KUMARAGURU
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Register Number: ……..

B.E. DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Sixth Semester

AUTOMOBILE ENGINEERING

AUE123: Hydraulics and Pneumatics Systems

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. An element which converts the liquid energy into mechanical force or torque to do useful work is known as
   a) Pump b) Valve
   c) Actuator d) Prime mover
2. If the temperature of a gas increases, its viscosity
   a) increases b) decreases
   c) remains constant d) initially increases and then decreases
3. Which one of the following is not a basic component of a pneumatic system?
   a) Compressor b) Pump
   c) Valve d) Reservoir
4. The device which controls the noise caused by the rapidly exhausting air-stream flowing into the atmosphere is known as
   a) Filter b) Regulator
   c) Muffler d) Lubricator
5. Which one of the following is not a positive displacement pump?
   a) Centrifugal pump b) Gear pump
   c) Vane pump d) Piston pump
6. Rotary actuator is also called as
   a) hydraulic cylinder b) telescopic cylinder
   c) tandem cylinder d) hydraulic motor

7. An electromagnetic mechanical transducer that converts an electrical signal into a mechanical output force is called as

a) Solenoid b) Relay

c) Limit switch d) Push button switch

8. The basic form of programming commonly used with PLCs is

a) part programming b) logic programming

c) linear programming d) ladder programming

9. An element which prevents hydraulic pressure from exceeding an allowable value in order to protect circuit components from damage is called as

a) servo valve b) hydraulic fuse

c) unloading valve d) accumulator

10. A chart which is used to simplify the troubleshooting process is known as

a) bar chart b) line chart

c) tree-branching chart d) matrix chart

PART B (10 x 2 = 20 Marks)

11. Define the term fluid power.
12. What are the primary functions of a hydraulic fluid?
13. What conditions under which the pneumatic systems are preferred?
14. What are the commonly used methods in the designing of pneumatic logic circuits?
15. List out different types of hydraulic cylinder mountings.
16. What is power pack?
17. What is ladder diagram?
18. What are the advantages of cartridge valves?
19. List out any four automotive applications of hydraulic system.
20. Define the term troubleshooting.

PART C (5 x 14 = 70 Marks)

21. a) (i) Discuss the advantages and applications of fluid power. (7)

(ii) What are the required properties of a good hydraulic fluid? (7)

(OR)

b) (i) Distinguish hydraulic systems and pneumatic systems. (7)

(ii) Explain briefly various symbols used for directional control valves. (7)

22. a) Explain the constructional features of filter, regulator and lubricator with a neat sketch.

(OR)

b) Design a pneumatic circuit by using cascade method for the following sequence: $A^{+}B^{+}A^{-}B^{-}$, where + is extension and – is retraction.

23. a) (i) Explain the working principle of vane pump with neat sketch. (10)

(ii) What is hydraulic cylinder cushion? State its purpose. (4)

(OR)

b) (i) Discuss briefly about the selection criteria of a hydraulic cylinder. (7)

(ii) Explain the constructional details of flow control valve. (7)

24. a) (i) Explain the construction and operation of an electro hydraulic servo valve. (7)

(ii) Discuss the significance of proportional valves in brief. (7)

(OR)

b) Narrate the major components of PLC with block diagram.

25. a) What is hydraulic tipping mechanism? Explain three-way hydraulic tipping mechanism with a neat sketch.

(OR)

b) Construct the layout of air brake system used in trucks and explain its working principle.

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