

**B.E DEGREE EXAMINATIONS: APRIL/MAY 2014**

(Regulation 2009)

Sixth Semester

**AUTOMOBILE ENGINEERING**

AUE123: Hydraulic and Pneumatics Systems

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Example for Hydrostatic system is
  - a) Steam Turbine
  - b) Fluid Coupling
  - c) Hydraulic Jack
  - d) Water Pump
2. Two cylinders with pistons are interconnected and filled with oil. The small cylinder area is 50 cm<sup>2</sup> and the other cylinder area is 200 cm<sup>2</sup>. If 50 kg force is applied on the small cylinder, what is the lifting capacity of other cylinder?
  - a) 50 kg
  - b) 500 kg
  - c) 20 kg
  - d) 200 kg
3. In FRL unit, F,R and L stands for
  - a) Forward-Reverse-left
  - b) Forward-Reverse- Lift
  - c) Filter-Remover- lubricator
  - d) Filter-Regulator-Lubricator
4. In cascade method, the pneumatic valves are
  - a) Connected in Parallel
  - b) Connected in Series
  - c) Connected in Shunt
  - d) Not connected
5. Cushioning in hydraulic cylinder is
  - a) Reducing the speed of piston at the end of stroke
  - b) Increasing the speed at the end of stroke
  - c) Reducing the speed of piston at the beginning of stroke
  - d) Increasing the speed of piston at the beginning of stroke
6. In axial motor,
  - a) Impellers are used
  - b) Nozzles are used
  - c) Pistons are used
  - d) Vanes are used
7. The Latching in electropneumatic circuit of used to
  - a) Opening
  - b) Locking
  - c) increasing
  - d) Decreasing
8. PLC stands for
  - a) Programmable Linear Controller
  - b) Programmable Linear Circuit

- c) Programmable Logic Controller
  - d) Programmable Logic Circuit
9. The problem of oil foaming in reservoir is due to
    - a) Excess oil level
    - b) Low oil level
    - c) Aeration in delivery pipes
    - d) Aeration in suction pipes
  10. In track mounted excavators the drive system for track is
    - a) Hydrodynamic system
    - b) Hydrostatic system
    - c) Propeller shaft system
    - d) Electric Drive system

**PART B (10 x 2 = 20 Marks)**

11. Can we use a double acting cylinder as single acting? Justify your answer.
12. Compare a hydraulic motor with an electric motor
13. List different type of control valves used in hydraulic circuits.
14. What are the Basic Requirements of pneumatic system?
15. Differentiate the pressure relief valve and pressure reducing valves
16. What are the various materials used for pipes?
17. What is an intensifier and what are its uses?
18. Draw the AND & OR logic valves
19. Draw the symbol for time delay valve
20. What is a ladder diagram? Give an example

**PART C (5 x 14 = 70 Marks)**

21. a) Briefly explain with neat diagrams the working of different types of accumulators and their application in hydraulic circuits.

**(OR)**

- b) Explain with neat diagram the construction and working of a pneumatic Power Pack.

22. a) Explain with neat diagram the step by step procedure of cascade method of two cylinder operation with reference to a typical application

**(OR)**

- b) A trap door in a silo is to open and close at periodic intervals. The trap door is operated by a double acting cylinder. This cylinder extends fully and keeps the

door open for 5 seconds and then retracts. It stays in the retracted position for a period of another 5 seconds, before extending again. The operation is started by a push button switch with a detent. To stop the cycle of operation, the detent switch is to be pressed again. Draw the pneumatic circuit and the displacement diagram for the cylinder.

\*\*\*\*\*

23. a) A single acting pneumatic cylinder is to lift a load of 25 kg through a height of 200 mm. The return stroke is by weight of the load itself. The load once lifted to the full height of 300 mm commences the retard stroke after a time interval of 20 seconds. The return stroke is adjustable. Design the components and the circuit for an operating pressure of 5 bar.

**(OR)**

- b) Explain the construction and working of pumps & motors with neat diagrams.

24. a) Draw the ladder diagram and write the mnemonics for a double acting pneumatic cylinder which on pressing a switch, lifts a sheet and another cylinder stamps it. The cylinders return back and repeat the operation till a second switch is pressed.

**(OR)**

- b) A clamping and stamping machine has two double acting cylinders. On pressing a switch S1, the clamping cylinder extends and clamps the job. The stamping cylinder extends and presses the job. Once a preset pressure is reached, the stamping cylinder returns. Draw the circuit diagram and the electropneumatic circuit for the problem and explain their working.

25. a) Briefly discuss the periodic maintenance works to be carried out on pneumatic and hydraulic circuits.

**(OR)**

- b) Draw and indicate various hydraulic and pneumatic symbols and their meanings.