

INSTRUMENTATION &  
SYSTEM DESIGN

Q.P. Code : 635400

MAY 16

Duration: 03 Hours.

Total marks assigned: 100

## Instructions to the candidates

- (1) Question No. 1 is compulsory.
- (2) Answer any four out of remaining six questions.
- (3) Assumptions made should be clearly stated.

Q. No.	Marks
Q. 1 Explain	20
a) Static characteristics of an instrument? b) Air service unit c) Piping geometry factor and pressure recovery factor d) IP standards	
Q.2 a) Size the control valve for following data	10
Fluid = water flowing at a rate of 2800 gpm Temp = 15°C, Pipe diameter = 12" P <sub>1</sub> = 72.2 psia, P <sub>2</sub> = 64.1 psia, C <sub>d</sub> = 17 Valve used is 60° butterfly valve	
b) Explain Cavitation and Flashing phenomenon in detail	10
Q.3 a) Size the control valve for following data	10
Fluid = Air and water, Pipe diameter = 10" scheduled 40 P <sub>1</sub> = 50 psia, P <sub>2</sub> = 40 psia, C <sub>d</sub> = 20, Temp = 520°R, W <sub>g</sub> = 3000 lb/hr W <sub>f</sub> = 150000 lb/hr F <sub>K</sub> = 1 X <sub>T</sub> = 0.38 psia, G = 1 Valve used = 60° butterfly valve	
b) Explain Expansion factor, choked flow and compressibility factor	10
Q. 4 a) Explain sources of valve noise in detail	10
b) Explain the path treatment of valve noise reduction	10
Q.5 a) Explain Control panel wiring diagram and color coding	10
b) Explain earthing and grounding scheme for Control panel	10
Q. 6 a) Explain ergonomics with reference to electronic product design	10
b) Explain enclosure design guidelines	10
Q. 7 write a note on (Any Two)	20
a) Reliability concepts b) Control room illumination and ventilation c) GA diagram	