



Duration: 03 Hours.

Total marks: 80

N. B. (1) Question No. 1 is **compulsory**.

(2) Answer any **Three** out of remaining questions.

(3) Assumptions made should be **clearly** stated.

Q. 1 Explain any **Four** 20

- a) Valve Sizing
- b) Piping Geometry Factor
- c) Expansion Factor
- d) Control Panel Ventilation
- e) ATC and ATO type of actuators

Q.2 a) Size the control valve for following data 10

Fluid = water, $P_1 = 42.6$ psia, $P_2 = 34.7$ psia,
 $q = 1600$ gpm $C_d = 17$ $D = 8$ " schedule 40

b) What is choked flow? Explain Flashing and Cavitation with reference to fluid pressure and velocity profile diagram 10

Q.3 a) Explain sources of valve noise. 10

b) Explain RTD Installation and its Calibration. 10

Q. 4 a) A 30" butterfly valve is to be operated under following conditions

Fluid = water, flow rate = 25000gpm, $P_1 = 65$ psia, $P_2 = 49$ psia
 $P_v = 0.6$ psia, Inside diameter = 29.25" What is the extent of cavitation? 10

b) Explain IP classification 10

Q.5 a) Explain Selection and sizing considerations for Actuator 10

b) Explain working of relief valve and rupture disc 10

Q.6 Write a note on (ANY TWO) 20

- a) Bath Tub Curve with reference to Reliability
- b) System Engineering
- c) Control room layout and its environment