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M.E./M.Tech. Degree Examinations, January 2017

First Semester

COMPUTER AIDED DESIGN

CD16005 – DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS

(Regulation 2016)

QP Code: 128929

Time: Three hours

Maximum : 100 marks

Answer **ALL** questions

PART A - (10 X 2 = 20 Marks)

1. Name the three popular construction types of positive displacement pumps.
2. What is a cylinder cushion? What is its purpose?
3. Define a check valve. What does it accomplish?
4. What is a solenoid-Actuated Valve? How does it work?
5. What is difference between closed-circuit and open-circuit system?
6. What is a double-rod cylinder?
7. What are the design considerations to be taken in designing a pneumatic circuit?
8. How does a limit switch differ from a push-button switch?
9. State the main functions of I/O module of a PLC.
10. Why timers are used in electrical control circuits?

PART B - (5 X16 = 80 Marks)

11. (a) (i) With a neat diagram, describe the classification of pump. **(8)**
- (ii) State the parameters considered for selection of pumps. **(8)**

(OR)

- (b) (i) A gear pump has 75 mm outside diameter, 50 mm inside diameter and 25 mm width. If the actual pump flow at 1800 rpm is 106 lits/min, What is the volumetric efficiency? **(8)**
- (ii) For a hydraulic motor, define volumetric, mechanical and overall efficiency. **(8)**

12. (a) (i) Draw the neat sketch of a Pressure reducing valve and discuss its operation. (8)
- (ii) Discuss the working principle of the non-return valve with neat sketch. (8)
- (OR)**
- (b) (i) Explain the flow control methods by
- (i). Meter in circuit (8)
- (ii). Meter out circuit (8)
13. (a) Design the hydraulic circuit to achieve synchronization by:
- (i). connecting them in parallel (8)
- (ii). connecting them in series (8)
- (OR)**
- (b) Design and explain the hydraulic punching press circuit by using the pressure intensifier. (16)
14. (a) In an industry the following operation is required, first cylinder A extends and bring under stamping station where B is located, Cylinder B then extends and stamp the job, Cylinder A can return back only cylinder B has retracted fully. Design a suitable pneumatic circuit for the above task using Cascade method and also sketch displacement step diagram. (16)
- (OR)**
- (b) (i) Explain the procedure for step-counter method with example. (10)
- (ii) Explain the time delay valve circuit with neat sketch. (6)
15. (a) (i) Comparison of Hydraulic and pneumatic circuits. (8)
- (ii) Explain the Hydro pneumatic (Air-over-oil) circuit with neat sketch. (8)
- (OR)**
- (b) (i) Write short notes on low cost automation. (8)
- (ii) How to control a hydraulic cylinder using PLC, explain with ladder diagram. (8)