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Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019

## Hydraulic Circuits and Program Logic Controllers

Time: 3 hrs.

Max. Marks: 80

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

### Module-1

- 1 a. Define fluid power. Mention the advantages and applications of fluid power system. (06 Marks)  
b. Write a note on application of Pascal's law. (04 Marks)  
c. Explain in brief the static and dynamic seals used in hydraulic system. (06 Marks)

OR

- 2 a. Discuss the various properties desired in hydraulic fluid. (10 Marks)  
b. Explain the following in brief:  
i) Quick acting couplings  
ii) Sources of contamination (06 Marks)

### Module-2

- 3 a. Distinguish between the following:  
i) Fixed displacement and variable displacement pump  
ii) Cavitation and aeration (04 Marks)  
b. Explain radial piston pump with a neat sketch. (08 Marks)  
c. Explain cushioning of cylinder with a neat sketch. (04 Marks)

OR

- 4 a. Write a note on application of accumulators in hydraulic systems. (04 Marks)  
b. Discuss the various types of cylinder mounting configurations in hydraulic systems. (08 Marks)  
c. A hydraulic motor has a displacement of  $150 \text{ cm}^3$  and operates with a pressure of 120 bar and a speed of 2500 rpm. The actual flow rate consumed by the motor is  $0.00781 \text{ m}^3/\text{s}$  and the actual torque delivered by the motor is 250 N-m. Find volumetric efficiency, mechanical efficiency, overall efficiency and power delivered by the motor. (04 Marks)

### Module-3

- 5 a. Explain rotary type directional control valve with a neat sketch. (06 Marks)  
b. What is a sequence valve? Explain the construction and working of a sequence valve with a neat sketch. Give the symbolic representation. (10 Marks)

OR

- 6 a. Explain how synchronization of cylinders is achieved using flow control valves and accumulators with a neat hydraulic circuit. (08 Marks)  
b. Explain the following in brief:  
i) Regenerative circuit  
ii) Force multiplication circuit (08 Marks)

**Module-4**

- 7 a. Explain the pneumatic control system with a neat block diagram. Also mention the advantages and limitations. (08 Marks)
- b. Explain the following: (08 Marks)
- i) Air compressor
  - ii) FRL unit

**OR**

- 8 a. Explain the quick exhaust valve and time delay valve with neat sketches. (08 Marks)
- b. Explain the following pneumatic actuators with neat sketches: (08 Marks)
- i) Double acting diaphragm cylinder
  - ii) Rodless cylinders

**Module-5**

- 9 a. Define Programmable Logic Controller (PLC). Discuss the basic components of PLC with the help of a schematic diagram. (10 Marks)
- b. Mention the functions and advantages of PLC. (06 Marks)

**OR**

- 10 a. Explain the following with reference to PLC: (10 Marks)
- i) Logic ladder diagram
  - ii) Programming Timers
- b. Write a note on advanced PLC's. (06 Marks)

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