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Question Paper Code: 49211

M.E. DEGREE EXAMINATION, DECEMBER 2014.

First Semester

CAD / CAM

14PCD503 – DESIGN OF HYDRAULIC AND PNEUMATIC SYSTEMS

(Regulation 2014)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (5 x 1 = 5 Marks)

1. In a hydraulic power-generation systems, surge tanks are provided to prevent immediate damage to _____
(a) Draft tube (b) Turbine (c) Tail race (d) Penstocks
2. Pressure relief valves are used as a safety device to protect equipment from _____ occurrences in any fluid process.
(a) Medium pressure (b) Low pressure
(c) Over-pressure (d) Very low pressure
3. Which type of accumulator is used in variable pitch propellers?
(a) Compressed gas (or gas-charged) closed accumulator
(b) Compressed gas open accumulator
(c) Raised weight
(d) Towers
4. Air logic controls are basically miniaturized _____ air valves.
(a) 1- and 3-way (b) 2- and 4-way
(c) 1- and 4-way (d) 3- and 4-way

5. Programmable controllers are widely used in _____
- (a) Motion control, temperature control and torque control
 - (b) Velocity control, positioning control and torque control
 - (c) Motion control, positioning control and force control
 - (d) Motion control, positioning control and torque control

PART - B (5 x 3 = 15 Marks)

6. Give any six specifications required for the selection of an appropriate pump.
7. Draw the symbol for a 3-position, 4-way solenoid operated directional control valve.
8. How the hydraulic oscillator circuit works?
9. Why filters are used in pneumatic circuits?
10. What are the uses of touch sensor in robotic circuits?

PART - C (5 x 16 = 80 Marks)

11. (a) When to choose a positive displacement pump? Explain with some of key application criteria. (16)

Or

- (b) Discuss in detail about the fluid power actuators with their advantages and disadvantages. (16)

12. (a) What are the functions of flow control valve? Explain with suitable diagrams. (16)

Or

- (b) (i) What are the types of actuation system? (4)
- (ii) Explain the hydraulic power system used in a hydraulic actuation system with neat sketch (12)

13. (a) Write short notes on the following:

- (i) Synchronizing circuits (8)
- (ii) Accumulator circuits (8)

Or

(b) (i) How is the cylinder movement controlled in a hydraulic system? (4)

(ii) Describe with a neat sketch the working principle of a hydraulic grinding machine. (12)

14. (a) Give brief notes on:

(i) Logic circuits (8)

(ii) Switching circuits (8)

Or

(b) What are the classifications of a sequential logic circuit? Explain in detail. (16)

15. (a) What are the differences between the open hydropneumatic actuator system and closed-circuit hydropneumatic actuator system? Discuss briefly. (16)

Or

(b) Write short note on the microprocessor-based power sequencing and management. (16)