase the speed of a double acting cylinder-piston.	**08**
	c)	With neat hydraulic circuit diagram explain the construction and working of speed control and direction reversal of a hydraulic motor using 4/3 lever actuated spring return DC valve.	**08**

UNIT - IV

5	a)	Draw the schematic showing production of compressed air.	**04**
	b)	How are compressors of pneumatic system classified? Explain with a neat sketch construction and working of piston type compressor.	**08**
	c)	With a neat sketch explain the construction and working of air lubricator used for treating air in pneumatic system.	**08**

UNIT - V

6	a)	With a neat sketch explain the construction and working of 4 way spool valve and pilot operated poppet valve used in pneumatic system.	**10**
	b)	With a neat circuit diagram explain the construction and working of direct and indirect actuation of a cylinder.	**10**

OR

7	a)	Why filters are used in fluid power systems? Classify and briefly explain different types of filters.	**10**
	b)	List the desirable properties of hydraulic oil and explain any four of them. Also name any four hydraulic fluids which satisfies the above properties.	**10**

****