movement for cylinder piston is as proposed below—

A+ Delay B- A- B+

Further, 3/2 single solenoid spring return valve for cylinder A and 5/2 double solenoid valve for cylinder B is selected to act as a final directional control valve.

Design electropneumatic circuit for the proposed sequence.

(B) Write a note on i) ON/OFF controller, ii) servomotor   10

Q.6 (A) Draw the root-locus of the control system whose open-loop transfer function is given by   10

$$G(S)H(S) = \frac{K}{S(S+2)(S+5)}$$

(B) Explain the factors to be considered for selecting a PLC for process control application.   05

(C) What are the main advantages of a PID controller   05

Q.7 (A) Sketch Bode plot and assess the stability for the control system having open loop transfer function

$$G(S)H(S) = \frac{120}{(S+2)(S+10)}$$ 10

(B) The open loop transfer function of unity feedback system is

$$G(s) = \frac{K}{s(Ts+1)}$$ 10

By what factor the gain 'K' should be multiplied so that damping ratio is increased from 0.3 to 0.8. By what factor time constant 'T' should be multiplied so that damping ratio is reduced from 0.6 to 0.4.

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