TE / Mechatronics / sem VI / CBSGS / 13.12.18.

Q.P. Code : 25202

[Time: Three Hours] **[Marks:80]**

Please check whether you have got the right question paper.

N.B:
1. Question.No.1 is compulsory.
2. Attempt any **three** questions out of the remaining **five** questions.
3. Figures to the **right** indicate **full marks**.
4. Assume suitable data wherever required but justify the same.

1. Solve any 4 of the following 20
   (a) Draw the process control block diagram and briefly explain the various elements of process control loop.
   (b) Explain two and four wire transmitters with neat diagram.
   (c) What are fluid control valves? What are its types?
   (d) Explain the effect of process characteristics on PID combination.
   (e) Write short note on Timers in PLC.

2. (a) Explain how basic strategy of control is employed in room air conditioning system. What is the controlled variable in that system? What is the manipulated variable in that system? Is the system self regulating? 7
   (b) Explain two and four wire transmitters with neat diagram. 7
   (c) Write short note on Gate valves. 6

3. (a) What is difference between direct action and reverse action? 7
   (b) Compare conventional and smart transmitters. 7
   (c) Write short note on volume booster. 6

4. (a) Explain construction and working of spring diaphragm type pneumatic actuator. 7
   (b) Explain in brief the concept of bump less transfers in PID controller. 6
   (c) What are various stability criteria tuning methods? 7

5. (a) Explain multi-position discontinuous controller with examples. 8
   (b) Explain quarter amplitude decay ratio with graph. 6
   (c) Explain working of on-delay and off-delay timers in PLC. 6

6. (a) Explain Ziegler Nichols method of PID tuning. 6
   (b) In a process a double acting cylinder is used for continuous to and fro motion. Cylinder has to move forward when button PB1 is pressed and once to and fro reciprocation starts it should continue till stop button PB2 is pressed. Limit switches are used for end position sensing. Draw the pneumatic circuit, PLC wiring diagram and ladder diagram to implement this task. 14
