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Question Paper Code: 31576

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2016

Fifth Semester

Mechanical Engineering

01UME506 – APPLIED HYDRAULICS AND PNEUMATICS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Differentiate oil hydraulics and pneumatics.
2. List five fields of applications of fluid power.
3. What is a positive displacement pump and how does it differ from a centrifugal pump?
4. Why is the operation of a screw pump quiet?
5. What are the advantages of compound relief valve over direct acting relief valve?
6. How does a pilot operated check valve differ from a simple check valve?
7. Write the difference between a strainer and filter?
8. Name the three types of positive displacement compressors that are commonly used in industry.
9. Compare PLC and a computer on the basis of fluid power applications.
10. What are the advantages of fluidic elements?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Discuss the factors to be considered in the selection of hydraulic fluids. (8)
(ii) Explain the factors which affect the selection of pumps. (8)

Or

- (b) (i) How is Reynolds number determined? (4)
(ii) Draw fluid power symbols of any six different types of valves. (12)
12. (a) (i) What is a positive displacement pump and how does it differ from a centrifugal pump? Draw the pressure-flow diagram of centrifugal and positive displacement pump. (12)
(ii) Draw the graphic symbols for the following pump type.
(1) Fixed displacement
(2) Variable displacement
(3) Pressure compensated
(4) Bidirectional. (4)

Or

- (b) A double acting cylinder is hooked up to reciprocate. The relief valve setting is 70 bars. The piston area is 0.016 m^2 and the rod area is 0.0045 m^2 . If the pump flow is $0.0013 \text{ m}^3/\text{s}$, find the cylinder speed and load-carrying capacity for the
(i) Extending stroke (ii) Retracting stroke. (16)
13. (a) (i) What is the purpose of seals in hydraulic system and how are they classified? Differentiate between positive seals and non-positive seals. (8)
(ii) Briefly explain the three important things that are controlled in a hydraulic system? (8)

Or

- (b) (i) Draw and explain the symbols for a pressure relief valve and pressure reducing valve. (8)

(ii) Classify the ways of applying flow control valves? Differentiate meter-in and meter-out controls. (8)

14. (a) (i) Briefly discuss about synchronization of cylinder motion. Name the various methods to achieve it. (10)

(ii) A double acting cylinder is provided in a regenerative circuit. The pump flow is 75 l/min. The piston area and rod area are $6 \times 10^{-3} \text{ m}^2$ and $1.5 \times 10^{-3} \text{ m}^2$. Find the cylinder speed for extending stroke. If the system pressure is 86 bar, what is the load carrying capacity of the system. (6)

Or

(b) (i) Classify the pneumatic cylinders based on principle and also draw the figures pneumatic cylinder. (12)

(ii) Mention few advantages of air motor over electric motor. (4)

15. (a) (i) What are the various approaches for entering the program in PLC? Explain why interfacing is necessary in a microprocessor control of fluid power? (10)

(ii) Define Low-Cost automation and what are its features? (6)

Or

(b) Brief about the operations of different fluidic devices. (16)
