



B.E DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

MECHATRONICS ENGINEERING

MCT114 : Applied Hydraulics and Pneumatics

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Heavy lifting work is often accomplished by shifting fluids in big machines. The power system of such machines can be described as
 - a) Reciprocating
 - b) Pneumatic.
 - c) Hydraulic.
 - d) Hybrid.
2. The scientific principle that makes hydraulic systems possible is
 - a) Pascal's principle.
 - b) Boyle's law.
 - c) Bernoulli's principle.
 - d) Fluid flow principle
3. When the piston area of the cylinder is connected to the atmosphere, the piston of the single-acting cylinder is pressed by the spring to the _____.
 - a) Cylinder center.
 - b) Cylinder down.
 - c) Cylinder bottom.
 - d) Cylinder upper.
4. A _____ is a solid cylinder or disk that fits snugly into a larger cylinder and moves under fluid pressure.
 - a) Screw
 - b) Compressor
 - c) Piston.
 - d) Rod
5. 4/3 way single solenoid valve has
 - a) 3 ports 3 positions.
 - b) 4 ports 3 positions.
 - c) 4 ports 4 positions.
 - d) 3 ports 4 positions.
6. A one-way valve that lets air into the reservoir of a compressor, but doesn't let it out, is a
 - a) Check valve.
 - b) Receiver valve
 - c) Control valve.
 - d) Three way valve.

7. Pneumatic and other power systems can support three kinds of motion; they are
 - a) Linear, reciprocating, and random motion.
 - b) linear, flowing, and rotary motion
 - c) Linear, zigzag, and spiral motion.
 - d) Linear, reciprocating, and rotary motion.
8. A one-way valve that lets air into the reservoir of a compressor, but doesn't let it out, is a
 - a) Check valve.
 - b) Receiver valve.
 - c) Control valve.
 - d) Three way valve.
9. PLCs are programmed using what language?
 - a) Natural language such as English.
 - b) C language.
 - c) Relay-ladder logic.
 - d) Fortran
10. In an old car without power steering, the driver steers heavily to turn wheels and axles, but in a modern car, steering fluid does most of the work. Power steering is an example of
 - a) Pneumatic power at work.
 - b) Hydraulic power at work.
 - c) Electrical power at work.
 - d) Mechanical power at work.

PART B (10 x 2 = 20 Marks)

11. Define fluid power.
12. List out any four desirable properties of hydraulic fluids.
13. How pumps are classified?
14. Draw the symbol of single acting and double acting telescopic cylinders.
15. What is an accumulator?
16. How do you control the actuation of directional control valve electrically?
17. What is meant by “meter in” circuit? List out their limitations.
18. What is the need of lubricator unit in the pneumatic system?
19. Name the basic electrical and electro pneumatic devices commonly used in the control of fluid power systems
20. What are the various programming methods of PLC?

PART C (5 x 14 = 70 Marks)

21. a) (i) Discuss the important properties of fluid power in detail. (8)
- (ii) Summarize the application of fluid power system. (6)
- (OR)**
- b) (i) Compare a hydraulic and a pneumatic system. (8)
- (ii) Outline the advantages of fluid power system. (6)

22. a) Explain the construction and working of external and internal gear pump with a neat sketch.

(OR)

- b) Compare the operation and constructional features of telescopic and tandem cylinders.

23. a) (i) What are the different pressure control valves used in hydraulic systems? (7)
(ii) Differentiate between simple pressure relief valve and compound pressure relief valve. (7)

(OR)

- b) (i) Define Accumulator. (3)
(ii) Explain the different types of Accumulators used in hydraulic system. (11)

24. a) With a neat sketch explain the construction and working of
(i) Air Filter (7)
(ii) Lubricator (7)

(OR)

- b) Develop an electro pneumatic circuit by cascade method for the following sequence: $A^+ B^+ B^- A^-$, Where A and B stands for cylinders + indicates extension and – indicates retraction.

25. a) Draw and Explain the construction and working of the hydro mechanical servo system with an example.

(OR)

- b) Double acting cylinder is used to perform machining operation. Pneumatic cylinder is advanced by pressing two push buttons simultaneously. If any one of the push button is released, cylinder comes back to start position. Draw the pneumatic circuit, PLC wiring diagram and ladder diagram to implement this task.
