TECHNO

USN

## Fifth Semester B.E. Degree Examination, Aug./Sept.2020 Hydraulics and Pneumatics

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO questions from each part.

## PART - A

1	9	List six basic components required in a	hydraulic	fluid pow	ver system and st	ate their essential
	a.			*		(06 Marks)
		functions.	1			1 11:-

b. With a neat sketch, explain the working principle of Balanced fixed displacement hydraulic vane pump. (08 Marks)

c. A gear pump has a 82.6mm outside diameter, 57.2mm inside diameter and 25.4mm width. If the actual pump flow rate at 1800 rpm and rated pressure is 0.00183m³/s. What is the volumetric efficiency? (06 Marks)

2 a. With a neat sketch, explain the working of a gear pump. (06 Marks)

b. An 8cm diameter hydraulic cylinder has a 4cm diameter rod. If cylinder receives flow at 100LPM, find the extension and retraction speeds. (04 Marks)

c. Derive an expression for torque capacity of limited rotation hydraulic motor containing a single rotating vane. (05 Marks)

d. A hydraulic motor has a displacement of  $164 \text{cm}^3$  and speed of 2000 rpm. If the actual flow rate consumed by the motor is  $0.006 \text{m}^3/\text{sec}$  and actual torque delivered by the motor is 170 N-m, find : i)  $\eta_v$  ii)  $\eta_m$ .

3 a. With the aid of neat sketches, explain briefly the following:

i) In – line check valve ii) Sequence valve. (12 Marks)

b. Sketch and explain pressure compensated flow control valve. (08 Marks)

4 a. With neat hydraulic circuit diagram, explain the working of double pump hydraulic system and list any 2 application. (10 Marks)

b. What is Accumulator? List its types and explain application of accumulator with any hydraulic circuit. (10 Marks)

## PART - B

5 a. What are the most common causes for hydraulic system break down? Explain briefly.

(07 Marks)

b. Explain the desirable properties of an ideal hydraulic oil. (08 Marks)

- c. Discuss the wear of moving parts due to solid particle contamination in hydraulic system.
  (05 Marks)
- 6 a. Explain briefly with neat figure End position cushioning of pneumatic actuator. (10 Marks)

b. Discuss briefly the types of seals and mounting arrangements of pneumatic actuators.

(10 Marks

- 7 a. Explain the construction and working of a quick exhaust valve, with a neat sketch. (08 Marks)
  - b. Explain with circuit sequence control of two double acting pneumatic cylinder using logic gates.

    (12 Marks)
- 8 a. Explain cascading method sequential circuit design in brief. (08 Marks)
  - b. What is an electrical relay? How does it work? Explain with sketch. (08 Marks)
  - c. Explain the different methods of distribution of compressed air. (04 Marks)

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