

Total number of printed pages-3

53 (IE 702) INSC

2021
(Held in 2022)

**INSTRUMENTATION SYSTEM
COMPONENTS**

Paper : IE-702

Full Marks : 100

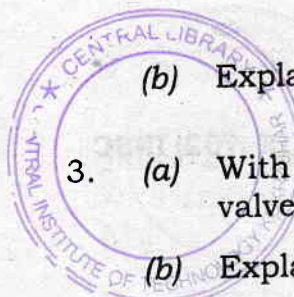
Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

Answer any five questions.

1. (a) With a neat diagram, explain error detector using synchros. 14
- (b) Explain 1-phase ON and 2-phase ON operations of variable reluctance stepper motor. 6
2. (a) Explain the construction and modes of working of a 2-phase permanent magnet stepper motor. 15

Contd.



- (b) Explain hydraulic system. 5
- 3. (a) With a neat diagram, explain 2-stage valve using 4-way spool valves. 10
- (b) Explain the following : 10
 - (i) Flapper valve
 - (ii) Check valve.
- 4. (a) Design a controller having parameters $G_P = 8$ and $G_D = 2$. Assume all capacitance as $1 \mu F$. 10
- (b) Design a controller having parameters $G_P = 2$ and $G_I = 0.4$; with minimum number of components. Assume all capacitance as $1 \mu F$. 10
- 5. (a) Design a controller to get the output;
 $V_o = 4V_i + 5 (dV_i / dt) + 0.8 \int V_i dt + V_o(0)$.
Assume all capacitance as $1 \mu F$. 14
- (b) Draw a pneumatic PID controller. 6
- 6. (a) Explain the construction and working of a pneumatic PD controller. Derive its transfer function. 15

- (b) Draw a pneumatic PI controller. 5
7. (a) Explain the construction and working of a pneumatic P controller. Derive its transfer function. 15
- (b) Explain pneumatic system. 5

