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**Question Paper Code: 52912**

M.E. DEGREE EXAMINATION, DECEMBER 2015

Elective

CAD / CAM

15PCD503 - DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

- Find the relation to calculate the volumetric displacement of vane pump
  - $V_D = (\pi/2)(D_C - D_R) e L$
  - $V_D = (\pi/4)(D_C + D_R)^2 e L$
  - $V_D = (\pi/2)(D_C + D_R) e L$
  - $V_D = (\pi/4)(D_C - D_R)^2 e L$
- Which one is not a two way valve?
  - Shuttle valve
  - Check valve
  - 2/2 valve
  - Pilot check valve
- An accumulator is basically \_\_\_\_\_ , in which hydraulic fluid is retained under pressure from an external source
  - Energy storage reservoir
  - Force storage reservoir
  - Pressure storage reservoir
  - Power storage reservoir
- What is the function of muffler?
  - To remove the moisture from air
  - To regulate the pressure of compressed air
  - To remove the foreign matters
  - To control the exhaust air noise



(ii) Discuss the working of an unloading valve with a neat sketch. (8)

13. (a) (i) A hydraulic cylinder is used for an industrial application. It has been decided to use an accumulator as a leakage compensator. Design a circuit to fulfill these requirements. (8)

(ii) Explain the hydraulic operation of Forklift equipment with a neat sketch. (8)

Or

(b) (i) Describe a hydraulic circuit for synchronizing two cylinders with flow control valve. (8)

(ii) Design a hydraulic sequence circuit for a milling machine with one cylinder for operating the power vice jaw and the other for controlling the cutter travel. (8)

14. (a) (i) Highlight the advantages of an air-over-oil circuit and explain it with a suitable application. (8)

(ii) Develop a continuous single cylinder reciprocation circuit for pneumatic system using limit switches and relays. (8)

Or

(b) Three pneumatic cylinders *A*, *B* and *C* are used in an automatic sequence of operation. Cylinder '*A*' extends, Cylinder '*B*' retracts, Cylinder '*C*' retracts and then Cylinder '*A*' retracts, Cylinder '*C*' extends and Cylinder '*B*' extends. Develop a pneumatic circuit by cascade method. (16)

15. (a) (i) Explain the principle of low cost automation. (6)

(ii) Explain the working principle of a PLC with a neat block diagram. What are the advantages of PLC? (10)

Or

(b) (i) How contamination of oil in hydraulic system takes place? How is it analyzed and reduced? (10)

(ii) What are the selection criteria for pneumatic components? (6)

